

HEALTH-RELATED BELIEFS  
OF  
CHILDREN WHO SOMATIZE

by

Renee L. Boomgaarden

A thesis submitted to  
the Faculty of Graduate Studies  
in partial fulfilment of  
the requirements for the degree of  
Master of Arts

Department of Psychology  
University of Manitoba  
Winnipeg, Manitoba, Canada

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## ABSTRACT

Using the Health Belief Model (Cummings, Becker, & Maile, 1980; Kirscht, 1974), the present study investigates the relationship of health-related beliefs of somatizing children and their mothers with frequency and intensity of the children's somatization. A comparison of 36 somatizing children and their mothers with 36 non-somatizing children and their mothers is also undertaken to investigate differences in health-related beliefs. The methodology involved a take-home and mail-back completion of questionnaires by mothers and their children attending an out-patient medical clinic.

Findings provide only limited support for the Health Belief Model as an appropriate framework for understanding somatization frequency and intensity in children. Only one health-related belief of somatizing children was associated as predicted with somatization frequency and intensity. The beliefs of mothers of somatizing children were not related to their children's somatization. As well, the somatizing and non-somatizing groups did not differ with regard to health-related beliefs. Number of health problems experienced by families and mothers' ratings of their children's health status were the only variables on which the two groups differed. Findings are discussed with regard to refinement of the theoretical model, the nature of the sample, methodological issues, and practical considerations. Directions for future research in this area are also discussed.

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## INTRODUCTION

### Childhood Somatization: A Review of the Literature

A physician is generally consulted by persons who feel ill and who are experiencing symptoms that are unusual, painful, and worrisome. The physician examines the patient, listens to the patient's report of symptoms, and may conduct diagnostic test. Suitable palliative measures are prescribed that will cure the illness and end the distressing symptoms. This traditional doctor-patient interaction may be problematic in the case of somatization, for either a demonstrable and identifiable disease cannot be found or the patient's reported symptoms are out of proportion to the degree of pathology present (Barsky, 1978). Diagnostic tests may prove to be negative and palliative measures cannot be guaranteed to be effective. As a result, the patient may continue to experience distressing symptoms and may be subjected to further consultations and diagnostic tests. People who somatize are considered to experience genuine pain and distress. The inability to find anything wrong can be exceedingly frustrating for both doctor and patient. Malingerers, or those who fake illness for gain, account for only a small percentage of those who somatize (Anstett and Collins, 1982). Organic disease is only rarely found in these originally diagnosed as somatizers (Barr and Feuerstein, 1983)

According to Anstett and Collins (1982), patients who somatize often present multiple physical complaints or symptoms that do not correspond to any known illness. Vague pains, headaches, gastrointestinal disorders (e.g., recurrent abdominal pain, colic, irritable bowel syndrome), and asthma are commonly reported by those who somatize (Anderson, Francis, Lion, and Daughety, 1978; Schwab and Traven, 1979; Starfield et al., 1980). Recurrent Abdominal Pain (RAP) appears to be the most common complaint reported by children who somatize, as evidenced by findings from epidemiological surveys (Starfield et al., 1980), and the attention it has received in the medical literature (Rosen et al., 1982). Somatization as defined in this proposal falls into DSM-III diagnostic category of Somatoform Disorders (American Psychiatric Association (APA), 1980), and would be represented by the specific diagnoses of Psychogenic Pain Disorder and Somatization Disorder (see Appendix A).

### The Nature of Bodily Symptoms

The pain and distress experienced by those who somatize are not considered to be imaginary or the result of faking. How then do such symptoms occur if there is no associated organic disease, or the perceived symptoms are of a greater magnitude than any organic condition present could warrant? It is not known how this actually occurs, but there are several plausible hypotheses that attempt to explain the phenomenon. According to Kirscht (1974), symptoms and bodily sensations occur almost all the time in almost all people. In light of this fact, Barsky (1979) has conceptualized somatization as the amplification of bodily sensations. According to Barsky all symptoms, whether disease based or not, result from the interaction of peripheral and reactive components. The peripheral component is the bodily sensation itself. The reactive component is the subjective level of distress that the peripheral sensation causes. Barsky hypothesizes that the perception of symptoms lies along a continuum of increasing magnitude. Those sensations at the lower end of the continuum are not readily noticed, such as rapid heart beat. Those sensations farther along the continuum, such as temporary muscle ache, are more readily noticeable and are usually dismissed. Those sensations at the highest end of the continuum, such as migraine and the pain of appendicitis, cannot be ignored. Barsky contends that those who somatize amplify bodily sensations that are normally



disregarded or minimized by other people. Barsky's account does not explain how or why this amplification actually takes place or the neural pathways that may be involved. It is thought that increased autonomic nervous system activity may be involved (Apley, 1975), which would increase the intensity of normal bodily sensations such as heart rate.

### Epidemiology

Somatizing patients make a considerable number of visits to primary care medical settings. Somatization is a phenomenon treated almost exclusively by the family physician or pediatrician. Medical journals frequently contain articles dealing with somatizing patients, who are often referred to as the worried well or crocks (Rosen et al., 1982). Medical legend holds that somatizing patients constitute 20% of a medical practice and that 50% of a physicians time is spent with this population (Rosen et al., 1982). Epidemiological studies have cited prevalence rates as high as 60% in the general population (Schwab and Traven, 1979). Estimates of somatization in the general population vary considerably (from 10% to 80%), presumably as a function of the characteristics of the sample, the types of symptoms considered to be somatic, and the stringency of the inclusion criteria. The percentages of medical patients diagnosed as having somatic complaints have been estimated at 10-15% (Anderson et al., 1978). Anstett and Collins (1982) suggested that the higher general population estimates may be due to the failure of physicians to properly diagnose somatic symptoms. Another explanation could be that not everyone who somatizes necessarily goes to the doctor.

According to Rosen et al. (1982), children and adolescents have traditionally been thought to somatize frequently. This belief has been upheld in the literature. Starfield et al.

(1980) studied the rate of somatization diagnoses in 47, 145 pediatric patients between the ages of 0-17 years. This population was a heterogeneous one gathered from seven primary care facilities from a variety of geographic regions in the U. S. The percentage of children in one year given a somatic diagnosis varied from 8-10% in the seven facilities surveyed. Recurrent abdominal pain, headache, and asthma were the most frequently reported symptoms at all seven sites. Apley, MacKeith, and Meadow (1978) found similar rates (from 5-15%) in a review of ten Scandinavian and British studies of abdominal pain, limb pain and headache in the general population of school children.

It appears that many children are brought to their pediatricians for physical complaints that have no organic basis. These children experience distressing symptoms, yet there is nothing medically wrong with them. If the rates for the epidemiological surveys are accurate, somatization can be considered a very serious problem for both the health care system and the many individuals who somatize. There has been very little controlled research concerning whether some children are more prone to somatize than other children. However, anecdotal evidence and case reports suggest that there may be common demographic and behavioral characteristics among those who somatize. Such reports should be interpreted with caution, however, and the conclusions that they offer considered speculative.

## Sociodemographic Characteristics

Age of Onset. Evidence from the literature suggest that while somatic or "functional" complaints can occur at any age, they are most likely to first occur between middle childhood and young adulthood (DSM-III, 1980). Apley (1975) found in an extensive investigation of Recurrent Abdominal Pain (RAP) in 118 children that boys were most likely to first experience pains by age five, while girls were more likely to first experience RAP between the ages of 8 and 10. Apley offered no explanation for the discrepancy between sexes. The ages of onset he reported are supported by anecdotal evidence from other studies (Christenson & Mortenson, 1975; Green, 1975; Hughes, 1984), although it is not clear whether these authors are referring to actual age of onset or simply the ages at which the children first came to medical attention. There does not appear to be much information regarding the age of onset of somatic complaints other the RAP. Friedman (1975) reported that in a sample of 74 children with RAP, headache, and other vague pains, the mean age for boys was 10.4 years across all complaints. The mean age for girls was 11.5 years across all complaints. Again, it is not clear how long these children had been experiencing the symptoms.

Sex. According to DSM-III (APA, 1980), both Psychogenic Pain Disorder and Somatization Disorder are diagnosed more often in females. Apley (1975) and Hughes and Zimin (1972) have noted in clinical practice an increased tendency for somatic complaints in girls. No explanation for this sex difference was offered by either study and it is unclear how many more women than men somatize or if the difference is significant.

Group affiliation. Barsky (1978), Mechanic (1972), and Rosen et al. (1982) stated that the poor, religious fundamentalists, those from rural areas, those with little education, medical students, and certain ethnic groups (Jew and Chinese) have been observed to somatize frequently. Several explanations have been offered to account for these group tendencies, although none have been empirically tested. For example, Barsky (1978) and Rosen et al. (1982) reported that somatization is hypothesized to occur in groups where the open expression of psychological distress is discouraged or where there is no vocabulary to express such distress. Group members are thus forced to express distress indirectly through physical and, thereby, appropriate means. This explanation is based on the belief that somatization is the physical expression of psychological stress.

Mechanic (1972) speculated that somatization may be a function of errors in symptom attribution. Medical students would typify such a group. Mechanic hypothesized that the combination of high stress, anxiety, and detailed but incomplete information about the symptoms of many illnesses would cause medical students to inaccurately attribute their physiological sensations to disease processes.

Anstett and Collins (1982) hypothesized that somatization occurs more often among lower socioeconomic classes and the less educated because physical illness is less stigmatized in these groups than are psychological problems. Although they do not appear to imply that the less educated and the poor are malingerers, Anstett and Collins also suggested that current disability programs such as Workman's Compensation make it difficult to file claims for disabilities related to emotional problems. This would thus reinforce the expression of stress through physical means. In addition, it could be that the poor and the less educated do not have the mental health resources that the more wealthy and more educated would have. The physician would thus become the primary source of support for less advantaged populations.

SES, culture, and educational level appear to be associated with the ways individuals report, interpret, and experience physical symptoms. It can be questioned whether group affiliation is the most productive way of explaining somatization. While researchers have hypotheses, they have

not determined empirically what it is about being members of the disparate groups just discussed that would make their members prone to somatization. In addition, while these groups are reputed to somatize, it is not known what proportion actually somatize.

Familial Influences. There is some evidence that experience with illness may be a common factor in those who somatize. McKeever (1983) stated that somatic complaints and concerns are consistently found in the healthy siblings of chronically ill children. Preoccupation with health, sleep disturbances, enuresis, recurrent abdominal pain, headache, and appetite disturbances are frequent noted in this population. It is presumed that the stress of having a chronically ill sibling leads these children to somatize, although the mechanics of such a process have not been elucidated. It may also be that children in these families become highly sensitized to illness and as a result somatize more. Another explanation is that being sick may be a way to compete for parental attention in these families.

Apley et al. (1978), Christenson and Mortenson, (1975), and Stone and Barbero (1970) have noted in limited research and clinical practice that children who somatize often have a parent who somatizes. Routh and Ernst (1984), compared the families of 20 children with RAP and the families of 20

children with organically based illnesses such as appendicitis and ulcers for evidence of somatization disorder. Only one child in the organic group had a first or second degree relative with somatization disorder, while half of the children with RAP had one or more first or second degree relative with somatization disorder. Information was gathered by interviewing the mothers in both groups. These findings would support the contention that somatization is behavior learned in the context of the family. However, it could also be argued that somatization occurs more often in certain families because of a genetic predisposition. There has been little research concerning the genetics of somatoform disorders, and the results have been inconclusive at best (Torgersen, 1986). Torgersen (1986) has conducted the only known published study of somatoform disorders in twins. Torgersen found a concordance rate of 29% ( $N=4$ ) in 14 monozygotic twins and a concordance rate of 10% ( $N=2$ ) in 21 dizygotic twins. While the higher concordance rate for monozygotic twins would indicate a genetic transmission of somatoform disorders, the difference between the two groups was not significant. In addition, Torgersen stated that it was impossible to estimate the impact that growing up together in the same family environment would have had on the development of a somatoform disorder. Torgersen states "a modest interpretation of my results is that somatoform disorders have a familial transmission, being either genetic or environmental" (p. 504).



### Psychological Characteristics

There has been some attempt in the literature to determine whether children who somatize present behavioral or psychological problems. Most reports are from anecdotal evidence and case studies, and their accuracy is difficult to determine. For example, Apley et al. (1978) described children who somatize as withdrawn, as presenting many fears, eating problems, school problems, and sleep disturbances, and as having inadequate social skills (undefined). Hughes and Zimin (1978) described children with Recurrent Abdominal Pain as compliant, serious, mature for their ages, excitable, passive, intensely concerned about family problems, having extensive knowledge of their family's health history, and having inadequate social skills (undefined). Due to the descriptive and anecdotal nature of these observations, it is impossible to assess the degree to which such statements are accurate.

Barr and Feuerstein (1983), in a more methodologically sound study, assessed the behavioral characteristics of 80 children with RAP. The index group was compared with a group of 82 children without RAP. Parents of both groups were asked to rate the children on 54 statements concerning various aspects of behavior, such as activity levels, sleep patterns, temperament, and emotional responsiveness. The children with RAP were rated as having significantly more sleep problems, headaches, illness experiences, eating

problems, sadness, bad dreams, and worries. They were also rated by their parents as being too neat and overly concerned with cleanliness. Barr and Feuerstein (1983) hesitated to state that the children with RAP exhibit more behavioral or psychological problems than do other children. They stated that, while the parents of children with RAP rated them as having significantly more behavioral problems, these parents may have been more inclined to report problems. The study took place in a medical setting and was part of a diagnostic evaluation. Similar behavior problems were also found in the non-RAP group. In addition, Barr and Feuerstein stated that because the children were rated on so many characteristics, it could be expected that two or three would exhibit significant differences by chance. The issue is further muddied by Apley's (1975) observation that 51% of school children with RAP have no distinguishing behavioral or personality characteristics and were described as "normal, average, good" (p. 42).

The evidence for behavioral and psychological problems in children who somatize is far from clear. While the children in Barr and Feuerstein's (1983) study exhibited many of the behaviors noted in the non-controlled case studies, the potential sources of bias in all studies would make any definitive statement concerning a common personality or behavioral profile in these children premature.

## Prognosis

It is difficult to assess the prognosis of somatization in childhood, as existing studies are few and poorly controlled. According to Christensen and Mortenson (1975) and Apley (1975), somatizing children are generally believed to lose their symptoms as they mature. This belief has not been substantiated in the few longitudinal studies that have been conducted. In a noncontrolled study, Apley and Hale (1973) interviewed 60 individuals hospitalized in childhood for Recurrent Abdominal Pain (RAP). Forty-two were experiencing RAP as well as other somatic complaints 8 to 20 years after their initial hospitalization. Those who continued to somatize into adolescence and young adulthood tended to be male and had parents who somatized. Females had a better chance of losing their abdominal pains but were more likely to develop other complaints, such as migraines and menstrual pain. Only 2 of 60 cases turned out to have had an organic basis at the follow-up. In another follow-up study, Christensen and Mortenson (1975) compared 34 patients admitted as children to hospital for RAP with a randomly selected control group. After 30 years, 18 of the original patients had persistent abdominal troubles. Most were given diagnoses of irritable colon (a non-inflammatory disorder of the colon characterized by colic, diarrhea, or constipation). Five of the former patients suffered from ulcers. The index group had significantly more non-gastrointestinal symptoms, such as

migraines and dysmenorrhea, than did the control group.

There appears to be a tendency for children with RAP to grow up to be adults with somatic symptoms. It is difficult to state conclusively that this is the case for all children who somatize. According to DSM-III (APA, 1980), both the Psychogenic Pain Disorder and Somatization Disorder can continue for years, although the course for the latter is more chronic. It is not clear, however, whether the individuals in the follow-up studies are representative of the majority of individuals who somatize. It is unknown at this time how the factors of severity and frequency of pain may influence long term prognosis. Epidemiological surveys do not suggest that somatic symptoms disappear as one ages, nor do the few longitudinal studies. The available information regarding somatization indicates that it can be a chronic disorder, but the factors that may influence prognosis are unknown at this time.

## Etiology

The tendency to somatize has been conceptualized and examined as a symptom of depression and, alternatively, as the result of stress. These two perspectives will be reviewed next, and a new perspective, the Health Belief Model, will be presented.

### Somatization and Depression

It is a widely held belief in medicine and psychology that depressed persons frequently somatize (Barsky, 1979; Katon, Kleinman, & Rosen, 1982). This belief has persisted despite a lack of empirical evidence linking the two phenomena (Armstrong, Goldbert, & Stewart, 1980) and the exclusion of somatization as a diagnostic indicator of depression in DSM-III (APA, 1980). For example, Katon et al. (1982a, 1982b) in a major review of 120 studies concluded that depression was the primary cause of somatization. Depressed persons who somatize are thought to minimize or mask the affective component of their depression and amplify their physical symptomology. According to Katon et al. (1982a), this occurs due to perceptual, cognitive, sociocultural, and childhood influences. Katon et al. (1982a) suggested that great numbers of individuals who go to their family physicians with physical complaints are in reality clinically depressed but are never properly diagnosed. Instead, their physical sensations are amplified, and unwary general practitioners

treat the symptoms and miss the depression entirely.

While the number of articles that Katon et al. (1982a, 1982b) reviewed is impressive, it is impossible to judge the accuracy of their conclusions. The authors did not include any contradictory findings or methodological critiques, making it appear that they accepted uncritically the findings of every study they reviewed. In addition, the exclusion of somatization in DSM-III as a diagnostic indicator of depression was not addressed.

#### Childhood Depression and Somatization.

There has been a great deal of controversy concerning childhood depression. As recently as the late 1960's it was thought that children could not become depressed (Kashani, Barbero, & Bolander, 1981). Through research and increased agreement on the criteria for childhood depression, children are now conceded to become depressed. According to Carlson and Cantwell (1980), the existing controversy concerns the form and quality of childhood depression. One position holds that childhood depression is similar if not identical to adult depression. This position is best represented by DSM-III (APA, 1980). The diagnostic criteria for depression are virtually identical for children and adults. The essential feature of depression is thought to be dysphoric mood, accompanied by apathy, fatigue, low self-esteem, problems in concentration, recurrent thoughts of death, and disturbances

in appetite, sleep and activity levels.

An alternative position is that children do not express depression directly. It is only through maladaptive behaviors such as somatic complaints, hyperactivity, aggressiveness, and school problems that depression in children is manifested (Malmquist, 1971a, 1971b). Depression is thus thought to be masked by other behaviors and disorders.

It appears that neither position concerning childhood depression has found total acceptance. According to Kazdin and Petti (1982) the concept of masked depression has fallen into disrepute. Research indicates that depression in children is readily evident through appropriate interview and diagnostic techniques. For example, Carlson and Cantwell (1980) examined depressive symptoms in 102 children between the ages of 7-17 referred for psychiatric assessment. All children were administered the Beck Children's Depression Inventory (CDI). The children were then interviewed and diagnosed using DSM-III criteria, independent of their scores on the CDI. Ninety-three children received DSM-III Axis I diagnoses which were spread over five categories: Behavioral Disorders, Emotional Disorders, Physical Disorders, Psychotic Disorders, and Affective Disorders. Twenty-eight children were given a diagnosis of Affective Disorder. Twelve of the 28 had an affective disorder only, and 16 had an affective disorder accompanied by another disorder such as conduct

disorder, attention deficit disorder, or anorexia.

All 93 children given DSM-III diagnoses were compared on their CDI performances and evaluated for dysphoric mood, low self esteem, anhedonia, fatigue, somatic complaints, suicidal ideation, and hopelessness. There were marked differences between children with affective disorders, even those with secondary diagnoses, and those children without affective disorders. Carlson and Cantwell (1980) state "two-thirds of the children with a diagnosis of affective disorder and behavior disorder said they were unhappy; only one fifth of the children with a behavioral disorder alone said they were unhappy. Children with anorexia nervosa and depression felt sad. Children with anorexia nervosa alone did not" (p.447).

Carlson and Cantwell suggest that the behavioral and emotional problems exhibited by children who also have an affective disorder may have mislead researchers and clinicians in the past. While these behavioral and emotional disorders may potentially mask a concomitant affective disorder, the mask is not that pervasive. The children with behavioral and emotional disorders with accompanying depression were more similar to the children with a sole affective disorder than they were to the children who had only a behavioral or emotional disorder. The question remains, however, as to the involvement of somatization in



childhood depression. Carlson and Cantwell reported that 64% (N=9) of the children with an affective disorder only reported somatic complaints, 44% (N=4) of those with an affective disorder and a behavior disorder reported somatic complaints, 30% (N=8) with a behavior disorder alone reported somatic complaints, 100% (N=5) with an affective disorder and another disorder reported somatic complaints, and 33% (N=2) of those children with anorexia reported such complaints. Unfortunately, Carlson and Cantwell did not determine whether the differences between the groups were significant.

In conclusion, Carlson and Cantwell were able to discriminate between depressed and non-depressed children using DSM-III criteria, and found that childhood depression is not necessarily masked by other behavioral and emotional problems. There appears to be dissatisfaction with the DSM-III criteria for depression in children, however, particularly with the absence of somatization as an important diagnostic indicator. Many researchers contend that while childhood depression is not masked, children who are depressed frequently somatize. Attempts to confirm this hypothesis have had mixed success and the results are not conclusive. Kashani et al. (1981) studied 100 children between the ages of 7 and 12, hospitalized for known or suspected medical illness. Each child was interviewed and rated on two diagnostic criteria for depression, namely DSM-III and the Bellvue Index of Depression (BID). The BID is similar to

DSM-III in that it considers dysphoric mood to be a prerequisite for a depression diagnosis. It differs from DSM-III by including somatic complaints as diagnostic indicators. Seven of the 100 children were diagnosed as having an affective disorder by both BID and DSM-III. Two children met criteria for BID by not DSM-III and were not included in the analysis. Six of the seven children diagnosed as depressed reported somatic complaints. Only 11% (N=10) of the non-depressed children reported such symptoms.

It is difficult to assess the importance of these findings for several reasons. First, Kashani et al. (1981) did not report the number of depressed children who were found to have organically based diseases. Second, the study appears to be dealing with the wrong question. It did not consider the proportion of children who somatize and who are also clinically depressed. Hughes (1984) attempted in a limited way to answer this question. He found that of 23 hospitalized children found to have nonorganic RAP, all were clinically depressed by DSM-III diagnostic criteria. Hughes cautions against generalizing his findings to all children who somatize. He stated that "the present approach is an expanded case report of a cross-sectional sample of a special group of children and their families with clinical observations by one observer, which has inherent limitations" (p. 154). These limitations, such as the lack of a control group and the lack of a randomized sample from inpatient and outpatient

populations, make it difficult to state conclusively that all children who somatize are clinically depressed. Hodges, Kline, Barbero and Flanery (1985), in a more methodologically sound study, compared rates of depression between 30 children with RAP, 67 children with behavioral disorders such as conduct disorder, and 42 normal children aged 7-16. The children were evaluated for depression with the CDI and the Child Assessment Schedule (CAS), a diagnostic mental status interview. The group of children with RAP and the normal group had significantly lower scores on the CDI than did the behavioral disorder group. The RAP group did not have any higher CDI scores than did the normal group. The CAS was unable to distinguish between the RAP group and the normal group on the basis of depression. Apley's (1975) report that more than half the school children with RAP whom he studied were emotionally and behaviorally undistinguished also warrants consideration.

It appears that depressed children may complain of physical symptoms that have no organic basis. It also appears that children who somatize may be depressed as well. It is not clear, however, what proportion of children who somatize are depressed, and the contradictory results of research in the area makes it difficult to reach any firm conclusion

#### Somatization and Psychosocial Stress

Rosen et al. (1982) defined somatization as "the

articulation of psychosocial stress by way of physical symptomatology" (p. 493). This is the most widely endorsed etiology of somatization. The term psychogenic is often used in this context to describe the symptoms. Many researchers have adopted the view that somatization in childhood is a direct response to stressors in the environment, such as family problems, school difficulties, and parental conflict. This position is advocated by Apley (Apley, 1975; Apley et al., 1978) who has conducted extensive work with children with recurrent abdominal pain and who is considered an authority on somatization in childhood. Barr and Feuerstein (1983), in a critical review of Apley's work, stated that while RAP is only one form of somatization, it is prototypical of all types of childhood somatization and the conclusions that Apley has drawn about the etiology of RAP can be extended to other forms of childhood somatization. Barr and Feuerstein (1983) stated that Apley (1975) has proposed three criteria for diagnosing RAP as a stress-related disorder:

- 1) Evidence should contraindicate an organic etiology.
- 2) There must be evidence that the child is exhibiting emotional or behavioral disturbances, and that physical symptoms are exacerbated when stress increases.
- 3) Symptoms should subside as emotional tension is removed through treatment.

According to Barr and Feuerstein (1983), Apley's first criterion has been substantiated. An organic cause is rarely found in somatization. The evidence for the other two criteria is not as clear cut, however, and will be discussed in some detail.

Apley's second criterion stated that the child must show signs of emotional or behavioral disturbances, and that the physical symptoms must worsen when stress increases. This criterion is two-fold. In addition to behavioral or emotional disturbances, there must be a temporal relationship between environmental stress and symptoms. There is some positive evidence to suggest that children with RAP, like children with other non-organic symptoms, exhibit emotional and behavioral disturbances. Barr and Feuerstein (1983) stated that while clinical reports suggest children with RAP experience many environmental stressors, few controlled studies have been conducted to verify such observations.

Hodges, Kline, Barbero and Flanery (1984) in their comparison of 30 children with RAP, 67 children with a behavioral disorder and 42 normal children attempted to assess environmental stresses in these three groups by measuring the number of stressful life events experienced by the children and their families during the 12 months preceding the study. Life events, such as moving to a new locality, the death of spouse or child, obtaining a new job, and losing or gaining friends, were measured with the Coddington Life Events Inventory and the Schedule of Recent

Experience. It was found that the children in the RAP group, and the children in the behavioral disorder group reported experiencing significantly more stressful life events than did the children in the normal group. In addition, it was found that compared to the behavior disorder group and the normal group, the RAP group reported experiencing significantly more health-related stressors such as hospitalization, sibling death, parental or sibling illness or hospitalization, and grandparent death. Hodges et al. (1984) cautioned, however, that their findings were made ungeneralizable to all children with RAP because the subjects were not matched, and the normal children came from families who reported experiencing fewer stressful events than expected. The problems noted by Hodges et al. (1984) in generalizing their findings are representative of the problems substantiating Apley's second criteria. It has not been possible to document a clear temporal relationship between the occurrence of the stressors and the onset or occurrence of symptoms. It is also not clear how stressful life events such as marital discord, family arguments, sibling illness, parental hospitalization, changes in environment, or school entrance maintain somatization over time. In addition, there is no conclusive evidence to suggest that children with RAP experience more stressors than do children without RAP, nor is it known if children with RAP cope with stress differently than do symptom free children.

In summary, while there is evidence to suggest that children with RAP do exhibit emotional and behavioral problems, the evidence linking environmental stressors to the precipitance and maintenance of symptoms is not clear. Certainly, anecdotal and clinical reports implicate stress and stressful events in RAP. It is not known what importance these stressful events have or if children who somatize use different coping strategies.

Apley's third criterion stated that symptoms should subside as emotional tension is removed through therapy. There is no substantive evidence to support this criterion. Treatment strategies utilizing behavior modification techniques (Wooley, Blackwell, & Winget, 1978) and a family systems approach (Leibman, Honig & Berger, 1977) have reported success in treating psychogenic or somatic pain. However, these treatment strategies did not attempt to reduce psychosocial or emotional stress as suggested by Apley, although there may have been an indirect reduction of stress through the interventions. For example, Wooley et al. (1978), in treating 300 inpatients with a variety of chronic illness behaviors (chronic headache, chronic psychogenic or somatic pain, uncontrollable diabetes, anorexia), presumed that such behaviors were perpetuated by social reinforcements from family members and secondary gains from being sick. Treatment consisted of reducing social reinforcements for the pain behavior, increasing independent care giving and coping

behavior, improving social skills, and self control of symptoms through biofeedback. A one-year follow-up of 36 patients indicated that 26 had few or no problems with physical symptoms; 10 continued to have physical problems and were considered program failures.

It is unclear whether reducing psychosocial stress will reduce somatic symptoms. No evidence currently exists that indicates a direct relationship between stress-reduction and symptom amelioration. Effective treatment strategies exist but they do not explicitly aim to reduce stress or tension.

Conceptualizing somatization as a stress related disorder can be criticized on several grounds. Simply stating that stress caused RAP or headache in a child tells very little why that particular child responded in that particular way. In making such a statement it is also necessary to propose a general mechanism of causality. In addition, such a conceptualization does not explain how such a response to stress could be maintained over many years and across many situations. Viewing somatization as simply a stress reaction tells us virtually nothing about those who somatize, the somatization experience, the stress that is supposedly causing the reaction, or the factors that may maintain it.

Godkin and Rice (1981) comment that methodological problems in stress research have made it virtually impossible



to determine whether causal relationships exist between psychosocial stress and illness behaviors like somatization. Many studies have relied on retrospective designs. In addition, researchers have used as subjects individuals with a particular disease and then have attempted to measure the stressful events that occurred prior to the onset of the disease. The potential sources of bias in these studies, such as inaccurate recall and nonrepresentative populations, make it difficult to show with any certainty what causal relationships between stress and illness may exist. In addition, Godkin and Rice comment that the reliance on clinical populations for subjects may confound stress events with behavioral patterns. By this, Godkin and Rice imply that such select populations may, besides experiencing stress, also display patterns of behaviors related to health facility utilization and help seeking that other individuals with similar stress and illness experiences do not display. This observation suggests that it may be profitable to determine whether those who somatize hold different health-related beliefs than do those who do not somatize. It is the aim of this study to investigate the health-related beliefs of children who somatize, utilizing the Health Belief Model.

#### The Health Belief Model

The Health Belief Model (HBM) was developed in the late 1950's to predict the probability of an individual engaging

in preventive health behaviors such as immunization and regular medical checkups. According to Cockerham (1982), the model is based on Kurt Lewin's value expectancy theory, which conceptualizes human behavior as occurring in a life space consisting of regions with positive and negative values or valences. People are assumed to be attracted to or repelled from a region in the life space (i.e., from performing or not performing a particular behavior) depending upon the region's value or valence. Cockerham related this to illness by stating:

An illness would be a negative valence, and would have the effect of pushing a person away from that region unless doing so would cause the person to enter a region of even greater negative valence (e.g., risking disease might be less negative than failing at an important task). Thus, a person's behavior might be viewed as the result of seeking regions which offer the most attractive values (p. 91).

In Lewin's theory, according to Cockerham, the chance of a behavior occurring depends upon the perceived value of the outcome of the behavior and the belief that engaging in the behavior will produce the expected outcome. The influence of Lewin's theory can be seen in the description of the original HBM by Becker et al. (1977), who stated:

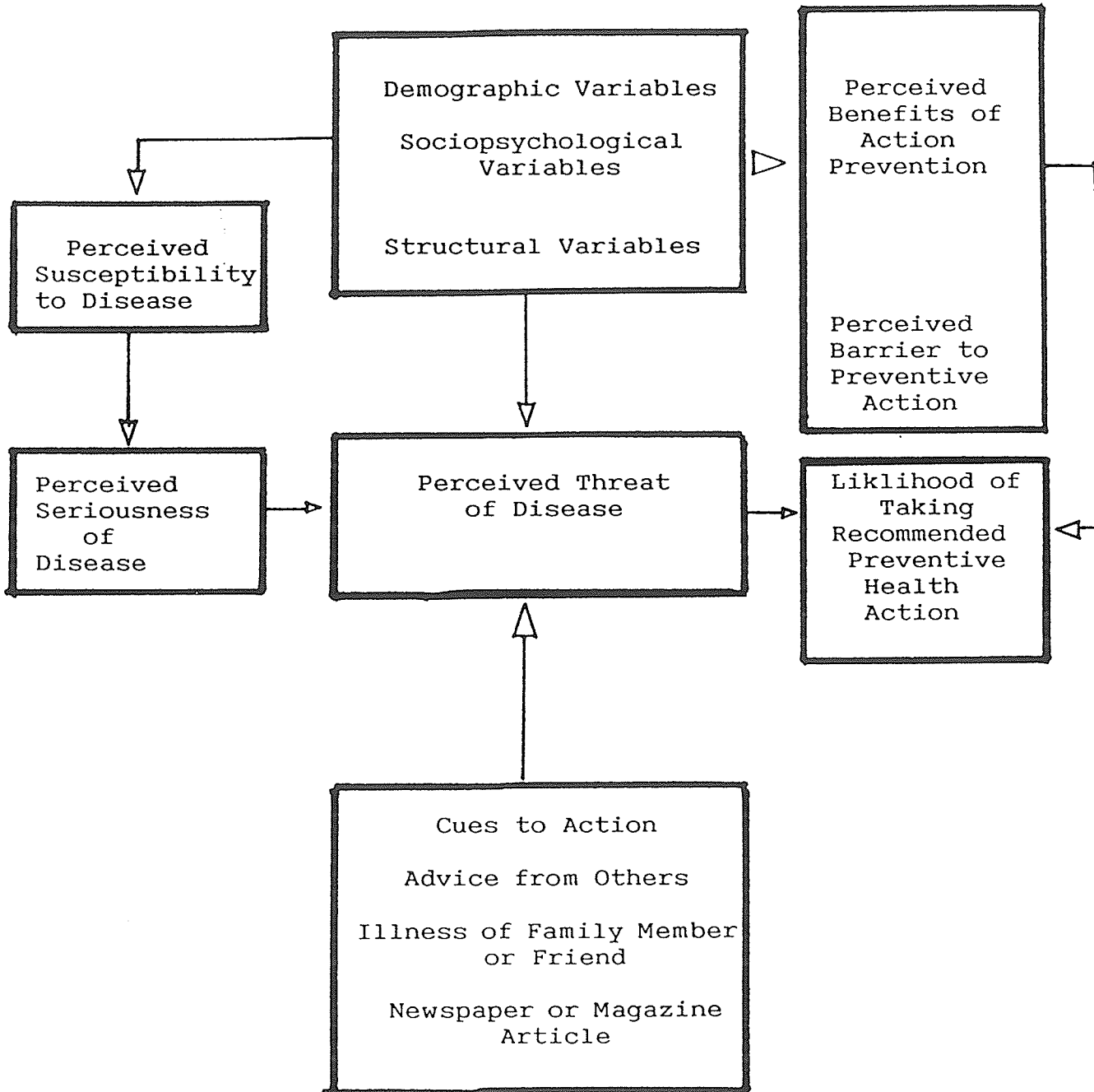
"As it was originally conceived, the Health Belief Model hypothesized that persons will generally not seek preventive care or health screening unless they

possess minimal levels of relevant health motivation and knowledge, view themselves as potentially vulnerable and the condition as threatening, are convinced to the efficacy of the intervention, and see few difficulties undertaking the recommended action" (p. 29).

The model has been expanded over the years and the variables thought to influence health-related actions have been made more explicit. The following diagram represents the HBM as currently formulated (see Figure 1). The HBM attempts to predict how likely the health-related action is to occur and to identify the factors that influence the likelihood of the action. The four major variables in the model are readiness to take action (determined by perceived susceptibility to health problems), perceived benefit of taking action, cues to action (internal, such as physical symptoms, or external, such as media messages), and modifying factors. According to Stone (1980), the model only makes relative, as opposed to absolute, predictions. "The theory does not specify what the functions are that relate these variables, nor how the the values of the variables arise and change" (p. 73). Using the decision to obtain the chest x-ray for tuberculosis screening as an example, the HBM would predict that a woman who perceived herself to be susceptible to tuberculosis, felt that the benefit of obtaining an x-ray was greater than the cost (such as time, money, pain), and who had been exposed to a media message about tuberculosis, would be more likely to obtain a chest x-ray than a woman who

FIGURE 1

The Health Belief Model  
(Cockerham, (1982))



did not feel susceptible to tuberculosis, felt that the cost of obtaining one was greater than any benefit that could be gained by one, and who had not been exposed to any media message concerning the dangers of tuberculosis. Modifying factors are not considered to be direct causes of health actions in the HBM, according to Becker (1979), but are considered to influence all of the model's belief dimensions.

Cockerham (1982) stated that the HBM has been applied with success in predicting a variety of health behaviors such as receiving influenza vaccinations, getting dental treatment, and dietary compliance in obese children. Cockerham states "help seeking behavior was observed in each of these studies to be based upon the value of the perceived outcome (avoidance of personal vulnerability) and the expectation that preventive action would result in that outcome" (p. 93). Stone (1980) stated that the HBM has received much interest and attention since its inception, and has spawned a considerable body of research over the years. Stone cautions, however, that the model is constantly evolving and should not be considered completed.

One reason for the need to adjust and alter the HBM has been the attempt to analyze non-preventive health care behaviors such as illness behaviors and sick role behaviors with the HBM approach. In order to predict the occurrence of these behaviors, researchers have developed models that are

not identical to the HBM as reported by Cockerham (1982), yet contain similar or identical predictive variables (Becker, 1979; Cummings, Becker, & Maile, 1980; Kirscht, 1974). Indeed, so many models have been developed that it is often difficult to determine what variables are important in predicting health-related behaviors and what model is most appropriate to use as a framework.

Cummings et al. (1980), in response to the confusion generated by the burgeoning number of theoretically distinct models, analyzed the 14 most prominent to determine what factors, if any, were held in common. It was felt that despite the diversity in theoretical perspectives, labels, and terms, the actual concepts used to predict health-related behaviors in each model were very similar. Cummings et al. (1980) found that the 14 models, including the HBM, contained 100 variables deemed to be important in predicting and understanding health-related behaviors. The authors of the original models were asked to serve as raters in comparing the set of 100 variables and placing them in categories based on similarity. The structural similarities between the models were assessed using a Smallest Space Analysis, which is a method of nonparametric multidimensional scaling. This analysis would determine the magnitude of relatedness between variables by counting across raters the number of times a pair of variables was grouped together. Cummings et al. (1980) found that the variables fell into six distinct clusters:

- 1) Factors related to accessibility to health services, such as availability of health care and the ability to pay for health services.
- 2) Factors related to the individual's attitudes toward health care, such as the perceived benefits of seeking care, the perceived value of health, attitudes toward health care providers, and the perception that health actions will lead to desired outcomes. The term Health Motivations was used in the HBM to refer to these attitudes.
- 3) Factors related to knowledge about disease, such as knowledge about symptoms, etiology, and prognosis of various diseases.
- 4) Factors related to the threat of illness, such as perceived susceptibility to illness, symptom sensitivity, perceived seriousness and severity of illness.
- 5) Factors related to an individual's social network, such as social norms which affect health actions, social support for taking health actions, and the degree to which symptoms may disrupt social activities.
- 6) Demographic characteristics, such as income, educational level, and social status.

Cummings et al. (1980) pointed out that this study only attempted to clarify the general factors that the major models of health-related behavior deem to be important. The next step involves determining how these factors interact to influence specific health-related actions. Cummings et al. (1980) stated:

The attribution of causal factors can be accomplished through causal models which incorporated theory, knowledge about the population, knowledge about the setting, and knowledge about the specific behavior under investigation (p. 139).

Cummings et al. (1980) do not advocate any one model to explain all health-related behaviors. Instead they suggest that researchers utilize the six general factors along with a specific theory appropriate for the health-related behavior in question. Somatization is an illness behavior, and it will be analyzed in terms of the HBM and the factors generated by Cummings et al. (1980).

### Illness Behavior, Somatization, and Health Beliefs

Kirscht (1974) stated that the basic questions concerning illness behaviors are what will people do when faced with symptoms and why will they do it: Mechanic (1962) defined illness behaviors as "the ways in which given symptoms may be differentially perceived, evaluated, and acted (or not acted) upon by different kinds of persons" (p. 198). Becker (1979), a proponent of the HBM, believes that



illness behaviors can be analysed in HBM terms. Becker (1979) and Mechanic (1978) have contended that illness behavior begins with the experience of symptoms. Becker (1979) stated that in the HBM:

Symptoms may have a dual role: as cues regarding the presence of conditions (in the HBM sense of "cues to action") and as often-disruptive threats to functioning in themselves (p. 260).

Becker (1979) continued translating illness behaviors into HBM terms by stating that the determination of a health action as beneficial could involve how well the action alleviated symptoms and/or if the action resulted in a permanent remedy of the symptoms. Becker also hypothesized that the perception of symptoms is closely related to the HBM variable of perceived vulnerability.

Kirscht (1974), coming directly from the HBM tradition, has more formally conceptualized how illness behavior can be explained in HBM terms. Kirscht (1974) feels that the key factors determining illness behaviors are:

- 1) Health motivations, or the degree of concern for health matters. Health motivations are aroused when symptoms occur.
- 2) The threat posed by the symptoms. This includes physical harm and interference with day to day functioning.

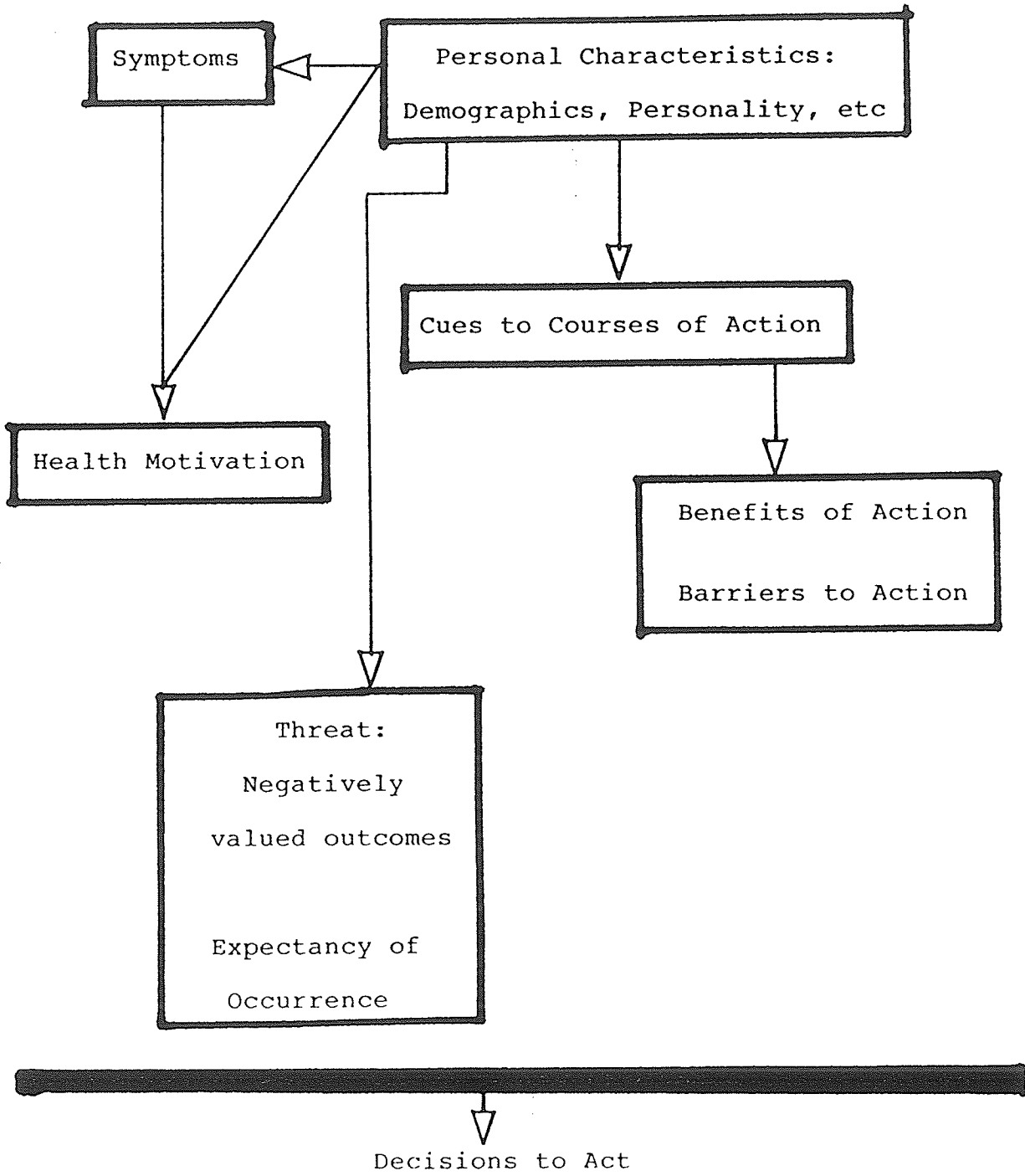
- 3) The benefits, efficacy, or value of an action to reduce threat, such as staying home in bed, going to the doctor, or reporting pain and symptoms.
- 4) The barriers or cost of actions.

Kirscht's model of illness behavior is portrayed in Figure 2. Becker (1979), Mechanic (1978), and Kirscht (1974) have suggested that the symptom experience is essential for any illness behavior to occur. The HBM approach to illness behaviors assumes that an individual evaluates vulnerability, threat, benefits of taking action, and barriers to action. The model also posits that variables such as sociocultural influences, personality factors, and demographic characteristics influence illness behaviors. The model does not state how all the proposed variables interact to influence illness behavior, nor what variables other than the symptom experience are most important in predicting illness behaviors. The model assumes that what one believes about health and illness is essential in determining how a person will behave regarding his or her health.

According to Jordan and O'Grady (1983), it has not been easy to determine how one's health beliefs affect one's illness behavior. The original HBM on which researchers have based their approaches is intended to predict preventive health care behavior. It is thus health oriented and tries to determine what people will do regarding their health in an

FIGURE 2

The Health Belief Model of Illness Behavior  
(Kirscht, 1974)



asymptomatic state. The concern with illness behaviors, on the other hand, involves people's actions when they are symptomatic. This difference in emphasis has not been addressed in any depth in the literature and it appears that it is not considered a serious problem. A more serious problem, according to Jordan and O'Grady, is a methodological one stemming from the diversity of illness behavior. The original HBM accounts for only one class of behaviors. It is assumed that possessing the "proper" combination of health beliefs (such as believing that one is susceptible to disease and that there are benefits in taking preventative actions) will predict whether or not any preventative action will be taken. Illness behavior, on the other hand, is an exceedingly variable concept. Researchers have studied how people interpret symptoms, decisions to seek care, decisions to self treat, admitting pain, delaying seeking diagnosis in the face of symptoms, and medical facility use. All are influenced by different factors. As Jordan and O'Grady state, "the relationship between health beliefs and illness behaviors depends on the outcome measures employed" (p. 63). For example, the perception of increased symptom severity is thought to be the most influential belief related to medical facility utilization. However, the willingness to admit pain and to report symptoms appears to depend upon age, sex, and personal beliefs about vulnerability (Campbell, 1975; Mechanic, 1964).

#### Somatization as Illness Behavior

The HBM approach to illness behavior considers the

symptom experience and its interpretation as the key factors in determining illness behaviors. The model presumes that an evaluative decision-making process takes place at some level in which threat and severity are assessed, the benefits and barriers of action are weighed, and modifying factors and health motivations interact to determine what action will be taken. Somatization, in terms of the HBM and the factors generated by Cummings et al. (1980), would involve several stages culminating in a decision to seek treatment:

- 1) Perception of a physiological sensation (possibly due to increased stress with concomitant physiological arousal).
- 2) Interpretation of the sensation as a symptom. This could involve an analysis of severity along with an analysis of potential threat. This step involves a subjective assessment of vulnerability to illness, disease, or accident. Mechanic's (1972) supposition that individuals who somatize err in symptom attribution is relevant to this step. It may be that persons who somatize interpret many physiological sensations as symptoms and perceive those symptoms as threatening. If individuals perceived themselves as vulnerable to illness and felt that the threat was great enough, then the next step could be taken.

- 3) Symptom reporting to self or others. This step is dependent upon the individual's willingness to admit pain. It is also dependent upon the amount of social support an individual would receive for reporting symptoms.
- 4) Decision regarding treatment. In this step, a person can decide to not seek treatment, to self-treat, or to seek treatment by others such as health professionals.

It is the decision to seek treatment from health professionals that is of particular interest to somatization and the HBM. In this case, as in symptom reporting, an individual must receive social support for taking a health-related action. Assuming that health care is accessible and affordable, seeking treatment is more likely to occur when an individual perceives that the action is in accordance with social norms, values and expectations. In addition, Cummings et al. (1980) reported that an individual must feel the benefits of taking a health action outweigh the cost. The HBM would also predict that an individual must believe the action (such as going to the doctor) to be beneficial in reducing susceptibility and threat, and that taking the action will lead to the desired outcome (i.e., getting well). The original HBM was developed in order to increase preventive health behavior. This would have the effect of increasing health facility utilization

(Becker et al., 1977). Somatization could be viewed as a problem of health facility over-utilization. It could be that a person who somatizes perceives that the most efficacious method of achieving a desired health outcome lies in seeking treatment from others. It may be that individuals who somatize lack a sense of self-efficacy regarding their ability to care for their own health. The attitude concerning self-efficacy and control of health, termed Health Locus of Control, has received some attention in the literature (Wallston & Wallston, 1978) and will be discussed in some detail later.

In summary, the HBM would predict that, relative to those who do not somatize, persons who somatize feel more susceptible to illness and accident, receive more support from significant others for reporting symptoms and going to the doctor, and feel less self-efficacious in taking care of their own health. Utilizing Figure 2, it can be seen that demographic characteristics act as modifying factors and are influential at all stages of the process.

#### Criticism of the HBM Approach to Somatization

According to Stone (1980), a major criticism of the original Health Belief Model is its overemphasis on concepts that are abstract and difficult to qualify. This criticism can be applied to the extended model for illness behaviors as well. While this criticism is cause for concern, it does not

appear that it has hampered the ability of the original model to serve as a framework for understanding health behaviors. Despite the conceptual abstractness, it has been possible to successfully predict health behaviors using the original HBM. Jordan and O'Grady (1983) and Cummings et al. (1980) have commented that there is a greater need for preciseness and specificity in extending the HBM to illness and sick role behaviors. It may be more difficult to predict illness behaviors using an extension of the HBM due to the complexity the behaviors in question and the abstractness of the model.

An important question that remains to be addressed concerns children's health-related beliefs. This question and the way the HBM can be applied to children will be discussed next.

#### Children's Health Beliefs and Illness Behaviors

Children have been virtually ignored in the health belief literature. Until recently, it was not known what children thought about illness and health concepts, or if they were even capable of thinking about such concepts. Evidence from the developmental psychology literature indicates that children are not passive observers of illness in themselves or in others. They attempt to understand and explain the things they see and experience. Perhaps no theory of thinking and casual reasoning in children has been



more influential than that of Jean Piaget. Piaget theorized that intellectual growth following an orderly sequence of discrete stages. Piaget (1929, 1930) noted that the ability of children to comprehend and offer causal explanations of a variety of phenomena such as dreams, the wind, and the origin of the sun and moon changed and progressed with age. Recently, child development researchers have begun to investigate how children comprehend and offer causal explanations of a variety of content areas related to health and illness, such as human reproduction (Bernstein & Cowan, 1975), death (Koocher, 1973), and contagion (Kister & Patterson, 1980). The results of this research indicate that the ability of children to understand and explain health and illness also follows a sequence of stages that correspond to Piaget's theory of cognitive development.

Piaget proposed four general stages of cognitive development that children experience in an invariant sequence at approximately the same ages. The first stage, the sensorimotor, is characteristic of child thought from birth to two years. Children in this age group are too young to understand health and illness concepts, and no further mention will be made of sensorimotor development. It is during the second major Piagetian stage, the preoperational, that children are first able to form concepts. During this stage, which occurs approximately between the ages of two and six, children become able to think symbolically. This means

that children are able to use language and to imagine objects when they are not present. Children in the preoperational stage are egocentric; they are unable to view any situation from more than one perspective. These children are bound to their own immediate, subjective experience, and the only perspective from which they can see the world is their own. Also characteristic of child thought during this stage are animism (attributing life to inanimate objects), artificialism (the belief that everything in the world is designed and designed by humans), transductive reasoning (A causes B, therefore B causes A), centering (concentrating on a single aspect or part of an experience or object while excluding all other features of the experience or object), and the inability to see processes as reversible.

The third, or concrete-operation stage, which occurs approximately between the ages of 7 and 11, marks a significant shift from child thought at the previous stage. While thought is still limited to concrete experience (i.e., children at this stage cannot think hypothetically) concrete-operational children are not bound to their own immediate, subjective, perceptions and can view a situation from more than one angle or perspective. Thought during this stage is much less egocentric than in preceding stages and children can now conceptualize processes as reversible. The concrete-operational child is able to use elementary logic to arrive at causal explanations.

The fourth or formal-operation stage, which is reached by most children by the age of 11 or 12, is characterized by the ability to think hypothetically and abstractly. This stage of cognitive development most closely approximates adult thinking. Piaget and Inhelder (1969) state that children at the formal operational level still do not think like adults in that they are just beginning to use adult logic and are just setting the stage for adult thinking.

Researchers have utilized Piagetian theory to determine how children conceptualize health and illness. For example, Bibace and Walsh (1980) tested 72 children at three different age groups (four, seven, and eleven) with a Concept of Illness Protocol. This consisted of 12 questions, each probing a single subject such as measles, headaches, and germs. From the responses generated by the children in their sample, the authors identified types of explanations that varied as a function of the children's development level. Besides a category of incomprehension in which the children's responses did not apply to the questions, the authors found two subcategories of responses in each major Piagetian stage.

In the preoperational stage, children defined and explained illness in terms of Phenominism (defining illness as a single external symptom such as a sight or sound associated with the illness) and Contagion (illness is

acquired through spatial or temporal contiguity with sick persons). For example, phenoministic response to the question "what is a heart attack?" was "a heart attack is falling on your back" (p. 290). A contagion response to "how do people get measles from other people?" was "you walk near them" (p. 291).

At the concrete-operational stage, children defined illness in terms of Contamination (naughtiness or contact with germs and dirt can cause illness) and Internalization (illness as being in an over-all or global sense inside the body). Thus, a contamination response to the question "how do people get cancer?" was "smoking without their mother's permission" (p. 293). Internalization responses were characterized by the child having some knowledge of the specific body organs involved but not being able to describe how these organs malfunctioned in a physiological sense. For example, a response to "how do germs give you a cold?" was "the germs get in your blood. They give you a cold, I guess" (p. 294).

Finally, at the formal-operational level, children defined illness in terms of the Physiological (illness involves the malfunction of internal, physiological structures) and the Psychophysiological (it is possible for feelings and thoughts, in addition to physiological events, to effect the body and its function). A physiological

response to "what is a heart attack:" was "a heart attack is when the heart stops pumping blood to the rest of the body. A person faints, stops breathing, and collapses" (p. 295). A Psychophysiological response to the same question was "a heart attack is from being all nerve racked and weary" (p. 296).

Results showed that in the four year old group, 12.5% gave phenoministic explanations, 70.8% gave contagion explanations, and 16.7% gave contamination explanations. In the seven year old group 16.7% gave contagion explanations, and 75% gave contamination explanations while 8.3% gave internalization explanations. In the 11 year old group 25% gave internalization response, 70.8% gave physiological responses and 4.2% gave psychophysiological responses.

Children's conceptualizations of illness appear to be tied to level of cognitive development. It is important to note that, in Bibace and Walsh's study, children as young as four years of age were able to offer casual explanations of health and illness concepts.

In addition to ignorance of children's thought about health and illness, children have been ignored in the health belief literature because they do not normally decide to seek medical care. Such decisions are made by parents or other adult caregivers. It would seem logical then to study only adult decision making and adult health beliefs as they affect

health facility utilization by children. However, as Jordan and O'Grady (1983) have contended, it appears that the child's health beliefs are most influential in reporting symptoms and pain. Lewis and Lewis (1982) reviewed the literature regarding the determinants of children's health-related beliefs and behaviors. They stated that the foremost factors determining health beliefs and behaviors are those associated directly with the child, such as self-concept and cognitive style.

While research concerning children's health-related beliefs and behaviors is sparse, there is no evidence to suggest that the HBM cannot be utilized to evaluate children's illness behaviors. How then can the HBM be applied to childhood somatization? The HBM would postulate that it is the aggregate of health-related beliefs held by an individual that determine his or her health-related actions. This aggregate can be conceptualized using the six factors (see pp. 30-31) generated by Cummings et al. (1980). Only three of the factors will be considered in this proposal. Accessibility to health care will not be considered in this proposal as it is the parent or adult caregivers who determine the child's accessibility and, thus, is a variable beyond the researcher's immediate control. Knowledge of health and disease will not be considered because the HBM does not explain adequately how this variable relates to illness behaviors, making it extremely difficult to use

health knowledge as a predictor of illness behavior. Demographic characteristics will not be considered either. There is too much conflicting and incomplete demographic evidence regarding somatization to consider sociodemographic variables to be useful predictors. Becker (1979) stated:

Unfortunately, emphasis on demographics and socioeconomic correlates, while providing important information for health planners and policy makers, has offered little insight into the determinants of health behavior (p. 253).

Becker commented that, in addition to inconsistency and lack of utility, a consistent relationship between demographic factors and a particular health behavior does not by itself explain the behavior. The emphasis of this proposal is the particular beliefs that children hold regarding their health. As so little is known about children's health and illness beliefs, and as the evidence regarding demographic characteristics is contradictory and inconclusive, the health and illness beliefs encompassed in the three remaining factors will be the focus of this proposal.

The three remaining factors, attitudes toward health care, perceived vulnerability, and social network factors, will now be considered in detail.

Attitudes Toward Health: Health Locus of Control

Health Locus of Control (HLC) refers to the beliefs people have concerning the controllability of the state of their health. HLC is a concept derived from Rotter's (1966) theory of internal-external control. Searcy and Hawkins-Searcy (1979) stated:

The locus of control concept is characterized as distributing individuals according to the degree to which they accept personal responsibility for what happens to them. Persons characterized as having external locus of control then to perceive what happens to them as contingent on forces beyond their personal control. Persons characterized as having internal locus of control tend to perceive reinforcements as being a consequence of their own actions (p. 75).

More specifically, those with internal HLC believe that their health can be controlled through the actions they themselves take. Those with external HLC tend to believe that the state of their health is primarily due to chance or forces beyond their control. Wallston and Wallston (1978) stated that general locus of control has been studied in the context of such behaviors as smoking, birth control, weight loss, and adherence with medical regimens. This research has found, using both general locus of control measures and specific HLC scales, that those who believe that reinforcement is contingent on their behavior (i.e., internals) are more likely to be nonsmokers, to wear seat belts, and to practice contraception. Externals, or those who believe that



reinforcement is not contingent on their behavior, have been found to use birth control less often than externals, to do less well in weight loss programs, and to know less about their illnesses when sick.

There has been virtually no research concerning HLC in children who somatize. The Children's Health Locus of Control Scale (CHLC) (Parcel & Meyer, 1978) has been developed to investigate this variable in children, and has been used successfully to assess HLC in children with juvenile diabetes (Moffatt & Pless, 1983), asthma, seizure disorders, and unspecified orthopedic conditions (Perrin & Shapiro, 1985). It is thought that locus of control belief are determined relatively early in life. Internal locus of control has been associated with family environments that provide children with nurturance, acceptance, consistent discipline, and reinforcement contingent upon behavior (Lau, 1982). External locus of control has been associated with unresponsive environments which do not provide children with reinforcement contingent upon their behavior. Accordingly, middle class children, who generally have more opportunities for successful control of their environments, have been found to score more internally on locus of control measures than have children from poor families (Searcy & Hawkins-Searcy, 1979). It has also been established that internality increases with age, suggesting that locus of control may be associated in some way with cognitive development (Parcel & Meyer, 1978;

Perrin & Shapiro, 1985; Searcy & Hawkins-Searcy, 1979).

Research related to personality and emotional factors has found that, as in adults, internal locus of control in children is associated with positive emotional adjustment and high self-esteem. External locus of control in children has been found to be associated with anxiety, emotional disturbances and low self-esteem (Searcy & Hawkins-Searcy, 1979). Most of the research concerning locus of control and its relationship to sociodemographic and psychological variables has been correlational in nature. As a result, a causal relationship between a particular locus of control belief and a particular emotional state cannot be confirmed. However, it appears that external locus of control is associated more closely with behavioral and emotional maladjustment; it would perhaps follow that external locus of control could also be associated with maladaptive illness behaviors such as somatization. There has been no published research concerning this possible relationship.

Parcel and Meyer (1978) suggested that health locus of control could be used to operationalize the Health Motivation variable in the HBM. They state:

Within the health belief model, a behavioral outcome can be related to the general variable "health motivation" (readiness). One component of readiness may be an individual's perceived source reinforcement for engaging in goal directed behavior related to health (p. 50).

It may appear that there is a logical inconsistency in proposing that somatization is associated with external locus of control. If externals do indeed somatize more than internals, (i.e., report symptoms and go to the doctor more often), why would they seek medical care if they don't believe that their actions have any impact upon their health status? This contradiction can be resolved from several perspectives. Going to the doctor when one feels ill is an accepted practice in North America. One could seek medical care out of habit and still not feel that the action would have any impact on health status. In addition, medical practitioners seem to be accorded a great deal of competence by the general population. An individual may not be able to control his or her health, but a physician surely can. The issue with Health Locus of Control and illness behavior may not be solely one of perceived source of reinforcement, but may also involve self-efficacy. Individuals who somatize may feel that only others can control their health.

Perceived vulnerability. Perceived vulnerability to illness is a concept derived from the original HBM and is considered to be an important variable in taking any health-related action. Gochman (1970, 1971) has investigated perceived vulnerability in children as it relates to preventive health actions. In an exploratory study to determine children's normative perceptions of

vulnerability to illness, Gochman (1970) asked 134 middle class white children between the ages of 7 and 17 to speculate how likely they were to be stricken in the next year with 10 illnesses and accidents such as colds, sore throats, poison ivy, and tooth ache. The subjects responded to the questionnaire utilizing a seven point likert-type scale. Gochman (1970) found upon analysis of the responses that there was a great deal of individual consistency in the subjects' expectations of getting sick or having an accident. Children who felt they were very likely to catch a cold also felt they were very likely to get a tooth ache. Children who didn't feel as though they were likely to have a bad accident also felt it was unlikely they would get a sore throat. Gochman (1970) found no significant differences between the response of younger and older subjects. There were significant sex differences, however. Boys perceived themselves to be at a significantly lower risk for sore throats and colds than did girls and had a significantly higher expectations of staying healthy than did girls.

Social Network Factors. The last factor mentioned by Cummings et al. (1980) as being important in predicting health-related behaviors is the social network. Mechanic (1980) suggested that the way people experience and report common physical complaints and symptoms is determined to a great extent by parental behavior

during childhood. In a longitudinal study of the health-related behaviors of children first studied in 1964, Mechanic interviewed 350 young adults about their current health status, physical symptoms, and health attitudes, and obtained retrospective reports of parental behaviors in various situations. This data was then correlated with the data collected in the earlier study (Mechanic, 1964), such as child health history, and maternal health, illness, and sick role behaviors. Results showed that those young adults who reported the fewest symptoms remembered their parents as concertededly teaching positive (undefined) health care behaviors, encouraging positive (undefined) health attitudes, and not attending to minor illnesses in their children. Those young adults whose parents responded excessively to minor physical illnesses, who did not teach positive health care behaviors, and who were physically abusive, reported more physical symptoms in the 1980 study. Mechanic (1980) suggested that such parental behaviors cause children to monitor their internal physical state closely, and that this behavior persists as a pattern of illness behavior into adulthood. It is unclear how abuse and neglecting to teach health care behaviors could lead these children to monitor their internal physical states and Mechanic (1980) did not offer any further explanation. Physical abuse could, perhaps, cause anxiety about health status, while neglect could reinforce external locus of control. There has been no

other published research to indicate the extent to which illness behaviors are learned in the family.

It certainly makes sense at an intuitive level that children who report symptoms and continue to do so over time are reinforced by their parents or other adult care givers for doing so. Unfortunately, Mechanic's (1980) study is far from conclusive, given that it relies partially on retrospective data. It may be that children who somatize are reinforced by their parents for reporting symptoms and are further reinforced for their behavior by being taken to the doctor. There is no substantive evidence to confirm this, however.

Children may also learn from parents when physiological sensations should or should not be interpreted as symptoms. It may be that children who somatize have learned to label most physiological sensations as symptoms and to interpret those symptoms as threatening by observing their parents or other individuals in their social network. The reports by Routh and Ernst (1984), Apley et al. (1978), Christenson and Mortenson (1975), and Stone and Barbero (1970) that children who somatize often have a parent or relative who somatizes lend credence to a learning explanation of somatization.

### Conclusion

This proposal is concerned with somatization in children, which appears to be a rather common complaint. Little is known about somatization other than basic sociodemographic information. It is unknown how pain and distressful symptoms occur in the absence of organic involvement. It is also unclear what causes children and adults to somatize. One position holds that somatization is a result of depression. While there is some evidence to suggest that children who somatize are depressed, the results are not conclusive. Another position maintains that somatization is the result of psychosocial stress. This is the most popular etiological explanation of somatization but it has proved unsatisfactory. It has been difficult to find a direct relationship between stress episodes and somatization, or between decreases in stress and amelioration of somatic symptoms. In addition, viewing somatization by itself as the result of stress contributes little toward understanding the disorder.

The health belief model is suggested as an alternative method of conceptualizing somatization. Using this model, somatization is viewed as an illness behavior resulting from a constellation of health-related beliefs such as perception of vulnerability to illness, external health locus of control, and reinforcement from the social network for

reporting symptoms.

There have been very few studies concerned with children's health-related behaviors and beliefs. It appears, however, that even very young children are capable of forming ideas and casual explanations of illness and disease.

It is proposed that the health belief model be used to investigate the health-related beliefs to children who somatize. The fundamental goals of the study will be to determine what health and illness beliefs somatizing children hold and whether these beliefs can predict the degree to which these children somatize. Given the presumed influence that parents have on their children's health-related behaviors and beliefs, the study will also attempt to determine what relationships exist between parents' and children's beliefs and behaviors.



## HYPOTHESES

- 1) There will be a positive relationship between frequency of somatization and vulnerability to illness and accident. Children who exhibit a high frequency of somatization will perceive themselves as more vulnerable to illness than children who exhibit a lower frequency of somatization.
- 2) There will be a negative relationship between frequency of somatization and external health locus of control. Children who exhibit a high frequency of somatization will have a more external health locus of control than children who exhibit a lower frequency of somatization.
- 3) There will be a positive relationship between frequency of somatization and perceived familial support. Children who exhibit a high frequency of somatization will perceive their families as more supportive than children who exhibit a lower frequency of somatization.
- 4) There will be a positive relationship between intensity of somatization and perceived vulnerability. Children who exhibit a high intensity of somatization will perceive themselves

as more vulnerable to illness than children who exhibit a lower intensity of somatization.

- 5) There will be a negative relationship between intensity of somatization and external health locus of control. Children who exhibit a high intensity of somatization will have a more external health locus of control than children who exhibit a lower intensity of somatization.
- 6) There will be a positive relationship between intensity of somatization and perceived familial support. Children who exhibit a high intensity of somatization will perceive their families as more supportive than children who exhibit a lower intensity of somatization.
- 7) There will be a positive relationship between frequency of somatization and mothers' perceived vulnerability, external health locus of control, and perceived familial support. Mothers of children who exhibit a high frequency of somatization will (a) perceive themselves as more vulnerable to illness, (b) have a more external health locus of control, and (c) perceive their families as more supportive than mothers of children who exhibit a lower frequency of somatization.

- 8) There will be a positive relationship between intensity of somatization and mothers' perceived vulnerability, external health locus of control, and familial support. Mothers of children who exhibit a high intensity of somatization will (a) perceive themselves as more vulnerable to illness, (b) have a more external health locus of control, and (c) perceive their families as more supportive than mothers of children who exhibit a lower intensity of somatization.
- 9) Children's health-related beliefs will be more influential than mothers' health-related beliefs in predicting frequency of somatization. In other words, children's beliefs will account for more of the variance in their somatization frequency than will mothers' beliefs.
- 10) Children's health-related beliefs will be more influential than mothers' health-related beliefs in predicting intensity of somatization. In other words, children's beliefs will account for more of the variance in their somatization intensity than will mothers' beliefs.
- 11) Compared to non-somatizing children, somatizing children will (a) perceive themselves as more vulnerable to illness, (b) have a more external

health locus of control, and (c) perceive their families as more supportive.

- 12) Compared to mother's of nonsomatizing children, mothers of somatizing children will (a) perceive themselves as more vulnerable to illness, (b) have a more external health locus of control, and (c) perceive their families as more supportive.

## METHOD

### Participants

Two groups of participants were included in the present study: (a) Mothers and their somatizing children age 8-13 identified by physicians as reporting physical symptoms for which there was no accompanying organic involvement (index group) and (b) mothers and their non-somatizing children matched to the index children on age and sex (control group). All participants were recruited from the outpatient population of the pediatric department of the Manitoba Clinic, a large, inner-city, medical outpatient clinic.

Recruitment of the index group took place over a 12 month period. Six participating pediatricians were asked to identify each somatizing 8-13 year-old child examined during their daytime office hours. Prior to the start of recruitment, the pediatricians were given a protocol delineating inclusion criteria. Eligible index group participants were defined as any 8-13 year-old child who reported physical symptoms for which no demonstrable or identifiable disease or illness could be found, who spoke English as a first language, and who had not reached menarche. The physical changes accompanying the onset of menses could have been confounded with other somatic symptoms. The physicians' index group inclusion protocol is

presented in Appendix B. If a child was identified as a somatizer during an office visit and met the other inclusion criteria, the pediatrician gave the accompanying parent a letter explaining the study and asking for their consent to participate. This letter is presented in Appendix C.

Control group recruitment began at the same time as index group recruitment, and lasted 14 months. A control child was found for each index child as soon as possible after the index child's questionnaires were returned to the researcher. Control children were obtained by finding children in the pediatricians' appointment books who matched the index children for age and sex. A control child had to have a birthday within three months of a particular index child to qualify. If more than one control child was found for any particular index child, the control child with the earliest appointment was used. Once a prospective control child was found in the appointment books, the researcher asked the child's pediatrician to give an accompanying parent the information/consent letter during the visit if, in the physician's opinion, the child's medical chart did not indicate a history of somatization and the child did not report somatization complaints. In addition, the child's first language was required to be English.

The pediatric practice at the Manitoba Clinic is large. Six pediatricians treat approximately 17,000 children a year

and the client population is highly representative of children seen for medical care. It was recognized that there would be potential problems as well as benefits in utilizing a clinical sample. It was necessary from a methodological standpoint to be assured that the symptoms reported by the somatizing children were not the result of disease or illness, and that the children in the control group were not somatizers. It was recognized, however, that parents decide to seek medical care. Obviously, only those children whose parents brought them to the doctor could participate in the present study. This limits the representativeness of the sample. However, there is virtually no information concerning the health-related beliefs of child somatizers. It appeared justified to risk sampling problems in order to gain basic information.

The age group of the participants in the present study was chosen in order to be assured of a sample with relatively homogeneous cognitive development. There is considerable methodological difficulty in comparing children of very disparate ages and levels of cognitive development (Wohlwill, 1973). It was hoped that these difficulties could be overcome utilizing a relatively homogeneous sample.

Characteristics of the Final Sample. The index group consisted of 36 mothers and 36 8-13 year-old somatizing children. Twenty-four (75%) of the children were girls and

12 (25%) were boys. Twenty-six (72%) of the index children reported experiencing abdominal pains while 10 (72%) reported experiencing abdominal pains along with headache. The control group consisted of 36 mothers and 36 children matched to the children in the index group on the basis of age and sex. The control children were attending the pediatric clinic for minor illnesses and well-child examinations.

Demographic and family health status information was obtained from participating mothers using a questionnaire constructed by the researcher specifically for the present study. The questionnaire is presented in Appendix D. It consists of eight items regarding marital status, socioeconomic status, mothers' education, number of children in family, number of family health problems, and child and family health status. Family socioeconomic status was measured with the Blishin Socioeconomic Index for Occupations in Canada (Blishin & McRoberts, 1976). Mothers indicated their highest education level on a scale from one (grades 1-4) to five (university) developed by Trute, Tefft and Scuse, (1983). Mothers also indicated marital status as one of five categories (Trute et al., 1983).

Number of family health problems was measured by asking mothers to list health problems other than cold and flu that family members had experienced during the 12 months preceding the study. Mothers were allowed to list as many health



problems as they wished, as well as the nature of the problems and who in the family had experienced each health problem.

Table 1 presents summary statistics on demographic characteristics and number of health problems of both index and control groups. T-tests show that the two groups are not significantly different in terms of socioeconomic status, educational levels of mothers, and number of children in the family. As well, a chi-square analysis indicates that there is no significant difference between the groups regarding parental marital status.

Table 1 indicates that the two groups differed on only one variable, number of health problems experienced by family in the 12 months preceding the study. Index mothers more than control mothers reported that their families had experienced significantly more health problems  $t(70) = 2.19$ ,  $p < .03$ .

### Procedure

When an index or control child was identified and parental consent was given during the office visit, the researcher spoke with the parent and child in the examining room immediately after the visit and gave them a packet of questionnaires in a stamped, self-addressed envelope. The parent and child were instructed to take the packet home,

Table 1

Demographic Characteristics and Frequency of Health Problems of Index and Control Groups

Characteristic	<u>Index (N=36)</u>		<u>Control (N=36)</u>		<u>t</u>	<u>p</u>
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
Socioeconomic status	2.8	2.3	2.8	2.1	0.11	NS
Mothers' education	3.8	0.9	3.7	0.9	0.64	NS
Number of children	2.3	0.8	2.5	0.9	-1.00	NS
Number of health problems	3.0	3.4	1.6	1.8	2.19	.03
Marital <sup>a</sup> status					9.5	NS
Married	28		29			
Separated	1		3			
Divorced	5		3			
Widowed	0		0			
Never married	2		1			

<sup>a</sup>Marital status data are frequency counts; test statistic is a chi-square.

fill out their respective questionnaires, and mail them back as soon as possible. The questionnaires were clearly labeled as either for mother or child. Forty-nine prospective index children and their mothers were identified and gave consent to participate during the 12 months of data collection. Thirty-six (75%) actually completed the questionnaires and returned them. Forty-two prospective control children were identified in order to match all 36 index children. The researcher telephoned participants two weeks after the questionnaires had been taken home and once a month thereafter to inquire about questions or concerns regarding the questionnaire packet. Participants were allowed four months to return questionnaires, after which time they were excluded from the study. Reasons given for not completing the questionnaire packet included illiteracy of the mother, child refusal, improvement in child's somatic complaints, and parental objection to questionnaires.

Index children only were rated on two scales by their pediatrician. Scale 1 assessed the frequency of somatization by requiring the physician to record the number of times in the 12 months preceding the visit which identified the child as a study participant that the child had been brought to the Manitoba Clinic reporting somatizing symptoms. The identification visit was also included in the frequency count of clinic visits. Scale 1 is represented in Appendix E.

Scale 2 required the pediatrician to make a judgment of the intensity of somatization exhibited by each child on a scale ranging from one (low) to five (high). Prior to the beginning of data collection, pediatricians were given rating criteria to increase reliability. These criteria were developed by the researcher using descriptions of child pain-related behavior provided by participating pediatricians and a pediatric gastroenterologist. Intensity was rated by assessing characteristics such as symptom duration, facial signs of distress, degree that daily activities had been curtailed, whether appetite had decreased, and whether the pain reported had made child cry. Scale 2 and the rating criteria for intensity are presented in Appendix F.

### Dependent Measures

Each child was administered:

1. The Children's Health Locus of Control Scale (CHLCS) (Parcel & Meyer, 1978). The CHLCS consists of 20 forced-choice statements developed from health education texts and an adult health locus of control scale (Wallston, Wallston, Kaplan, & Maides, 1976) and adapted for use by children aged 7-12. It yields a single score ranging from 20-40. The higher the score, the more internal the health locus of control. It has adequate internal consistency (Kuder-Richardson  $\underline{r}$  = .75) and six week, test-retest reliability ( $\underline{r}$  = .62). According to Parcel and Meyer (1978),

the measure has adequate construct validity, as evidenced by its significant (but unspecified) correlation with a well validated general locus of control scale for children, the Nowicki-Strickland Children's Locus of Control Scale. The CHLCS is presented in Appendix G.

2. Gochman's Index of Perceived Vulnerability (IPV) (Gochman, 1970; Gochman & Saucier, 1982). The IPV consists of 15 statements concerned with how vulnerable individuals feel to various accidents and diseases. Statements are scored on a scale of vulnerability from one (low) to seven (high). Total scores range from 15 to 105, with higher scores indicating greater perceived vulnerability. The measure has adequate internal consistency ( $\bar{r} = .79$ ). According to Gochman and Saucier (1982), the measure has adequate construct validity and test-retest reliability. However, they offer no statistical evidence for their claims. The IPV is presented in Appendix H.

3) Family Support Measure 1 (FSM1). The FSM1 was constructed by the researcher specifically for the present study. It consists of 12 items concerned with the degree to which children perceive their parents supporting and reinforcing them when they are sick or injured. The FSM1 assesses the degree to which parents provide special treats, express concern and worry, keep children home from school, and take children to the doctor. Items were included in the

measure if it was thought by the researcher that the parental behavior would maintain or increase symptom reporting and other illness behaviors in children. Statements are scored on a scale from one (never) to five (always). Total scores range from 12 to 60, with high scores indicating greater perceived parental support. No reliability or validity data is available on this measure. The FSM1 is presented in Appendix I.

**Each mother was administered:**

1. The Multidimensional Health Locus of Control Scale (MHLC), form CIHLC (Chance and Internal Health Locus of Control) (Wallston, Wallston, & DeVellis, 1978). The CIHLC consist of 12 items concerned with the perceived ability of adults to control their health. Statements are scored on a scale from one (less control) to six (more control) for externally worded items and the opposite for internally phrased items. Total scores range from 12 to 72, with higher scores indicating a more external locus of control. The scale has adequate internal consistency ( $r = .77$ ). Concurrent and discriminative validity are reported to be high (Wallston & Wallston, 1981). The CIHLC presented in Appendix J.

2. Gochman's Index of Perceived Vulnerability (IPV) (Gochman, 1970; Gochman & Saucier, 1982), described above.

3. Familial Support Measure 2 (FSM2). The FSM2 was

constructed by the researcher specifically for the present study. It consists of 12 items concerned with the degree to which mothers perceive themselves supporting their children when they are sick or injured by, for example, providing special treats, expressing worry and concern, keeping children home from school, and taking children to the doctor. Items were included in the measure if it was thought by the researcher that the parental behavior would maintain or increase symptom reporting and other illness behaviors in children. Statements are scored on a scale from one (never) to five (always). Total scores range from 12 to 60, with higher scores indicating greater perceived parental support. No reliability or validity data is available on this measure. The FSM2 is presented in Appendix K.

## RESULTS

### Overview of Statistical Analyses

Standard multiple regression, Pearson product-moment correlation (Pearson  $r$ ), squared semipartial correlation ( $Sr^2$ ), an analysis of variance (ANOVA) techniques were used to test the hypotheses in this study.

Two standard multiple regressions were performed to assess the relationship between predictor and criterion variables in the group of index children, as stated by Hypotheses 1-3 and 4-6. A Pearson correlation matrix consisting of pairwise correlations between (a) the three predictor variables (index children's scores on measures of health locus of control, perceived vulnerability to illness, and familial support) and (b) the two criterion variables (physicians' ratings of frequency and intensity of index children's somatization) was produced to help clarify regression results.

Two standard multiple regressions were performed to assess the relationship between the predictor and criterion variables in the group of index mothers, as stated by Hypotheses 7 and 8. A Pearson correlation matrix consisting of pairwise correlations between (a) the three predictor variables (index mothers' scores on measures of health locus of control, perceived vulnerability to illness, and familial support) and (b) the two criterion variables



(index children's frequency and intensity of somatization) was produced to help clarify regression results.

Twelve squared, semipartial correlations were utilized to assess the differences in the ability of the index children's and index mothers' predictor variables to account for the variance of the criterion variables, as stated by Hypotheses 9 and 10.  $Sr^2$  correlations provide information about the unique amount of variance that an individual predictor variable accounts for in a regression equation. The amount of variance reflected in a  $Sr^2$  correlation does not include any variance that a predictor variable may share with any variable in the regression equation, thus making the  $Sr^2$  statistic a useful index of the importance of each predictor variable in the prediction of the criterion variable (Tabachnik and Fidell, 1983).

Six one-way ANOVA'S were performed to test for differences between the index and control groups on the dependent variables (scores on mother and child measures of health locus of control, perceived vulnerability to illness, and familial support), as stated by Hypotheses 11 and 12. The alpha level for all statistical analyses was set at .05. Given the exploratory nature of the study, it was decided that this level of significance would most appropriately balance experiment-wise Type I and Type II error.

### Index Group Analyses

The assumptions underlying Pearson correlations are that the variables are normally distributed, that the relationship between the correlated variables is linear, and that the standard deviations of both variables are roughly the same (homoscedasticity).

Examination of the predictor and criterion variables prior to analysis showed that one variable, frequency of somatization, was severely positively skewed. A logarithmic transformation of the scores on this variable was performed, as suggested by Tabachnik and Fidell (1983). This reduced the skewness to within the acceptable range. The skewness of all other predictor and criterion variables fell within the acceptable range as reported by Tabachnik and Fidell (1983). Thus, the assumption of normality was presumed to be met. Examination of the bivariate scatter-plots of the predictor and criterion variables indicated that the relationships between the variables were linear and that the assumption of homoscedasticity was met. No outliers were found. There was no missing data.

Additional assumptions underlying standard multiple regression are that the predictor variables are not multicollinear, and that normality, linearity, and homoscedasticity exist between the residuals (i.e., the predicted criterion variable scores and errors of prediction).

Examination of the collinearity diagnostics provided by SAS regression program (SAS Institute Inc., 1985) revealed that multicollinearity was not present. Examination of residuals scatterplots after the variable transformation indicated that the assumptions of normality, linearity, and homoscedasticity of residuals were also met. Table 2 shows mean scores and standard deviations of predictor and criterion variables for the two index groups (i.e., children and mothers). Table 3 shows the intercorrelations between predictor and criterion variables for index children. Table 4 shows intercorrelations between predictor and criterion variables for index mothers. Tables 3 and 4 indicate the degree of relationship between all variables included in the index group regression analyses.

Hypothesis 1. Hypothesis 1 states that there will be a positive relationship between frequency of somatization and perceived vulnerability to illness and accident. Children who exhibit a high frequency of somatization will perceive themselves as more vulnerable to illness than children who exhibit a lower frequency of somatization. Results of a standard multiple regression indicate that the R for regression is significantly different from zero,  $F(3, 32) = 5.27$ ,  $p < .004$ . Moreover, as shown in Table 5, the beta weight for perceived vulnerability is significantly different from zero,  $t(1) = 3.32$ ,  $p < .002$ , indicating that it accounts significantly for the variance in frequency of somatization

Table 2

Mean Scores and Standard Deviations of Predictor and Criterion Variables Within Index Group

Variable	<u>Children</u>		<u>Mothers</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Health locus of control	33.4	4.0	31.2	7.4
Perceived vulnerability	56.3	14.5	53.1	11.4
Familial support	42.2	6.6	40.7	6.9
Somatization frequency	2.2	1.5		
Somatization intensity	2.3	1.1		

Table 3

Intercorrelations Between Index Children's Predictor and Criterion Variables

Variable	Intensity of somatization	Frequency of somatization	Health locus of control	Perceived vulnerability	Familial support
Intensity of somatization	-	.59**	.31	.33*	-.37*
Frequency of somatization		-	.31	.36*	-.24
Health locus of control			-	.01	-.38*
Perceived vulnerability				-	-.02
Familial support					-

\*p .05. \*\*p .01.

Table 4

Intercorrelations Between Index Mothers' Predictor and Criterion Variables

Variable	Intensity of somatization	Frequency of Somatization	Health locus of control	Perceived vulnerability	Familial support
Intensity of somatization	-	.59**	-.07	-.06	-.07
Frequency of somatization		-	-.09	-.04	-.16
Health locus of control			-	.33*	.19
Perceived vulnerability				-	.38*
Familial support					-

81

\* $p < .05$ . \*\* $p < .01$

Table 5

Parameter Estimates of Standard Multiple Regression of Index  
Children's Health-Related Beliefs on Frequency of Somatization

Variable	<u>B</u>	<u>t</u>	<u>p</u>	<u>Sr<sup>2</sup></u>
Perceived vulnerability	.03	3.32	.002	.23*
Health locus of control	.02	1.39	NS	.04
Familial support	-.01	-1.12	NS	.03

\*Unique variance = 23%

as logarithmically transformed. Children who exhibit a high frequency of somatization perceive themselves as more vulnerable than children who exhibit a lower frequency of somatization.  $Sr^2$  correlations indicate that perceived vulnerability alone accounts for 23% of the total variance.

A Pearson  $r$  between frequency of somatization as logarithmically transformed and perceived vulnerability (Table 6) shows a significant relationship in the predicted direction,  $r(36) = .36$ ,  $p < .03$ . This indicates that the higher the frequency of somatization, the greater the perceived of vulnerability.

Since transformation of a variable can change the meaning of its scores, frequency of somatization was also examined in its original or untransformed state. The results of a standard multiple regression using untransformed frequency of somatization scores show that the R for regression is also significantly different from zero,  $F(3, 32) = 3.54$ ,  $p < .02$ . Table 7 indicates that the beta weight for perceived vulnerability in the untransformed regression is significantly different from zero,  $t(1) = 2.37$ ,  $p < .02$ . This means that perceived vulnerability accounts significantly for the variance in untransformed somatization frequency, and that children who exhibit a high untransformed somatization frequency perceive themselves as more vulnerable than children who exhibit a lower untransformed frequency of somatization. Overall, results support Hypothesis 1.

Hypothesis 2. Hypothesis 2 states that there will be a



Table 6

Pearson Correlations of Relationships Within Index Group

Variable ;	<u>n</u>	Frequency of somatization	
		<u>r</u>	<u>p</u>
Perceived vulnerability			
Children	36	.36	.03
Mothers	36	-.05	NS
Health locus of control			
Children	36	.31	.06
Mothers	36	-.09	NS
Familial support			
Children	36	-.24	NS
Mothers	36	-.16	NS

Table 7

Parameter Estimates of Standard Multiple Regression of Index  
Children's Health-Related Beliefs on Untransformed Frequency  
of Somatization

Variable	<u>B</u>	<u>t</u>	<u>p</u>
Perceived vulnerability	.10	2.37	.02
Health locus of control	.04	1.66	NS
Familial support	-.03	-0.86	NS

negative relationship between frequency of somatization and external health locus of control. Children who exhibit a high frequency of somatization will have a more external health locus of control than children who exhibit a lower frequency of somatization.

Table 5 shows that the beta weight for health locus of control is not significantly different from zero,  $t(1) = 1.39$ ,  $p > .05$ , indicating that it does not account significantly for the variance in frequency of somatization as logarithmically transformed. Children who somatize frequently do not have a more external health locus of control than children who somatize less frequently.  $Sr^2$  correlations indicate that health locus of control alone accounts for only 4% of the total variance.

A Pearson  $r$  between frequency of somatization as logarithmically transformed and health locus of control (Table 6) only approaches significance,  $r(36) = .31$ ,  $p < .06$ . Further, the sign of the correlation is in the direction opposite to that hypothesized. This indicates a trend for more frequently somatizing children to have a more internal health locus of control than less frequently somatizing children.

Table 7 indicates that the beta weight for health locus of control in the untransformed regression is not significantly different from zero  $t(1) = 1.66$ ,  $p > .05$ . Health locus of control does not account significantly for the variance in untransformed somatization frequency. More frequently somatizing

children do not have a more external health locus of control than less frequently somatizing children. Overall, results do not support Hypothesis 2.

Hypothesis 3. This hypothesis states that there will be a positive relationship between somatization frequency and perceived familial support. Children who exhibit a high frequency of somatization will perceive their families as more supportive than children who exhibit a lower frequency of somatization. Table 5 shows that the beta weight for perceived familial support is not significantly different from zero,  $t(1) = -1.12$ ,  $p > .05$ , indicating that perceived familial support does not account significantly for the variance in somatization frequency as logarithmically transformed. Children who somatize frequently do not perceive their families as more supportive than children who somatize less frequently.  $Sr^2$  correlations indicate that perceived familial support accounts for only 3% of the total variance.

A Pearson  $r$  between somatization frequency and perceived familial support (Table 6) is not significant,  $r(36) = -.24$ ,  $p > .05$ . Somatization frequency and familial support are not related as hypothesized.

Table 7 indicates that the beta weight for perceived familial support in the untransformed regression is not significantly different from zero,  $t(1) = -0.86$ ,  $p > .05$ .

Perceived familial support does not account significantly for the variance in untransformed somatization frequency.

Overall, results do not support Hypothesis 3.

Hypothesis 4. Hypothesis 4 states that there will be a positive relationship between somatization intensity and perceived vulnerability. Children who exhibit a high intensity of somatization will perceive themselves as more vulnerable to illness and accident than children who exhibit a lower intensity of somatization.

Results of a standard multiple regression indicate that the R for regression is significantly different from zero  $F(3, 32) = 4.17, p < .01$ . As shown in Table 8, the beta weight for perceived vulnerability is significantly different from zero,  $t(1) = 2.18, p < .04$ , indicating that it accounts significantly for the variance in somatization intensity.  $Sr^2$  correlations indicate that perceived vulnerability alone accounts for 11% of the total variance.

A Pearson  $r$  between somatization intensity and perceived vulnerability (Table 9) shows a significant relationship in the predicted direction,  $r(36) = .33, p < .05$ . This indicates that the higher the somatization intensity, the greater the perceived vulnerability. Results support Hypothesis 4.

Hypothesis 5. Hypothesis 5 states that there will be a negative relationship between somatization intensity and

Table 8

Parameter Estimates of Standard Multiple Regression of Index  
Children's Health-Related Beliefs on Intensity of Somatization

Variable	<u>B</u>	<u>t</u>	<u>p</u>	<u>Sr<sup>2</sup></u>
Perceived vulnerability.	.06	2.18	.04	.11*
Health locus of control	.02	1.36	NS	.04
Familial support	-.05	-1.82	.08	.07

\*Unique variance = 11%.

Table 9

Pearson Correlations of Relationships Within Index Group

Variable	<u>n</u>	Intensity of somatization	
		<u>r</u>	<u>p</u>
Perceived vulnerability			
Children	36	.33	.05
Mothers	36	-.06	NS
Health locus of control			
Children	36	.31	.07
Mothers	36	-.07	NS
Familial support			
Children	36	-.37	.03
Mothers	36	-.07	FNS

external health locus of control. Children who exhibit a high intensity of somatization will have a more external health locus of control than children who exhibit a lower intensity of somatization. Table 8 shows that the beta weight for health locus of control is not significantly different from zero  $t(1) = 1.36, p > .05$ , indicating that health locus of control does not account significantly for the variance in somatization intensity. Children who exhibit a high intensity of somatization do not have a more external health locus of control than children who exhibit a lower intensity of somatization.  $Sr^2$  correlations indicate that health locus of control alone accounts for only 4% of the total variance.

A Pearson  $r$  between somatization intensity and health locus of control (Table 9) only approaches significance,  $r(36) = .31, p < .07$ . Further, the sign of the correlation is in the direction opposite to that hypothesized. This indicates a trend for children with higher somatization intensity to have a more internal health locus of control than children with lower somatization intensity. Overall, results fail to support Hypothesis 5.

Hypothesis 6. Hypothesis 6 states that there will be a positive relationship between intensity of somatization and perceived familial support. Children who exhibit a high intensity of somatization will perceive their families as



more supportive than children who exhibit a lower intensity of somatization.

Table 8 shows that the beta weight for perceived familial support only approaches significance  $t(1) = 1.82$ ,  $p < .08$ , indicating that perceived familial support does not account significantly for the variance in somatization intensity. Children who exhibit a high intensity of somatization do not perceive their families as more supportive than children who exhibit a lower intensity of somatization.  $Sr^2$  correlations indicate that perceived familial support alone accounts for only 7% of the total variance.

While the Pearson  $r$  between somatization intensity and perceived familial support (Table 9) is significant,  $r(36) = -.37$ ,  $p < .03$ , it is in the direction opposite to that hypothesized. This indicates that the higher the intensity of somatization, the lower the perceived familial support. Overall, results do not support Hypothesis 6.

Hypothesis 7. Hypothesis 7 states that there will be a positive relationship between frequency of somatization and mothers' perceived vulnerability, external health locus of control, and perceived familial support. Mothers of children who exhibit a high frequency of somatization will (a) perceive themselves as more vulnerable to illness, (b) have a more external health locus of control, and (c) perceive their families as more supportive than mothers of children who

exhibit a lower frequency of somatization. Results of a standard multiple regression fail to support this hypothesis. The R for regression is not significantly different from zero  $F(3, 32) = .35, p > .05$ . Only 3% of the variance of the criterion variable is accounted for by the mother's predictor. As shown in Table 10, none of the predictor beta weights accounts significantly for the variance in frequency of somatization as logarithmically transformed.

Table 6 indicates that Pearson correlations between somatization frequency and each predictor were not significant. Mothers of children with high somatization frequency do not show greater perceived vulnerability, a more external health locus of control, or more perceived familial support than mothers of children with lower somatization frequency.

A standard multiple regression using untransformed somatization frequencies show that the R for regression is not significantly different from zero  $F(3, 32) = .69, p > .05$ . Table 11 indicates that none of predictor beta weights accounts significantly for the variance in untransformed somatization frequency. Overall, results do not support Hypothesis 7.

Hypothesis 8. Hypothesis 8 states that there will be a positive relationship between somatization intensity and mothers' beliefs concerning perceived vulnerability, external health locus of control, and perceived familial support.

Table 10

Parameter Estimates of Standard Multiple Regression of Index  
Mothers' Health-Related Beliefs on Frequency of Somatization

Variable	<u>B</u>	<u>t</u>	<u>p</u>	<u>Sr<sup>2</sup></u>
Perceived vulnerability	.002	.17	NS	.001
Health locus of control	-.006	-.39	NS	.004
Familial support	-.140	-.87	NS	.020

Table 11

Parameter Estimates of Standard Multiple Regression of Index  
Mothers' Health-Related Beliefs on Untransformed Frequency  
of Somatization

Variable	<u>B</u>	<u>t</u>	<u>p</u>
Health locus of control	-.01	-0.4	NS
Familial support	-.03	-1.1	NS
Perceived vulnerability	-.01	-0.3	NS

Mothers of children who exhibit a high intensity of somatization will (a) perceive themselves as more vulnerable to illness, (b) have a more external health locus of control, and (c) perceive their families as more supportive than mothers of children who exhibit a lower intensity of somatization.

Results of a standard multiple regression fail to support this hypothesis. The R for regression is not significantly different from zero  $F(3, 32) = .11, p > .05$ . Only 1% of the variance of the criterion is accounted for by the mothers' predictors. Table 12 indicates that none of the predictor beta weights accounts significantly for the variance in somatization intensity.

Table 9 indicates that Pearson correlations between somatization intensity and each predictor were not significant. Mothers of children with high somatization intensity do not show greater perceived vulnerability, a more external health locus of control, or more perceived familial support than mothers of children with lower somatization intensity. Overall, results do not support Hypothesis 8.

Hypothesis 9. Hypothesis 9 states that children's health-related beliefs will be more influential than mothers' beliefs in predicting frequency of somatization. In other words, children's health-related beliefs will account for more of the variance in their somatization frequency than will mothers' beliefs.

Table 12

Parameter Estimates of Standard Multiple Regression of Index  
Mothers' Health-Related Beliefs on Intensity of Somaticization

Variable	<u>B</u>	<u>t</u>	<u>p</u>	<u>Sr<sup>2</sup></u>
Health locus of control	-.009	-.32	NS	.003
Familial support	-.008	-.28	NS	.002
Perceived vulnerability	-.002	-.12	NS	.001

The R for regression involving children's health related beliefs is significantly different from zero,  $F(3, 32) = 5.27$ ,  $p < .004$ , and accounts for 33% of the variance of somatization frequency. In contrast, the R for regression of mothers' health-related beliefs on somatization frequency is not significant  $F(3, 32) = .35$ ,  $p > .05$ , and accounts for 3% of the variance. Thus, these two regressions indicate that, as hypothesized, children's health-related beliefs are more influential in predicting somatization frequency than mothers' health-related beliefs. Further, as seen in Table 13, each of the children's health-related beliefs accounts for more unique variance in somatization frequency than do the corresponding health-related beliefs of mothers. Thus, Hypothesis 9 is strongly supported.

Hypothesis 10. Hypothesis 10 states that children's health-related beliefs will be more influential than mothers' beliefs in predicting intensity of somatization. In other words, children's health-related beliefs will account for more of the variance in their somatization intensity than will mothers' beliefs.

The R for regression involving children's health-related beliefs is significantly different from zero  $F(3, 32) = 4.17$ ,  $p < .01$ , and accounts for 28% of the variance of somatization intensity. In contrast, the R for regression of mothers' health-related beliefs on somatization intensity is not significant  $F(3, 32) = .11$ ,  $p > .05$  and accounts for 1% of the

Table 13

Squared Semipartial Correlations of Predictor Variables in  
Index Group for Frequency of Somatization

Variable	<u>Children</u> <u>Sr<sup>2</sup></u>	<u>Mothers</u> <u>Sr<sup>2</sup></u>
Perceived vulnerability	.23	.020
Health locus of control	.04	.004
Familial support	.03	.001



variance. Thus, these two regressions indicate that, as hypothesized, children's health-related beliefs are more influential in predicting somatization intensity than mothers' health beliefs. Further, as seen in Table 14, each of the children's health-related beliefs accounts for more unique variance in somatization intensity than do the corresponding health-related beliefs of mothers. Thus, Hypothesis 10 is strongly supported.

### Between Group Analyses

One-way ANOVA'S were performed to assess differences between the index and control group on the dependent measures (health locus of control, perceived vulnerability, and perceived familial support). The assumptions underlying the ANOVA procedure are normality of the dependent measures and homogeneity of variance. As no significant skewness was noted in the dependent measures and no significant differences were noted between standard deviations prior to analysis, these assumptions were presumed to be met. Table 15 shows the means and standard deviations for the dependent measures of the children's groups. Table 16 shows the means and standard deviations for the dependent measures of the mother's groups.

Hypothesis 11. Hypothesis 11 states that compared to non-somatizing children, somatizing children will (a) perceive themselves as more vulnerable to illness, (b) have a more external health locus of control, and (c) perceive their families as more

Table 14

Squared Semipartial Correlations of Predictor Variables for  
Intensity of Somatization

Variable	<u>Children</u> <u>Sr<sup>2</sup></u>	<u>Mothers</u> <u>Sr<sup>2</sup></u>
Perceived vulnerability	.11	.003
Health locus of control	.04	.002
Familial support	.07	.001

Table 15

Mean Scores and Standard Deviations of Children on Dependent Variables

Variable	<u>Index</u>		<u>Control</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Perceived vulnerability	56.3	14.5	55.2	14.2
Health locus of control	33.4	4.0	33.9	2.9
Familial support	42.2	6.6	43.7	6.8

Table 16

Mean Scores and Standard Deviations of Mothers on Dependent Variables

Variable	<u>Index</u>		<u>Control</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Perceived vulnerability	53.1	11.4	51.4	10.0
Health locus of control	31.2	7.4	29.6	8.5
Familial support	41.7	6.9	42.6	7.1

Table 17

Between Group Comparisons of Index and Control Children on  
Dependent Variables

Variable	Source	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Health locus of control	Between	1	37.5	37.5	3.04	NS
	Within	70	865.1	12.3		
	Total	71	902.6			
Perceived vulnerability	Between	1	22.2	22.2	0.11	NS
	Within	70	14374.2	205.3		
	Total	71	14396.4			
Familial support	Between	1	39.0	39.0	0.87	NS
	Within	70	3145.9	44.9		
	Total	71	3184.9			

supportive. As shown in Table 17, the results of the comparisons do not support this hypothesis. The groups did not differ on any of the variables. Overall, results do not support Hypothesis 11.

Hypothesis 12. Hypothesis 12 states that compared to mothers of non-somatizing children, mothers of somatizing children will (a) perceive themselves as more vulnerable to illness, (b) have a more external health locus of control, and (c) perceive their families as more supportive. As shown in Table 18, the results of the comparisons do not support this hypothesis. The groups did not differ on any of the variables. Overall, results fail to support Hypothesis 12.

Table 19 provides summary information regarding the results of hypothesis testing for this study.

#### Post-hoc Analyses

Mothers were asked to rate family and child health on three scales included on the Demographic and Health Status Questionnaire presented in Appendix D. Mothers rated family health on a scale from one (poor) to five (good). The health status of child participants was measured by asking mothers to rate the child's health compared to that of other children in their respective families on a scale from one (worse) to five (better). As well, mothers rated the participating child's health compared to that of the general population on a scale from one (worse) to five (better).

Table 18

Between Group Comparisons of Index and Control Mothers  
on Dependent Variables

Variable	Source	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Health locus of control	Between	1	48.3	48.3	0.76	NS
	Within	70	4449.3	63.5		
	Total	71	4497.6			
Perceived vulnerability	Between		55.1	55.1	0.48	NS
	Within		8076.8	115.3		
	Total		8131.9			
Familial support	Between		141.6	41.6	2.06	NS
	Within		4806.2	68.6		
	Total		4947.8			

Table 19

Hypothesis Testing Summary

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Hypothesis	Supported	Unsupported
1	X	
2		X
3		X
4	X	
5		X
6		X
7		X
8		X
9	X	
10	X	
11		X
12		X

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Univariate t-tests were performed to determine if there were any differences between index and control mothers' ratings of their families' and participating children's health status. Table 20 indicates that there is no significant difference between index and control mothers' ratings of their families' health status. There also is no significant difference between index and control mothers' ratings of participating children's health relative to that of other children in the family. However, compared to control mothers, index mothers rated their participating children's health status relative to the general population as significantly poorer  $t(70) = -1.45, p < .003$ .

This indicates that while index mothers perceive their children to be in poor health, they minimize their children's health problems when assessing family health.

Table 20

Post-hoc Between Group Comparisons of Mothers' Health Ratings

Variable	<u>Index (N=36)</u>		<u>Control (N=36)</u>		<u>t</u>	<u>P</u>
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
Family health status	3.9	0.6	4.2	0.8	-1.45	NS
Child/family health status	3.0	0.7	3.3	0.7	-1.62	NS
Child/general population health status	3.2	0.8	3.8	0.8	-3.06	.003

## DISCUSSION

The purpose of the present study was to examine somatization in children by utilizing the Health Belief Model (Cummings et al., 1980; Kirscht, 1974). The health-related beliefs (perceived vulnerability, health locus of control, and perceived familial support) of somatizing children and their mothers were examined with regard to their relationships with the children's somatization. The health-related beliefs of somatizing children were compared with the health-related beliefs of their mothers with regard to ability to predict frequency and intensity of somatization. In addition, somatizing children and their mothers were compared with non-somatizing children and their mothers with regard to the health-related beliefs previously mentioned.

### Children's Health Beliefs and Somatization

The basic tenet of the Health Belief Model (Cummings et al., 1980; Kirscht, 1974) is that an individual's beliefs about health and illness are essential in determining how an individual behaves regarding health and illness. With regard to this study, it was expected that children's perceived vulnerability to illness, health locus of control, and perceived familial support when ill would have significant relationships with somatization frequency and intensity. However, findings regarding these predicted

relationships derived from the Health Belief Model (HBM) were mixed at best, indicating a re-evaluation and revision of the HBM in understanding illness behaviors like somatization in children.

Perceived Vulnerability. Perceived vulnerability to illness and accident was significantly related as predicted to both somatization frequency and intensity. Children who visited their pediatrician frequently reporting somatic complaints felt more vulnerable to illness and accident than somatizing children who visited their pediatrician less frequently. As well somatizing children who reported more severe, disabling symptoms felt more vulnerable to illness and accident than somatizing children who reported less severe, disabling symptoms. These findings can be explained by the contention of the HBM that individuals who somatize interpret many physiological sensations as symptoms and view these symptoms as threatening. Individuals who feel vulnerable to illness and accident will, according to the HBM, monitor their physiological states closely, thus giving rise to many opportunities to interpret those sensations as threatening symptoms. This error in symptom attribution then leads to more frequent doctor visits to report illness (Mechanic, 1972). According to Barsky (1979) those who somatize amplify bodily sensations that are normally disregarded and minimized by other people. The results suggest that the more vulnerable an individual feels to

health problems, the closer that individual monitors physiological sensations and the more that individual amplifies those sensations. As a result, the more severe and disabling are the symptoms that the individual reports.

Health Locus of Control. It was hypothesized that a high frequency of somatization would be associated with external health locus of control. Those who somatize were hypothesized to lack a sense of self-efficacy regarding their ability to care for their health, to perceive their health status to be the object of chance or luck, to feel that their actions regarding their health would not result in desired outcomes, and to be more likely to entrust their health care to others. This was not reflected in the results, however. External health locus of control was not significantly related to somatization frequency as hypothesized. In fact, there was a trend for somatizing children to have a more internal health locus of control. For the somatizing children in this study, self-efficacy regarding health is not evidenced in self-care and stoicism but in the faithful reporting of disturbing physical symptoms so that more capable adults will provide amelioration and care.

The bulk of previous research concerning the role health locus of control plays in health-related actions has been carried out with adults (Wallston & Wallston, 1978). Moreover, adult measures of health locus of control beliefs

have been used in developing similar measures for children (Parcel & Meyer, 1978). Perhaps the assumptions that adult and child health locus of control beliefs are evidenced by similar behaviors and can be measured using similar criteria are incorrect. Children may view acting on sensations promptly by reporting them to a responsible adult as a way of controlling their health. Therefore, this aspect of somatization behavior could be viewed as an expression of internal, not external health locus of control from a child's perspective. A model of health-related behaviors which is based on adult health concepts may be inappropriate when applied to child health-related behaviors.

Health locus of control also did not correlate significantly and in the predicted direction with somatization intensity. Somatizing children who reported more severe and disabling symptoms did not exhibit a more external health locus of control than children who reported less severe and disabling symptoms. This can perhaps be explained by a lack of somatization specific questions in the health locus of control measure. For example, children were asked to respond yes or no to statements such as "People who never get sick are just plain lucky" and "When I am sick, I can do things to get better". The use of somatization-specific statements such as "People who never get stomachaches are just plain lucky" and "When I have a headache I can do things to get better" may have assessed

health locus of control in a manner more relevant to somatization intensity than general statements concerning health locus of control. Children may have more external beliefs regarding their somatic symptoms than regarding health in general. This could be due to a social desirability response bias toward the more general statements or greater personal experience with the pains referred to in more specific statements. Greater experience with somatic complaints could lead to a more external health locus of control due to the frequent, unexplained, and treatment resistant quality of the symptoms.

Familial Support. The HBM predicts that an individual's propensity to report symptoms will depend partially on the amount of social support an individual receives for symptom disclosure. However, amount of familial support for symptom reporting and other illness-related behaviors did not correlate significantly with frequency of somatization, or account significantly for the variance of somatization frequency. This failure can perhaps be explained by the fact that the measure of family support used in this study was not specific to support received for somatization behavior, such as having stomachaches and headaches, and reporting stomach and head pains. Rather, it measured support received for being sick in a general sense. A somatization-specific questionnaire would have provided more accurate information regarding the amount of support for somatization behavior

received by the children parents than a general measure.

Alternatively, the failure of familial support to correlate significantly with frequency of somatization can be explained by the trend toward internal health locus of control exhibited by children with high somatization frequency. It could be that these children's sense of greater control over their health made familial support unnecessary for symptom reporting to occur. The negative correlation between the somatizing children's health locus of control beliefs and perceived familial support indicates that a more internal health locus of control was associated with perceptions of low familial support. However, lack of a specific familial support measure is the likeliest explanation for the failure of family support to correlate significantly with somatization frequency, as the trend toward internal health locus control was very weak.

The amount of familial support that somatizing children reported receiving when ill correlated significantly with somatization intensity, but in the direction opposite that hypothesized from the HBM. Somatizing children who reported more severe, disabling symptoms reported receiving less support from their parents when ill than children who reported less severe, disabling symptoms. The finding suggests that the less supported the somatizing children felt for being sick and reporting symptoms, the louder they



felt they had to figuratively yell to be heard by their parents and doctors. It could be that an interaction occurs, whereby complaining leads to less parental attention, which leads to more complaining. This would also tend to increase perceived vulnerability and make doctor visits more important.

### Mothers' Health Beliefs and Somatization

Index mothers' health-related beliefs did not correlate significantly with their children's somatization frequency or intensity, or contribute significantly toward accounting for the variance of the two aspects of somatization. This finding is not entirely unexpected, given the supposition of Jordan and O'Grady (1983) and Lewis and Lewis (1982) that the foremost factors determining health beliefs and behaviors are those directly associated with the child. Indeed, the failure of mothers' health-related beliefs to relate to their children's somatization frequency and intensity could be viewed as an indication of the importance of individual beliefs in determining illness behavior.

It is surprising, however, that mothers' health-related beliefs were as uninfluential as the results of this study indicate. It would be expected from the HBM that children would be influenced to some extent by their mothers with regard to symptom reporting and appropriate behavior when ill, since health beliefs are presumably learned by children

at least in part from their parents. One explanation could be that the symptom experience is so very powerful that it is unaffected by the behavior or beliefs of others. This is not to suggest that mothers are unimportant with regard to behaviors, however. Children report their symptoms and physical complaints to their parents, and parents ultimately decide whether or not to take their children to the doctor. The HBM may need to be revised concerning parents' influence on their children's beliefs, such that parents have a less direct influence on their children's personal beliefs, while playing a key role in treatment decisions.

In addition, lack of somatization specific-statements in the questionnaires used to measure mothers' health-related beliefs could have failed to provide information directly relevant to their children's somatization behavior and beliefs regarding their symptoms. Mothers may report that they respond differently to their children's somatic symptoms than they respond to other illnesses in the children. For example, mothers may attend more to their children when they report somatic symptoms and may be more likely to take their children to the doctor, than when the children have colds or other ailments.

#### Between Group Comparisons

The finding that the index and control groups did not differ significantly with regard to their health-related

beliefs is both surprising and difficult to explain given the fact that one group somatized and the other presumably did not. One explanation could be that the control group was somehow unrepresentative of the general population of well children. While some control children were at the pediatrician for preventive treatment, others were experiencing acute illness. It could be that the illness experience has such a powerful influence on health beliefs that the control children who were at the pediatrician for acute health problems had beliefs more similar to the index group than to the well general population. It is note-worthy that the control children perceived themselves to be as vulnerable to illness and accident as the children who somatized, suggesting that acute illness experience caused the control children's perception to resemble that of children with more chronic complaints.

Index and control mothers were hypothesized to differ in their health-related beliefs because of the assumptions of the HBM that (a) mothers' beliefs help produce children's health beliefs and (b) children who somatize have different health beliefs than children who do not somatize. The finding that index and control mothers did not differ with regard to their health-related beliefs suggests that the causal connection between mothers' and children's health-related beliefs is negligible, and that the HBM needs to be revised with regard to the influence mothers have on their children's beliefs.

Post-hoc analyses of demographic and health-status rating differences between the index and control groups may also shed light on the lack of differences with regard to health-related beliefs. The only variables on which the two groups differed significantly were (a) the number of health problems the index mothers reported that their families had experienced in the 12 months prior to participating in the study, and (b) the health ratings by mothers of their participating children's health relative to the general population. Index mothers rated their children's health as significantly poorer relative to the general population than did control mothers. In addition, index mothers reported significantly more illnesses in their families than the control mothers reported. However, compared to control mothers, index mothers did not rate their families as having significantly worse health. They also did not perceive themselves to be more vulnerable to illness and accident. These findings suggest that the lack of differences between index and control mothers on the dependent measures and family health ratings may reflect a lack of sensitivity on the part of index mothers to the impact that illness may have on family members' health-related beliefs, such as feelings of increased vulnerability to illness, concerns about the unpredictability of health status, and concerns about physical sensations and symptoms. If this lack of sensitivity exists, it would prevent mothers from recognizing their children's needs for reassurance and explanations regarding health

concerns and physical sensations. As a result, children's concerns and worries regarding their health would persist, leading to increased feelings of vulnerability and, presumably, increased physiological monitoring and somatic complaints. If this were so, it would be expected that other children in the index families would somatize. No data was collected concerning the somatization history of siblings, however. Thus, the erroneous assumption that mothers' health beliefs help produce their children's beliefs is the most likely explanation for the lack of differences between index and control mothers' health-related beliefs.

#### Directions for Future Research

In the present study, only one health-related belief of somatizing children, perceived vulnerability, was found to be related to somatization as hypothesized. As well, no differences were found between index and control groups with regard to the health-related beliefs. It is concluded that the results provide only limited support for the HBM as an appropriate framework to examine illness behaviors in children. Therefore, a reappraisal and refinement of the model and its components is necessary.

An important theoretical issue raised in this study is that of the HBM'S appropriateness in explaining children's health-related beliefs and behaviors, given that the model was developed from research with adults. Child development

literature provides ample evidence that children think and reason much differently than do adults. Moreover, the range of health-related behaviors available to children is much more limited than for adults. Thus, an important direction for future research will be to revise the HBM so that it is realistic and meaningful for children. As Cummings et al. (1980) have pointed out, any attempt at model building and testing needs to take not only a theory of health-related behaviors into account, but also must incorporate variables peculiar to the population to be studied.

If the HBM is to be a more accurate predictor of children's health-related behaviors, components of the model such as personal characteristics, benefits/barriers to action, and health motivation must be redefined to be consistent with children's reasoning abilities, health care resources, and personal capabilities. For example, health locus of control should be redefined to reflect what self-care and self-efficacy regarding health mean for children. The results of this study suggest that interpreting a child's symptom reporting as an example of external health locus of control because the behavior in adults exemplifies such a belief may be incorrect. Measures of children's health-related beliefs that are identical to adult measures but with simpler language will not necessarily provide information that can be interpreted using adult norms.

With regard to measures of health-related beliefs and behaviors, an important direction for future research will be to develop more and better instruments. There are few pencil and paper measures of children's health-related beliefs, and those that exist have not been adequately validated. In addition, tests need to be developed that are not simply adult tests in children's language, but reflect instead health beliefs that are consistent with children's capabilities and limitations.

The findings of the present study also suggest that measures specific to somatization behavior would have provided more useful information. No measures concerning locus of control and familial support of somatization currently exist, and need to be developed.

Several methodological changes to the present study would be advisable for any future research of this topic. The first change would involve the setting in which the control group was obtained. The finding that there were no differences between the index and control groups with regard to health-related beliefs is perhaps the most puzzling aspect of the present study. Any future studies should include control groups from non-medical settings in order to rule out situational response bias and the impact that acute illness may have on subjects' health-related beliefs.

Another methodological consideration for future research

would be to increase sample size in order to increase statistical power. This would be particularly important with regard to the relationships between health locus of control and somatization frequency and intensity. The Pearson correlations for these relationships approached significance. These relationships may have been statistically significant had the sample size been larger. The statistical power in the present study, with an N of 36, was not great enough to detect significant relationships between health locus of control and somatization frequency and intensity. Finally, the measures used in the present study did not provide information specific to children's beliefs regarding their somatic symptoms. They would need to be modified in future studies in order to provide this more relevant information.

#### Practical Relevance of the Findings

Perhaps the most important finding of the present study is the greater influence of children's beliefs compared to the beliefs of their mothers in accounting for somatization frequency and intensity. This finding confirms the suppositions of Jordan and O'Grady (1983) and Lewis and Lewis (1982), that the health beliefs of children are essential when assessing children's health-related behaviors. While the beliefs and behaviors of parents and adult caregivers are important to consider, particularly with regard to decisions to seek medical care, the current study suggests that health



professionals must include children as active participants in treatment. Telling a mother that there is nothing physically wrong with her child will have little impact on the symptoms of the child unless the child can be convinced as well.

Another issue of practical relevance suggested by the present study concerns with the etiology and treatment of somatization. Somatization is not simply a stress-related disorder. A somatizing child feels vulnerable to illness and accident, whether or not the child feels stressed. This specific belief about perceived vulnerability could be easier to change than a more global problem of nonspecific stress. It is to be hoped that increased knowledge and understanding of the specific beliefs involved in somatizing children will result in improved methods, such as cognitive-behavioral programs for changing somatizing children's health beliefs, and preventive health education programs for children, in dealing with this puzzling childhood problem.

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Appendix A  
DSM III Diagnoses



Appendix A  
DSM-III DIAGNOSES

The information provided in this appendix has been quoted from DSM-III (APA, 1980), p. 241-242 and p. 249-250.

Somatoform Disorders

The essential features of this group of disorders are physical symptoms suggesting physical disorder (hence, Somatoform) for which there are no demonstrable organic findings or known physiological mechanisms and for which there is positive evidence, or a strong presumption, that the symptoms are linked to psychological factors or conflicts. Unlike Factitious Disorder or Malingering, the symptom production in Somatoform Disorders is not under voluntary control, i.e., the individual does not experience the sense of controlling the production of the symptoms. Although the symptoms of Somatoform Disorders are 'physical,' the specific pathophysiological processes involved are not demonstrable or understandable by existing laboratory procedures and are conceptualized most clearly using psychological constructs. For that reason, these disorders are not classified as 'physical disorders.'

300.81 Somatization Disorder

The essential features are recurrent and multiple somatic complaints of several years' duration for which medical attention has been sought but which are apparently not due to any physical disorder. The disorder begins before the age of 30 and has a chronic but fluctuating course.

Complaints are often presented in a dramatic, vague, or exaggerated way, or are part of a complicated medical history in which many physical diagnoses have been considered. The individuals frequently receive medical care from a number of physicians, sometimes simultaneously. (Although most people without mental disorders at various times have aches and pains and other physical complaints, they rarely bring them to medical attention.) Complaints invariably involve the following organ systems: conversion or pseudoneurological (e.g., paralysis, blindness), gastrointestinal (e.g., abdominal pain), female reproductive (e.g., painful menstruation), psychosexual (e.g., sexual indifference), pain (e.g., back pain), and cardiopulmonary (e.g., dizziness).

Associated Features. Anxiety and depressed mood are common. In fact, many individuals with this disorder who seek mental health care do so because of depressive symptoms, which include suicide threats and attempts. Antisocial behavior, and occupational, interpersonal, and marital difficulties are common. Hallucinations are also reported; this is usually the hallucination of hearing one's name called

without impairment of reality testing. Histrionic Personality Disorder and, more rarely, Antisocial Personality Disorder often are also present.

Age at onset. Symptoms usually begin in the teen years or, rarely, in the 20's. Menstrual difficulties may be one of the earliest symptoms in females, although preadolescents and adolescents may present with seizures, depressive symptoms, headache, abdominal pain, or a plethora of other physical symptoms.

Course. This is a chronic but fluctuating disorder that rarely remits spontaneously. A year seldom passes without some medical attention.

Impairment and complications. Because of constant seeking out of doctors, numerous medical evaluations are undergone, both in and out of the hospital; and there is frequently unwitting submission to unnecessary surgery. These individuals run the risk of Substance Use Disorders involving various prescribed medicines. Because of depressive symptoms, they may experience long periods of incapacity and frequent suicidal threats and attempts. Completed suicide, when it occurs, is usually associated with Substance Abuse. People with this disorder often lead lives as chaotic and complicated as their medical histories.

Predisposing factors. No information.

Prevalence and sex ratio. Aproximately 1% of females have this disorder. The disorder is rarely diagnosed in males.

Familial pattern. This disorder and Antisocial Personality Disorder are more common among family members than in the general population.

### 307.80 Psychogenic Pain Disorder

The essential feature is a clinical picture in which the predominant feature is the complaint of pain, in the absence of adequate physical findings and in association with evidence of the etiological role of psychological factors. The disturbance is not due to any other mental disorder.

The pain symptom either is inconsistent with the anatomic distribution of the nervous system or, if it mimics a known disease entity (as in angina or sciatica), cannot be adequately accounted for by organic pathology, after extensive diagnostic evaluation. Similarly, no pathophysiological mechanism accounts for the pain, as in tension headaches caused by muscle spasm.

That psychological factors are etiologically involved in pain may be evidenced by a temporal relationship between an environmental stimulus that is apparently related to a psychological conflict or need and the initiation or exacerbation of the pain, or by the pain's permitting the individual

to avoid some activity that is noxious to him or her or to get support from the environment that otherwise might not be forthcoming.

Associated features. Psychogenic Pain Disorder may be accompanied by other localized sensory or motor function changes, such as paresthesias and muscle spasm. There often are frequent visits to physicians to obtain relief despite medical reassurance (doctor-shopping), excessive use of analgesics without relief of the pain, requests for surgery, and the assumption of an invalid role. The individual usually refuses to consider the role of psychological factors in the pain. In some cases the pain has symbolic significance, such as pain mimicking angina in an individual whose father died from heart disease. A past history of conversion symptoms is common. Histrionic personality traits are seldom present, nor is 'la belle indifference,' though concern about the pain symptom is usually less than its stated severity. Dysphoric moods are common.

Age at onset. This disorder can occur at any stage of life, from childhood to old age, but seems to begin most frequently in adolescence or early adulthood.

Course. The pain usually appears suddenly and increases in severity over a few days or weeks. The symptom may subside with appropriate intervention or termination of a precipitating event, or it may persist for months or years if reinforced.

Impairment. This varies with the intensity and duration of the pain and may range from a slight disturbance of social or occupational functioning to total incapacity and need for hospitalization.

Complications. The most serious complications are iatrogenic; they include dependence on minor tranquilizers and narcotic analgesics and repeated, unsuccessful, surgical intervention.

Predisposing factors. Severe psychosocial stress is a predisposing factor.

Prevalence. No information, although the disorder is probably common in general medical practice.

Sex ratio. The disorder is more frequently diagnosed in women.

Familial pattern. Relatives of individuals with this disorder have had more painful injuries and illnesses than occur in the general population.

Appendix B  
Index Group Inclusion Protocol

## Appendix B

## Index Group Inclusion Protocol

I am conducting a study of somatization in children born in the years 1972 to 1977 (between the ages of 8 and 13 years). By somatization I am referring to the reporting of any physical symptom or complaint for which no demonstrable or identifiable disease or illness can be found. You may have heard such individuals referred to as "bellyachers" or the "worried well".

Children Eligible for Study

ANY boy or girl who speaks English as a first language born in the years 1972 to 1977 (between the ages of 8 and 13) who is brought to you reporting symptoms or complaints for which you can find no organic basis.

Children Ineligible for Study

Any girl who has reached menarche is not eligible. Any children born before 1972 or after 1977 (who are older than 13 or younger than 8) are not eligible. Any children who does not speak English as a first language are not eligible



Appendix C  
Informed Consent Letter

Dear Parent,

Ms. Renee Boomgaarden, a candidate for a master's degree in psychology at the University of Manitoba, is conducting a research project here at the Manitoba Clinic Department of Pediatrics. The project is under the direction of Dr. Bruce Tefft, Department of Psychology, University of Manitoba. The study focuses on the way children report symptoms and physical complaints to their doctor, and what these children and their mothers think about sickness and health. This study should provide valuable information which will assist us in helping these children and their mothers.

The pediatricians at the Manitoba Clinic are assisting Ms. Boomgaarden in identifying typical children and mothers to participate in the study. You and your child have been selected at random as being eligible participants. Your help with this study would require about 30 minutes of your and your child's time to fill out 3 brief questionnaires. Participation is, of course, entirely voluntary for both you and your child, and your decision will not influence the care you receive at the clinic. Dr. \_\_\_\_\_ has given his approval for the study. You may wish to discuss your concerns with him.

If you and your child are interested in participating in this study, please tell the doctor, and Ms Boomgaarden will give you and your child the questionnaires today at the

clinic after the doctor is finished with you. All information will be kept strictly confidential. This means that no one, not even your doctor, will see the questionnaires you fill out except Ms. Boomgaarden. Everyone who participates will be sent a summary of the results once the study is completed. Thank you very much for your cooperation.

I understand the purpose of this study and know that my privacy and that of my child will be respected by the interviewer. I also understand that I will be sent a letter describing the outcome of the study once it is finished, and that I will not be given information how I or my child compare with others on an individual level, or how I or my child performed on a certain questionnaire.

\_\_\_\_\_ Parent's signature

\_\_\_\_\_ Date

Appendix D  
Demographic and Health Status Questionnaire

Please fill out this form as completely as possible.

What health problems, other than the usual colds and flu, have you and your family experienced during the last 12 months? Please state the nature of the problem and who was ill.

How would you rate your family's health at the present time?

POOR \_\_\_\_\_

FAIR \_\_\_\_\_

GOOD \_\_\_\_\_

EXCELLENT \_\_\_\_\_

What is your marital status?

Married/Living As Married \_\_\_\_\_

Separated \_\_\_\_\_

Divorced \_\_\_\_\_

Widowed \_\_\_\_\_

Never Married \_\_\_\_\_

What is your occupation? \_\_\_\_\_

What is your spouse's (If applicable) \_\_\_\_\_

. How many children do you have? \_\_\_\_\_

<u>AGE</u>	<u>SEX</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

. Compared to other children in the family, how would you rate the over all health of the child you brought to the pediatrician today?

E \_\_\_\_\_ WORSE \_\_\_\_\_ SAME \_\_\_\_\_ BETTER \_\_\_\_\_ MUCH BETTER \_\_\_\_\_

. Compared to to other people in the general population, how would you rate the health of the child you brought to the pediatrician today?

E \_\_\_\_\_ WORSE \_\_\_\_\_ SAME \_\_\_\_\_ BETTER \_\_\_\_\_ MUCH BETTER \_\_\_\_\_

8. What is the highest level of schooling you have completed?

Grades 1-4 \_\_\_\_\_

Grades 5-8 \_\_\_\_\_

Grades 9-12 \_\_\_\_\_

Tech. or Voc. training \_\_\_\_\_

University \_\_\_\_\_

Appendix E

Scale 1



## Appendix E

## Scale 1

How many times in the past 12 months has this child been brought to the clinic reporting symptoms for which no demonstrable or identifiable disease or illness could be found?

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Appendix F  
Scale 2 Rating Criteria

## Appendix F

## Scale 2

Compared to other children who you have treated for symptoms for which no demonstrable or identifiable disease or illness could be found, on a scale of 1 to 5 with 1 being the least severe and 5 being the most severe, how would you rate this child as to the severity of somatization he or she presents?

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

5 \_\_\_\_\_

What was the presenting somatic complaint for this child on this visit?

Abdominal pain \_\_\_\_\_

Headache \_\_\_\_\_

Limb pain \_\_\_\_\_

other \_\_\_\_\_

This protocol is intended to assist you when you rate the somatizing children as to the severity of the somatization they present. Below I have noted some behaviors that may be characteristic for each severity rating. Please use this protocol as a general guide when making your evaluations. I realize that a child may not fit perfectly into a particular rating category. Please rate each child by placing him or her in the category which best describes the somatization complaints he or she presents.

1 \_\_\_\_\_ A rating of 1 would characterize a somatizing child who presents the following:

- Experiences the presenting symptoms for minutes as opposed to hours.
- shows no facial signs of distress
- has not curtailed activities because of the symptoms
- has not experienced pain bad enough to make him or her cry

2 \_\_\_\_\_ A rating of 2 would characterize a somatizing child who presents symptoms more severe than a 1 rating but not severe enough to warrant a 3 rating.

3 \_\_\_\_\_ A rating of 3 would characterize a somatizing child who presents the following:

- experiences the presenting symptoms for hours as opposed to minutes
- shows some facial signs of stress (e.g., wincing, grimacing)
- reports some decrease in appetite
- reports some decrease in activities because of symptoms

4 \_\_\_\_\_ A rating of 4 would characterize a somatizing child who presented symptoms that were more severe than a 3 rating but not severe enough to warrant a 5 rating.

5 \_\_\_\_\_ A rating of 5 would characterize a somatizing child who presents the following:

- experiences the presenting symptoms for hours or days
- shows extensive facial signs of distress (e.g., wincing grimacing)
- reports pain bad enough to make them cry
- reports a cessation of most daily activities because of the symptoms
- reports lying still or curling up in reaction to the pain

Appendix G

Children's Health Locus of Control Scale

would like you to learn about different ways children look  
 their health. Here are some statements about health or illness  
 (sickness). Some of them you will think are true, and so you will  
 circle the YES. Some of them you think are not true and so you  
 will circle the NO. Even if it is very hard to decide, be sure  
 to circle YES or NO for every statement. Never circle both YES  
 and NO for one statement. There are no right or wrong answers.  
 Be sure to answer the way you really feel and not the way other  
 people might feel.

PRACTICE: Try the statements below.

a. Children can get sick. YES NO  
 If you think this is true, circle...YES  
 If you think this is not true, circle...NO

b. Children never get sick. YES NO  
 If you think this is true, circle...YES  
 If you think this is not true, circle...NO

Try one more statement for practice.

c. When I am not sick, I am healthy. YES NO

NOW TURN THE PAGE AND DO THE REST OF THE STATEMENTS THE WAY YOU  
 PRACTICED

- |   |     |    |
|---|-----|----|
| 1. Good health comes from being lucky.                                    | YES | NO |
| 2. I can do many things to keep from getting sick.                        | YES | NO |
| 3. Bad luck makes people sick.  | YES | NO |
| 4. I can only do what the doctor tells me to do.                          | YES | NO |
| 5. If I get sick, it is because getting sick just happens.                | YES | NO |
| 6. People who never get sick are just plain lucky.                        | YES | NO |
| 7. My mother must tell me how to keep from getting sick.                  | YES | NO |
| 8. Only a doctor or a nurse keeps me from getting sick.                   | YES | NO |
| 9. When I am sick, I can do things to get better.                         | YES | NO |
| 10. If I get hurt it is because accidents just happen.                    | YES | NO |
| 11. I can do many things to fight illness.                                | YES | NO |
| 12. Only the dentist can take care of my teeth.                           | YES | NO |
| 13. Other people must tell me how to stay healthy.                        | YES | NO |
| 14. I always go to the nurse right away if I get hurt at school.          | YES | NO |
| 15. The teacher must tell me how to keep from having accidents at school. | YES | NO |



- |     |   |     |    |
|-----|---|-----|----|
| 6.  | I can make choices about my health.                           | YES | NO |
| 7.  | Other people must tell me what to do when I feel sick.        | YES | NO |
| 18. | Whenever I feel sick I go to see the school nurse right away. | YES | NO |
| 19. | There are things I can do to have healthy teeth.              | YES | NO |
| 20. | I can do many things to prevent accidents.                    | YES | NO |

-Appendix H

Index of Perceived Vulnerability

is is a questionnaire to find out how likely you think that you will get sick or hurt this next year. Below each question about the likelihood of you getting sick or hurt are 7 choices ranging from NO CHANCE to CERTAIN. Read each sentence and pick the one word below that will answer the question that it will be true for you. Circle only one answer per question. There are no right or wrong answers. Be sure to answer the way you really feel and not the way other people might want you to feel.

EXAMPLE QUESTION:

What chance is there of your breaking your leg during this next year?

.ALMOST NO. . . .A SMALL. . . . A MEDIUM. . . . A GOOD. . . .ALMOST. . . .CERTAIN  
 CHANCE CHANCE CHANCE CHANCE CERTAIN

PLEASE TURN THE PAGE AND ANSWER THE QUESTIONS AS YOU WERE INSTRUCTED TO.

1. What chance is there of your getting the flu during this next year?

.ALMOST NO. . . .A SMALL. . . . A MEDIUM. . . . A GOOD. . . .ALMOST. . . . CERTAIN  
 CHANCE CHANCE CHANCE CHANCE CERTAIN

2. What chance is there of your having a bad accident during this next year?

.ALMOST NO. . . .A SMALL. . . . A MEDIUM. . . . A GOOD. . . .ALMOST. . . . CERTAIN  
 CHANCE CHANCE CHANCE CHANCE CERTAIN

3. What chance is there of your getting a rash during this next year?

.ALMOST NO. . . .A SMALL. . . . A MEDIUM. . . . A GOOD. . . .ALMOST. . . . CERTAIN  
 CHANCE CHANCE CHANCE CHANCE CERTAIN

4. What chance is there of your having a tooth pulled during this next year?

.ALMOST NO. . . .A SMALL. . . . A MEDIUM. . . . A GOOD. . . .ALMOST. . . . CERTAIN  
 CHANCE CHANCE CHANCE CHANCE CERTAIN

5. What chance is there of your getting a sore throat during this next year?

.ALMOST NO. . . .A SMALL. . . . A MEDIUM. . . . A GOOD. . . .ALMOST. . . . CERTAIN  
 CHANCE CHANCE CHANCE CHANCE CERTAIN

6. What chance is there of your getting a fever during this next year?

.ALMOST NO. . . .A SMALL. . . . A MEDIUM. . . . A GOOD. . . .ALMOST. . . . CERTAIN  
 CHANCE CHANCE CHANCE CHANCE CERTAIN

7. What chance is there of your getting a toothache during this next year?

.ALMOST NO. . . .A SMALL. . . . .A MEDIUM. . . .A GOOD. . . .ALMOST. . . . .CERTAIN  
 CHANCE CHANCE CHANCE CHANCE CERTAIN

8. What chance is there of your getting a cold during this next year?

.ALMOST NO. . . .A SMALL. . . . .A MEDIUM. . . .A GOOD. . . .ALMOST. . . . .CERTAIN  
 CHANCE CHANCE CHANCE CHANCE CERTAIN

9. What chance is there of your getting bleeding gums during this next year?

.ALMOST NO. . . .A SMALL. . . . .A MEDIUM. . . .A GOOD. . . .ALMOST. . . . .CERTAIN  
 CHANCE CHANCE CHANCE CHANCE CERTAIN

10. What chance is there of your getting an upset stomach during this next year?

.ALMOST NO. . . .A SMALL. . . . .A MEDIUM. . . .A GOOD. . . .ALMOST. . . . .CERTAIN  
 CHANCE CHANCE CHANCE CHANCE CERTAIN

11. What chance is there of your missing a week of school (work) because of sickness during this next year?

.ALMOST NO. . . .A SMALL. . . . .A MEDIUM. . . .A GOOD. . . .ALMOST. . . . .CERTAIN  
 CHANCE CHANCE CHANCE CHANCE CERTAIN

12. What chance is there of your getting a cavity during this next year?

.ALMOST NO. . . .A SMALL. . . . .A MEDIUM. . . .A GOOD. . . .ALMOST. . . . .CERTAIN  
 CHANCE CHANCE CHANCE CHANCE CERTAIN

13. What chance is there of your breaking or cracking a tooth during this next year?

.ALMOST NO. . . .A SMALL. . . . A MEDIUM. . . .A GOOD. . . .ALMOST. . . . .CERTAIN  
CHANCE CHANCE CHANCE CHANCE CERTAIN

14. What chance is there of your getting a bad headache during this next year?

.ALMOST NO. . . .A SMALL. . . . A MEDIUM. . . .A GOOD. . . .ALMOST. . . . .CERTAIN  
CHANCE CHANCE CHANCE CHANCE CERTAIN

15. What chance is there of your cutting a finger accidentally during this next year?

.ALMOST NO. . . .A SMALL. . . . A MEDIUM. . . .A GOOD. . . .ALMOST. . . . .CERTAIN  
CHANCE CHANCE CHANCE CHANCE CERTAIN

Appendix I  
Familial Support Measure 1

Now I would like you to tell me what you and your family do when you are sick or hurt. Here are some unfinished sentences about being sick or hurt. Each sentence has 5 words below it. Please read each sentence and then pick the one word below that will finish the sentence the way you think is true for you. If it is very hard to decide, be sure to circle the one word that will make the sentence true for you and your family. There are no right or wrong answers. Be sure to answer the way you really feel, and not the way other people might expect you to feel.

EXAMPLE QUESTION:

I \_\_\_\_\_ sneeze when I have a cold.

NEVER. . . . HARDLY EVER. . . . SOMETIMES. . . . ALMOST ALWAYS. . . . ALWAYS

My mom \_\_\_\_\_ gets sick.

NEVER. . . . HARDLY EVER. . . . SOMETIMES. . . . ALMOST ALWAYS. . . . ALWAYS

NOW DO THE REST OF THE SENTENCES THE WAY YOU PRACTICED HERE.



I \_\_\_\_\_ tell my mom or dad when I feel sick.

VER. . . . .HARDLY EVER. . . . .SOMETIMES. . . . .ALMOST ALWAYS. . . . . ALWAYS

I \_\_\_\_\_ tell my mom or dad when I get hurt.

VER. . . . .HARDLY EVER. . . . .SOMETIMES. . . . .ALMOST ALWAYS. . . . . ALWAYS

My mom \_\_\_\_\_ takes me to the doctor when I feel sick.

VER. . . . .HARDLY EVER. . . . .SOMETIMES. . . . .ALMOST ALWAYS. . . . . ALWAYS

I \_\_\_\_\_ have to go to school when I don't feel good.

VER. . . . .HARDLY EVER. . . . .SOMETIMES. . . . .ALMOST ALWAYS. . . . . ALWAYS

I \_\_\_\_\_ have to stay by myself in my room when I'm sick.

VER. . . . .HARDLY EVER. . . . .SOMETIMES. . . . .ALMOST ALWAYS. . . . . ALWAYS

I \_\_\_\_\_ get to do special fun things when I'm home sick.

VER. . . . .HARDLY EVER. . . . .SOMETIMES. . . . .ALMOST ALWAYS. . . . . ALWAYS

My mom \_\_\_\_\_ worries that I might get sick.

VER. . . . .HARDLY EVER. . . . .SOMETIMES. . . . .ALMOST ALWAYS. . . . . ALWAYS

8. My mom \_\_\_\_\_ worries that I might get hurt playing or at school.

NEVER. . . . HARDLY EVER. . . . SOMETIMES. . . . ALMOST ALWAYS. . . . ALWAYS

9. My mom \_\_\_\_\_ gets upset when I don't tell her I'm sick.

NEVER. . . . HARDLY EVER. . . . SOMETIMES. . . . ALMOST ALWAYS. . . . ALWAYS

10. My mom \_\_\_\_\_ gets upset when I don't tell her I'm hurt.

NEVER. . . . HARDLY EVER. . . . SOMETIMES. . . . ALMSOT ALWAYS. . . . ALWAYS

11. I \_\_\_\_\_ get to stay home from school when I don't feel good.

NEVER. . . . HARDLY EVER. . . . SOMETIMES. . . . ALMOST ALWAYS. . . . ALWAYS

12. My mom \_\_\_\_\_ wants me to tell her when I don't feel good or I get hurt.

NEVER. . . . HARDLY EVER. . . . SOMETIMES. . . . ALMOST ALWAYS. . . . ALWAYS

Appendix J

Multidimensional Health Locus of Control Scale (Form CIHLC)

This is a questionnaire to determine the way in which different people view certain important health-related issues. Each item is a belief statement with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item you are to circle the number that represents the extent to which you disagree or agree with the statement. The more strongly you agree with the statement, then the higher will be the number you circle. The more strongly you disagree with a statement, the lower will be the number you circle. Please circle only one number. This is a measure of your personal beliefs; obviously there are no right or wrong answers.

Please answer these items carefully but do not spend too much time on any one item. Be sure to answer every item. Also, try to respond to each item independently when making your choice; do not be influenced by your previous choices. It is important that you respond according to your actual beliefs and not according to how you feel you should believe.

NOW TURN THE PAGE AND COMPLETE THE QUESTIONNAIRE AS YOU WERE TOLD TO DO IN THE INSTRUCTIONS.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
If I get sick, it is my own behavior which determines how soon I get well again.	1	2	3	4	5	6
No matter what I do, if I am going to get sick, I will get sick.	1	2	3	4	5	6
Most things that affect my health happen to me by accident.	1	2	3	4	5	6
I am in control of my health.	1	2	3	4	5	6
When I get sick I am to blame.	1	2	3	4	5	6
Luck plays a big part in determining how soon I will recover from an illness.	1	2	3	4	5	6
My good health is largely a matter of good fortune.	1	2	3	4	5	6
The main thing which affects my health is what i myself do.	1	2	3	4	5	6
If I take care of myself, I can avoid illness.	1	2	3	4	5	6
No matter what I do, I'm likely to get sick.	1	2	3	4	5	6
If it's meant to be, I will stay healthy.	1	2	3	4	5	6
If I take the right actions, I can stay healthy.	1	2	3	4	5	6

Appendix K  
Familial Support Measurs 2

Now I would like you to tell me what you and your child do when he or she is sick or hurt. On the following page are some statements that may be true or not true for you. Beneath each statement is a scale which ranges from Never true for Me to Always true for Me. For each statement, please circle the word that represents the extent to which the statement is true or not true for you. There are no right or wrong answers. Be sure to answer the way you really believe, and not the way other people might want you to believe.

AMPLE QUESTION:

I sneeze when I have a cold.

RARELY	SOMETIMES	USUALLY	ALWAYS
IE. . . . <del>TRUE</del> FOR ME. . . .	TRUE FOR ME. . . .	TRUE FOR ME. . . .	TRUE FOR ME

NOW TURN THE PAGE AND COMPLETE THE QUESTIONNAIRE AS YOU WERE TOLD TO DO IN THE INSTRUCTIONS.

1. I take my child to the doctor when he or she doesn't feel well.

	RARELY	SOMETIMES	USUALLY	ALWAYS
ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME

2. When my child is home sick I make him or her stay quietly in bed.

	RARELY	SOMETIMES	USUALLY	ALWAYS
ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME

3. I give my child special fun things to do when he or she is home sick.

	RARELY	SOMETIMES	USUALLY	ALWAYS
ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME

4. I would get upset if my child got hurt playing or at school and didn't tell me.

	RARELY	SOMETIMES	USUALLY	ALWAYS
ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME

5. I would get upset if my child wasn't feeling well and didn't tell me.

	RARELY	SOMETIMES	USUALLY	ALWAYS
ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME

6. I make my child go to school even if he or she isn't feeling too well.

	RARELY	SOMETIMES	USUALLY	ALWAYS
ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME

7. I worry that my child might become sick.

	RARELY	SOMETIMES	USUALLY	ALWAYS
ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME. . . . .	TRUE FOR ME



8. I worry that my child might get hurt playing or at school.

ER RARELY SOMETIMES USUALLY ALWAYS  
OR ME. . . . TRUE FOR ME. . . . TRUE FOR ME. . . . TRUE FOR ME. . . . TRUE FOR ME

9. I insist that my child tell me whenever he or she gets hurt or doesn't feel well.

ER RARELY SOMETIMES USUALLY ALWAYS  
OR ME. . . . TRUE FOR ME. . . . TRUE FOR ME. . . . TRUE FOR ME. . . . TRUE FOR ME

10. My child tells me when he or she feels sick.

ER RARELY SOMETIMES USUALLY ALWAYS  
OR ME. . . . TRUE FOR ME. . . . TRUE FOR ME. . . . TRUE FOR ME. . . . TRUE FOR ME

11. My child tells me when he or she has gotten hurt.

ER RARELY SOMETIMES USUALLY ALWAYS  
OR ME. . . . TRUE FOR ME. . . . TRUE FOR ME. . . . TRUE FOR ME. . . . TRUE FOR ME

12. If I think my child isn't feeling well, I'll keep him or her home from school.

ER RARELY SOMETIMES USUALLY ALWAYS  
OR ME. . . . TRUE FOR ME. . . . TRUE FOR ME. . . . TRUE FOR ME. . . . TRUE FOR ME