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ISBN 0-315-53273-4

Symptom Reporting in Healthy Adolescents
and their Mothers

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Thesis submitted to the School of Graduate Studies of the University of
Ottawa as partial fulfillment of the requirements for the degree of
Doctor of Philosophy.

Ottawa, Canada

1989

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Acknowledgements

As with any major undertaking, this dissertation is the product of commitment, satisfaction, and renewed acquaintances--all of which have been intermingled with anxiety, frustration, sleepless nights, and missed appointments. These feelings have now been transformed into the pride that accompanies the knowledge that I am the first member of my family to have earned a doctorate. Many individuals have played a vital role in this transformation. It is their unique contributions that I wish to gratefully acknowledge.

I would not have entered university had it not been for the encouragement of my husband, Bob. Throughout the impoverishment of student life in New York, Toronto, and Ottawa, I have basked in the richness of his stalwart support, constructive criticism, and unfailing friendship. I am grateful to him for having shown me the beauty of so many new horizons--and for journeying toward them with me.

Many thanks are offered to my supervisor, Patrick McGrath, whose example reinforced my belief that long hours, dedication, and success are inseparable concepts. He taught me that the scientist-practitioner model is the only viable choice for me. He also showed me that earning academic credentials is only one small part of a successful graduate career. For this I thank him--and I "forgive" him.

Much gratitude is extended to Phil Firestone and Nick Spanos, for their support, flexibility, and expert feedback during the progress of this dissertation. They were both available whenever their assistance was needed--even during their respective sabbatical years.

I am indebted to five dedicated research assistants--Serena D'Costa, Kathryn Oakley-McKeen, Mary-Catherine Dean, Linda MacKinnon, and Nancy Peixoto who spent many weekends running subjects, and coding data. Much appreciation is offered to the 158 mothers, sons, and daughters who participated in this research. They truly were volunteers--they received no payment, and no treatment, yet they willingly rearranged schedules to contribute several hours to a scientific study. A large number of these participants would not have been found if it had not been for the co-operation of individuals in Toronto, Sutton West, Wakefield, Cornwall, and Ottawa. Many thanks are offered to Peter and Jean DiSanto and their families, Marie Lauzier, Ellen Lanaus, Margo Lemelin, Julie Marleau, and Wendy Richardson for their creative subject recruitment. I am also indebted to a true friend, Paddy Bowen, who demonstrated her advocacy abilities by helping me to secure desperately needed computer equipment, and by volunteering the eyes and voices of several of her co-workers.

I am grateful to my family for their continual nourishment and support during my doctoral journey. I am particularly thankful for the financial assistance and moral support of my parents (Harold and Frances Wilson), my mother-in-law (Joan Nolan), my sister-in law (Linda Nolan), as well as for the clerical support of my sister (Susan Kennedy) and the computer assistance of my brother-in-law (Pat Nolan). Finally, the kindness and gustatory delights of the Migliore family in the Bronx, NY, continually ensured that Bob and I were not two lonely Canadian students--molte grazie e affetto. You truly made a difference.

Abstract

This research examined two facets of symptom reporting: (a) whether adolescents and their mothers showed similar patterns of trait and state symptom reporting; and (b) whether sensitizing subjects to one of two aspects of a fatigue-inducing task differentially affected task-related performance. Two experimental conditions were utilized. A symptom-sensitizing condition employed a tape recorded summary of potential positive and negative sensations and symptoms that mothers and their adolescents could experience during a fatigue-oriented arm-extension task; a slide-sensitizing condition encouraged subjects to pay close attention to the content of the slides presented throughout the arm-extension task. Results indicated that no correlation existed between the state or trait measures of symptom reporting among Mothers and Sons, or among Mothers and Daughters. Using baseline level of fatigue and a trait measure of symptom reporting as a covariate, MANCOVAs were conducted to compare symptom-sensitized and slide-sensitized mother-adolescent dyads on a number of measures previously found to be related to symptom reporting among adults. These included post-task (state) symptom reporting, fatigue ratings, and duration of participation in the fatigue-oriented task. Post-task differences were evidenced on symptom reporting, but not on fatigue ratings or duration of participation. A second purpose of this research was to examine the family aggregation of scores on variables previously found to be related to symptom reporting. No correlations existed between the Mother/Son or the Mother/Daughter scores on state anxiety, social desirability, or

three subscales of the MMPI (Hypochondriasis, Depression, Hysteria). In addition, no family aggregation was evident on four task-related behaviors: total on-task time, mean fatigue, highest fatigue level reached, or length of time taken to reach the highest fatigue level.

Three coping groups (Stoics, Reachers, and Enders) were identified based on subjects' decreasing persistence with the on-task requirements. MANCOVAs indicated that Stoics reported significantly more post-task symptoms than did the Reachers or Enders. No family aggregation was evident with regard to the way Mothers and their respective Sons and Daughters persevered with the arm-extension task. Implications of the findings are discussed in terms of future research into family aggregation.

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CHAPTER 1

Introduction and Review of Results from Relevant Adult Symptom Reporting Studies

Over the past decade many psychologists have become interested in health-related issues. Research conducted within behavioral medicine and health psychology has afforded much attention to the adult population. While less investigation has been conducted into childhood health concerns, a growing literature indicates an awareness of the importance of this domain.

Two realms of health-related issues have remained inadequately explored. These areas, family aggregation of symptoms, and adolescent health concerns, provide the general framework for this paper. Family aggregation is "the extent to which parents and their children are similar in terms of a specified characteristic" (Sweda, Sines, Lauer, & Clarke, 1986). While the belief in family aggregation of health-related behaviors is intuitively appealing, there is little empirical evidence to support its existence. The investigations that have examined the concept of family aggregation have suffered from serious methodological flaws. Well-controlled studies in support of family aggregation of symptom reporting could not be located.

Few investigations have examined the symptom reporting behavior of adolescents. This paper, therefore, will highlight the relevant symptom reporting research that has been conducted among children and adults. Bibace and Walsh (1980) suggested that the emergence of the concept of

illness is consistent with the Piagetian model of cognitive development (Piaget, 1930). According to this model, most adolescents are capable of formal operational thought. Consequently, their interpretation of physical symptoms should closely parallel that of an adult. Beales (1982) has noted that adolescents, as well as adults, are more likely to assess and respond to symptoms in terms of implications for attractiveness, social esteem, career choices, and childbearing potential. The work of Beales (1982) and Bibace and Walsh (1980) suggests that it is possible to infer that many of the findings from adult-oriented research can be generalized to adolescents. This paper will focus on the investigations that have been conducted with adults. The presentation of child-oriented studies will be limited to the area of the paper that deals specifically with family aggregation of symptom reporting.

This paper is divided into four chapters. Chapter 1 highlights the results of relevant investigations into adult symptom reporting. This section also includes: (a) an examination of research into family aggregation of diseases and behaviors--this section will include a limited amount of child research, (b) a brief summary of the findings of three recent surveys on adolescent health concerns, and (c) the rationale and hypotheses for the present study. Chapter 2 describes the methodology and measures that the current investigation utilized in examining two broad issues: (a) whether symptom reporting among adolescents resembles that of their mothers, and (b) whether symptom reporting among mother-adolescent dyads is affected by pre-task

instructions to focus on physical symptoms or task-related stimuli. Chapter 3 details the results of the data analyses pertaining to the current study. Finally, Chapter 4 offers a discussion of the findings and implications of this study, as well as suggestions for future research in the areas of symptom reporting, and family aggregation.

Relevant Results from Adult Symptom Reporting Studies

The perception of physical symptoms is a private and subjective experience that is frequently not accompanied by any objectively measurable or observable phenomenon e.g. the experience of chest pain that occurs in the absence of any identifiable cardiac damage or pathology. Investigations into symptom perception can explore three closely related processes: encoding, awareness, and reporting of internal states (Pennebaker, 1982). Encoding is the nonconscious processing of sensory information (Adam, 1980). For instance, while reading a text, an individual nonconsciously processes visual, olfactory, and proprioceptive information. The individual is not alert to this encoding process, but he or she can learn to bring nonconsciously encoded sensations into consciousness. If the individual becomes cognizant of the sensory information, another form of symptom processing--symptom awareness--is identified. For example, persons can be taught to become conscious of intestinal stimuli (Adam, 1980). Symptom awareness is understood as a conscious process in which persons are aware of internal functioning. This process is affected by the magnitude of the internal stimulation, the presence of environmental

stimuli, and an individual's propensity to focus internally. Symptom awareness is a function of two sub-processes: symptom perception and symptom detection. Symptom perception implies that a subject is making use of both internal physiological and external environmental cues in evaluating a visceral state. Symptom detection, on the other hand, relies solely on the evaluation of physiological cues (Pennebaker & Hoover, 1984).

Finally, after an individual has become aware of an internal state, a decision is made regarding the reporting of these symptoms. Symptom reporting implicates variables such as potential reinforcement or punishment that an individual can derive for overreporting or underreporting internal states. Positive reinforcement can occur if, for example, reporting symptoms of headache, nausea, and fatigue results in a desired increase in attention from others in the environment. Negative reinforcement can occur if symptom reporting offers an individual the opportunity to avoid unwanted responsibilities. Punishment can result from underreporting if failure to attend to, or to report symptoms, results in physical harm. An example of punishment for underreporting is the coma that is associated with the final stages of insulin shock. If the diabetic patient fails to ingest sugar as a response to the early warning signs of insulin shock (tremors, sweating, hunger), then a coma will ensue (Pennebaker, 1982).

Frequency of Symptom Reporting

When subjects are asked to report the number of symptoms they have experienced over a specified time, usually one week, an average of 17 symptoms are reported (Pennebaker, 1984). Females typically report slightly more symptoms than do males. No sex differences emerge, however, when symptom reporting is based on current experience (Pennebaker, 1982). Pennebaker (1982) noted that across samples, 79.6 percent of subjects report currently experiencing at least some degree of at least one symptom. The lack of sex differences pertaining to current symptoms enables comparisons to be made across gender. The frequency of physical symptoms has been established through the integration of two types of investigative approaches: the nomothetic and the idiographic. The following section briefly describes each of these.

Methods of Studying Physical Symptoms

The Nomothetic vs. the Idiographic Approach

The perception of symptoms is based on generally held beliefs about physiological functioning, past experience with similar situations, and actual underlying physiology (Leventhal, Meyer, & Nerenz, 1980). To capitalize on these aspects, investigations must integrate a between-subject and a within-subject design.

The between-subject, or nomothetic method of research allows observation of the association between perceived and actual physiological functioning. Pennebaker (1982) notes that when assessing

this relationship across a variety of subjects and symptoms, his work has consistently yielded a correlation of $+0.30$. One problem with the nomothetic approach is that despite the stability of the correlation, no common clinical relationship exists between perceived and actual functioning. For example, subjective determination of increased heart rate is not uniformly based on the accurate perception of more frequent beats per minute. Rather, some subjects focus on the pounding quality of the heart while others use the presence of sweaty hands or shortness of breath to infer a quickened heart rate (Pennebaker, 1982). In addition, the wide variation of baseline measures of physiological functioning indicates that the nomothetic method is insufficient. For example, if subjects were asked to identify whether the current rate of 80 beats per minute was slower or faster than usual, subjects with a normally slow heart rate (60 beats per minute) would be correct in evaluating an exercise-induced increase. Those with a normally fast heart rate (85 beats per minute) would be incorrect in perceiving an increase (Pennebaker & Epstein, 1983).

To overcome these difficulties, researchers use the within-subject or idiographic approach that allows assessment of a subject's ability to perceive deviations from normal functioning. Although this method identifies when and why a person experiences visceral changes, it does not enable researchers to generalize findings. It is for these reasons that a between-group and a within-subject design must be used in investigating the relationship between perceived and actual physiologic functioning (Pennebaker & Epstein, 1983).

The Relationship between Symptom Perception
and Available Stimuli

Investigators in perception and cognition have identified three characteristics of human information processing that are relevant to the perception of physical symptoms. First, only a limited quantity of information can be encoded at one time. This quantitative limitation results in selective processing of both internal and external information (Navon & Gopher, 1979). To appropriately select what is to be processed, strategies or structures are adopted that enable persons to reduce large amounts of incoming data. These strategies, or schemata (Neisser, 1976) allow incoming data to be searched for information that is pertinent to the perceiver's current hypotheses. In this way, perception is active, selective, and hypothesis-guided (Pennebaker & Skelton, 1981).

A second characteristic of human information processing is that novel, complex, or moving stimuli are examined in greater detail than are redundant, simple, or stationary phenomena (Berlyne, 1960). Thus, in the presence of stable, internal, sensory information, persons are more likely to attend to changing environmental stimuli. Conversely, in the presence of stable environmental stimuli, persons are more likely to attend to changing internal sensory information.

The third relevant aspect of information processing is that in addition to being active seekers of information, perceivers can simultaneously be passive processors of other stimuli. The passive model of perception deals primarily with the initial orienting, or

noticing process through which one becomes aware of physical symptoms (Pennebaker, 1982).

Taken together, the three characteristics suggest that the continuous barrage of internal and external information is actively and passively processed. Stimuli are actively attended to based on the extent to which they are novel, complex, or moving. At the same time, perceivers are passively processing stimuli that are not currently in the foreground of their awareness. In this way, internal and external stimuli are continuously competing for attention.

Relationship between Symptoms and Internal/External Competition of Cues

Research has borne out the notion of internal/external competition of cues. For example, Pennebaker and Lightner (1980) compared the performance of joggers on a cross-country course and a lap track. Throughout the ten days of the study, 11 of the 13 subjects demonstrated faster running times on the cross-country course than on a lap course of the same distance. Post-test ratings indicated that the subjects found the cross-country course to be more interesting and less tedious than the lap track. They reported that on the cross-country course, it was necessary to continuously process environmental stimuli. Failure to do so was accompanied by the threat of tripping, falling or loss of direction. On the flat, even-surfaced lap track no such threats existed and better times should have been recorded. Because of the lack of novelty in the lap track setting, however, joggers were able to pay more attention to internal sensations. As they perceived their feelings of

fatigue, their pace was slowed. Post-jogging fatigue ratings and physical symptoms were identical regardless of location of exercise. This indicates that although the lap track was no more physically stressful than the cross-country track, lap track joggers responded to the most salient stimuli--that is, the internal sensations of fatigue.

Other research into the competition of internal vs. external information has revealed that symptom perception can be enhanced by instructing subjects to attend to internal sensations such as symptoms of hypertension (Barr, Pennebaker, & Watson, 1988), muscle soreness (Pennebaker, Skelton, Wogalter, & Rodgers, 1978) and pain (Kanfer & Goldfoot, 1966). Pennebaker and Lightner (1980) demonstrated differences in reports of fatigue and general symptoms when subjects were exposed to different internal/external stimuli. That is, during a treadmill exercise task, control subjects and those exposed to distracting street sounds, reported lower levels of fatigue and symptoms than did subjects who listened to their own breathing while exercising. In the study by Pennebaker and Lightner (1980), subjects were tested on two occasions. Interestingly, subjects reported fewer symptoms on the second testing than on the first. The authors explained this by noting that the novelty of internal sensations during the initial treadmill task encouraged subjects to turn their attention inward. As the task and its associated physiological changes became more familiar, less internal attention was required. Similar findings were reported by Fillingim and Fine (1986).

Relationship between Symptoms and Expectations

Investigations into symptom reporting typically involve self-reports of physical symptoms. Reliance on self-reports is necessary because, as noted above, symptoms are private, subjective experiences that may, or may not be, accompanied by any observable phenomena. Researchers must be aware that self-reports assess what an individual perceives is happening inside his or her body. This perception may not accurately reflect physiological functioning.

Pennebaker (1982) noted that although individuals occasionally perceive cold fingers, racing hearts, or nasal congestion, they also perceive more generalized conditions such as influenza, fatigue, or hunger. Pennebaker described these symptoms as reflecting a specific vs. a broader impression of bodily sensations. The broader state is typically perceived through a series of processes that involve specific internal as well as external cues. The processing involves formulating tentative hypotheses regarding the bodily state. These hypotheses are tested and verified by selectively focussing on particular aspects of the internal or external environment.

Empirical evidence has indicated that if individuals expect to feel certain states, they will focus on the internal and external cues that are consistent with these expectations. Burnam and Pennebaker (1977) administered one of two sets of instructions to 185 undergraduates. The first set was designed to make students more sensitive to symptoms of influenza. In this condition, students were reminded that it was the time of year that many cold- and flu-producing viruses were in the air.

The second condition omitted this statement. Students were also asked to rate the degree to which they were experiencing each of 12 cold- and flu-related symptoms. Results demonstrated that students who had received the virus-sensitizing statement reported more symptoms than those who had not been sensitized to the symptoms.

In another study of the relationship between perceived symptoms and expectations, Pennebaker and Skelton (1981) exposed subjects to charts describing influences of hypothetical drugs on the heart rate of a hypothetical person. Half received instructions stating that heart rate would increase following administration of the drug; half were told that heart rate would decrease. Subjects were then shown a standardized chart displaying heart beats that were supposedly recorded following injection of the drug. Two chart-related measures were taken: (a) whether subjects felt the standardized heart rate increased or decreased following the injection of the drug, and (b) the area of the heart beat chart that subjects used to make their decision regarding increase or decrease. Results indicated that subjects in the increase-expectancy condition actually reported an increase in heart rate; those who expected decreases, reported decreases. Further, in making their decisions, subjects used only portions of the chart that were consistent with anticipated rates.

In summary, the above research suggests that (a) internal and external stimuli compete for the attention of perceivers, (b) stimuli that are novel, complex, or moving will be noticed over redundant, simple, or stationary stimuli, (c) subjects can be instructed to focus

internally, (d) focussing attention inward typically results in increased reports of targeted symptoms, and (e) subjects' perceptions are affected by expectations.

Three distinct research perspectives have been used to study physical symptoms. The following section discusses each of these in detail.

Research Perspectives in the Study of Physical Symptoms

Investigations into symptom reporting among healthy adults stem from two general approaches: clinical biofeedback and perceptual cognitive processes. A third perspective, the medical perspective, has focussed primarily on symptom reporting among medical populations (Pennebaker, 1982). A discussion of the medical approach will be included because the findings of symptom reporting research among healthy individuals, has implications among clinical populations.

Clinical Biofeedback Perspective

The goal of the clinical biofeedback research has been to identify the relationship between actual and perceived body states while controlling all extraneous factors. When using this approach, researchers have typically relied on two techniques: tracking and signal detection. The typical tracking experiment requires subjects to press a button or to tap at a rate that is synchronous with a target symptom (Davidson, Horowitz, Schwartz, & Goodman, 1981). Signal detection experiments usually ask subjects to discern whether a flashing light or beeping sound is synchronous or dysynchronous with a targeted

symptom. For example, following exposure to a light or tone, subjects are asked to report whether or not the stimulus was consistent with their heart rate (Katkin, Blascovich, & Goldband, 1981). In this way, subjects learn to control the biofeedback device, rather than learning how to directly manipulate internal states or symptoms.

Cognitive Perceptual Perspective

The cognitive perceptual perspective has attempted to identify the relationship between actual and perceived states within the context of real or simulated environmental conditions. The techniques commonly used in the cognitive-perceptual perspective are tracking and self-reports. While the tracking procedure is methodologically identical to that employed by the clinical biofeedback approach, when used within this paradigm, measures of rates of tapping or button pressing are taken while subjects are engaged in other tasks (Gillis & Carver, 1980). The self-report technique also requires subjects to provide measurements while engaged in various tasks. In this method, tapping is replaced by descriptions (e.g. fast/slow heart rate; warm/cool temperature) of targeted visceral functioning (see, for example, Pennebaker, 1982). A modified version of this approach has been used effectively in teaching insulin-dependent diabetics to appropriately detect and respond to changes in blood glucose levels (Gonder-Frederick, Cox, Clarke, & Carter, 1987).

Within the cognitive-perceptual perspective, two main approaches have emerged: (a) cognitive labeling/attribution approach, and (b) information processing theory. Each will be discussed in detail.

Cognitive labeling/attribution approach.

Festinger (1954) posited this approach to describe how individuals seek to interpret ambiguous information by observing, and imitating, the behaviors of others who are in a similar situation. Schacter and Singer (1962) expanded Festinger's theory by demonstrating that individuals also attempt to label ambiguous emotions and feelings. Schacter and Singer noted that if a label is not readily available to explain a physiologically aroused state, an individual will begin to search for a label that will explain the arousal. Investigations conducted within this approach have consistently shown that there is little relationship between actual and perceived changes in state. That is, individuals will label a perceived change, even in the absence of altered physiological functioning. For example, Kotses, Rawson, Wigal, and Creer (1987) demonstrated that self-report measures do not necessarily accurately represent physiological functioning. In their study, 30 healthy female undergraduate students were exposed to one of two conditions. Subjects in the first condition (expectancy) expected to experience breathing difficulties as a result of inhaling a medication used to treat asthma; the second condition (neutral) described the inhalant as an inert substance that would not affect breathing. In fact, all subjects inhaled untreated air contained in an empty plastic bottle that was fastened to a complex inhalation device and air spectrum analyzer. Compared to the neutral group, physiological measures showed higher rates of post-inhalation breathing difficulties among subjects in the expectancy condition. Of note, however, is the fact that self-

reports of differences in breathing before and after inhalation of the substance did not differentiate subjects in the two treatment conditions. Studies such as this illustrate the lack of congruity between actual and perceived physiological changes.

Throughout the past two decades, the principles of cognitive labeling have been incorporated into attribution theory. According to this theory, individuals causally attribute perceived physiological arousal to a targeted person, event, or object. Although different names are applied to each of these approaches, they are almost indistinguishable in practice. They both make the same predictions about the role of internal sensations and the subsequent behaviors (Pennebaker, 1982).

The labeling/attribution approach, however, does not address the specific characteristics of a situation that will result in particular labels being applied to ambiguous feelings. Nor does it address any changes in the perception of the internal states once a label has been applied. Another approach within the cognitive-perceptual perspective, information processing, has tried to deal with these issues.

Information processing approach.

This approach represents an integration of computer sciences with cognitive and perceptual psychology. Of interest to theorists applying information processing is the way a stimulus is encoded and represented in perception. Leventhal (1982) has provided the most well-developed model. Specifically he posits that informational and emotional aspects

of the sensory experience are processed in a parallel manner. In addition to considering the roles of prior learning and development, Leventhal has incorporated five specific foci into his theory: receptor activity and neural transmission, preattentive and attentive mechanisms, cognitive organization of sensory information, conscious awareness, and memory. The major shortcoming of Leventhal's theory is that no specific predictions are made about perception or behavior. Of note is that the absence of predictions is characteristic of information processing theories (Pennebaker, 1982).

Not surprisingly, investigations conducted within the clinical biofeedback and cognitive perceptual perspectives have yielded different results (Pennebaker & Hoover, 1984). For example, Pennebaker and Epstein (1983) and Pennebaker, Gonder-Frederick, Stewart, Elfman, and Skelton (1982) found that when using the cognitive perceptual technique of self-report, accuracy of reporting one autonomic index did not predict accuracy on other indices. Conversely, in an experiment employing a signal detection technique common to the biofeedback approach, subjects who correctly identified heart beat were also successful in identifying gastric motility (Whitehead & Drescher, 1980).

Males consistently perform better than females on signal detection of heart rate (Katkin et al., 1981; Whitehead & Drescher, 1980). No such sex difference has appeared using (cognitive perceptual) tracking or self-reports (Pennebaker, 1982). No explanation has been offered regarding this lack of sex differences, or the lack of congruence between results among different methodologies.

Research using elements of the cognitive perceptual and clinical biofeedback approaches have demonstrated that subjects who are successful in utilizing one technique are not necessarily accurate in employing the other method. Using three techniques (clinical biofeedback tracking, signal detection, and self-report) Pennebaker and Hoover (1984) compared subjects on their ability to identify heart rate. The tracking technique required subjects to press a hand-held button at the rate they thought their heart was beating. The signal detection technique required subjects to orally report whether or not a flashing light matched their heart rate. Finally, the self-report method asked subjects to use a 100-point scale to estimate their heart rate. Results indicated that the methods were independent of one another with regard to accuracy. On two testings, one week apart, self-report proved to be the most accurate. Correlations between actual and self-reports of perceived heart rate were $r = .36$, $r = .40$ ($p < .01$) for weeks one and two, respectively. The correlations of scores for weeks one and two indicated that self-reports ($r = .62$, $p < .01$) were the most reliable. Self-report measures also indicated that when subjects were engaged in aversive tasks they reported faster heart rates than when engaged in non-aversive tasks. Correlations between tracking and actual heart rate produced the next most accurate scores [$r = .22$, $r = .20$; $p < .01$] for weeks one and two, respectively] but a lack of reliability ($r = .27$, ns) warns against its use. Signal detection yielded the least accurate ratings [$r = .21$, $r = .18$ $p < .01$] but did demonstrate greater reliability ($r = .54$, $p < .01$) than did tracking.

Pennebaker and Hoover (1984) stated that their results were consistent with those of previous researchers who employed each of the three techniques. They noted that the seemingly contradictory results of investigations into symptom perception arose from a confusion between the questions being posed by each method. That is, the clinical biofeedback method uses tracking and signal detection to determine whether or not persons can accurately detect autonomic functioning. The cognitive perceptual approach employs tracking and self-reports to identify factors that influence this ability. Pennebaker and Hoover suggested that clarification of this issue necessitates a distinction between symptom perception and symptom detection. Recall that symptom perception implies that a subject is making use of both internal physiological and external environmental cues in evaluating a visceral state, while symptom detection relies solely on the use of physiological cues (Pennebaker & Hoover, 1984).

The tracking technique and the signal detection technique are of limited real-world utility. With regard to tracking as employed in the clinical biofeedback approach, there would be few instances in which an individual would be required to tap out the rate at which physiological processes are occurring. Further, it is even more unlikely that an individual would be asked to perform this task at the same time as he or she is engaged in a second activity. This decreases the usefulness of the tracking technique as employed by the cognitive perceptual perspective. Similarly, the requirements of the signal detection technique bear little resemblance to those that exist in typical daily

functioning. Signal detection requires an individual to ignore environmental input and to focus solely on internal physiological cues. The self-report method, on the other hand, allows persons to utilize internal physiological and external environmental cues in estimating bodily states. While this enables a closer approximation of real-world behaviors, the inclusion of environmental cues reduces the accuracy of estimation (Pennebaker & Hoover, 1984).

The above research has addressed the notions of accuracy and reliability of symptom reporting. Various aspects of the accuracy of symptom reporting will be included in the section dealing with the medical perspective. At this point, only test-retest reliability will be considered.

Test-retest reliability is an important concept in the assessment of symptom reporting. Personality theorists have asserted that traits predispose an individual to respond consistently over time (Allport, 1961). Support for this view has been derived from moderate to high test-retest reliability on assessments of self-reported symptoms [e.g. Symptom Checklist-90 (SCL-90), Derogatis et al.; Pennebaker Inventory of Limbic Languidness (PILL), Pennebaker, 1982; hypochondriasis subscale of MMPI, Hathaway & McKinley, 1949). Engel (1986) and Bandura (1986) have argued that although personality traits may be consistent over time, they are inadequate as sole predictors of situation-specific behaviors (e.g. physical symptom reporting). Instead, social learning theory (Bandura, 1969; 1986) asserts that an individual's responses are determined by a continual interaction of the individual with

environmental influences (e.g. peer behavior, parental modeling, situational demand characteristics). If the environmental conditions are consistent from one situation to another, the individual's performance can be accurately predicted. Similar symptom reporting scores would be expected if an individual was repeatedly tested in a similar environment, such as a psychometrist's office, or the home setting. Based on the work of Bandura (1986) and Engel (1986), trait measures of symptom reporting would not be reliable predictors of scores on state measures of symptom reporting.

Medical Perspective

The medical perspective views symptoms as the representation of deeper physical or emotional problems (Pennebaker, 1982). Typically, it is the perception of symptoms that results in a patient contacting a physician. Once contact has been established with a physician, two additional sources of information supplement his or her understanding of the importance of the patient's presenting symptoms: (a) a physical examination is used to elicit the symptom pattern, and (b) a medical history probes the patient's memory about symptom onset, exacerbations, and offset. The presenting symptoms guide the medical practitioner's formation of hypotheses regarding the presence of possible disease processes, as well as the decisions regarding the ordering of investigative tests (Leventhal, 1986).

Three major problems are associated with self-reports of physical symptoms within medical settings. First, both the patient and the

medical community agree that symptoms are signs of disease. Frequently, however, the model of the disease process that patients have differs substantially from that held by physicians. Thus, while symptoms can legitimately be viewed as indicators of disease, physicians and patients do not always agree on what the symptoms are indicating (Kleinman, 1980; Tanner, Cockerham, & Spaeth, 1983). Further complicating this aspect are the types of actions that individual patients display in response to their perception of symptoms. Robinson and Granfield (1986) noted differences in response to physical symptoms among those who frequently attended physicians and those who rarely sought medical help. Compared to infrequent attenders, frequent attenders had more symptoms, and were less able to ignore them. From the perspective of the physician, however, the infrequent attenders were not (objectively) healthier than the frequent attenders. In a study of the irritable bowel syndrome (IBS), however, Welch, Hillman, and Pomare (1985) noted that those with IBS who attended physicians were not psychologically distinct from either those who had the syndrome and failed to attend physicians or those who did not have the syndrome.

The second problem that is encountered with the use of self-reports within the medical perspective pertains to the private nature of symptoms. Recall that this method relies on self-reports of the presence of symptoms. The stimuli that elicit these symptoms are not available to the medical practitioner. Consequently, no social verification of the presence or intensity of symptoms can occur. Practitioners must base their clinical judgments on the patient's

subjective descriptions. There is no way of knowing to what extent these descriptions are accurate or honest (Leventhal, 1986).

Conflicting evidence exists with regard to patients' abilities to accurately perceive their symptoms. Baumann and Leventhal (1985) demonstrated that there is no reliable association between systolic blood pressure and self-reported changes in blood pressure. On the other hand, Pennebaker and Watson (1988) found that subjects in a laboratory setting could detect changes in their systolic blood pressure with a moderate degree of accuracy. Similar conflicting results have been associated with investigations into the honesty with which persons report their symptoms. The findings from one study (Lehmann, Russell, & Spratt, 1983) suggested that patients with pending litigation and compensation tended to exaggerate their symptoms more than patients without such potential rewards. Reesor and Craig (1988), however, in their study of patients with chronic low back pain found no evidence that litigation played a role in maintaining medically incongruent pain.

The third problem encountered in the medical approach involves both the patients' presentation of diseases, and the different symptom clusters that can accompany a single disease process. With regard to the patients' presentation of diseases, wide variations exist in the way that individual patients present symptoms for the same disease. For instance, some persons who suffer a myocardial infarction have reported severe pain that is confined to a specific region of the chest; others have described shortness of breath; still others have collapsed (Appels, 1983; Gillum, Feinleib, Margolis, Fabsitz, & Brasch, 1976). In

addition, any one symptom can have a variety of physiological causes (Pennebaker, 1982). For instance, severe chest pain can result from coronary heart disease, pericarditis, endocarditis, or a pneumothorax (Roll & Theorell, 1987). Symptom manifestation is one of the variables that helps physicians diagnose and treat diseases. In prescribing appropriate treatment, medical practitioners must rely on their knowledge of the wide variation in manifestations of similar, but discrete, disease processes, the patient's description of the history of the presenting symptom, and the absence of other relevant symptoms.

In summary, the above has demonstrated that each of the three major perspectives has utility in different areas of symptom reporting. The tracking and signal detection techniques of the clinical biofeedback approach, as well as the tracking technique of the perceptual cognitive approach are most useful in well-controlled experimental conditions. Their utility as predictors of general symptom reporting behavior has not yet been established. The self-report technique employed by the perceptual cognitive and the medical perspectives yield the most consistent results. Self-reports are subject to environmental and inferential biases. This technique is the most useful method to use when assessing an individual's tendency to symptom report in a specific situation.

Relationship between Symptom Reporting and Other Factors

Emotion

The emotion-symptom specificity theory posits that unique constellations of perceived sensations are associated with each emotion that we experience. This theory has received some empirical support. For instance, in a study of 177 undergraduate students, Pennebaker (1982) demonstrated that each emotion was correlated with a separate cluster of symptoms. Pennebaker stated that these clusters were emotion-specific. It should be pointed out, though, that a number of sensations were repeated for different emotions. For example, sadness and guilt were both associated with headache, watering eyes, racing heart, tense muscles, and upset stomach. Both guilt and anger were associated with a flushed face. Pennebaker noted that one of the problems that is encountered when researching the relationship between sensations and emotions is that individuals do not experience pure emotions or single sensations. Rather, several emotions and sensations are typically experienced simultaneously. Pennebaker's own observation contradicts the tenets of the emotion-specificity theory that he has promoted.

Few studies have described the relationship between emotions and symptom reporting. The following discussion will highlight the findings from one investigation (Verbrugge, 1985) that examined the interaction of these two variables. It should be noted that a substantial amount of data was collected during this study. Information about daily moods, symptoms, malaise, and environmental events were rated on 10-point

scales. Unfortunately, the author compromised her data analyses by dichotomizing subjects' responses. Verbrugge limited the variability in responses and lost potentially valuable information. In this study, subjects completed a diary over a six-week period. Mood was based on daily responses to the question "How were your spirits today?". Ratings ranged from 1 (terrible) to 10 (wonderful). Data analyses dichotomized responses such that ratings of 1-5 were interpreted as bad mood; ratings of 6-10 were scored as good mood. Negative events were determined in response to the question "Did anything happen--for better or worse--to make today different than usual?". Using the responses given on a negative events scale (Dohrenwend, Krasnoff, Askenasy, & Dohrenwend, 1978) scores were divided into negative, positive, ambiguous, or no event days. Finally, subjects described their symptoms by responding in detail to the question "Did you have any symptoms or discomforts today?". For purposes of analyses their responses to this question were dichotomized into a yes and no format.

Of importance to research into the relationship between mood and symptom reporting was Verbrugge's hypothesis that the reported mood on one day would affect symptom reporting on the following day. Examination of both within-day zero order correlations and across-day cross tabulations indicated that mood was the predominant trigger for symptom reporting. That is, if a bad mood and a negative event both occurred on a given day, no increase in symptom reporting occurred on the following day. On the other hand, if on a given day a negative event and a good mood occurred, the following day was marked by

increased symptom reporting (Verbrugge, 1985). The occurrence of a negative event was of secondary importance. The main, or triggering factor, was the mood that existed when the negative event occurred. Verbrugge explained these findings by noting that a bad mood was a proximal trigger and a negative event was a distant trigger. The author did not define the meaning of the words proximal and distant. From the general description that was available, it seems appropriate to interpret these terms as personal and impersonal, respectively. Using this interpretation, the results of Verbrugge's study suggest that negative personal factors, such as negative mood, are more likely than impersonal factors, such as a negative event, to induce symptoms and facilitate reporting.

The across-day cross tabulation method that Verbrugge used suggests that there is a causal relationship between mood and symptom reporting. Nonetheless, her findings were based on correlational data, thus cautioning against accepting the notion that mood causes symptom reporting. Similarly, previous research that has established a positive relationship between negative affect and increased symptom reporting has been based solely on correlations (Pennebaker & Skelton, 1978). Thus, while psychosomatic theorists have long maintained that negative affect induces symptom perception (Graham et al, 1962; Katon, Egan, & Miller, 1985) questions remain regarding the causal relationship between mood and symptom reporting.

Personality Factors

Investigations conducted on medical populations have found positive correlations between symptom reporting and somatization disorder (Routh & Ernst, 1984), hypochondriasis (Wielgosz et al., 1984), hysteria, anxiety neurosis, and primary affective disorder--depressed type (Liss, Alpers, & Woodruff, 1973). One group of researchers have suggested that all patients presenting with symptoms of irritable bowel syndrome (IBS) should be screened for psychiatric illness, especially hysteria and depression (Young, Alpers, Norland, & Woodruff, 1976).

The MMPI (Hathaway & McKinley, 1967) is the most frequently used assessment tool in determining correlations between symptom reporting and psychopathology. Two facts regarding the scales of the MMPI are of particular clinical significance. First, the Hypochondriasis subscale consists of numerous items that assess physiologic functioning. This subscale can be viewed as a symptom checklist (Sternbach, 1978). It should be expected, therefore, that persons reporting a high number of symptoms will also obtain high scores on the Hypochondriasis subscale. Second, Fordyce (1979) noted that elevations on either the Hypochondriasis or Hysteria subscales

reflect the probability the person will emit somatic concern of 'physical sickness' or somatic distress or pain behaviors. The elevations have little in themselves to say about why those sickness behaviors are emitted. They may occur because of the patient's physical condition, or for other reasons. (p. 4)

While psychological maladjustment is typically invoked as the primary

other reason, the preceding summary of research has demonstrated that environmental factors are equally likely to be responsible for differing scores on these scales.

Researchers have cautioned against using personality variables to explain symptom reporting and health-care seeking behaviors. For instance, Drossman and Sandler (1985) re-analyzed data resulting from a previous survey of the prevalence of the irritable bowel syndrome (Sandler, Drossman, Nathan, & McKee, 1984). Three groups were identified from a sample of 566 students and hospital employees: those who had attended a physician because of bowel dysfunction; those who had bowel dysfunction but had not attended a physician; and those who were free from bowel dysfunction. Among the two bowel dysfunction groups, those who had attended a physician also reported higher levels of abdominal pain. No other physiological or demographic characteristic differentiated these two groups. The authors challenge researchers to explore the relationship between increased pain and health-care seeking. They suggested many possible explanations. For example, they posited that those who attended physicians may have had a more severe physiological pathology. Others, however, have found that in a general medical practice patients who rarely attended physicians were not healthier than those who frequently sought medical help (Robbins & Kirmayer, 1986; Robinson & Granfield, 1986). Drossman and Sandler also suggested there could be the presence of increased stress, or a psychopathology such as somatization disorder. To date, the interaction

of these factors with the perception of symptoms relating to bowel disease has not been well explored.

From research reported in the foregoing section it can be concluded that symptom perception among healthy adults is a private experience that can be influenced by experimental manipulation. Self-report is the most reliable technique of assessing symptom perception although this method is not necessarily related to physiological functioning. Finally, symptom perception has been shown to correlate with mood, somatization, neuroticism, hypochondriasis, and gender, yet the importance of many of these variables remains unclear.

Family Aggregation of Health-Related Behaviors

For many years psychologists and sociologists have been aware that societal norms impact on the behaviors of individuals within the society. Zborowski (1952) demonstrated that persons from a variety of ethnic backgrounds described pain differently. In particular, the patients he examined referred to the role that their mothers had played in the formation of attitudes toward illness and health.

Methodological problems associated with Zborowski's study temper the impact of his findings. Modern researchers, however, have continued to search for similarities in the behaviors of parents and their children. Many investigators have invoked social learning theory to explain how parental behaviors influence those of their children (Bandura, 1986). This theory posits that children imitate the behaviors that are modelled by their parents. Other researchers have demonstrated that hereditary

factors are involved in the transmission of abnormal behaviors such as schizophrenia (Baron, Gruen, Asnis, & Kane, 1983). Genetic factors are beyond the scope of this paper. Thus, the findings that will be cited are consistent with the notion that similarities in parent and child behaviors stem from the tenets of social learning theory. The following section will highlight the shortcomings of the research that has been conducted to date.

This section is based on the acceptance of the four main assumptions of a cognitive social psychological approach (Eiser, 1980). First, persons are viewed as active, rather than passive processors of information. Second, the interpretation of a stimulus is determined by two factors: (a) the attributes of the stimulus and (b) the perceiver's prior exposure to, and expectations about the stimulus. Third, in organizing stimuli, a perceiver subjects them to a process of selection and simplification. Finally, the action that an individual takes in dealing with a situation is a result of the active, organized meaning that has been applied to selected stimuli.

This section will present evidence that seems to have established a link between children's response to physical symptoms and the way in which parents have managed their own symptoms/illnesses. It is important to note that this apparent support has been derived from poorly conducted research investigations. There is a notable lack of well-controlled studies to support the belief that parents play a role in helping children apply meaning to the experience of physical symptoms.

Of particular concern in these studies is the fact that theoretical conclusions have been formulated on the basis of findings from studies that employed a retrospective design. One of the studies asked patients to remember behaviors that took place up to 30 years previously (Christensen & Mortensen, 1975). When a retrospective design is employed, there is typically no way to determine whether or not the passage of time has distorted the details that subjects have provided. It is impossible to determine the effects of these potential distortions. Furthermore, Weinberger, Schwartz, and Davidson (1979) have reported the need to include a measure of social defensiveness (e.g. social desirability; Crowne & Marlowe, 1960)) when assessing self-reported levels of somatic or affective functioning. This construct has not been measured in any of the family aggregation studies that will be reviewed. In addition to making the reader aware of these general problems, specific caveats will be provided as each study is presented.

Some of the family aggregation studies involved assessment of both parents and children. One frequently reported study examined 38 adults who had experienced recurrent abdominal pain (RAP) as children (Christensen & Mortensen, 1975). Of relevance to this paper was the finding that the offspring of persons in this category were no more likely to experience recurrent abdominal pain than were children of parents who did not experience the syndrome in childhood. In keeping with social learning theory, however, an increase in the incidence of recurrent abdominal pain was evidenced in the offspring of those adults who were currently experiencing abdominal pain. The findings of this

study are in keeping with the social learning model of parent-child aggregation of symptom reporting. It must be noted though that the children who were described as reporting abdominal symptoms were not clinically examined. Rather, they were included in the RAP category based on parent's questionnaire responses regarding the behaviors of their children.

Sweda et al. (1986) also conducted a study that measured fathers, mothers, and children. As part of a larger longitudinal study, 221 volunteer families were assessed. Of these, 115 families had sons and 106 had daughters. Sons (mean age 11.08 years) and daughters (mean age 10.89 years) were compared to mothers and fathers with regard to the presence of Type A behaviors. Comparisons were made on the basis of questionnaire scores--the teacher-rated MYTH scale (Matthews Youth Test for Health; Matthews & Angulo, 1980) and the Jenkins Activity Survey (JAS; Jenkins, Zyzanski, & Rosenman, 1971) for children and parents, respectively. Results indicated no relationship between the fathers' Type A scores and the presence of the behavior pattern in either sons or daughters. Maternal Type A scores, however, were significantly and positively related to presence of the pattern in both male and female children. Although the authors correctly reported statistically significant correlations, they grossly overstated the finding of maternal/child similarity. Only one out of the potential 12 pairs of mother/son correlations were significant. For the mother/daughter correlations, only two of the potential 12 pairs were significant. The

strongest of the three significant correlations ($r = .23$) accounted for only 5% of the variance. Thus, it should be concluded from this study that no similarity existed between fathers and sons, and that very little similarity existed between mothers and their sons and daughters.

Bortner, Rosenman and Friedman (1970), in an early study of the Type A (coronary-prone) behavior pattern, examined 120 sons of men who had been involved in the Western Collaborative Group Study (Rosenman et al., 1966). The scores of adolescent sons whose fathers had originally been described as Type As were compared with sons whose fathers had been described as Type Bs. Results indicated that sons of the Type A fathers had more Type A behaviors than did sons of Type B fathers ($t = 2.09$, $p < .05$). Two types of comparisons of the scores of fathers and sons were conducted. The first type compared Pattern A (or Pattern B) classifications of fathers to the classifications of sons. This form of comparison yielded a contingency coefficient (.31) that indicated a significant correlation between the scores of fathers and sons. On the other hand, if Pearson product moment correlations were performed on the fathers' and sons' Pattern A (or Pattern B) scores, a nonsignificant correlation (.16) occurred. Within the group of Pattern A sons, ratings were provided describing how similar sons felt their Pattern A/B behaviors were to their fathers'. No significant differences emerged between the sons who viewed themselves as very similar to their fathers and those who rated their behaviors as dissimilar. This last finding failed to support the notion that conscious parental modelling is a major influence in the development of Pattern A behaviors. The results

of this study demonstrated that, at best, there was a small degree of similarity between the Pattern A/B scores of fathers and sons. This study did not use a retrospective design. The major difficulty with this study is that there was a time-lag between the timing of the testings of the fathers and the sons. The fathers' Type A behavior pattern had been assessed several years earlier when they began taking part in the Western Collaborative Study. No new testing was conducted to confirm the continuation of Pattern A behaviors in those who were previously described as having that particular repertoire. Testing that is done simultaneously would enable the observations of a clearer relationship--or lack of one--between the behaviors of fathers and sons.

Bush, Melamed, Sheras, and Greenbaum (1986) examined the relationship between maternal behavior and the coping behavior of their young child (ages 4 to 10 years). The behaviors of 50 mother-child dyads were observed as they awaited the arrival of a physician who would conduct a painful medical procedure. A low correlation ($r = .32$, $p < .05$) emerged between observer-rated maternal agitation and child distress. These distressed children were unlikely to turn to their mothers for emotional support. Self-reported maternal state anxiety was unrelated to either maternal or child behaviors. A low correlation ($r = .39$, $p < .01$) was reported between observer-rated distress of the child and the mother's provision of information about the upcoming medical procedure. The authors noted that one of the shortcomings of their correlational study was that no causal relationship could be established. It was not possible to determine whether mothers who were

agitated caused their children's distress. The inverse relationship--distressed children caused their mothers to manifest agitated behaviors--was equally possible. Similarly, the study could not determine whether the distress in some children was caused by their mothers' provision of information about the procedure. It is possible that these mothers viewed information provision as a way to ease their children's usual distress response. The children and mothers were always observed together. In the absence of solitary observations or measures obtained in other situations, the causal relationship remains unknown.

Many of the family aggregation studies have asked adults to recall details of their parents' behaviors. For example, Whitehead, Winget, Fedoravicius, Wooley, and Blackwell (1982) examined the long-term effects of parental rewards for childhood illness behaviors. Adults with irritable bowel syndrome (IBS) and peptic ulcer disease (PUD) were asked if, during childhood, their parents gave them toys or special foods when they were sick. Compared to those who stated they were not rewarded, persons who admitted to receiving special toys or foods when ill were more likely, as adults, to display illness behaviors (e.g. attending a physician for colds, increased hospitalizations, increased frequency of acute illnesses). In addition to the retrospective nature of this study, further difficulties existed. The information used in this investigation was obtained through a telephone interview. No measure of accuracy of current or past behaviors was included to verify the information. Thus from the design of the study, it was impossible

for the researchers to determine if subjects were accurately recalling the parents' tendency to pair illness with toys or special foods. Actual parental behaviors may have been confounded with the children's desired parental behaviors. From a current point of view, no objective measure was included regarding the subjects' perception of their own tendency to display illness behaviors. The absence of this type of information raises the possibility that if the subjects manifested illness behaviors as adults, these behaviors may have been reinforced by something other than the parents' actions.

Turkat (1982) also asked subjects to recall parents' behaviors. Based on 27 adult diabetics' reports of parental work-avoidance behaviors, two groups were formed: the parent-avoidant model, and the parent non-avoidant model. Subjects completed questionnaires regarding their own current health service utilization, days absent from work, and quality of life ratings. Results showed that those who rated their parents as belonging to the avoidant group showed more current activity avoidance when ill than did those who rated their parents as non-avoiders. Three problems related to this research include: the retrospective nature of the investigation, the small sample size, and the lack of measures of accuracy of descriptions about the subjects' current activity avoidance behaviors. It is possible that if the subjects were demonstrating work avoidance behaviors, these may have resulted from something other than parental role modelling.

The past behaviors of mothers has been studied in relation to how daughters' manage current menstrual symptoms. Whitehead, Busch, Heller,

and Costa (1986) questioned nursing students on how their mothers reacted to their own menstrual symptoms as well as to those exhibited by the daughters during adolescence. The mothers were asked to independently complete a similar questionnaire. Correlations were conducted on the scores of mothers and daughters. A correlation coefficient of .52 ($p < .01$) was evidenced for the modeling of menstruation-related sick role behaviors (e. g. staying home from work, reducing participation in household duties, requesting additional assistance with household chores). Subjects whose mothers modeled the sick role, or who encouraged their adolescent to adopt such a role reported significantly more menstrual symptoms, clinic visits, and disability days than did the other group whose mothers coped more effectively. In the same study, the authors reported an identical pattern for behaviors related to the symptoms of colds. The retrospective nature of this study is of particular concern because of the topic that was being investigated. As the authors noted, there have been many attitudinal changes regarding menstruation in the past decade. The investigators stated that they avoided the problem of distorted recollection by including the responses of the mothers. It is likely, however, that mothers and daughters were subjected to similar media information and medical facts. The study may have made an unwarranted claim that the problem of distorted recollection had been dealt with adequately (Whitehead, Busch, Heller, & Costa, 1986).

In summary, there is minimal support for the concept of family aggregation of health-related behaviors. Numerous studies have

attempted to examine how parental behavior patterns influence the manner in which their children manage symptoms of a variety of diseases and health issues. Although these studies provide apparent support for the concept of family aggregation, each of the investigations has suffered from serious methodological flaws such as small sample sizes, retrospective designs, failure to empirically assess both members of the parent-child dyad, and a failure to verify current or past behaviors of subjects and/or their parents. Well-controlled studies are needed to determine if the intuitively appealing notion of family aggregation can be supported with empirical evidence.

Adolescent Health Concerns

Few studies could be located that investigated symptom reporting among healthy adolescents. Hansell and Mechanic (1985) examined the relationship between introspectiveness and symptom reporting among college freshman. A sample of 1,014 black, hispanic and white males and females were included in the study. Results showed that introspectiveness was positively correlated with psychological distress ($r = .40, p < .05$) and with physical symptom reporting ($r = .27, p < .05$). Hansell and Mechanic limited their study to the older adolescent population. As a result, no norms were provided on introspectiveness among younger adolescents. A variety of new physical sensations are experienced during the early and middle stages of adolescence (Petersen & Taylor, 1980). It is possible that many adolescents develop an inward focus in an effort to understand their

novel biological functioning. Different norms are likely to exist for younger and older adolescents with regard to their tendency to focus inward. Consequently, the work of Hansell and Mechanic is of limited application to research being conducted with younger adolescents.

A major Finnish study examined the relationship between symptom reporting and a number of theoretically important variables. The investigation included 2246 Finnish adolescents between the ages of 14 and 16 who completed questionnaires on three occasions. These included the initial assessment, and a 5-month and 17-month follow-up testing. The questionnaire battery included a 17-item checklist that assessed physical and psychological symptoms, a semantic differential scale of self-image, a self-esteem scale, a life events scale, a self-report of school marks, as well as a structured questionnaire regarding dating, and alcohol intake. Girls also responded to questions regarding onset of menstruation. All subjects provided information on parental death, divorce, and family discord. Findings revealed that throughout the study, girls reported more symptoms than did boys, although both sexes showed increased symptom reporting at each follow-up examination (Aro, Paronen, & Aro, 1987). Compared with children from intact families, those whose parents had divorced reported higher symptoms. This effect was particularly noticeable among the girls. Girls from divorced families reported higher levels of symptoms and lower self-esteem than did girls from families where discord existed. The opposite trend appeared for boys, with symptoms and decreased self-esteem appearing more frequently among boys from discordant families (Aro, 1988). By the

end of the study, those who had experienced many life events also reported the highest level of symptom reporting. Although throughout the study boys reported fewer symptoms than girls, it is of note that boys who experienced many life events achieved similar symptom reporting levels as girls who experienced similar numbers of life events (Aro, 1987). For both sexes, a marked increase in symptoms was noted among those with poor (as compared to good) school performance (Aro, Paronen, & Aro, 1987). Finally, increased symptoms were reported among early maturing (vs. on-time) girls, and girls who reported dating and drinking (Aro & Taipale, 1987).

Garrick, Ostrov, and Offer (1988) examined the relationship between physical complaints and psychological disturbances among a community sample of adolescents. The investigators mailed out two questionnaires--the Offer Self-Image Questionnaire (OSIQ; Offer, Ostrov, & Howard, 1981) and the Adolescent Symptom Checklist (ASQ; Garrick, et al., 1988), a questionnaire designed for use in their study. A total of 122 subjects (males = 54, females = 68; M age $15 \pm .07$ years) returned completed questionnaires. Results indicated that 11% of the boys ($n = 7$) and 15% of the girls ($n = 10$) reported significant symptoms--defined as one standard deviation above the mean for the OSIQ. Based on correlational data, Garrick et al. (1988) determined that among boys, high levels of symptom reporting indicated negative self-image in all areas except sexual attitudes. For girls, high levels of symptom reporting indicated emotional distress. These authors defined emotional distress based on scores on four subscales of the OSIQ: impulse control,

body image, psychopathology, and emotional tones. Garrick et al. (1988) noted the inadvisability of using a self-image questionnaire to measure psychopathology. Despite this, however, they went on to comment on the high proportion of depressed adolescents in their study (13%) compared to the typical percentages found by other authors. For example, Garrick et al. (1988) noted that Albert and Beck (1975) reported that only 2.2% of their 63 seventh and eighth-grade students were severely depressed. Garrick et al. (1988), however, failed to note that Albert and Beck (1975) also reported that the scores on a standard depression inventory indicated that 33.3% of their adolescents fell into the moderate to severe range of depression. Rigorous empirical investigation needs to explore some of the issues raised by the findings (and the explanation of these findings) by Garrick et al. (1988).

In a survey that examined the health concerns of 729 youth between the ages of 12 and 20 (Feldman, Hodgson, Corber, & Quinn, 1986) no age-related or sociodemographic trends emerged with regard to a number of concerns reported. While both sexes were equally bothered by acne, dental, and eye problems, gender differences did appear on a number of items. For example, both sexes were quite concerned about weight problems, yet twice as many adolescent girls (36%) as boys (14%) were affected. In addition, girls also reported more emotional and stomach concerns. Worry surrounding menstruation was also common, particularly among older girls. It was not uncommon for girls who experienced stomach problems to also have concerns pertaining to menstruation and/or birth control.

Exploration of social concerns revealed that both sexes were equally concerned about school issues. Girls, however, were more bothered by family problems (Feldman et al., 1986) than were boys.

With regard to health-related behaviors, smoking was more common among females than among males. While almost half of the respondents reported that they drank alcoholic beverages, only 1% reported being concerned about this behavior. The use of recreational drugs was reported by one-quarter of the older respondents. Thirty-six percent of 16- to 17-year-olds, and 46% of those over 18 reported participation in sexual intercourse (Feldman et al., 1986).

The results of the survey by Feldman et al. are consistent with the view that adolescence is a time of rapidly changing physiological and psychosocial growth. The development of new skills and roles, especially beyond the parameters of the family, allows teenagers to identify actions that are deemed appropriate by their peers and family members. While most adolescents are free from major illnesses, the marked biological alterations of puberty result in a variety of new internal sensations (Mechanic, 1983). Based on the foregoing summary of adult symptom reporting, it is anticipated that the novelty of these experiences would encourage the adolescent to develop an inward focus of attention. This hypothesis received support from a survey conducted by Cochran and Hale (1985). These researchers demonstrated that compared to adults and college students, adolescents had higher levels of somatization as determined by the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983).

The few investigations into symptom reporting among healthy adolescents has raised many issues that need to be addressed. Numerous adult studies have clearly linked the perception of physical symptoms with situational demands, prior experience with similar symptoms, and various forms of psychopathology. These relationships have yet to be established among the adolescent population. The current study represents a first step in exploring whether symptom reporting among adolescents is similar to symptom reporting among adults.

The Present Study

Rationale

To date, no empirical studies have been conducted to determine if family aggregation of symptom reporting exists among adolescents and their mothers. Further, no investigations have explored how adolescent symptom reporting is affected by experimental manipulation of expectations. The importance of studying the relationship among family aggregation, expectations, symptom reporting, and other psychological measures rests in the fact that health seeking behavior is related to what we think is going on in our bodies (Verbrugge, 1985). Whether an internal sensation is defined as a warning sign of impending physiological threat or as an innocuous internal change depends on two factors: the environment in which the sensation occurs, and our previous experience with such changes. It is likely that adolescents' determination of warning signs vs. innocuous changes is influenced by maternal attitudes and behaviors (Campbell, 1978). It is expected that in an ambiguously defined situation, adolescents' evaluation of changing physical symptoms will resemble that of their mothers. In addition, personality variables such as social desirability (Crowne & Marlowe, 1960), mood (Verbrugge, 1985), general tendency to symptom report (Pennebaker, 1982), hypochondriasis (Wielgosz et al., 1984), hysteria, anxiety neurosis, and primary affective disorder--depressed type (Liss et al, 1973) have also been shown to influence symptom reporting. The current study examined these relationships by assessing the attitudes

and behaviors of adolescents and their mothers before, during, and following, participation in a fatigue-oriented task.

Healthy adolescents and their mothers completed a pre-task mood inventory, a symptom checklist that measured the general tendency to report symptoms, a measure of social desirability, and a personality inventory that provided a measure of neuroticism (hypochondriasis, depression and hysteria). Before participating in a fatigue-oriented arm-extension task, half of the subjects were exposed to a tape recording that sensitized them to potential positive and negative symptoms and sensations associated with the task. Describing both positive and negative aspects was used to ambiguously define the situation in which the physical symptoms occurred. The intent of the symptom-sensitizing tape was to encourage the subjects to focus on their physical symptoms, thus making the internal sensations most salient. The other half of the subjects were exposed to a tape recording that provided information pertaining to the elements of the slides that could be used in making interest ratings that were requested throughout the task. The intent of the slide-sensitizing tape was to make external stimuli more salient than internal sensations. Both groups of subjects provided fatigue ratings and interest ratings of the slides during the arm-extension task. The duration of the task was noted for each subject. Following the task, a (state) symptom checklist and a visual perception recall checklist were completed to assess the effects exerted by the respective tapes. State anxiety, trait symptom reporting, a

measure of social desirability, and a baseline fatigue score were included as potential co-variates in the data analyses.

Hypotheses

Major hypotheses

The tenets of social learning theory (Bandura, 1969) provide the basis for the formulation of Hypotheses 1, 2, 6, 7, 8, 9, and 10. This theory would predict similar scores on attitudes and behaviors of mothers and their adolescents. Hypotheses 3, 4, and 5 are based on the above-noted findings that symptom reporting is affected by expectations (Burnam & Pennebaker, 1977) and pre-task instructions (Barr, et al., 1988; Kanfer & Gold, 1966; Pennebaker et al., 1978), and the salience of internal vs. external stimuli (Pennebaker & Lightner, 1980).

1. A positive correlation will exist between the trait symptom reporting scores of Mothers and their Sons, as well between Mothers and their Daughters.

2. A positive correlation will exist between the state symptom reporting scores of Mothers and their Sons, as well as between Mothers and their Daughters.

3. Subjects exposed to the symptom-sensitizing tape will report significantly more symptoms on the post-task (state) measure of symptom reporting than will subjects exposed to the slide-sensitizing tape recording.

4. Subjects exposed to the symptom-sensitizing tape recording will report significantly higher levels of fatigue than will subjects exposed to the slide-sensitizing tape recording.

5. Subjects exposed to the slide-sensitizing tape will engage in the arm-extension task for a significantly longer period than will subjects exposed to the symptom-sensitizing tape recording.

Minor hypotheses

6. A positive correlation will exist between the social desirability scores of Mothers and their Sons, as well as between Mothers and their Daughters.

7. A positive correlation will exist between the state anxiety scores of Mothers and their Sons, as well as between Mothers and their Daughters.

8. A positive correlation will exist between the scores of Mothers and their Sons, as well as between Mothers and their Daughters on the Hypochondriasis, the Depression, and the Hysteria subscales of the MMPI.

9. A positive correlation will exist between Mothers and their Sons, as well as between Mothers and their Daughters on the total time engaged in the arm-extension task.

10. A positive correlation will exist between the fatigue rating scores of Mothers and their Sons, as well as between Mothers and their Daughters.

CHAPTER 2

Methodology

Subjects

Subjects included 79 healthy adolescents and their biological mothers. Adolescents were between the ages of 11 and 17. Mothers were between the ages of 30 and 55. Maternal report verified that at the time of participation in the study, neither she nor her child were receiving medical or psychological treatment for any chronic or acute disease, disorder or condition. Because of the nature of the exercise involved, specific questions were asked to ensure that the adolescent and mother were free from cardiovascular and joint problems.

Apparatus and Materials

A 180 cm vertical pole, anchored to a tripod, and equipped with a series of holes that allowed insertion of a horizontal metal bar, was used to identify the maximum downward deviation each subject was permitted to have during the task. The level of this bar was measured in the following manner. Each subject stood 50 cm away from the vertical pole. He or she then horizontally extended the non-dominant arm to the side so that when the fingers touched the vertical metal pole, the arm was parallel to the floor. The horizontal metal bar was inserted 29 cm below the tip of the fingers, thus allowing each subject's arm to deviate approximately 30 degrees from its original horizontal position (Appendix A; W. D. Jones, personal communication, February 19, 1987). A 35 mm slide projector was used to present slides

for which subjects provided interest ratings throughout the arm extension-task. Two bristol board charts--one with fatigue ratings, one with interest ratings--were fastened to the wall. A portable Sony cassette tape recorder was used to expose subjects to the symptom- or slide-sensitizing tapes. Testing was conducted in two urban centers (Ottawa and Toronto) and three rural communities (Cornwall, Sutton West, Ontario; and Wakefield, Quebec).

State-Trait Anxiety Inventory.

The State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970; Appendix B) is a two-part scale designed to assess the state and the trait aspects of anxiety. State anxiety is measured by a 20-item inventory (A-State, X-1) that rates current positive and negative feelings on a 4-point scale (not at all, somewhat, moderately so, very much so, respectively scored as 1, 2, 3 and 4). Trait anxiety is measured by a 20-item inventory (A-Trait, X-2) that allows subjects to rate how they typically feel. The 4-point scale employed in the trait measure uses similar rating descriptors and scoring as those of the state scale, i.e. almost never, sometimes, often, almost always. Each scale yields one total score, ranging from 20 to 80; scales can be administered separately or together.

Earlier versions of the STAI (Spielberger, Gorsuch, & Lushene, 1967; 1968) attempted to measure state and trait anxiety using the same items. By altering instructions, Spielberger and his colleagues thought both aspects would be adequately measured. Continued administration, however, demonstrated the inappropriateness of this approach. The

scales were revised, enabling separate (but related) items to detect states and traits associated with anxiety.

The STAI was originally designed for use with non-psychiatric adults; normative data is available for adolescents and adults, with means and standard deviations reported for males and females within each group (Spielberger et al., 1970).

Persons with fifth or sixth grade reading ability can complete either scale of the STAI. The inventory has been used as a research tool on a variety of populations, including junior and senior high school students, neuropsychiatric, medical and surgical patients (Spielberger et al., 1970). The time required to complete each scale has been reported as ranging from six to twelve minutes (Spielberger et al., 1970).

Since only the A-State measure was used in the present study, the discussion of validity and reliability will be limited to Form X-1. Internal consistency is acceptable with the median item-remainder correlation reported as .55, .45 and .55 for high school students, college freshman and undergraduates, respectively. Validity of the A-State has been demonstrated on many college populations, particularly in psychologically stressful situations.

In the current study, the A-State score was used as a measure of mood prior to commencement of the task. This measure was included as a potential co-variate.

Marlowe-Crowne Social Desirability Scale.

The Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960; Appendix C) is a 33-item scale that assesses an individual's attitudes toward specific social behaviors. A True/False format is used to determine the extent to which a subject's responses reflect culturally sanctioned behaviors. To construct their scale, Crowne and Marlowe chose two types of questions. Half of the questions are culturally acceptable, but probably untrue; the other half are socially undesirable, but probably true. All questions were chosen from contemporary personality inventories and all items have minimal abnormal implications.

The scale takes approximately 10 minutes to complete and produces a single score that ranges from 0-33. The interpretation of the scores is as follows. Low scores (0-8) suggest two things: (a) the respondent places little emphasis on receiving social approval, and (b) the questions have most likely been answered in an honest manner. Average scores (9-19) are earned by two out of three respondents. Such scores include a balance of socially desirable and undesirable responses. High scores (20-33) indicate that an individual frequently seeks social approval from others. Persons who achieve scores in the upper range are considered to be so concerned about approval that they experience anxiety in social situations. Even very high scores, however, are not seen as indicative of a pathological condition.

The Marlowe-Crowne was originally validated on a small sample. In their original validation of this scale, Crowne and Marlowe tested 120

university students. Based on results obtained on this sample, the internal consistency is reported to be good. Using the Kuder-Richardson formula 20, Crowne and Marlowe achieved an internal consistency of .88. Test-retest reliability ($n = 39$) yielded a correlation of .89 on two testings conducted one month apart (Crowne & Marlowe, 1960).

Scores on the Marlowe-Crowne scale were significantly positively correlated with the Lie and K scales of the Minnesota Multiphasic Personality Inventory (MMPI; Hathaway & McKinley, 1943). These two scales are understood as measures of defensiveness and attempting to be seen in a favorable light. As expected, the Marlowe-Crowne was negatively correlated with the F scale of the MMPI, a scale associated with attempting to appear in an unfavorable manner. The Marlowe-Crowne was also significantly and negatively correlated with the Schizophrenia and Psychopathic Deviate scales of the MMPI (Crowne & Marlowe, 1960).

Norms for the Marlowe-Crowne were established using a population of 1,400 university students. The mean for males was 15.1 (S.D. = 5.6); the mean for females was 16.8 (S.D. = 5.5). Norms are also available for schizophrenic in-patients, psychiatric out-patients, and prisoners.

This instrument has been used in numerous research studies with young adults (cf Cole, 1988; Petrie & Chamberlain, 1983; Strahan & Gerbasi, 1972) and one study with older adolescents (Hansell & Mechanic, 1985). Previous research has demonstrated that this scale is sensitive to social situational variables. Robinson and Shaver (1973) found that when female job applicants were informed that their (Marlowe-Crowne)

score would be considered as part of the hiring process, a higher than average mean occurred ($M = 24.6$; $N = 285$).

This scale was included in the current investigation because of the belief that some individuals view symptom reporting as a socially desirable behavior while others do not (Fordyce, 1979; Pennebaker, 1982; Sternbach, 1978). The Marlowe-Crowne Social Desirability Scale was used as a potential co-variate.

Pennebaker Inventory of Limbic Languidness.

The Pennebaker Inventory of Limbic Languidness (PILL; Pennebaker, Burnam, Schaefer, & Harper, 1977; Pennebaker, 1982; Appendix D) is a 54-item checklist that assesses the frequency of many common physical symptoms. It is used to determine the general proclivity to report symptoms, thus viewing symptom reporting as a trait. The inventory takes approximately 10 minutes to complete. Although the original (1977) version was scored on a 7-point scale, the PILL was revised in 1982 to include a 5-point scale. The range of the scale is from A to E, respectively represented by have never or almost never experienced the symptom to experience the symptom more than once a week. Only items rated as being experienced monthly or more (i.e. columns C, D or E) are counted in the total score. A binary method (0, 1) has been adopted so that regardless of which column is used only one point is awarded. The total score can thus range from 0 to 54.

The reliability of the PILL is good. Pennebaker (1982) reported high internal consistency (Cronbach's $\alpha = .88$). When administered

to 177 adults over a two-month period, the test-retest reliability of the PILL was reported as .79 (Pennebaker, 1982).

Pennebaker (1982) noted that averaging the frequency scores from five adult groups (with a total sample size of 939) yielded a mean of 17.9. In a study of 273 university students, Nolan and Spanos (1987) reported a slightly lower mean of 16.18 (S.D. 9.41). No study could be found that had administered the PILL to adolescents. Nevertheless, the straightforward language and instructions used in the inventory as well as its extensive use on college populations, makes the PILL an appropriate tool to use with 12 to 16-year-olds. In the current study, the PILL was administered as a trait measure of symptom reporting.

Minnesota Multiphasic Personality Inventory.

The Minnesota Multiphasic Personality Inventory (MMPI; Hathaway & McKinley, 1943, 1957, 1967; Appendix E) is a widely used inventory designed to provide measures on common personality characteristics. The scale has undergone several revisions since it was originally designed over 40 years ago (Hathaway & McKinley, 1943). In its present form, the MMPI is typically administered in one of two ways. The first, or standard type of administration, involves completion of a 566-item inventory. The second, shorter version consists of the first 399 questions of the standard test, but can be further reduced to 366 items by eliminating two of the subscales. Many other forms of the scale exist, although their use is controversial because of their demonstrated inability to detect mild pathology among outpatients and normal college populations (Newmark & Thibodeau, 1979). One abbreviated form, the

MMPI-168, has achieved wider acceptance. This form uses the first 168 items of the standard 566-MMPI and has been used successfully as a screening tool among college students (Newmark & Thibodeau, 1979). Overall and Gomez-Mont (1974) have noted that the appeal of this version is that the variance of the 566-item MMPI can be reliably accounted for in the first 168 items.

Answers on all versions of the MMPI are binary (True/False). The scale yields scores for a total of 13 subscales. Three of these are validating scales: L (Lie), F (validity), and K (correction). Nine clinical subscales include: Hs (Hypochondriasis), D (Depression), Hy (Hysteria), Pd (Psychopathic Deviate), Mf (Masculinity-Femininity), Pa (Paranoia), Pt (Psychasthenia), Sc (Schizophrenia), and Ma (Hypomania). In addition, a score for Si (Social Introversion) can be computed. By eliminating the items pertaining to the Schizophrenia and Social Introversion subscales, the 399-item MMPI is transformed into the 366-item inventory.

The MMPI was developed by comparing responses of approximately 700 normal subjects to those of 800 clinical respondents. The age range of subjects used was 16 to 55 years, although the inventory has been described as appropriate for "literate adolescents" (Hathaway & McKinley, 1967, p. 7). Current research has demonstrated the ability of the MMPI to identify psychopathology among adolescents ranging in age from 12 to 18 (Mezzich & Mezzich, 1979) and 14 to 19 years (Haslam, 1978). Williams (1986) notes that when administering the scale to 12 and 13-year-old adolescents three guidelines should be followed. First,

investigators must determine that the adolescent has achieved a reading level that will enable him or her to comprehend test items. Before the test begins, therefore, each teenager should be asked to read and explain three or four statements from the MMPI. Second, the investigator should periodically return to the testing room to ensure that the adolescent remains on-task. Finally, before administering the MMPI, investigators must determine that adolescents have had a sufficiently wide range of experiences to make the test items psychologically and semantically meaningful.

Test-retest reliability coefficients on administrations conducted at various time intervals have ranged from .71 to .83 for Psychopathic Deviate and Hypomania, respectively. In addition, Hathaway and McKinley (1967) reported the validity of the MMPI as high insofar as high scores on various scales have been found to positively predict the final clinical diagnosis in more than 60% of new psychiatric admissions.

In the present study adolescents and mothers completed the 168-item MMPI. Subjects took approximately 35 minutes to complete this questionnaire. The rationale for employing this version of the scale was that the MMPI was employed as a screening tool to ensure that no between-group pre-treatment differences existed on the scores of the neurotic triad (comprised of Hypochondriasis, Depression, and Hysteria; Hathaway & McKinley, 1967). In addition, the scores of these three subscales were used to assess the family aggregation of affective symptoms.

When interpreting the scores on the MMPI, it is necessary to transform raw scores into T scores. Systems are available to compute these transformations for both adolescents (Marks, Seeman, & Haller, 1974) and adults (Greene, 1983). The Results section of this paper explains why raw scores, rather than T scores, were used in analyzing the data from the MMPI.

Fatigue Rating Scale.

A Fatigue Rating Scale, similar to that employed by Matthews and Volkin (1981) was used to assess fatigue during the arm-extension task. A chart, consisting of an 11-point scale ranging from (0) not at all tired to (10) extremely tired was used to obtain 30-second fatigue ratings throughout the time subjects were engaged in the arm-extension task. As a subject was only allowed to extend his or her arm for a maximum of 15 minutes, the maximum number of fatigue ratings was 30.

Interest Rating Scale.

An Interest Rating Scale was constructed to measure how interesting the subjects found each of the slides that were shown throughout the arm-extension task. A chart, identical in format to the one employed to measure the level of fatigue, provided an 11-point scale. Available ratings ranged from (0) not at all interesting to (10) extremely interesting. These ratings were given every 30 seconds throughout the task, resulting in a maximum possible of 30 interest ratings.

On-task Timings.

A single score, representing the total number of minutes and seconds spent engaged in the arm-extension task was recorded for each mother and adolescent. Timings began as soon as the subject extended his or her arm. The task was terminated when any of the following conditions occurred: (a) 15 minutes had elapsed; (b) for a period of at least four seconds, the subject had rested his or her hand on the bar that indicated that the arm had dropped 30 degrees from the horizontal position; or (c) the experimenter observed movements that indicated that the subject had begun to involve different muscles, i.e. movements such as turning the palm upward, bending the elbow, or lifting the shoulder.

Post-task Symptom Checklist (PSC).

Pennebaker (1982) notes that symptom checklists can be constructed to assess task-related symptom reporting. In describing administration of these inventories Pennebaker states that the specific items listed will not affect internal consistency or test-retest reliability. His research with these lists has repeatedly produced high internal consistency ($\alpha = .75$). Based on this, a 35-item post-task symptom checklist (Appendix F) was constructed to assess symptoms that adolescents and their mothers experienced following the arm-extension task. Subjects rated the absence/presence of symptoms on a 3-point scale including none at all, some, a bit, and quite a lot. The checklist included twelve symptoms/feelings that had been identified in the symptom-sensitizing tape as being possible consequences of participating in the task. The checklist included 12 items that had

been specifically mentioned in the symptom-sensitizing tape, and 25 items that had not been addressed.

Visual Perception-Recall Checklist (VPRC).

A checklist (Appendix G) was devised, purportedly to assess the accuracy of subjects' observations of the slides that were presented throughout the task. The checklist included a number of details contained in the slides as well as many that were not present. Subjects used a 3-point scale (not at all, only once, more than three times) to identify the frequency of the appearance of specific details. The data from the checklist were not analysed. This questionnaire was included to prevent arousing the suspicion of subjects regarding the "real" purpose of the study. That is, subjects were asked to complete the Post-task Symptom Checklist following the arm-extension task. Failure to address the role of the slides may have directed too much attention to the symptom-reporting nature of the task. Thus, the Visual Perception Recall questionnaire was included solely to lend credibility to the inclusion of the slides in this study.

Procedure

Contact procedure.

Letters outlining the proposed research (Appendix H) were sent to school boards, community centres and targeted offices that deal with adolescents e.g. Boys' and Girls' Clubs, Girl Guides, Scouts. Two weeks later, the experimenter contacted the organizations to invite participation. In addition, bulletin board announcements (Appendix I)

were posted at universities and community centres throughout Ottawa and the surrounding communities. Advertisements were also placed in community newspapers. These methods of subject recruitment were quite ineffective, however. As a result, most participants were obtained by asking each subject to supply the name of a friend who would be interested in taking part in the study.

Once the experimenter received the name of a potential mother or adolescent subject, the mother was contacted by telephone. The study was explained as an investigation into how mothers and adolescents perceive things inside and outside their bodies. Inside the body was described as the feelings that people have following a simple exercise task; outside the body was identified as the observation of slides that was done throughout the task. The mother was informed that the task would take approximately two hours to complete. Potential participants were also told that the mother and adolescent would complete the questionnaires simultaneously but would concurrently take part in the exercise task. After determining that (a) the mother and adolescent were willing to participate, and (b) neither the mother nor adolescent was under the care of a physician or psychologist for any acute or chronic illness, an appointment was made. In families where more than one adolescent wished to participate, the experimenter randomly selected one subject at the time of initial contact. The day before the scheduled appointment, dyads were contacted by telephone to remind them of the appointment.

At the time of the initial contact, subjects were not informed that they would be randomly assigned to a specific treatment group.

Individuals who failed to keep scheduled appointments dropped out before they were assigned to a treatment cell. It could not be inferred, therefore, that characteristics of the treatment group influenced a dyad's decision to cancel a scheduled testing appointment. For this reason drop-outs were replaced.

Experimental task

Each mother and adolescent was asked to sign an Agreement to Participate (Appendix J). Subjects were asked to complete the A-State scale of the State-Trait Anxiety Inventory (STAI; Spielberger et al, 1970; Appendix B) and the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960; Appendix C). Adolescents were randomly assigned to a treatment group. Each mother was exposed to the same treatment as her son or daughter. Half of the subjects were asked to complete the Pennebaker Inventory of Limbic Languidness (PILL; Pennebaker, 1982; Appendix D) and the 168-item version of the Minnesota Multiphasic Personality Inventory (MMPI; Hathaway & McKinley, 1957; Appendix E) prior to the fatigue task. To control for the effects of completing several questionnaires containing items referring to physical symptoms, half of the subjects completed the PILL and MMPI following the experimental task.

Subjects were randomly assigned to the symptom-sensitizing and slide-sensitizing groups in a manner that ensured groups of equal size. Those assigned to the symptom-sensitizing group were exposed to a taped

description of possible positive and negative physical effects from extending his or her arm (Appendix K). Those in the slide-sensitizing group were exposed to a tape of identical duration but one that provided information regarding the interest ratings of the slides (Appendix L) that were presented throughout the arm-extension task. Suggestions were made relating to aspects of the slides that could assist subjects in determining their interest ratings. Subjects were encouraged to carefully scrutinize each slide.

Both the symptom-sensitizing and the slide-sensitizing tapes contained information describing how the arm was to be held during the task. That is, the arm was extended to the side, at shoulder height, and parallel to the floor. Specific instructions were also given regarding the fatigue and interest ratings that were requested throughout the task. These instructions were based on those used by Matthews and Volkin (1981). To ensure that the subject understood how to use the fatigue rating scale, a baseline measure of overall fatigue was obtained right after the explanation was given. That is, the tape was stopped, the baseline fatigue rating was obtained, and the tape was re-started. After each subject had listened to the taped instructions, the experimenter demonstrated the arm-extension task. Measurement for the placement of the horizontal bar was then conducted. Before beginning the arm-extension task, each subject was reminded that he or she was free to end the experiment at any time. Each subject then completed the arm-extension task.

Throughout the task, subjects were asked to give interest ratings of each slide that they viewed, as well as fatigue ratings relating to how tired their extended arm had become. The first interest rating was requested 15 seconds after the task began. These ratings were then taken every 30 seconds. The first fatigue rating took place 30 seconds after the task began, and continued at 30-second intervals until the task was ended.

Timing began as soon as the arm was extended; timing was ended when any of the following conditions occurred: (a) 15 minutes had elapsed; (b) for a period of at least four seconds, the subject had rested his or her hand on the bar that indicated that the arm had dropped 30 degrees from the horizontal position; or (c) the experimenter observed movements that indicated the subject had begun to involve different muscles i.e. movements such as turning the palm upward, bending the elbow, or lifting the shoulder.

After completing the arm-extension task, those subjects who had not completed the PILL and MMPI prior to the experimental task were asked to do so. All subjects were asked to complete the Post-task Symptom Checklist (Appendix F) and Visual Perception Recall Checklist (Appendix G). A debriefing session then took place during which the real purpose of the study was explained to subjects.

Dependent Variables

A total of nine dependent variables representing the greatest theoretical relevance were derived from the laboratory task and questionnaires. Four variables were employed as potential co-variates.

The STAI (Spielberger et al., 1970) yielded one total state anxiety score that was used as a potential co-variate.

The Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960) yielded one total score. This score was used as the second potential co-variate in order to control for the effect exerted by social desirability on possible overreporting or underreporting of physical symptoms among the two treatment groups.

The PILL (Pennebaker, 1982) provided a total score representing the general tendency (trait) to report symptoms. To ensure that differences that appeared on post-task symptom reporting were due to the symptom-sensitizing tape and not to the differences in the tendency to report symptoms, the PILL score was used as a potential co-variate.

The fourth potential co-variate was the baseline fatigue measure that was obtained just prior to participation in the arm-extension task. The rationale for this is that length of on-task behavior may have been affected by the level of general fatigue that was present at the commencement of the fatigue-inducing task.

The MMPI yielded three scores: Hypochondriasis, Depression and Hysteria. It was originally intended to transform the raw scores into T-scores by using the method devised by Hathaway and McKinley (1967). A

discussion regarding the inappropriateness of using the T-scores, however, is provided in the Results section.

A mean fatigue rating was computed for each subject.

The on-task timings yielded one score, representing the total number of seconds during which the arm was extended. Timings were based on the last rating (either fatigue rating or interest rating) that was given.

The Post-task Symptom Checklist produced two scores. The first was a Negative Symptoms Subscale score, achieved by summing the scores for items that independent judges had rated as negative symptoms--i.e. items #7, 14, 17, 25, 28, 31, 33, and 34. The sum was determined by taking a simple frequency of symptoms rated as occurring some, a bit and by multiplying by two, the number of symptoms rated as occurring quite a lot. A Positive Symptoms Subscale score was derived using an identical method, but restricted to the four items that the judges had rated as reflecting positive aspects i.e. items #10, 15, 18, and 35.

The data from the Visual Perception Recall Checklist were not analyzed. This questionnaire was included solely for the purpose of lending credibility to the experimental manipulation. For purposes of this study, accuracy of visual perception was unimportant.

CHAPTER 3

Results

Description of Subjects

The subjects in this study comprised a convenience sample. All participants were volunteers who were obtained from a variety of sources. Some subjects responded to bulletin board advertisements or to classroom announcements made by Professors at the University of Ottawa. The majority of the subjects were referred by persons who participated in the study. All subjects defined themselves as physically healthy individuals who were not seeing a physician or psychologist for any on-going physical or emotional problem.

A total of 158 subjects were included in the study. Mothers ($n = 79$), Sons ($n = 39$), and Daughters ($n = 40$) participated. The mean ages and standard deviations for each group are outlined in Table 1.

Table 1

Ages of Participants

	Subject		
	Mothers	Sons	Daughters
Age Range	34-54	12-17	11-17
M	41.86	13.89	14.14
SD	3.67	2.04	1.96

The distribution of the Daughters and Sons across ages is given in Table 2. This study had been designed to include an equal number of males and females at each of the five adolescent age levels, that is 12, 13, 14, 15, and 16 years. This objective was not strictly met. Table 2 indicates that this study included twelve subjects who were beyond the target age range. A Chi-square analysis revealed that there were no significant differences in the way in which adolescents were distributed across gender and age ($\chi^2 = 10.08$, 6 df, ns).

Table 2

Age Distribution of Sons and Daughters

Age	Subject Identity	
	Sons	Daughters
11-year-olds	0	2
12-year-olds	5	8
13-year-olds	14	9
14-year-olds	9	3
15-year-olds	5	4
16-year-olds	3	7
17-year-olds	3	7
Total	39	40

Validation of Task

Prior to proceeding with any analyses, several steps were undertaken to demonstrate task validity. The first procedure involved illustrating that the exercise employed in this study as a fatigue-inducing task, did, in fact, induce fatigue.

To demonstrate that the arm-extension task was valid, a mixed between-within analysis of variance (ANOVA) was conducted on the fatigue ratings of the Mother/Son dyads and Mother/Daughter dyads. The Mother/Son dyads were examined first. A 2 (Tapetype: Symptom-/Slide-sensitized) X 2 (Relation: Mothers/Sons) X 3 (Fatigue Intervals: Minutes 1-3/4-6/7-9) factorial design was utilized. Subjects' mean fatigue ratings across three consecutive 3-minute intervals served as the dependent variable. The three-way interaction was nonsignificant: $F(2,140) = 1.78$, ns. Similarly, nonsignificant findings emerged for the two-way interactions: Tapetype X Relation $F(1,70) = 3.26$, ns; Tapetype X Fatigue Interval $F(2,140) = 1.39$, ns; Relation X Fatigue Interval $F(2,140) = 2.03$, ns. A nonsignificant main effect was found for the Tapetype factor-- $F(1,70) = 0.00$, ns. Main effects were found for the Intervals Factor-- $F(2,140) = 318.48$, $p < .001$ as well as for the Relation factor $F(1,70) = 11.26$, $p < .001$. As shown in Table 3, the mean fatigue ratings of Sons were significantly greater than those of the Mothers.

Post-hoc comparisons using the Newman-Keuls method were conducted on the marginals for the Intervals factor. Post-hoc comparisons demonstrated that significant differences existed among all intervals.

That is, differences were found between Intervals 3 and 1 ($g = 25.96$ $p < .01$), Intervals 3 and 2 ($g = 11.84$ $p < .01$) and Intervals 2 and 1 ($g = 9.91$ $p < .01$). Fatigue ratings were lowest at Interval 1 and showed a significant monotonic increase at Intervals 2 and 3. This analysis demonstrated that the fatigue ratings of Sons and their Mothers significantly increased over time.

Table 3

Means and Standard Deviations for Fatigue Ratings
for Mothers and Sons

		Fatigue Rating	
Factor		M	S.D.
Relation:	Mothers	3.92	2.44
	Sons	5.19	2.43
Interval:	Minutes 1-3	2.55	1.74
	Minutes 4-6	4.68	1.96
	Minutes 7-9	6.47	1.96

Fatigue ratings of Mothers and Daughters were subjected to a similar 2 (Tapetype: Symptom-/Slide-sensitized) X 2 (Relation: Mothers/Daughters) X 3 (Fatigue Intervals: Minutes 1-3/4-6/7-9) mixed ANOVA. Mean fatigue ratings across three consecutive 3-minute intervals again served as the dependent variable. The three-way interaction was nonsignificant: $F(2,148) = 0.55$, ns. The two-way Tapetype X Interval

interaction was nonsignificant: $F(2,148) = 0.35$, ns. Similarly, the Relation X Tapetype interaction was nonsignificant: $F(1,74) = 0.59$, ns. The main effect for Tapetype was also nonsignificant: $F(1,74) = 0.09$, ns. A significant Fatigue Interval X Relation interaction [$F(2,148) = 3.92$, $p < .02$] was demonstrated.

Examination of the simple main effects was first conducted for Mothers across the Intervals variable. A significant F -ratio was noted: $F(2,73) = 76.17$, $p < .001$. All Newman-Keuls post-hoc comparisons were significant: Intervals 1 and 3 ($q = 22.33$ $p < .01$), Intervals 1 and 2 ($q = 11.26$ $p < .01$) and Intervals 2 and 3 ($q = 11.13$ $p < .01$). As noted in Table 4, the lowest ratings for the Mothers were reported at Interval 1; a significant monotonic increase was noted in their fatigue at Intervals 2 and 3. The post-hoc comparisons therefore demonstrated that the Mothers' fatigue ratings increased significantly across each successive three-minute interval. Examination of the simple main effect for Daughters across the Intervals Factor revealed a significant F -ratio: $F(2,73) = 101.77$, $p < .001$. Post-hoc comparisons revealed the following significant differences: Intervals 1 and 3 ($q = 27.04$ $p < .01$), Intervals 1 and 2 ($q = 16.29$ $p < .01$) and Intervals 2 and 3 ($q = 10.76$ $p < .01$). As noted in Table 4, the lowest fatigue ratings for the Daughters were reported at Interval 1. A significant monotonic increase was noted at Intervals 2 and 3, indicating that the Daughters' fatigue ratings significantly increased across time.

The simple main effects for each level of the Interval variable

were then examined across the Relation factor. No significant simple main effects were found.

The above-noted mixed ANOVAs were conducted on the first nine of the potential 30 fatigue ratings. A high incidence of missing data prevented analyses on ratings beyond this point. For example, by the twelfth fatigue rating, 52 (33%) of the subjects had ended their participation. This high drop-out rate was accepted as evidence that the fatigue level was becoming higher as the task progressed. Based on this, no analyses were carried out beyond rating nine.

Table 4

Means and Standard Deviations for Fatigue Ratings
for Mothers and Daughters

Relation	Fatigue Interval					
	1		2		3	
	M	S.D.	M	S.D.	M	S.D.
Mothers	2.61	1.91	4.39	2.21	6.16	2.32
Daughters	2.30	1.61	4.88	2.08	6.60	2.07

The second step in the task validation procedure focussed on the correlation that existed between the state and trait symptom reporting measures that were used in this study. Following participation in the fatigue-inducing task, subjects were asked to report post-task symptoms.

This state measure of symptom reporting was achieved through the use of a newly devised 35-item symptom inventory, the Post-Task Symptom Checklist. Twelve of the items reflected symptoms that the symptom-sensitizing tape had suggested may occur as a result of participation in the arm-extension task. Ten independent raters, who were blind to the purpose of the questionnaire, were asked to rate each of these twelve items on a scale of -5 (most negative) to +5 (most positive). Their ratings indicated 100% agreement that four of the items reflected symptoms associated with positive feelings/symptoms that could have been associated with participation in the task (sturdy legs, clearheadedness, settled stomach, and a strong arm). Similarly, 100% agreement indicated that eight of the items reflected negative symptoms (racing heart, upset stomach, stiff arm headache, dizzy, numb arm, shaking legs, and shaking hand). Based on these ratings, two subscales were derived from the 12-item checklist: the 4-item Positive Symptom Subscale and the 8-item Negative Symptom Subscale.

The internal consistency of this abbreviated 12-item scale was assessed through a Cronbach's alpha that was conducted simultaneously on all four groups (Mothers of Sons, Mothers of Daughters, Sons, Daughters). This analysis yielded a coefficient ($\alpha = .67$) representing moderate internal consistency.

Once it had been determined that a moderately reliable scale was being used to assess post-task symptom reporting, the second phase of the task validation procedure continued. This phase involved two steps: (a) demonstrating that the items contained in the Positive

Symptom subscale correlated negatively with previously validated symptom reporting checklists, and (b) demonstrating that the items contained in the Negative Symptom subscale correlated positively with established symptom reporting scales. Pennebaker (1982) has noted that although symptom reporting can be viewed as a stable unidimensional construct, it can be influenced by situational demands. Based on the work of Pennebaker, it was assumed that individuals would report post-task symptoms in a manner that was representative of the way in which they typically report symptoms. Non-specific and uncontrollable influences of the experimental setting were expected to reduce the magnitude of the correlation between state and trait symptom reporting. That is, some subjects may have reported more than their usual number of symptoms because they may have been particularly fatigued on the day of testing, or because they wanted to ensure the success of the study in which they were participating. Alternatively, others may have reported less symptoms in an effort to appear athletic after having engaged in a fatigue-inducing task. As a result of these factors, a moderate correlation was expected when the scores from the trait measures were correlated with the scores on the state measure of symptom reporting. Two validated measures of trait symptom reporting were included in this study. These were the Pennebaker Inventory of Limbic Languidness (PILL; Pennebaker, 1982) and the Hypochondriasis subscale of the MMPI (Hathaway & McKinley, 1943). The appropriateness of using the Hypochondriasis subscale for this purpose is based on the observation by Sternbach (1978) that this subscale is legitimately viewed as a symptom checklist.

Based on the patterns of correlations that emerged for the Mothers of Sons, Mothers of Daughters, Sons, and Daughters (Table 5), it was determined that there was moderate support indicating that the Negative Symptom Subscale measured negative symptoms. In addition, there was weak support for accepting that the Positive Symptom Subscale measured positive symptoms. Two positive correlations existed between the Negative Symptom Subscale and the PILL (Mothers of Sons, Daughters). The Positive Symptom Subscale did not negatively correlate with the PILL. Two negative correlations emerged between the Negative Symptom Subscale and Hypochondriasis (Mothers of Sons, Daughters). The Positive Symptom Subscale correlated negatively with Hypochondriasis for one group (Sons). All correlations were conducted using one-tailed significance levels.

Taken together, the above process demonstrated the validity of the arm-extension task and the 12-item Post-task Symptom Checklist that were devised for use in this study.

Table 5

Correlation of Post-task Symptom Checklist
with PILL and Hypochondriasis Scores

	Variable	
	PILL	Hypochondriasis
Mothers of Sons ($n = 39$)		
Negative	.38	.37
	$p < .01$	$p < .01$
Positive	.19	-.12
	ns	ns
Mothers of Daughters ($n = 40$)		
Negative	.21	.20
	ns	ns
Positive	-.10	.08
	ns	ns
Sons ($n = 39$)		
Negative	.12	.21
	ns	ns
Positive	-.25	-.49
	ns	$p < .005$
Daughters ($n = 40$)		
Negative	.47	.47
	$p < .005$	$p < .005$
Positive	-.13	-.26
	ns	ns

Note: probabilities reported are for one-tailed tests

Use of the MMPI T-Scores

Before presenting the results of any of the analyses that were carried out, an explanation is needed regarding the scores on the subscales of the MMPI. The purpose of including the 168-item version of the MMPI in the present study was to provide a measurement of the tendency of mothers and their adolescents to report hypochondriacal, depressive or hysterical symptoms. Typically, interpretation of the MMPI involves converting the raw scores into interpretable T-scores. Converting the raw scores of adults and adolescents into T-scores requires the use of very different standards. Excellent norms are available for adults. Much less research, however, has focussed on the use of the MMPI with an adolescent population. Available adolescent norms indicate that the implications of the responses to MMPI items differ markedly as the adolescent matures. For instance, norms established by both the Psychological Corporation and National Computer Scoring provide different T-scores for males and females at four different ages--14, 15, 16, and 17 (Vincent et al., 1984). As a result of the variety of norms that would be required to transform the raw scores of this study, the findings would become less, rather than more, interpretable. For example, on the Depression subscale, a mother who achieved a raw score of 16 would be assigned a T-score of 29. Her 15-year-old son, who achieved a raw score of 15 would be assigned a T-score of 69. Further, if the Depression score of 15 was obtained by a 15-year-old daughter, the appropriate T-score would be 57. In this case, even though the mother endorsed more depressive items than her son or

daughter, each adolescent would appear to be more depressed than the mother. Also, the son's score would fall in the clinically elevated range, while the daughter's would fall well below the clinical criterion of 70. This scoring system may be clinically meaningful. The current study, however, was conducted on a non-clinical sample, and the MMPI was not used to identify well-defined pathologies. Further, the non-clinical status of these subjects was not determined by reference to a standardized scoring schema. Rather, it was inferred from two factors. First, all subjects stated that, during the past year, they had not seen a psychologist or psychiatrist. Second, an examination of the raw scores for hypochondriasis, depression, and hysteria revealed an absence of outliers for Mothers, Sons, and Daughters. Recall that one of the minor hypotheses of this study posited that there would be family aggregation of symptoms indicating affective distress (i.e. hypochondriasis, depression, and hysteria). In order to determine whether or not family aggregation existed for the three clusters of affective symptoms that were measured by the MMPI, it was necessary to use a uniform method of comparison across age and gender. Consequently, it was decided to compare Mothers, Sons, and Daughters according to their raw scores on the hypochondriasis, depression, and hysteria subscales of the MMPI. From this point on, when referring to the scores on these three subscales, the author will simply mean the number of items that were endorsed.

Between-group Differences on Pre-task Measures

The first analysis was conducted to ensure that no pre-treatment differences existed between groups on the seven pre-task measures that were utilized in this study. These measures included: The Pennebaker Inventory of Limbic Languidness (PILL), the Spielberger State Anxiety Inventory (State Anxiety), the Marlowe-Crowne Social Desirability Scale (Marlowe-Crowne), the Hypochondriasis (Hypochondriasis), Depression (Depression), and Hysteria (Hysteria) subscales of the MMPI, and baseline fatigue level (Baseline Fatigue).

The random assignment of Sons, Daughters, and their Mothers into the Symptom-sensitized and Slide-sensitized groups resulted in a total of eight treatment groups--i.e. Symptom-sensitized and Slide-sensitized Mothers of Sons, Symptom-sensitized and Slide-sensitized Mothers of Daughters, Symptom-Sensitized and Slide-sensitized Sons, and Symptom-Sensitized and Slide-sensitized Daughters. A 4 (Relation: Sons/Daughters/Mothers of Sons/Mothers of Daughters) X 2 (Tapetype: (Symptom-/Slide-sensitized) multiple analysis of variance (MANOVA) was conducted to ensure that no pre-treatment differences existed. This analysis revealed that there was no significant multivariate interaction [$F(21,414) = 0.072$, ns], nor was there a significant multivariate main effect for Tapetype [$F(7,144) = 1.37$, ns]. A significant main effect emerged for Relation [$F(21,414.04) = 2.03$, $p < .005$]. Two univariate effects (PILL, and Hypochondriasis) contributed to this significant multivariate main effect.

Post-hoc comparisons using the Newman-Keuls method were conducted on the marginals for the Relation factor. Post-hoc comparisons yielded no significant between-group differences on the Hysteria scores. Comparisons on the PILL scores indicated that a significant difference existed between Mothers and their Sons. Of little theoretical importance for this study was the finding that the PILL scores for the Mothers of Daughters significantly differed from those of the Sons. No difference was found on the PILL scores between the Mothers and their Daughters. This analysis demonstrated that a generational difference existed between Mothers and their Sons on trait symptom reporting, but not on any of the other pre-task measures (state anxiety, social desirability, hypochondriasis, depression, hysteria, baseline fatigue). The presence of this generation difference indicates that the PILL should be used as a co-variate when conducting analyses across generations. This decision will be elaborated upon in a subsequent section dealing with the use of co-variates. No significant differences existed between Mothers and their Daughters on any of these variables. Further, no significant gender differences existed between Sons and Daughters on any of the pre-task measures. The means and standard deviations for the four groups are reported in Table 6.

Table 6

Means and Standard Deviations for Pre-measuresRelation Factor

Variable	Relation							
	Mothers of Sons		Mothers of Daughters		Sons		Daughters	
	M	SD	M	SD	M	SD	M	SD
PILL	9.31 ^a	(7.28)	8.53	(6.61)	15.97 ^a	(10.02)	12.35	(9.23)
State Anxiety	30.92	(7.77)	30.08	(7.13)	34.51	(7.73)	33.30	(6.18)
Marlowe-Crowne	16.85	(4.79)	16.85	(4.37)	15.26	(4.43)	15.73	(6.56)
Hypochondriasis	3.62	(2.76)	3.30	(2.69)	4.34	(3.14)	3.90	(2.43)
Depression	12.95	(3.67)	13.13	(3.76)	12.00	(3.81)	13.10	(3.20)
Hysteria	11.13	(3.26)	11.30	(3.35)	9.69	(3.74)	9.80	(2.29)
Baseline Fatigue	2.50	(2.64)	2.89	(2.41)	2.19	(2.22)	3.03	(2.63)

^a significant post-hoc difference, Newman-Keuls method

Examination of Hypotheses 1 and 2

The primary purpose of this study was to explore family aggregation of symptom reporting. Hypotheses 1 and 2 posited that significant correlations would exist between the scores of Mothers and Sons, as well as Mothers and Daughters on trait symptom reporting (PILL), and state symptom reporting (Positive Symptoms, Negative Symptoms). Falconer (1960) noted the appropriateness of employing correlational techniques to examine the strength of parent-child similarity in family aggregation studies. Based on the assumption that there would be a linear relationship between the scores of Mothers and their adolescents, Pearson product moment correlations (r) were used to test Hypotheses 1 and 2 (Ferguson, 1976). To control for the occurrence of Type II errors, a stringent alpha level ($\alpha = .01$) was used. A one-tailed test of significance was conducted because of the a priori nature of the hypotheses upon which these correlations were based.

Table 7 demonstrates a lack of significant Mothers/Sons and Mothers/Daughters correlations for trait symptom reporting, as well as for both positive and negative state symptom reporting. This indicates that there is a lack of similarity between the symptom reporting behaviors of Mothers and their Sons, as well as between Mothers and their Daughters. These findings fail to support Hypotheses 1 and 2.

In the absence of significant correlations, an examination was conducted to determine if a nonlinear relationship existed between the scores of Mothers and Sons, and Mothers and Daughters. No evidence was found to support the presence of a quadratic relationship between the

scores of Mothers and their Sons or Daughters. These results are presented in Appendix M.

Table 7

Correlation of Mothers/Sons, and Mothers/Daughters Scores on State and Trait Symptom Reporting

Variable	Relationship	
	Mothers/ Sons ($n = 39$)	Mothers/ Daughters ($n = 40$)
PILL	.11 ns	.07 ns
Negative Symptoms	.15 ns	.21 ns
Positive Symptoms	-.09 ns	.16 ns

Note: probabilities reported are for one-tailed tests

Use of Potential Co-variates

Before discussing the remaining hypotheses, clarification is necessary regarding the use of the potential co-variates in this study. As noted in the section describing the proposed analyses, four measures were targeted as co-variates. Three of these, the PILL, State Anxiety, and the Marlowe-Crowne measure of social desirability were included because of their previously noted relationship to the reporting of negative symptoms. The fourth co-variate, a measure of Baseline Fatigue, was included because of its theoretical importance to participating in a fatigue-inducing task. That is, it was expected that persons who reported a high level of baseline fatigue would participate in the task for a shorter period of time than persons who reported a low level of baseline fatigue. Table 8 presents the results of the relevant correlations of the potential co-variates with the post-task Negative Symptom Subscale. This table also reports the correlations among the potential co-variates. Because the correlations were evaluated using a one-tailed significance level. As noted earlier, a stringent alpha level ($\alpha = .01$) was used in order to balance the risk of making Type I and Type II errors.

As noted in Table 8 a different pattern of significant correlations among potential co-variates emerged for Mothers of Sons, Mothers of Daughters, Sons, and Daughters. The PILL scores significantly correlated with positively with negative symptom reporting and state anxiety, and negatively with social desirability. Negative (state) symptom reporting correlated positively with baseline fatigue. State

Table 8

Correlation of Potential Co-variables with
Post-task Symptom Reporting

Variable	Relationship			
	Mothers of Sons (n = 39)	Mothers of Daughters (n = 40)	Sons (n = 39)	Daughters (n = 40)
PILL/Negative Symptoms	.28 ns	.21 ns	.12 ns	.47 p < .01
State Anxiety/ Negative Symptoms	-.01 ns	.11 ns	.06 ns	.04 ns
Marlowe-Crowne/ Negative Symptoms	.03 ns	-.10 ns	-.02 ns	-.34 ns
Baseline Fatigue/ Negative Symptoms	.42 p < .01	-.05 ns	.01 ns	.04 ns
PILL/State Anxiety	.38 p < .01	.10 ns	.28 ns	.04 ns
PILL/Marlowe-Crowne	-.18 ns	-.40 p < .01	-.04 ns	-.54 p < .01
PILL/Baseline Fatigue	.32 ns	.01 ns	.07 ns	.12 ns
Marlowe-Crowne/ State Anxiety	-.24 ns	-.02 ns	-.34 p < .01	-.28 ns
Baseline Fatigue/ State Anxiety	.34 ns	.19 ns	.14 ns	.17 ns
Baseline Fatigue/ Marlowe-Crowne	.08 ns	.02 ns	.07 ns	-.08 ns

Note: probabilities reported are for one-tailed tests

anxiety correlated negatively with social desirability. In order to enable comparisons among all four groups (Mothers of Sons, Mothers of Daughters, Sons and Daughters), it was necessary to employ identical co-variates for each group. Based on the correlation pattern that was evident between state (Negative Symptoms) and trait (PILL) symptom reporting, it was necessary to use the PILL as a co-variate. Recall that the need to use the PILL as a co-variate was also suggested by the generational differences that existed between Mothers and their Sons on this variable. The correlation between the PILL and state anxiety (Mothers of Sons), as well as between state anxiety and social desirability (Sons), indicated that of these three, only the PILL needed to be included as a co-variate. In addition, the need to include baseline fatigue as a co-variate was indicated by the correlation of this variable with negative symptoms. All analyses that included the Negative Symptom Subscale, therefore, employed the PILL and baseline fatigue as co-variates.

Examination of Hypothesis 3

Hypothesis 3 referred to the post-task differences that were expected to result from the experimental manipulation. Recall that Mother/Son and Mother/Daughter dyads were randomly assigned to two treatment groups. One treatment group was sensitized to the symptoms they could feel as a result of participating in the arm-extension task; the other group was sensitized to items that could help them in making their interest ratings of the slides. It was posited that Symptom-

sensitized subjects would have higher levels of post-task state symptom reporting than would Slide-sensitized subjects.

A 4 (Relation: Mothers of Sons/Mothers of Daughters/Sons/Daughters) X 2 (Tapetype: Symptom-/Slide-sensitized) MANCOVA was conducted, using the PILL and baseline fatigue as the co-variates. The scores on the Negative Symptom Subscale and the Positive Symptom Subscale of the Post-task Symptom Checklist served as the dependent measures. Analyses revealed a nonsignificant Relation X Tapetype interaction ($F(6,294) = 1.54, ns$), as well as a nonsignificant main effect for Relation ($F(6,294) = 1.82, ns$). A significant main effect emerged for the Tapetype factor ($F(2,147) = 7.02, p < .001$). Only negative symptoms contributed at the univariate level. As evident in Table 9, the Symptom-sensitized subjects reported significantly higher post-task negative symptoms than did the Slide-sensitized subjects. Table 9 provides the adjusted means for Positive and Negative Symptoms of the Symptom- and Slide-sensitized groups. This analysis supported Hypothesis 3, and also demonstrated the effectiveness of the symptom-sensitizing procedure.

Table 9

Adjusted Means of Symptom- vs. Slide-sensitized SubjectsPost-task Symptom Reporting

Variable	Tapetype	
	Symptom- Sensitized (n = 80)	Slide- Sensitized (n = 78)
Positive Symptoms	1.50 (0.41)	1.42 (0.47)
Negative Symptoms	^a 0.48 (0.31)	^a 0.33 (0.28)

Note: Means with common superscripts differed significantly

Examination of Hypotheses 4 and 5

Hypotheses 4 and 5 referred to the on-task differences that were expected to occur between symptom- and slide-sensitized subjects. It was posited that Symptom-sensitized subjects would have higher fatigue levels and shorter total time engaged in the task than would Slide-sensitized subjects. The dependent variables that reflected these on-task behaviors were: Total Time engaged in the task, and the Mean Fatigue Rating. Two co-variates (Baseline Fatigue and the mean Interest rating) were used in this analysis. These were chosen based on two significant correlations that emerged for the Sons. The Sons demonstrated a significant correlation between the Baseline Fatigue and Total Time ($r = .37, p < .01$) as well as between Mean Fatigue and Interest ($r = .46, p < .01$).

A 4 (Relation: Mothers of Sons/Mothers of Daughters/Sons/Daughters) X 2 (Tapetype: Symptom-/Slide-sensitized) MANCOVA was conducted, with Total Time and Mean Fatigue as the dependent measures. Baseline Fatigue and Interest served as co-variates. Analysis revealed a nonsignificant Relation X Tapetype interaction [$F(3,148) = 1.62, ns$], as well as a nonsignificant main effect for Tapetype [$F(2,147) = 0.08, ns$]. A significant main effect was noted for the Relation factor [$F(6,294) = 2.65, p < .02$]. Total Time contributed to this main effect at the univariate level. The means for both Total Time and Mean Fatigue are reported in Table 10. Post hoc comparisons using the Newman-Keuls method indicated that Mothers of Sons stayed on-task significantly longer than did their Sons. Although these Mothers also significantly

Table 10

Adjusted Means and Standard Deviations for On-task Measures

Relation	Variable			
	Total Time		Mean Fatigue	
	M	SD	M	SD
Mothers of Sons	ab 472.41 (196.90)		5.72 (1.21)	
Nothers of Daughters	427.64 (153.38)		5.63 (1.57)	
Daughters	a 384.62 (124.13)		5.62 (1.66)	
Sons	b 389.89 (101.17)		6.35 (1.53)	

Note: Means with common superscripts differed significantly

differed from Daughters, this finding is of lesser importance to this study. No significant differences existed between Daughters and their Mothers, or between Sons and Daughters. The lack of significant differences in the fatigue level and on-task time between Symptom- and Slide-sensitized subjects indicates that Hypothesis 4 and 5 were not supported.

Examination of Hypotheses 6 to 10

Hypotheses 6 to 10 posited that family aggregation would exist on variables that are theoretically related to symptom reporting. These include: social desirability (Marlowe-Crowne), state anxiety (State Anxiety), the Hypochondriasis (Hypochondriasis), Depression (Depression) and Hysteria (Hysteria) subscales of the MMPI, total time engaged in the task (Total Time), highest fatigue rating achieved (Highest Fatigue), length of time that subjects participated in the task before reporting their maximum level of fatigue (Length to Maximum Fatigue), and the mean fatigue rating. As seen in Table 11, no Mothers/Sons or Mothers/Daughters correlations were significant. These data, therefore, provided no evidence of family aggregation on state and trait measures. Hypotheses 6 to 10 were not supported.

Table 11

Correlation of Mothers/Sons and Mothers/Daughters Scores on Variables
Associated with Symptom Reporting

Variable	Relationship	
	Mothers/ Sons (<i>n</i> = 39)	Mothers/ Daughters (<i>n</i> = 40)
Marlowe-Crowne	.06 ns	.33 ns
State Anxiety	.06 ns	.27 ns
Hypochondriasis	-.01 ns	-.07 ns
Depression	.16 ns	-.05 ns
Hysteria	.25 ns	-.17 ns
Total Time	.01 ns	.22 ns
Highest Fatigue Level	.03 ns	.07 ns
Length to Highest Fatigue	-.02 ns	.15 ns
Mean Fatigue Rating	-.22 ns	.02 ns

Note: probabilities reported are for one-tailed tests

Supplemental Analyses

The remainder of the analyses were not specified in the stated hypotheses of this study. These supplemental analyses examined whether post-task symptom reporting behavior was similar among subjects who demonstrated varying levels of on-task coping. Coping ability was defined in terms of an individual's tendency to remain on-task after he or she had reached the highest possible fatigue level. Three levels of a Persisters factor were defined. Subjects who reached the highest possible fatigue level of 10 and continued with the task were identified as Stoics ($n = 62$). Subjects who reached the highest possible fatigue level and ended the task, were defined as Reachers ($n = 35$). Subjects who ended the arm-extension task prior to reaching the highest possible fatigue level were defined as Enders ($n = 61$).

A 4 X 3 MANCOVA was conducted, using Relation (Mothers of Sons/Mothers of Daughters/Sons/Daughters) and Persisters (Stoics/Reachers/Enders) as the grouping factors. The dependent measures were the scores on the Positive and Negative Symptom Subscales of the Post-task Symptom Checklist. The PILL and Baseline Fatigue were used as co-variates. The Relation X Persisters interaction yielded a nonsignificant multivariate F -ratio: $F(12,286) = 0.94$, ns. Similarly, a nonsignificant multivariate F -ratio was found in the main effect for Relation: $F(6,286) = 1.22$, ns. A significant main effect was observed for the Persisters factor: multivariate $F(4,286) = 2.37$, $p < .05$. Only the scores on the Negative Symptoms Subscale contributed to this significant multivariate F -ratio at the univariate level. Post-hoc

comparisons using the Newman-Keuls method indicated that significant differences existed among all groups. That is, Stoics reported significantly more post-task negative symptoms than did either the Reachers or Enders. Enders reported significantly more symptoms than did Reachers. The means scores for Positive and Negative Symptom reporting are provided in Table 12.

Of interest was the distribution of subjects across categories. The following distribution was noted: Stoics (Mothers $n = 17$; Sons $n = 17$), Reachers (Mothers $n = 8$; Sons $n = 8$), Enders (Mothers $n = 14$; Sons $n = 14$), Stoics (Mothers $n = 13$; Daughters $n = 15$), Reachers (Mothers $n = 10$; Daughters $n = 9$), and Enders (Mothers $n = 17$; Daughters $n = 16$). A series of Chi-square analyses was conducted to determine whether significant differences existed in the distribution of Stoics, Reachers and Enders across Mothers, Sons, and Daughters. No age-related or gender differences emerged. The following nonsignificant Chi-square values were obtained: Mothers vs. Daughters $\chi^2 = 0.23$ ($df = 2$); Mothers vs. Sons $\chi^2 = 0.01$ ($df = 2$); and Sons vs. Daughters $\chi^2 = 0.30$ ($df = 2$).

The final analysis involved determining whether significant differences existed in the concordant vs. discordant categorization of Mothers/Sons dyads and Mothers/Daughters dyads across Stoics, Reachers, and Enders. Table 13 illustrates the concordant and discordant groupings of both Mothers and their Sons, and Mothers and their Daughters across the Persisters categories. A kappa revealed that no significant differences existed in the percentage of concordant and

discordant pairs of Mothers/Sons dyads ($k = .19$) and the Mothers/Daughters dyads ($k = .10$) across the Stoics, Reachers and Enders categories.

Table 12

Adjusted Means and Standard Deviations for Marginals (Persisters Factor)
in Relation X Persisters MANCOVA

Variable	Persisters					
	Stoics		Reachers		Enders	
	M	SD	M	SD	M	SD
Positive Symptoms	1.51	(0.38)	1.42	(0.46)	1.44	(0.49)
Negative Symptoms	0.48	(0.34)	0.35	(0.23)	0.38	(0.28)

Note: Means with common superscripts differed significantly

Table 13

Distribution of Mothers, Sons, and Daughters
Across Stoic, Reacher, and Ender Categories

		Sons		
Mothers		Stoics	Reachers	Enders
	Stoics	9 (23.1%)	2 (5.1%)	6 (15.4%)
	Reachers	2 (5.1%)	2 (5.1%)	4 (10.3%)
	Enders	6 (15.4%)	4 (10.3%)	4 (10.3%)

		Daughters		
Mothers		Stoics	Reachers	Enders
	Stoics	5 (12.5%)	4 (10.0%)	6 (15.0%)
	Reachers	3 (7.5%)	1 (2.5%)	5 (12.5%)
	Enders	5 (12.5%)	5 (12.5%)	6 (15.0%)

CHAPTER 4

Discussion

Subject Information

A total of 158 Mothers, Sons, and Daughters volunteered to participate in this study. The Sons and Daughters who comprised this convenience sample were well distributed across the adolescent age range. All subjects defined themselves as healthy and completed a consent form that verified they were not currently attending a physician or psychologist for any acute or chronic disorder.

Subjects did not directly benefit from taking part in this study. That is, they were not paid for their participation nor was it intended that they experience any therapeutic effects. As with most research involving volunteers, a great deal of difficulty was experienced in obtaining a sufficient sample size. When the traditional forms of subject recruitment (i.e. posting bulletin board announcements, contacting service clubs, running newspaper/radio advertisements), failed to yield the targeted number of subjects, it was decided to ask each participating dyad to supply the name of another potential dyad. In an effort to minimize the potential sample bias that could result from this type of subject recruitment, testing was conducted in five locations. Two urban and three rural testing sites were involved. At each center, males and females of various ages participated.

Validation of Task

Prior to conducting analyses to observe the effects of the treatment manipulations, two procedures were carried out to demonstrate the effectiveness of the task employed in this study as well as the validity of the newly devised Post-task Symptom Checklist. First, it was established that the fatigue-inducing task successfully induced fatigue in Sons and their Mothers, as well as in Daughters and their Mothers. For all four groups, monotonic increases in fatigue were noted across the first nine fatigue ratings; analyses of ratings beyond this point could not proceed due to the excessive amount of missing data. Second, a Cronbach's alpha determined that a moderately reliable checklist had been designed to measure post-task symptom reporting. This checklist, the Post-Task Symptom Checklist, yielded two subscales--an 8-item Negative Symptoms Subscale and a 4-item Positive Symptoms Subscale. The validity of each of these subscales was assessed by correlating each of them two previously validated trait measures of symptom reporting.

Both trait measures (the Hypochondriasis subscale of the MMPI, and the PILL) were designed to measure a subject's general symptom reporting tendencies. The state measure of symptom reporting, the Negative Symptoms Subscale and the Positive Symptoms Subscale, were intended to assess a subject's situation-specific symptom reporting behavior. Symptoms are typically understood as representing an underlying pathology (Davidson & Baum, 1986; Gold, 1986; Pennebaker, 1982; Pennebaker & Beall, 1986). The reporting of physical symptoms is a

stable, unidimensional construct, that involves negative cognitive, affective, and physiological processes (Pennebaker, 1982). Research has demonstrated, however, that symptom reporting behavior is influenced by expectations (Burnam & Pennebaker, 1977; Pennebaker & Skelton, 1981). Bandura (1986) noted that the influence of such mediating variables helps to explain why trait measures of symptom reporting are poor predictors of situation-specific symptom reporting behavior. In this study it is likely that mediating variables affected in-task and post-task symptom reporting behaviors. For instance, the knowledge that peers would be participating may have encouraged peak performance among some subjects. Others may have responded to the novelty of the experimental setting. These types of effects were not measured in the current study.

Based on the above, a moderate positive correlation was expected between the state and trait measures of negative symptom reporting; a moderate negative correlation was expected between the trait measure of negative symptom reporting and the state measure of positive symptom reporting.

The pattern of correlations offered weak support for the fact that the newly devised Positive Symptom Subscale was measuring positive symptoms, and moderate support that the Negative Symptom Subscale was measuring negative symptoms. The two-step procedure to validate the task and the state measure of symptom reporting provided sufficient evidence to support the belief that fatigue was being induced, and that post-task positive and negative symptoms were being measured.

Pre-treatment Measures

Sons and Daughters were randomly assigned to either a Symptom-sensitized or a Slide-sensitized condition. Each Mother received the same treatment as her Son or Daughter. The first set of analyses determined that no pre-treatment differences existed among Symptom- and Slide-sensitized groups on trait symptom reporting, state anxiety, social desirability, baseline fatigue, and the endorsement of MMPI items that would suggest hypochondriasis, depression, or hysteria. A generation effect emerged, demonstrating that Mothers achieved significantly lower scores on the trait measure of symptom reporting than did their Sons.

Hypotheses 1 and 2

The first two hypotheses of this study referred to the notion that mothers and their adolescents would be similar on state and trait measures of symptom reporting. These hypotheses were not supported.

Trait symptom reporting was measured by the PILL. State symptom reporting was measured using the two subscales of the Post-task Symptom Checklist--Positive Symptoms and Negative Symptoms. No significant correlations were observed between the scores of Mothers and Sons, or between those of Mothers and Daughters. Hypotheses 1 and 2 received no support.

As noted in the literature review of this paper, many studies (Bortner, Rosenman, & Friedman, 1970; Bush & Melamed, 1986; Christensen & Mortensen, 1975; Sweda et al., 1986; Turkat, 1982; Whitehead et al.,

1982; Whitehead et al., 1986) have purported to demonstrate the existence of family aggregation of traits and behaviors. From the critical review that was presented earlier, it must be remembered that methodological problems have plagued those investigations.

Consequently, questions must be raised about the accuracy of their findings. The results from the current experimental research suggests that the concept of family aggregation of symptom reporting is inadequate in accounting for situation-specific behaviors exhibited by mothers and their adolescents. Mediating variables need to be integrated into studies that examine parent-child relationships. This suggestion will be discussed more fully later in the Discussion.

Hypotheses 3 to 5

Hypotheses 3, 4, and 5 dealt with the treatment effects that were expected to result from exposure to the symptom-sensitizing and slide-sensitizing tapes. Hypothesis 3 was posited that compared to the Slide-sensitized subjects, those who were exposed to the symptom-sensitizing tape would report more post-task (state) symptoms. Analyses demonstrated that this hypothesis was supported for the Negative Symptoms Subscale, but not for the Positive Symptoms Subscale.

Hypotheses 4 and 5 posited that on-task behaviors would be affected by the experimental manipulation. A MANCOVA demonstrated that no effect emerged as a result of the experimental manipulation. On the other hand, compared to their Sons, and to the Daughters, the Mothers of Sons remained on-task for a significantly longer time. There were no between-

group differences in the mean fatigue level reported by the Sons and their Mothers.

Several factors may have contributed to the lack of significant on-task differences between the Symptom- and the Slide-sensitized subjects. The work of Pennebaker and his colleagues (Barr, Pennebaker & Watson, 1988; Pennebaker & Lightner, 1980; Pennebaker, Skelton, Wogalter & Rodgers, 1978) suggests that instructing subjects to attend to internal cues should result in increased post-task symptom reporting. This post-task difference did occur in the current study. It can be accepted, therefore, that the Symptom-sensitized subjects were internally focussed. On the other hand, the slide-sensitizing tape that was used to assist subjects in making their interest ratings may not have provided appropriate information to encourage subjects to focus on the slides, rather than on their physical symptoms. Recall that subjects were asked to give a fatigue rating every 30 seconds. By doing so, they were in effect being asked to focus on their fatigue, rather than on the slides. It is possible that the slide-sensitized subjects were prevented from experiencing the external focus that the manipulation attempted to produce. Alternatively, it may have been that the fatigue-inducing task was so effective in rapidly producing fatigue in both symptom-sensitized and slide-sensitized subjects that the slides were unable to provide the desired re-direction away from the fatigue-related symptoms. An ANOVA demonstrated no significant differences among the interest ratings of Symptom- vs. Slide-sensitized Mothers, Sons, or Daughters. The mean interest ratings in these eight groups ranged from

5.33 to 6.55 (on a 10-point scale). This indicated that the slides were of moderate interest to subjects, irrespective of the treatment condition to which they were exposed. It may be that even though there was moderate interest, the salience of task-related fatigue was too high to be offset by distracting slides.

Researchers who wish to compare the on-task performance of mothers and adolescents engaged in a fatigue-oriented exercise are faced with a difficult problem. The physical strength of mothers, sons, and daughters varies. An appropriate task must be fatiguing enough to achieve the desired effect among the physically fit members of each group. At the same time, however, the task must be mild enough not to unfairly reduce the ability of less fit subjects to persevere. These two requirements eliminate the use of such fatigue-inducing techniques as floor exercises, aerobics, and the construction of weights based on maximum hand-grip strength. Initially, the fatigue task that was intended for use in this study was one that measured each subject's maximum hand grip strength to determine the weight that would appropriately induce fatigue. This methodology was developed by Matthews and Volkin (1981) to examine the performance of healthy children with the Type A vs. Type B behavior pattern. The weights proved to be an inappropriate method to use with adults. The first two mothers whom we attempted to include in the study, would have been required to hold a weight of 32 and 29 pounds, respectively. The weights that were calculated for their respective son and daughter were 17 and 14 pounds. It was readily apparent that these weights would

induce fatigue very rapidly. In an effort to utilize a task that would provide a slower onset of fatigue, it was decided to employ an isotonic exercise (arm-extension), without the addition of a weight. The amount of missing data that occurred after the third minute of the arm-extension task suggests that for many subjects, fatigue had a more rapid onset than was expected. If future researchers in this area can identify a task with a slower fatigue-onset time, between-group differences may be observed in on-task performance.

Hypotheses 6 to 10

Hypotheses 6 to 10 referred to the notion that Mothers and their Sons, as well as Mothers and their Daughters would demonstrate positive correlations on one state measure (state anxiety) four trait measures (social desirability, hypochondriasis, depression, and hysteria), and four behavioral measures (total time engaged in the task, the fatigue ratings given throughout the task, the highest fatigue level reported, and the mean fatigue level). These hypotheses were not supported. These findings suggest that family aggregation did not exist on any of these variable among this sample of Mothers and their respective Sons and Daughters.

Supplemental MANCOVAs Used to Examine Post-task Symptom Reporting

The final series of supplemental analyses was conducted to compare the post-task symptom reporting of Mothers, Sons and Daughters. This time, however, rather than grouping subjects according to treatment condition, an in-task behavioral measure was used. Individuals were

classified according to how effectively they persisted in the experimental task. Three levels of the Persisters factor were created. That is, subjects who reached the highest fatigue level of 10 and continued were identified as Stoics; those who reached 10 and immediately ended the experiment were labelled Reachers, and subjects who terminated the task prior to reaching the highest fatigue level were identified as Enders. This method of grouping subjects yielded the most interesting findings.

A MANCOVA revealed a main effect for the Persisters factor. Post-hoc comparisons indicated that the Stoics reported significantly more negative symptoms than did the Reachers or Enders. In addition, the Enders reported significantly more symptoms than did the Reachers. Stoics by definition remained on-task longer than did either the Reachers or Enders. Nonetheless, Stoics were not individuals who were oblivious to their fatigue or the negative symptoms that were being produced by participation in a fatigue-inducing task. Rather, they appeared to be quite aware of these effects but they were willing to bear with the strain and remain task-oriented.

The response to the perceived feelings of fatigue was the most important variable in determining whether a Mother, Son, or Daughter was classified as a Stoic, a Reacher, or an Ender. The following pattern was evident. For the Mothers/Sons analysis, an identical number of Mothers and Sons were classified into three groups representing decreasing evidence of coping with a fatigue-inducing task. The percentages of Mothers and Sons that were classified into each category

included: Stoics (44%), Reachers (20%), and Enders (36%). Mothers and Daughters showed the following distribution: Stoics (35%), Reachers (24%), and Enders (41%). Stoics were subjects who reported the highest fatigue level. The Reachers seemed to be aware of their fatigue but struggled to remain on-task until they had achieved a pre-defined goal--reaching the highest fatigue level. Once they attained that goal, the Reachers appeared unable to cope with their high level of fatigue so they terminated the task. Finally, the Enders appeared to be so acutely tuned in to their fatigue that they were unable to sustain involvement in the task. Their way of responding to the feelings of fatigue was to terminate the fatigue-inducing activity.

Chi-square analyses indicated that no significant age- or gender-related differences existed with regard to the distribution of Stoics, Reachers, and Enders across Mothers, Sons, and Daughters. Based on the above, it is concluded that meaningful groupings of subjects were formed based on their persistence during the fatigue-inducing task. In addition, there were no gender-related differences among Sons and Daughters.

The fact that an identical number of Mothers and Sons were classified as Stoics, Reachers, and Enders was intriguing. Follow-up analyses were undertaken to determine if, for example, a Stoic Mother had a Stoic Son. A kappa statistic indicated that a similar number of concordant (e.g. Stoic Mother, Stoic Son) and discordant (e.g. Stoic Mother, Reacher Son) dyads existed. A similar phenomenon was found among the Mothers and their Daughters. It was accepted then, that an

absence of family aggregation existed even when subjects were examined based on their on-task performance.

This study did not measure motivational factors, or cognitive processes that were responsible for the ability of the Stoics to persevere with the task. Further research needs to explore this issue. It remains to be determined whether coping with an experimental task is reflective of the way individuals cope with acute clinical conditions.

Summary and Limitations

One purpose of this research was to investigate the family aggregation of symptoms in an experimental setting. The data did not support the notion that Sons and Daughters are similar to their Mothers. No significant correlations were evidenced for the state or trait measures of symptom reporting of Mothers and Sons, or of Mothers and Daughters. The findings from the present investigation suggest that the popular understanding of the family aggregation concept (i.e. a direct relationship between mother and adolescent variables) is inadequate. It may be that the effect of parental behavior on adolescent behaviors is mediated by such factors as peer influence, social context, and the adolescent's need for an independent identity.

A related aspect of this study was the investigation of family aggregation on variables associated with symptom reporting. The absence of significant correlations on any of the state, trait, and behavioral measures confirmed the conclusion that the concept of family aggregation was not supported for subjects in this study. In the review of the

research into family aggregation, it was noted that methodological problems seriously compromised the validity of the findings that suggested children were similar to their parents. Some of these problems (e.g. retrospective design, lack of verification of parental behaviors) were controlled in this study, and no family aggregation emerged. Two possibilities can be used to explain this discrepancy. First, it is possible that family aggregation (i.e. a direct relationship between maternal and adolescent behavior) does not exist in a physically and psychologically healthy community-based sample. It may be that this relationship exists in physically or psychologically dysfunctional families, where extremely maladaptive behaviors are modelled. Second, family aggregation might exist, but the measures included in this study may not have been sensitive enough to detect similarities between mothers and their adolescents. The lack of strong empirical evidence in support of family aggregation suggests that the first explanation is more tenable.

The second major purpose of this study was to examine the effects of two types of instructional sets on the on-task and post-task performance of Mothers, Sons, and Daughters. Significant differences emerged between symptom vs. slide sensitized subjects on their post-task negative symptom reporting. No between-group on-task difference emerged. It is possible that the fatigue-oriented task that was developed for use in the study induced fatigue so quickly that group differences could not be seen. Further, it is possible that the two manipulations (symptom- vs. slide-sensitizing tape recordings) were

unable to produce the desired treatment effects. The second possibility appears less likely given that previous research (Pennebaker & Burnam, 1977) has successfully obtained differences in symptom reporting behavior by means of modest manipulations (i.e. inclusion vs. omission of symptom-sensitizing statements in pre-task treatment manipulation). A third possibility is also quite possible, though. That is, the task requirements may have forced even Slide-sensitized subjects to attend to their fatigue to such an extent that the intended manipulation was effectively eliminated.

Supplemental analyses categorized subjects into three groups (Stoics, Reachers, Enders) based on their on-task performance. This classification was used to examine post-task symptom reporting. It was determined that Stoics reported significantly more symptoms than either the Reachers or the Enders. A similar number of Mothers and Sons, as well as Mothers and Daughters were categorized into each of the three groups. Even when Mothers and their adolescents were classified in this way, no family aggregation of post-task symptom reporting emerged.

One qualification for the findings of this study is the fact that family aggregation of symptoms was studied using data from one child, and one parent, per family. When subjects learned about the real purpose of the study during the debriefing, many mothers commented that they would have volunteered another child had they known what was being studied. Many of the adolescents who participated noted that they were more like their fathers than their mothers. Whether the intuitive notions of these subjects can be borne out by empirical investigation is

not clear. Future research in family aggregation, however, ideally needs to involve both parents as well as all children.

A second qualification is that the sample size was not large enough to allow analyses to be conducted by age. The data do not permit examination of the effects that age may have exerted on the similarity between Mothers and their Sons or Daughters. No analyses could be conducted to compare Mothers' behavioral responses to younger vs. older Sons, or younger vs. older Daughters.

A third qualification of these empirical findings is that the fatigue-inducing task may have induced fatigue too quickly. A more effective task would be one that induces fatigue at a slower pace. As noted earlier, however, this is a challenging problem for researchers who are investigating healthy adults and adolescents.

Future Research

If the findings of this study are replicated despite using the entire family constellation, further research should be conducted to determine at what point parental influence ceases to be a primary variable in shaping the coping behaviors of children. The lack of similarity between mothers and their teens may be a reflection of peer influences, idealized social roles, and the adolescent's need for an independent identity. It is quite possible that a parent-child similarity in symptom reporting is strong in childhood, decreases during adolescence, and re-emerges as the teenager achieves a more autonomous view of himself/herself. Based on the work of Bandura (1986), it is

likely that on-task coping in this study was mediated by cognitive, social and physiological processes. These mediating variables need to be investigated in future well-controlled empirical investigations.

Finally, as noted above, it is important to determine whether the ability to cope with a fatigue-inducing experimental task is similar to the way in which individuals cope with acute pathological/clinical conditions. Similar research, therefore, must be conducted using a clinical population.

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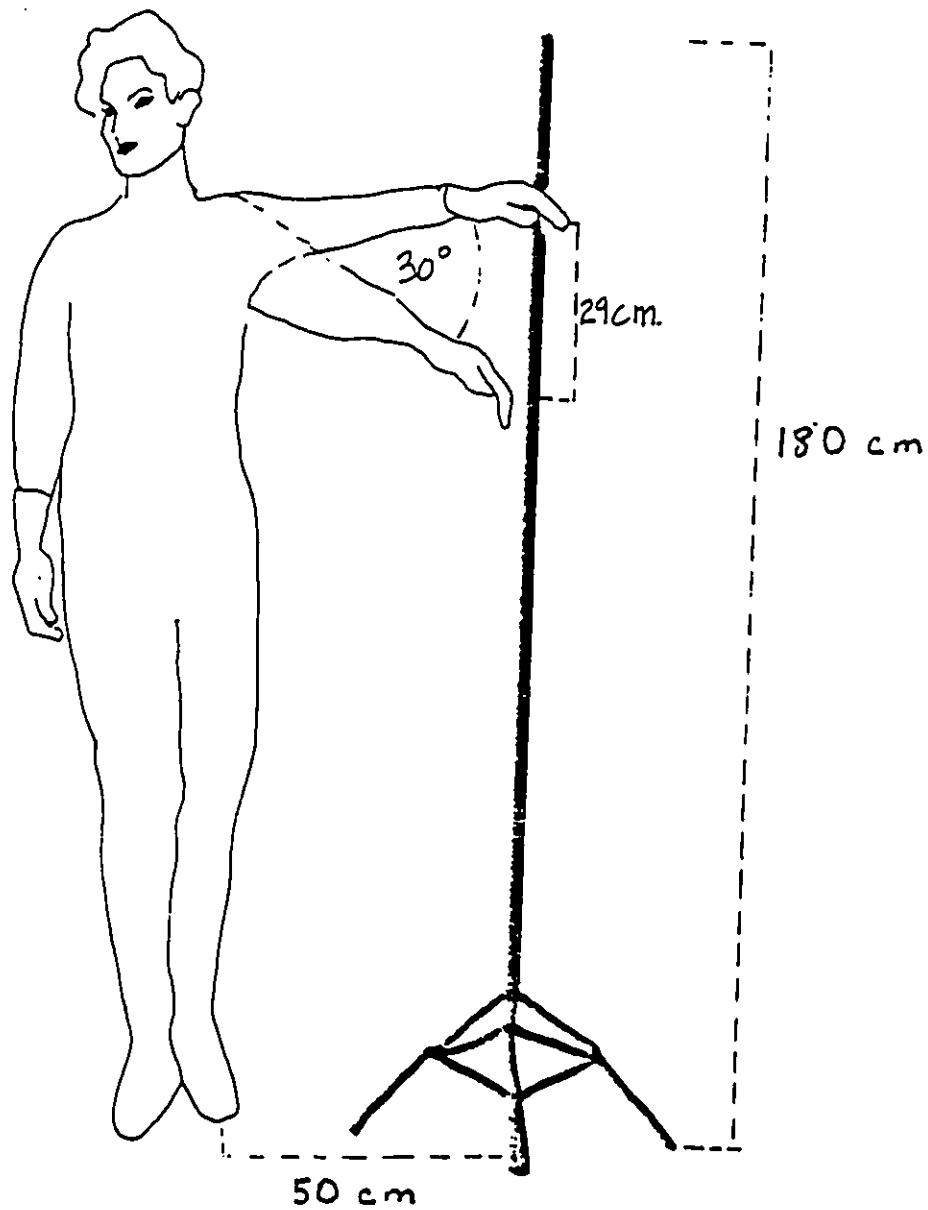
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Appendix A

Measurements to determine maximum deviation that each subject's arm is allowed from initial horizontal position.



Appendix B

Self-Evaluation Questionnaire: Form 1

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

	Not At All	Somewhat	Moderately So	Very Much So
1. I feel calm	()	()	()	()
2. I feel secure	()	()	()	()
3. I am tense	()	()	()	()
4. I am regretful	()	()	()	()
5. I feel at ease	()	()	()	()
6. I am upset	()	()	()	()
7. I am presently worrying over possible misfortune	()	()	()	()
8. I feel rested	()	()	()	()
9. I feel anxious	()	()	()	()
10. I feel comfortable	()	()	()	()
11. I feel self-confident	()	()	()	()
12. I feel nervous	()	()	()	()
13. I am jittery	()	()	()	()
14. I feel "high strung"	()	()	()	()
15. I am relaxed	()	()	()	()
16. I feel content	()	()	()	()
17. I am worried	()	()	()	()
18. I feel over-excited and "rattled"	()	()	()	()
19. I feel joyful	()	()	()	()
20. I feel pleasant	()	()	()	()

Appendix C

Self-Evaluation Questionnaire--3

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true (T) or false (F) as it pertains to you. Check the appropriate bracket. Go with your first judgment and do not spend too much time mulling over any question.

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

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

Appendix D

The PILL Scale: A Trait Measure

On the following pages several common symptoms or bodily sensations are listed. Most people have experienced most of these at one time or another. We are currently interested in finding out how common these symptoms are among healthy adolescents and their mothers. All information will be kept confidential.

Please respond by checking the appropriate letter for each question.

Have never or almost never experienced the symptom (A)	Less than 3 or 4 times per year (B)	Every month or so (C)	Every week or so (D)	More than once every week (E)
--	---	--------------------------------	----------------------------	--

For example, if your ears tend to ring once every week or so, you would check the brackets for "D" next to item #3.

	A	B	C	D	E
1. Eyes water	()	()	()	()	()
2. Itching or painful eyes	()	()	()	()	()
3. Ringing in ears	()	()	()	()	()
4. Temporary deafness or hard of hearing	()	()	()	()	()
5. Lump in throat	()	()	()	()	()
6. Choking sensations	()	()	()	()	()
7. Sneezing spells	()	()	()	()	()
8. Running nose	()	()	()	()	()
9. Congested nose	()	()	()	()	()
10. Bleeding nose	()	()	()	()	()
11. Asthma or wheezing	()	()	()	()	()
12. Coughing	()	()	()	()	()
13. Out of breath	()	()	()	()	()

Have never or almost never experienced the symptom (A)	Less than 3 or 4 times per year (B)	Every month or so (C)	Every week or so (D)		More than once every week (E)		
			A	B	C	D	E
14. Swollen ankles			()	()	()	()	()
15. Chest pains			()	()	()	()	()
16. Racing heart			()	()	()	()	()
17. Colds hands or feet even in hot weather			()	()	()	()	()
18. Leg cramps			()	()	()	()	()
19. Insomnia			()	()	()	()	()
20. Toothaches			()	()	()	()	()
21. Upset stomach			()	()	()	()	()
22. Indigestion			()	()	()	()	()
23. Heartburn			()	()	()	()	()
24. Severe pains or cramps in stomach			()	()	()	()	()
25. Diarrhea			()	()	()	()	()
26. Constipation			()	()	()	()	()
27. Hemorrhoids			()	()	()	()	()
28. Swollen joints			()	()	()	()	()
29. Stiff muscles			()	()	()	()	()
30. Back pains			()	()	()	()	()
31. Sensitive or tender skin			()	()	()	()	()
32. Face flushes			()	()	()	()	()
33. Severe itching			()	()	()	()	()
34. Skin breaks out in a rash			()	()	()	()	()

Have never or almost never experienced the symptom (A)	Less than 3 or 4 times per year (B)	Every month or so (C)	Every week or so (D)		More than once every week (E)		
			A	B	C	D	E
35. Acne or pimples on face			()	()	()	()	()
36. Acne or pimples other than face			()	()	()	()	()
37. Boils			()	()	()	()	()
38. Sweat even in cold weather			()	()	()	()	()
39. Strong reactions to insect bites			()	()	()	()	()
40. Headaches			()	()	()	()	()
41. Sensation of pressure in head			()	()	()	()	()
42. Hot flashes			()	()	()	()	()
43. Chills			()	()	()	()	()
44. Dizziness			()	()	()	()	()
45. Feel faint			()	()	()	()	()
46. Numbness or tingling in any part of body			()	()	()	()	()
47. Twitching of eyelid			()	()	()	()	()
48. Twitching other than eyelid			()	()	()	()	()
49. Hands tremble or shake			()	()	()	()	()
50. Stiff joints			()	()	()	()	()
51. Sore muscles			()	()	()	()	()
52. Sore throat			()	()	()	()	()
53. Sunburn			()	()	()	()	()
54. Nausea			()	()	()	()	()

DO NOT MAKE ANY MARKS ON THIS BOOKLET

1. I like mechanics magazines.
2. I have a good appetite.
3. I wake up fresh and rested most mornings.
4. I think I would like the work of a librarian.
5. I am easily awakened by noise.
6. I like to read newspaper articles on crime.
7. My hands and feet are usually warm enough.
8. My daily life is full of things that keep me interested.
9. I am about as able to work as I ever was.
10. There seems to be a lump in my throat much of the time.
11. A person should try to understand his dreams and be guided by or take warning from them.
12. I enjoy detective or mystery stories.
13. I work under a great deal of tension.
14. I have diarrhea once a month or more.
15. Once in a while I think of things too bad to talk about.
16. I am sure I get a raw deal from life.
17. My father was a good man.
18. I am very seldom troubled by constipation.
19. When I take a new job, I like to be tipped off on who should be gotten next to.
20. My sex life is satisfactory.
21. At times I have very much wanted to leave home.
22. At times I have fits of laughing and crying that I cannot control.
23. I am troubled by attacks of nausea and vomiting.
24. No one seems to understand me.
25. I would like to be a singer.
26. I feel that it is certainly best to keep my mouth shut when I'm in trouble.
27. Evil spirits possess me at times.
28. When someone does me a wrong I feel I should pay him back if I can, just for the principle of the thing.
29. I am bothered by acid stomach several times a week.
30. At times I feel like swearing.
31. I have nightmares every few nights.
32. I find it hard to keep my mind on a task or job.
33. I have had very peculiar and strange experiences.
34. I have a cough most of the time.
35. If people had not had it in for me I would have been much more successful.
36. I seldom worry about my health.
37. I have never been in trouble because of my sex behavior.
38. During one period when I was a youngster I engaged in petty thievery.
39. At times I feel like smashing things.
40. Most any time I would rather sit and daydream than to do anything else.
41. I have had periods of days, weeks, or months when I couldn't take care of things because I couldn't "get going."
42. My family does not like the work I have chosen (or the work I intend to choose for my life work).
43. My sleep is fitful and disturbed.
44. Much of the time my head seems to hurt all over.
45. I do not always tell the truth.

GO ON TO THE NEXT PAGE

46. My judgment is better than it ever was.
47. Once a week or oftener I feel suddenly hot all over, without apparent cause.
48. When I am with people I am bothered by hearing very queer things.
49. It would be better if almost all laws were thrown away.
50. My soul sometimes leaves my body.
51. I am in just as good physical health as most of my friends.
52. I prefer to pass by school friends, or people I know but have not seen for a long time, unless they speak to me first.
53. A minister can cure disease by praying and putting his hand on your head.
54. I am liked by most people who know me.
55. I am almost never bothered by pains over the heart or in my chest.
56. As a youngster I was suspended from school one or more times for cutting up.
57. I am a good mixer.
58. Everything is turning out just like the prophets of the Bible said it would.
59. I have often had to take orders from someone who did not know as much as I did.
60. I do not read every editorial in the newspaper every day.
61. I have not lived the right kind of life.
62. Parts of my body often have feelings like burning, tingling, crawling, or like "going to sleep."
63. I have had no difficulty in starting or holding my bowel movement.
64. I sometimes keep on at a thing until others lose their patience with me.
65. I loved my father.
66. I see things or animals or people around me that others do not see.
67. I wish I could be as happy as others seem to be.
68. I hardly ever feel pain in the back of the neck.
69. I am very strongly attracted by members of my own sex.
70. I used to like drop-the-handkerchief.
71. I think a great many people exaggerate their misfortunes in order to gain the sympathy and help of others.
72. I am troubled by discomfort in the pit of my stomach every few days or oftener.
73. I am an important person.
74. I have often wished I were a girl. (Or if you are a girl) I have never been sorry that I am a girl.
75. I get angry sometimes.
76. Most of the time I feel blue.
77. I enjoy reading love stories.
78. I like poetry.
79. My feelings are not easily hurt.
80. I sometimes tease animals.
81. I think I would like the kind of work a forest ranger does.
82. I am easily downed in an argument.
83. Any man who is able and willing to work hard has a good chance of succeeding.
84. These days I find it hard not to give up hope of amounting to something.
85. Sometimes I am strongly attracted by the personal articles of others such as shoes, gloves, etc., so that I want to handle or steal them though I have no use for them.
86. I am certainly lacking in self-confidence.
87. I would like to be a florist.
88. I usually feel that life is worth while.
89. It takes a lot of argument to convince most people of the truth.

GO ON TO THE NEXT PAGE

90. Once in a while I put off until tomorrow what I ought to do today.
91. I do not mind being made fun of.
92. I would like to be a nurse.
93. I think most people would lie to get ahead.
94. I do many things which I regret afterwards (I regret things more or more often than others seem to).
95. I go to church almost every week.
96. I have very few quarrels with members of my family.
97. At times I have a strong urge to do something harmful or shocking.
98. I believe in the second coming of Christ.
99. I like to go to parties and other affairs where there is lots of loud fun.
100. I have met problems so full of possibilities that I have been unable to make up my mind about them.
101. I believe women ought to have as much sexual freedom as men.
102. My hardest battles are with myself.
103. I have little or no trouble with my muscles twitching or jumping.
104. I don't seem to care what happens to me.
105. Sometimes when I am not feeling well I am cross.
106. Much of the time I feel as if I have done something wrong or evil.
107. I am happy most of the time.
108. There seems to be a fullness in my head or nose most of the time.
109. Some people are so bossy that I feel like doing the opposite of what they request, even though I know they are right.
110. Someone has it in for me.
111. I have never done anything dangerous for the thrill of it.
112. I frequently find it necessary to stand up for what I think is right.
113. I believe in law enforcement.
114. Often I feel as if there were a tight band about my head.
115. I believe in a life hereafter.
116. I enjoy a race or game better when I bet on it.
117. Most people are honest chiefly through fear of being caught.
118. In school I was sometimes sent to the principal for cutting up.
119. My speech is the same as always (not faster or slower, or slurring; no hoarseness).
120. My table manners are not quite as good at home as when I am out in company.
121. I believe I am being plotted against.
122. I seem to be about as capable and smart as most others around me.
123. I believe I am being followed.
124. Most people will use somewhat unfair means to gain profit or an advantage rather than to lose it.
125. I have a great deal of stomach trouble.
126. I like dramatics.
127. I know who is responsible for most of my troubles.
128. The sight of blood neither frightens me nor makes me sick.
129. Often I can't understand why I have been so cross and grouchy.
130. I have never vomited blood or coughed up blood.
131. I do not worry about catching diseases.

GO ON TO THE NEXT PAGE

132. I like collecting flowers or growing house plants.
133. I have never indulged in any unusual sex practices.
134. At times my thoughts have raced ahead faster than I could speak them.
135. If I could get into a movie without paying and be sure I was not seen I would probably do it.
136. I commonly wonder what hidden reason another person may have for doing something nice for me.
137. I believe that my home life is as pleasant as that of most people I know.
138. Criticism or scolding hurts me terribly.
139. Sometimes I feel as if I must injure either myself or someone else.
140. I like to cook.
141. My conduct is largely controlled by the customs of those about me.
142. I certainly feel useless at times.
143. When I was a child, I belonged to a crowd or gang that tried to stick together through thick and thin.
144. I would like to be a soldier.
145. At times I feel like picking a fist fight with someone.
146. I have the wanderlust and am never happy unless I am roaming or traveling about.
147. I have often lost out on things because I couldn't make up my mind soon enough.
148. It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important.
149. I used to keep a diary.
150. I would rather win than lose in a game.
151. Someone has been trying to poison me.
152. Most nights I go to sleep without thoughts or ideas bothering me.
153. During the past few years I have been well most of the time.
154. I have never had a fit or convulsion.
155. I am neither gaining nor losing weight.
156. I have had periods in which I carried on activities without knowing later what I had been doing.
157. I feel that I have often been punished without cause.
158. I cry easily.
159. I cannot understand what I read as well as I used to.
160. I have never felt better in my life than I do now.
161. The top of my head sometimes feels tender.
162. I resent having anyone take me in so cleverly that I have had to admit that it was one on me.
163. I do not tire quickly.
164. I like to study and read about things that I am working at.
165. I like to know some important people because it makes me feel important.
166. I am afraid when I look down from a high place.
167. It wouldn't make me nervous if any members of my family got into trouble with the law.
168. There is something wrong with my mind.

Appendix F

Post-task Symptom Checklist (PSC)

Please check the box that most closely describes the symptoms or sensations that you are feeling RIGHT NOW.

	Not At All	Somehwat, A Bit	Quite A Lot
1. ringing in ear	()	()	()
2. good general muscle tone	()	()	()
3. lump in throat	()	()	()
4. out of breath	()	()	()
5. strong back	()	()	()
6. chest pains	()	()	()
7. racing heart	()	()	()
8. physically relaxed body	()	()	()
9. cold hands or feet	()	()	()
10. sturdy legs	()	()	()
11. even breathing	()	()	()
12. leg cramps	()	()	()
13. physically alert	()	()	()
14. upset stomach	()	()	()
15. clear head	()	()	()
16. pains or cramps in stomach	()	()	()
17. stiff arm muscles	()	()	()
18. settled stomach	()	()	()
19. back pain	()	()	()
20. firm grip	()	()	()
21. regular heart beat	()	()	()
22. athletic	()	()	()
23. tender skin on arm	()	()	()
24. flushed face	()	()	()
25. headache	()	()	()
26. comfortable body temperature	()	()	()
27. pressure in head	()	()	()
28. dizziness	()	()	()
29. relaxed arm	()	()	()
30. feel faint	()	()	()
31. numbness in arm or head	()	()	()
32. physically fit	()	()	()
33. legs shaking	()	()	()
34. hands shaking	()	()	()
35. strong arms	()	()	()

Appendix G

Visual Perception Recall Checklist (VPRC)

When completing this checklist, think of the slides that you saw during the arm-extension task. Please put a check mark inside the bracket that most closely describes the information that you remember seeing in the slides.

	Not at all	Once or twice	More than three times
1. young children	()	()	()
2. oceans	()	()	()
3. buildings	()	()	()
4. tall trees	()	()	()
5. falling snow	()	()	()
6. jungle animals	()	()	()
7. bushes	()	()	()
8. dolphins	()	()	()
9. elderly people	()	()	()
10. lakes	()	()	()
11. deserts	()	()	()
12. farm animals	()	()	()
13. waterfalls	()	()	()
14. fish	()	()	()
15. igloos	()	()	()
16. bird	()	()	()
17. dinosaurs	()	()	()
18. insects	()	()	()
19. rain	()	()	()
20. house pets	()	()	()
21. flowers	()	()	()
22. country roads	()	()	()
23. pyramids	()	()	()
24. cars	()	()	()
25. snakes	()	()	()



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Appendix H

Letter to Community Organizations

Dear

The Psychology Department of the University of Ottawa is currently conducting research into how adolescents and their mothers differ on a perception task. This study will measure a group of behaviors that we expect will be useful in future medical research. We are presently looking for subjects and are asking for your co-operation in helping us find mothers and adolescents who would be willing to participate.

The research we are running does not require participants to have any special skills. Mothers and adolescents will be asked to complete a few questionnaires and to engage in an arm-extension task for a standardized length of time. While they are engaged in the arm extension task, each participant will be asked to view a series of slides. The whole procedure will take about two hours to complete. Testing can be done at the University of Ottawa or, in many cases, at the site generally used by your organization.

We need a total of 120 adolescents (60 males and 60 females) and their mothers. The specific requirements that subjects need to meet are:

1. adolescents must be between the ages of 12 and 17, and
2. must have a mother who is willing to participate.

One of our researchers, Barbara Nolan, will be contacting you within the next two weeks. It is hoped that arrangements can be made at that time to have your organization take part in this study. In the meantime, if you have any questions, please contact Mrs. Nolan at 737-7160 or Dr. Patrick McGrath at 737-6643.

Sincerely,

Patrick J. McGrath, Ph.D.,
Career Scientist,
Adjunct Professor of
Psychology & Pediatrics.



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Appendix I

Bulletin Board Announcement

ATTENTION

Behavior Health Specialists at the University of Ottawa are looking for 240 mothers and adolescents to participate in a research study.

- GOAL:** To examine how groups of mothers and adolescents perceive things happening inside and outside their bodies during a simple exercise task.
- FUTURE APPLICATIONS:** To investigate if watching slides makes it easier for teens and adults to cope with difficult medical procedures, such as having X-rays, bone marrow aspirations, spinal taps, etc.
- REQUIREMENTS:** Individual testing of mothers and adolescents will involve three types of activities:
- a. completing several questionnaires
 2. participation in a simple exercise task (you DON'T have to be athletic or in good shape to do this task)
 3. rating the interest of visual slides
- TIME REQUIRED:** One testing that lasts about 1 1/2 to 2 hours
- WHO IS ELIGIBLE:** Any mother-son or mother-daughter pair can participate as long as the teenager is between 12 and 17 years of age
- DATES OF STUDY:** September 8 to December 18, 1987
- TIMES OF TESTING:** By appointment, all day Saturday and Sunday, as well as Tuesday, Wednesday, and Friday evenings
- PLACE OF TESTING:** University of Ottawa, Child Study Center
- If more than one mother-teen pair from the same neighborhood can be tested at one time, we will go to your home. So get a neighbor involved.
- HOW TO PARTICIPATE:** Contact Barbara Nolan, Researcher
University of Ottawa
Phone 737-7160 to arrange an appointment



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Appendix J

Agreement to Participate

The Department of Psychology, University of Ottawa, is currently conducting a study investigating the way mothers and their adolescents perceive things inside and outside their bodies. This study requires my child and I to complete several questionnaires each and to view some slides while we are participating in an arm-extension task. The study will take approximately two hours to complete.

I understand that if I agree to participate, and to authorize the participation of my son or daughter,

- (a) he/she and I will be asked to view some slides at the same time as we are extending the arm we DO NOT write with
- (b) my son/daughter and I are free to terminate the experiment at any time
- (c) any information my son/daughter or I give will be used in this study only
- (e) neither my son/daughter nor I will directly benefit from participating in this study

Are you OR your son/daughter currently under the care of a physician or psychologist for any acute or chronic disorder or condition? Yes ____ No ____

Have you ever been treated for arthritis? Yes ____ No ____

Have you ever been treated for heart problems, chest pains, difficulty breathing, shortness of breath? Yes ____ No ____

Has your child ever been treated for arthritis? Yes ____ No ____

Has your child ever been treated for heart problems, heart murmur, congenital heart condition, or chest pain? Yes ____ No ____

If you have answered "yes" to any of these questions, please discuss the problem with the researcher BEFORE beginning the exercise task.

Appendix J

Agreement to Participate (continued)

I have read the above and understand my role and that of my son/daughter in this study. I authorize his/her participation and I agree to participate.

Parent's Name (Please print)

Parent's Signature

Date

I have read the above instructions and understand my role in this study and I agree to participate.

Adolescent's Name

Adolescent's Signature

I have explained the nature of the study to the mother and adolescent and believe they have understood it.

Mrs. Barbara Nolan
Researcher

Researcher's Signature

Date

Signature of Witness

If you would like to receive a copy of the final group results, please write your address below. Results will be mailed to you when the study is completed--probably around November 1988.

Appendix K

Information Provided by Symptom-Sensitizing Tape

Thank you for participating in this study. During the next little while you are going to be performing two tasks. The first task is to keep your arm extended the way you were shown by the experimenter. It is important that you keep your arm within the boundaries that were set up for you. If you are right-handed, extend your left arm; if you are left-handed, extend your right arm. Please keep your arm extended until the experimenter tells you to stop. But remember, if you feel so tired that you can't continue, you may stop the study at any time.

Your second task will involve slides that will be projected onto the wall. Every 30 seconds or so, you will be asked to rate how interesting you think each slide is. When the voice on the tape recorder says interest rating, please pick a number between 0 and 10 that describes how interesting you think the slide is that you are watching at that moment. A rating of 0 will mean not at all interesting and a rating of 10 will mean extremely interesting. The chart on the wall will remind you of the rating scale you will be using.

In order for me to know how tiring it is for you to keep your arm extended, you will be asked every 30 seconds or so to tell me how tired you feel. The way you'll do this is by choosing a number from the second chart on the wall. The fatigue ratings range from 0 (which means not at all tired) to 10 (which means extremely tired). When the voice on the tape recorder says fatigue rating, please choose a number between 0

and 10 that describes how tired your arm feels at that moment. To familiarize yourself with the fatigue rating scale, please give the experimenter a fatigue rating that represents how tired you generally feel right now. (PAUSE).

Before you begin the arm-extension task, it may be helpful for you to know some of the symptoms reported by people who have already done this task. Some, or all of these things, may happen to you while you are extending your arm. For instance, your arm may become tired. If you continue to keep your arm extended after it has become tired, a couple of things may happen--your arm may begin to shake or feel numb. On the other hand, your arm and shoulder muscles may feel very strong, much stronger than you thought they were. During the task, your legs might begin to shake. Or, they may feel sturdy, like those of a well-toned athlete. Your heart might beat very quickly, or it may feel like it is pounding quite hard. This might make you feel like you are giving your heart the best workout it has had in months. You may also feel proud that you are capable of doing two things at once--giving fatigue and interest ratings at the same time as you are monitoring your arm to make sure it stays within the limits described by the experimenter. You may become dizzy or develop a headache or a sick stomach from keeping your arm extended. On the other hand, you may be able to think more clearly, or your stomach may become very settled during the time you are focussing on keeping your arm in the same position. All of these feelings are only temporary and should disappear after you have rested for a few minutes.

If you have any questions, please ask the experimenter. If not, please wait until you hear the first beep that sounds like this on the tape recorder. At the sound of the beep, please extend your arm so the task may begin. By the way, the beeps will continue periodically throughout the study. Please ignore them.

Appendix L

Information Provided by Slide-Sensitizing Tape

Thank you for participating in this study. During the next little while you are going to be performing two tasks. The first task is to keep your arm extended the way you were shown by the experimenter. It is important that you keep your arm within the boundaries that were set up for you. If you are right-handed, extend your left arm; if you are left-handed, extend your right arm. Please keep your arm extended until the experimenter tells you to stop. But remember, if you feel so tired that you can't continue, you may stop the study at any time.

Your second task will involve slides that will be projected onto the wall. Every 30 seconds or so, you will be asked to rate how interesting you think each slide is. When the voice on the tape recorder says interest rating, please pick a number between 0 and 10 that describes how interesting you think the slide is that you are watching at that moment. A rating of 0 will mean not at all interesting and a rating of 10 will mean extremely interesting. The chart on the wall will remind you of the rating scale you will be using.

In order for me to know how tiring it is for you to keep your arm extended, you will be asked every 30 seconds or so to tell me how tired you feel. The way you'll do this is by choosing a number from the second chart on the wall. The fatigue ratings range from 0 (which means not at all tired) to 10 (which means extremely tired). When the voice on the tape recorder says fatigue rating, please choose a number between 0

and 10 that describes how tired your arm feels at that moment. To familiarize yourself with the fatigue rating scale, please give the experimenter a fatigue rating that represents how tired you generally feel right now. (PAUSE).

Before you begin the arm-extension task, it may be helpful for you to know some of the things people look for when giving interest ratings of the slides. Some, or all of these features may influence your decision to rate a slide as extremely interesting or as not at all interesting.

For instance, many people are fascinated by color. Regardless of the content of the picture, those who find bright colors appealing will typically give high ratings to slides that contain a number of different shades or colors. Other people look for movement in the slides. For these people, pictures that indicate animals running, or snow falling are rated higher than slides that show still water or quiet country scenes. A third group of people tends to give the highest interest rating to slides that contain a variety of different features. For these raters, the most interesting pictures are those that have a lot of shapes or several humans or animals, or slides that allow the observer to move from one item to another and therefore not get bored by having to focus on any one feature for a long time.

But don't feel you need to use other people's likes and dislikes in deciding how interesting you think a slide is. There are no right or wrong answers. Each slide will be shown for 30 seconds, but you will be asked to rate the interest 15 seconds after you see the slide for the

first time. So, as you can tell, what we want is your first impression of each slide's interest.

If you have any questions, please ask the experimenter. If not, please wait until you hear the first beep that sounds like this on the tape recorder. At the sound of the beep, please extend your arm so the task may begin. By the way, the beeps will continue periodically throughout the study. Please ignore them.

Appendix M

Hierarchical Regression Analysis Used to Assess Quadratic Relationship
between Symptom Reporting Scores of Mothers and Sons.
and Mothers and Daughters

Variable	Adj. R-Sq.	F-Ratio	df	p-value
Mothers/Sons				
PILL	-.01	0.46	1,37	ns
PILL Exponential	-.01	0.99	2,36	ns
Hypochondriasis	-.03	0.01	1,37	ns
Hypochondriasis Exponential	-.05	0.02	2,36	ns
Negative Symptoms	-.01	0.82	1,37	ns
Negative Symptoms Exponential	-.03	0.52	2,36	ns
Positive Symptoms	-.02	0.31	1,37	ns
Positive Symptoms Exponential	-.03	0.36	2,36	ns
Mothers/Daughters				
PILL	-.02	0.18	1,38	ns
PILL Exponential	-.04	0.25	2,37	ns
Hypochondriasis	-.02	0.18	1,38	ns
Hypochondriasis Exponential	-.03	0.40	2,37	ns
Negative Symptoms	.02	1.71	1,38	ns
Negative Symptoms Exponential	.01	1.08	2,37	ns
Positive Symptoms	-.01	0.96	1,38	ns
Positive Symptoms Exponential	.07	2.54	2,37	ns