

Psychosocial Predictors of Health Behavior and
School Functioning in Elementary School Children

by

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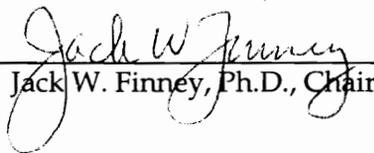
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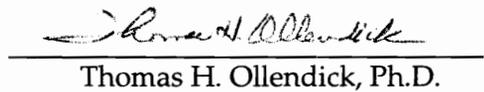
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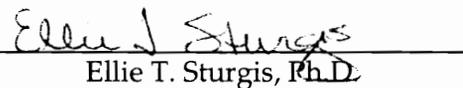
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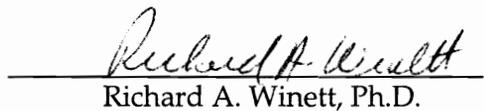
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PSYCHOSOCIAL PREDICTORS OF HEALTH BEHAVIOR AND
SCHOOL FUNCTIONING IN ELEMENTARY SCHOOL CHILDREN

by

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(ABSTRACT)

The current study was designed to test the utility of a multivariate model to predict health care utilization, absenteeism, and achievement functioning. The model included demographic factors and measures of physical health status as well as psychosocial predictors (child mental health, child developmental status, and family functioning). Four dependent variables were used including encounters with the health clinic at school, primary care utilization, absenteeism (partial and whole days for the current year), and achievement status. Multiple regression analyses were performed to determine whether psychosocial factors would account for significant portions of the variance beyond that predicted by health and demographic factors. Results revealed that psychosocial predictors contributed significantly to the prediction of school and primary care health encounters. Predictors of absenteeism and achievement also included contributions of psychosocial factors although they were less robust.

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Review of Literature

Recently, the health status of American school children has evidenced signs of deterioration in spite of increases in preventive health practices (e.g., immunizations; well-child visits). Concurrently, health care professionals have witnessed an increase in utilization of primary care visits for some samples (Browne et al., 1990) as well as encounters in school based clinics (Adelman, Baker, & Nelson, 1993).

Often, researchers and health professionals cite global and/or static factors to account for the apparent decline in children's health status (e.g., poor educational programs, demographic factors). While important, these variables are limited in treatment utility as a result of their largely descriptive nature. Therefore, Tinsley (1992) suggested the need to identify variables that are more amenable to intervention. To accomplish this, psychological, cognitive, and behavioral parameters need to be considered in addition to biological variables when attempting to assess and predict health outcomes (Kaplan, 1990). Until recently, however, the biomedical model has predominantly been utilized to conceptualize children's health status in spite of evidence that suggests that psychosocial factors influence symptom experience and expression (Mechanic, 1992). Health status then should be considered a multifactorial construct that reflects the dynamic interaction between biological and psychosocial dimensions. The sequelae of poor health status represents a relevant and fertile area of research for mental health professionals. For example, identification of factors related to negative health outcome may help identify children at risk for psychosocial and psychiatric problems. Additionally, such investigations may reveal modifiable factors associated with excessive utilization of health care services.

With regard to utilization of primary care medical services, samples of children who account for a disproportionately large quantity of medical visits often emerge in empirical investigations of health behavior (Finney, Riley, & Cataldo, 1991; Joost et al.,

1993; Lewis et al., 1977). Furthermore, in these high-use samples, there is often a lack of correspondence between the severity of the "illness" and the behavioral manifestations of the pain. Instead, these children typically present with diffuse or ambiguous "symptoms" that are diagnosed largely on the basis of self-report (e.g., headaches, stomachaches, backpain; Leventhal, Meyer, & Nerenz, 1980) as opposed to "signs" that are subject to medical verification (e.g., presence of identifiable pathogens). Although these children have become a burden to health-care providers, as they significantly overutilize primary health-care resources (including appointment times and diagnostic tests), Mechanic (1992) suggested that their subjective symptom complaints may be the best predictor of subsequent mortality and morbidity.

Utilization of health care then is considered a primary health behavior and should be considered in any discussion of health status (Tinsley & Holtgrave, 1989). The task then is to determine what besides the medical pathology contributes to differential use of health-care resources. The unmet mental health needs of these patients may also have significant economic implications (Whitehead, Busch, Heller, & Costa, 1986) as well as academic consequences in the form of excessive absence rates and decreased achievement functioning (Weitzman et al., 1986).

SCHOOL OUTCOMES

Absenteeism

Absenteeism represents a significant academic and social problem in the U.S. educational system. Excessive absenteeism is associated with school drop-out rates and therefore, may indirectly influence adult adjustment (e.g., employment; Weitzman et al., 1986). Although educational interventions have been designed to reduce these deleterious effects, they have generally been unsuccessful (Weitzman et al., 1986). Approximately 75% of all school absences are reported to be health related (Basco et al.,

1972), however, this statistic appears to reflect more than undiagnosed illness. For example, Weitzman et al. (1982) found that physical and mental health problems of students and their families were the primary contributing reasons for absenteeism in 50% of the cases. This finding is particularly important since school absence patterns established in early grades generally persist throughout the school years. Therefore, school absenteeism may serve as a meaningful marker for psychological and psychosocial problems (e.g., masked depression and family dysfunction) and poor coping with minor illness (e.g., common acute infections).

Regarding the latter, Rogers and Reese (1965) documented the absences of children in Pittsburgh schools and found that the children with the greatest frequency of absences visited the school health room more frequently than those in the low absence group. Interestingly, however, while students in the high absence group reported more health problems, there was no evidence of more severe illness parameters in the high absence group relative to the low absence subjects. This finding was also supported in a study of middle-school health room use (Joost et al. 1993).

Adelman, Barker, and Nelson (1993) found that school clinic services are utilized by approximately half the student body with as many as 50% being frequent users. Furthermore, using data from a high-school based clinic, they found that high users differed from low users on self-reports of psychological distress (characterized by general distress, somatization, depression, and anxiety). With regard to psychosocial indices, high users reported more temper outbursts, more frequent alcohol use, and multiple sexual partners. These results suggest that assessing school clinic utilization may aid in identifying students with high risk psychological profiles.

In response to these and other significant findings, Weitzman et al. (1985) developed an intervention program to address the health needs of children in the Boston public school system. Consistent with previous findings, Weitzman and his colleagues

found that excessively absent students and their family members identified health problems as the primary reason for the absences. Interestingly, however, health programs using "medically mediated interventions" did not result in a significant reduction in absentee rate. Weitzman concluded that other demographic and educational factors of the students were more influential to their absenteeism as opposed to unmet health needs. Similarly, Weitzman, Walker, and Gotmaker (1986) found that children with psychosocial problems were absent more often than children without such problems and more than children with chronic health problems. Similar results have been found in primary care settings. In fact, some empirical studies have found that actual health need accounts for less than one-sixth of the variance in primary care use (Levy, 1980; see Riley et al., 1994). Hence, school officials could inadvertently be contributing to excessive absences by ignoring the psychosocial sequelae of high utilizers.

Whereas most young children generally rely on their parents to appraise the severity of their symptoms (Palmer & Lewis, 1976), assessing children who select themselves for school clinic services may reveal important child variables that contribute to their high utilization patterns. Specifically, this setting provides a unique opportunity to assess childrens' subjective experiences of pain and somatic distress without being directly influenced by parental factors such as parent interpretation of the symptom, the parent stress level, family resources (including financial and time), and the parent's own propensity to seek medical care for symptoms.

One provocative study used an "adult free system" in an elementary school in which children were allowed to seek health services without the permission of their teachers (Lewis et al., 1977). The findings revealed that 12% of the sample comprised over 50% of the visits to the school nurse. Furthermore, these children generally presented with vague or diffuse complaints of stomachaches and headaches.

Interestingly, a disproportionate amount of these children reportedly had behavioral and social problems, but an absence of any documented history of medical conditions that would explain their repeated visits. In fact upon being asked about the etiology of their symptoms, many of these high-utilizers attributed the somatic sensations to a "math headache" or some other nonmedical, stress-laden condition. These findings point to the fact that while some children might recognize that their "illness" is associated with a stressful event (e.g., tests), they still continue to seek medical services for relief, perhaps because they have learned to manifest their stress in somatic complaints or because psychological resources are not available.

Absenteeism also indirectly reflects achievement as it is often difficult for children to keep up with the work demands (Wolfe, 1985). Therefore, achievement status represents another important outcome variable that warrants investigation.

Achievement

Achievement status, as one index of cognitive functioning, has a demonstrative relationship with illness and organic pathology (e.g., brain insult; low birth weight). However, it may also be reflective of the influence of psychosocial deficits. For example, Wolfe (1985) found that children who experience moderate to severe psychological distress exhibit decreases in achievement level. Additionally, King and Ollendick (1989) demonstrated the association between anxiety and school phobia and difficulties in the school classroom. Hence a school-based study might come closer to understanding children's own perceptions and behaviors related to health and school outcomes instead of solely using parental perceptions as a proxy. However, as suggested earlier, children's behavior cannot be interpreted without regard for the context in which it was socialized. Therefore, factors associated with parent behaviors must also be explored as these factors may demonstrate how a child's learning/socialization experiences

influence their health and social behavior in school. In other words, investigation of family variables such as parental functioning and psychopathology may help explain why some children are rendered more vulnerable than others.

FAMILY CONTEXT

As children progress in the rapid development of abilities to think, understand, reason, and subsequently make informed decisions about their behavior, various family contextual factors may impinge upon this development positively and/or negatively. As with the attainment of other developmental milestones (e.g., social, motor, and emotional development), the development of health and illness attitudes and behaviors cannot be separated from the context in which they occur.

Early illness experiences are likely to have an effect on a child's subsequent experiences with somatic sensations (Maddux et al., 1986; Melamed & Bush, 1985). In addition to being a discriminative stimulus for symptom reporting, the parent has substantial authority to sanction the sick role. That is, parents help determine whether or not a child adopts the sick role and how long he/she assumes that role (Palmer & Lewis, 1986). According to Walker and Zeman (1992) mothers are more likely to assume this position than fathers. At a minimum then, this suggests that it is important to consider maternal variables when assessing illness behavior in children and when delivering interventions. For example, Mechanic (1964; 1983) indicated that maternal distress may be a significant predictor of when she takes her child to the doctor, even in the face of rather benign symptom complaints on the part of the child. Specifically, psychological distress symptoms become masked in more "acceptable" symptoms for both the mother and the child. Therefore, the primary complaints leading to medical utilization may differ according to underlying factors that are distinct from the actual

medical status of the child. Consequently, the relationship between maternal distress and the learning experiences she provides for her child warrants careful investigation.

Moreover, the socialization process that begins early in the life of a child appears to have long term consequences, influencing adult patterns of health and illness behavior (Lau et al., 1990; Tinsley, 1992). Using structural equations (latent variables analysis), Lau et al. (1990) provided evidence that behaviors and health beliefs learned during the childhood and adolescent years remain relatively consistent. Using a longitudinal data set of 532 subjects and one caretaker (the mother in 80% percent of the cases), the influence of parental health beliefs and behaviors on their children's health beliefs and behaviors was explored. Data were collected from subjects and parents during the adolescent years and once yearly during college. The longitudinal multivariate model that was developed revealed a significant and powerful influence of parents as socializers of both healthy and unhealthy behaviors. Moreover, this influence endured, even after the child left the family context for college.

Pratt (1973) found that methods of child rearing (defined as the use of reason and information, rewards, and encouragement of autonomy) were related significantly and positively to child health behaviors. Furthermore, the encouragement of autonomy accounted for the largest proportion of the total variance (11%) when compared to the other indices (reason and rewards) and hence, was considered the most influential to child health practices. Pratt also proposed that child rearing practices that foster such independence result in the development of positive coping strategies that consequently lead to healthy behavioral patterns in children. Therefore, the resources with which a child approaches stressful stimuli and illness symptoms are subject to significant shaping/learning experiences in the family environment and consequently, are important to health status. Because the stressors with which a child is confronted may

include those associated with school functioning, it is important to consider the child's behavior in this context as well.

In summary then, school based clinics may be one way of bringing the mental health needs of children and their families to our attention. Furthermore, it is particularly important to assess health behaviors and characteristics of younger children as this may be the most efficacious time to begin prevention and intervention practices.

VARIABLE SELECTION

The literature summarized above suggests the importance of psychosocial factors for health and school outcomes. However, the identification of specific variables that are influential to differential outcomes is largely unexplored. The current study was designed to test a number of psychosocial variables representing several domains. Guided by a conceptual framework based on social learning theory, variables were selected on the basis of their potential for intervention at multiple levels (e.g., child, family, school) and in multiple settings (e.g., school, physician office, mental health center). A brief review of psychosocial constructs as they relate to health and school outcome is summarized below followed by specific indices of these constructs that were used in the current study.

CHILD PSYCHOSOCIAL VARIABLES

Several psychological variables were explored representing child psychological functioning, child developmental status, and family functioning. There have been relatively few clinical or epidemiological investigations of the influence of psychosocial factors that affect school outcomes, therefore, the majority of the literature review relates to health care utilization patterns.

CHILD PSYCHOLOGICAL FUNCTIONING

Psychological/Behavioral Problems

As indicated in the introduction, mental health is important to both health and school outcomes. With regard to health status, the influence of mental health factors is generally inferred from the rate of utilization of primary care by psychiatric samples, (Costello, Edelbrock et al., 1988; Finney et al., 1991; Jacobsen et al., 1980). Evidence of psychopathology, however, is frequently ignored and/or misdiagnosed by primary care physicians and therefore, has been referred to as the "new hidden morbidity" (Costello, Edelbrock et al., 1988). This issue was explored in a study conducted by Costello, Edelbrock et al. (1988) that compared physician diagnoses of psychopathology with those based on structured interviews of children and their parent(s). Physicians completed a brief checklist that assessed their judgments regarding the presence and nature of emotional and/or behavioral problems for 300 children during their medical visits. Simultaneously, the families of these children were interviewed using the Diagnostic Interview Schedule (DISC; Parent and Child Versions; Costello et al., 1984). The results showed that the pediatricians recognized psychiatric disorders in 5.6% of the sample as compared to 11.8% identified on the basis of the DISC. Interestingly, the largest discrepancy emerged for the anxiety disorders which include somatic complaints as part of the diagnostic criteria. Moreover, on the basis of the DISC, children with medical diagnoses in the category of "signs, symptoms, and ill-defined conditions" received psychiatric diagnoses more often which is suggestive of underlying psychopathology for children who present with diffuse and subjective somatic complaints that are not amenable to verifiable medical diagnosis. Even when considering the tendency for psychopathology to be overestimated by structured interviews like the DISC, the results are compelling and suggest that the mental health problems of many children may go undetected.

Additional evidence of the "hidden morbidity" can be inferred from psychological intervention studies conducted in conjunction with primary care services. Finney et al. (1991) evaluated the effects of brief targeted therapy in a sample of 93 referred children (ages 1-15) and evaluated the effects on utilization. A comparison sample of 93 nonreferred children matched on the basis of demographic variables, HMO membership, and completion of a primary care encounter, were employed for comparison. Children in the treatment group were characterized by problems with behavioral and school functioning as well as toileting and psychosomatic problems for which therapy was delivered by a psychological consultation service (Behavioral Pediatrics Service, Columbia Medical Plan). The results showed that the treatment group evidenced improvement in psychological functioning and significantly reduced medical encounters (e.g., for acute illnesses and nonmorbidity) to the level of the comparison group. Reductions in utilization were accounted for primarily by the decrease in services used by the behavior problem and toileting groups. The reduction in primary care visits subsequent to mental health treatment found in these groups is an example of what has been referred to as the offset effect. Interestingly, however, the psychosomatic group, who had the highest pre-study utilization rate, evidenced a nonsignificant increase in medical services. Finney et al. (1991) proposed that when other factors are present (e.g., psychosocial problems), even acute or minor illnesses result in heightened stress levels that yield excessive medical care utilization.

An offset effect was found in the school-based study described earlier (Lewis et al., 1977) when unbeknownst to the researchers children were also given the opportunity to see a counselor in addition to the school nurse. The utilization of this service corresponded with a decrease in health room visits. Although the finding was serendipitous, it suggested the importance of mental health services in the school context.

Additionally, several studies have illustrated the relationship between psychosocial deficits, including anxiety, and associated difficulties with academic functioning (King & Ollendick, 1989; Shaffer et al., 1985). A study of neuropsychological and cognitive functioning conducted by Kusche, Cook, & Greenberg (1993) supported this anxiety-achievement relationship and also revealed the association between externalizing behavior problems as well as a comorbid symptomatology on cognitive functioning. Together, these findings suggest that when psychosocial problems are evident, there may be deleterious consequences for academic functioning. When considered in conjunction with other studies that have illustrated how absenteeism is related to psychosocial problems (Weitzman, Walker, & Gortmaker, 1986), these findings suggest the need to expand school-based health clinics to include the provision of mental health services. Presently, however, school clinics are limited in resources available to address psychological components of health complaints (Adelman & Taylor, 1991). Furthermore, some children continue to seek medical care for benign symptom complaints, even when mental health services are available. This suggests that additional factors need to be explored including developmental factors such as coping, responsibility for health care, and knowledge of illness.

CHILD DEVELOPMENTAL VARIABLES

Perceptions of Control

Individual differences in perceptions of control over stimuli have been found to be associated with health outcomes, particularly with regard to the locus of these control perceptions (e.g., internal or external to the organism). Consistently, research findings have demonstrated that persons who perceive stimuli to be controllable have an internal locus while the opposite has been found for uncontrollable perceptions (Johnson & Sarason, 1978; Lau & Hartman, 1983). For example, in a longitudinal study of late

adolescents and young adults, Lau, Bernard, and Hartman (1989) found that high perceptions regarding the controllability of preventing sickness were associated with an internal locus of control (e.g., increased beliefs in self-control over health) and decreased beliefs in chance health outcomes. Moreover, in adult populations, it has been found that healthy samples maintain an internal locus of control while chronically unhealthy patients typically have an external locus of control (beliefs in powerful others or chance outcomes; Wallston, Wallston, & DeVellis, 1978). These findings suggest that locus of control may be one factor that mediates the relationship between symptoms and outcomes. The particular resources a child brings to a stressful situation may be another factor. Therefore, to predict outcome also requires investigation of the child's coping repertoire.

Coping and Stress

Guided by the work of Lazarus and Folkman (1984), coping has been conceptualized as a learned cognitive and/or behavioral strategy employed in response to stressful stimuli. Stress experienced early in the life of a child can influence subsequent development. That is, early stressful events may initiate a series of transactions that have an enduring and significant impact on later transactions, particularly since it is during the childhood years that coping and adaptation skills undergo rapid development (Compas, 1987). During the childhood years, there are a number of potential school-related stressors with which children are confronted including both academic and social challenges. Consequently, coping may influence both absence rates and achievement functioning. Regarding the latter, Dweck and Wortman (1982) classified children as effective versus ineffective copers based on their response to academic failures. Children who were effective copers were persistent and remained motivated when faced with academic challenges while ineffective copers

responded with discouragement and diminished motivation to perform. Dweck and Wortman (1982) suggested that the effective copers were able to direct more attention to generating adaptive strategies, thereby avoiding the helpless emotions that accompanied the ineffective copers. Conversely, the ineffective copers directed their attention to identifying attributions for failure, most of which were described as uncontrollable (e.g., external locus of control). Therefore, a child's ability to generate a number of adaptive coping responses when stressful events are encountered is associated with positive outcomes (Compas, 1987; Spivak & Schure, 1976).

Compas, Malcarne, & Fondacaro (1988) studied children and adolescents' strategies for coping with academic and interpersonal stressors and found moderate degrees of consistency in the number of strategies generated across the two domains. This suggests that coping may represent a salient intervention target whose effects may generalize cross both health and school related stressors. As revealed in the Dweck and Wortman (1982) study as well as more recent investigations (Compas, 1987; Lazarus and Folkman, 1984) assessment of control of the stressor is also important for coping. Furthermore, the type of coping strategy employed (emotion-focused versus problem-focused) has an important relationship to one's perception of control (internal versus external).

The Coping-Control Relationship

Although a combination of problem- and emotion-focused coping strategies are typically employed to some degree within an individual confronted with a stressor, when his/her appraisal suggests that a problem is controllable (e.g., internal locus), a problem-focused coping strategy generally appears to be most efficacious. Conversely, emotion-focused strategies are typically more effective for persons with perceptions of less control (Compas, 1987).

In a two-year prospective study of stress and illness in adults, McFarlane et al. (1980) found that perceptions of control and appraisal of one's ability to cope with a particular event determined whether or not the event was perceived as stressful. When both factors were weak, there was an increased chance of experiencing reported health problems. These findings help explain why the same event might be interpreted very differently by different persons.

Another example of the coping-control relationship was illustrated by Dunn-Grier et al. (1986) who studied interactions between children with benign intractable pain (e.g., abdominal pain, headaches) and their mothers using a protocol that induced pain in the area of the somatic complaint. There were no differences in the onset of pain across children. The children were then divided in "copers" and "noncopers" on the basis of whether or not they continued to fulfill daily obligations of their developmental stage (e.g., going to school) in spite of the chronic pain complaints. The non-copers verbally indicated more anger, refusal, or discouragement during the protocol. However, pain diaries kept by the children revealed that both groups experienced similar levels of intensity, frequency, and duration of pain. Importantly, analysis of maternal behaviors during the protocols revealed that the mothers of the non-copers discouraged coping behaviors significantly more than the mothers of the copers which accounted for the group differences in a discriminate analysis which classified 100% of the copers and 70% of the non-copers. Furthermore, the mothers of the non-copers were observed to be more "intrusive" and "overinvolved" in the pain protocols. That is, it appeared as though they were actively fostering dependence (external locus) instead of encouraging the child to accept responsibility for efforts that might function to reduce pain.

LaMontagne (1984) found that locus of control was related to the coping strategy employed by preoperative children. Children with an internal locus chose active

strategies (e.g., seeking information about the impending surgery, detailed knowledge about the medical problem, and a readiness to discuss the surgery) while children with an external locus engaged in avoidant strategies (defined as having restricted knowledge and an unwillingness to discuss the impending surgical procedure). While these results were not related to surgical outcome, other studies have found a positive relationship between the use of preparatory information (where active coping strategies are taught) and postoperative adjustment (Melamed & Siegel, 1975; Peterson & Shigetomi, 1981). In adult samples it has been found that palliative coping strategies (characterized by negative thinking and passive adherence) were associated with increased psychological distress, functional impairment, and health-care utilization (Gil, Williams, Thompson, & Kinney, 1991).

Therefore, the relationship between coping and control appears important to the development of positive or negative outcomes. These psychosocial factors may also be related to a child's cognitive status and thus related to differential outcome (see Compas, 1987a).

Cognitive-Developmental Status

A child's conception of illness symptomatology is likely related to his/her cognitive/achievement functioning and deficits in this domain may contribute to the illness experience. Several studies regarding children's concepts of illness have demonstrated the importance of cognitive processes on health status. Burbach and Peterson (1986) summarized data that illustrated that one's knowledge and understanding of illness and its causes may influence the onset, course, and recovery of illness. Perhaps the most comprehensive description of this variable has been presented by Bibace and Walsh (1980). They demonstrated that children in the preoperational stage (Piaget, 1929) are considered the least sophisticated and conceive of illness as a

concrete phenomenon, caused by magical processes. Conversely, children in the formal operational stage conceptualize illness as having both physiological and psychological parameters. While the results of these studies are compelling, (Brewster, 1982; Campbell, 1975; Lau & Klepper, 1988; Natapoff, 1982; Perrin & Gerrity, 1981; Simeonsson, Buckley, & Monson, 1979), overall, only moderate relations have been found between children's health knowledge/concepts and actual health behavior (Tinsley, 1992). However, the findings may have implications for illness and achievement outcomes.

Therefore, children's concepts of illness should be considered one characteristic that defines their health status and behavior. It is also important to consider that a child's concepts are also formed by relevant experiences with illness that can contribute positively or negatively to health status. This factor then should be studied in relation other predisposing factors (e.g., poor coping, low perceptions of control) hypothesized to be related to health outcomes.

More specifically, deficits in one domain can have consequences for other domains because of the reciprocal nature of these developmental processes. For example, cognitive status is related to perceptions of control over symptoms. Having knowledge of the etiology of an illness may tell the child what factors are amenable versus beyond his/her personal control. Empirical evidence of the relationship between cognitive status and locus of control was revealed by Shagena, Sandler, and Perrin (1988). They found that health locus of control mediated the relationship between illness experience and concepts of illness in samples of chronically ill and healthy children. That is, children with an internal locus demonstrated more sophisticated understanding of the cause, treatment and prevention of illness.

A child's concepts of illness may also be related to his/her choice of coping procedures (Baumann, Cameron, Zimmerman, & Leventhal, 1989). In a reciprocal

manner, a child's conceptualization of an illness will in part determine and be determined by available coping strategies. That is, as they become more cognitively sophisticated in their understanding of health and illness, so do their coping strategies. Specifically, they evolve from having a coping repertoire consisting primarily of limited behavioral strategies to one that is more expansive, providing the child with a range of both cognitive and behavioral strategies to employ in response to stressors (Ryan, 1989). Without some level of cognitive sophistication, the efficacy of these more cognitive strategies would likely go unrealized and underutilized (Natapoff, 1982).

In summary, the constructs discussed (perceptions of control, coping, psychosocial problems, and illness conceptions/perceptions) are hypothesized to be specific child related psychosocial factors important to health and academic functioning and may explain differential health care utilization, absenteeism, and achievement levels. While these child characteristics likely do not account for all of the variability in his/her outcome, they may facilitate explanations of variations in vulnerability to illness (Mechanic, 1977; Tinsley, 1992). That is, individual child factors and contextual variables that determine which coping strategies are mobilized in the face of challenges may determine why some children manifest disordered patterns of development, while others do not, in spite of similar risk status. The influence of these psychosocial factors is hypothesized to also be associated with characteristics of parental behavior and family functioning which suggests that indices of these variables are also important when assessing health and academic outcomes.

PARENTAL FACTORS AND CHILD HEALTH STATUS

Family Functioning

In the domain of health, dysfunction has been found in families of children with poor health status (Schor, 1986). For example, using a measure of family functioning

(e.g., Family Adaptability and Cohesion Evaluation Scale II; Olsen et al. 1983), Phipps (1991) found significant negative relationships between family level of adaptability and acceptance of the sick role. More recently, Riley et al. (1994) found that family conflict was related to more frequent health care utilization. Moreover, it has been suggested that stressful life events and maladaptive family contexts are implicated in the etiology and/or maintenance of acute (see Cohen & Williamson, 1991 for a review), chronic (Sklar & Anisman, 1981), and psychosomatic illnesses (Minuchin et al., 1974). Furthermore, Mechanic (1964), found that mothers who report life stress and family dissatisfaction, also report more illness in themselves and their children. This is exacerbated when evidence of parental psychopathology exists.

One construct in particular that has emerged as a significant contribution to the variance in child health status is Negative Affect (NA: defined as anxiety, depression, hostility, and other negative emotional states). Specifically, health status variables that are nonspecific and ambiguous (e.g., stomachaches, headaches, nausea) are significantly correlated with indices of NA. This is not surprising given that the type of somatic complaints endorsed by persons characterized by NA are often consistent with diagnostic criteria for depression and anxiety disorders (American Psychiatric Association, 1987). Moreover, in an analysis of measures of health status (including symptom checklists and reports), Watson and Pennebaker (1989) found that many are correlated with measures of NA. Their findings suggest that many presumed measures of physical health status are also tapping an important psychological component. Specifically items endorsed may represent subjective interpretations of visceral sensations that are significantly influenced by mood or emotional status (see also Croyle & Uretsky, 1987; Salovey & Birnbaum, 1989). Consistent with this finding, they revealed that the higher the level of NA, the greater the symptom scores, with correlations ranging from .30 and .50. This may explain the consistent finding in both early and

recent studies that physical health need emerges as the best predictor variance in overall health status (Manning & Wells, 1992; Tessler & Mechanic, 1978). However, Watson and Pennebaker's work calls into question the validity of many self-report measures as proxies for physical health status because of the strong correlations with NA found.

These findings are relevant to the current study in that medical procedures as well as acute illness experiences during the socialization period also provide a valuable context for teaching a child to cope with anxiety arousing stimuli (Melamed & Bush, 1985; Walker & Zeman, 1992). Parmelee (1986) explored the behavioral effects of acute illnesses and suggested that they serve a significant socializing event for children, contributing to their overall development (behavioral, cognitive, social, and affective development). More specifically, these experiences afford the child the opportunity to expand their repertoire of health related knowledge. The mother's own psychopathology may have important implications for the child's psychological and developmental status which consequently influences health outcomes (e.g., rates of utilization). For example, it is generally the mother who appraises, interprets, and labels her child's symptoms and determines whether a physician visit is warranted. Hence, illness reports can be shaped by the mother, which might explain the consistency and aggregation typically found in health/illness patterns between the mother and child (Craig & Prkachin, 1980; Johnson, 1971). Consequently, the child who approaches a stressor ill-equipped cognitively, emotionally, and behaviorally might interpret and handle the stressor very differently than the way in which another child may respond to a similar stressor. Repeated experience with such responses to stress may teach an otherwise healthy child that somatic symptoms in the face of stress are functional and that only external agents (e.g., physicians) can control the symptoms. Therefore, the current study will also assess the extent to which illness behaviors are encouraged or reinforced through socialization experiences in the family context.

In the academic domain, an early study by Boardman et al. (1975) illustrated how a child's excessive absentee record can serve as a marker for family dysfunction. A sample of elementary school children with high absence rates was matched by race, sex, grade, and school with a low absence comparison sample. The findings revealed significantly more chronic illness in family members in the high absence group as well as evidence of decreased family competence. The results of another study supported this association between high absence rates and family dysfunction and social problems (Miles & Ury, 1978; Weitzman et al., 1986). Furthermore, several studies have demonstrated the implications of parental psychopathology on academic functioning. Although most of the literature has been limited to adolescent samples (Weissman & Siegal, 1976), the data suggest that parental psychopathology may put children at risk for educational problems. For example, early studies by Rice et al. (1971) revealed that as many as 25% of children with a parent hospitalized for mental illness had to repeat at least one grade.

Another parental variable that warrants exploration is parent health care utilization rates as they may represent another manifestation of psychopathology. This is particularly important since utilization patterns are generally characterized by family aggregation, whereby the similarity within a family is greater than that evidenced between families.

Parental Utilization Patterns

Recently, Quadrel and Lau (1990) conducted a multivariate analysis of adolescents' orientations toward physician use. Using structural equations models, they revealed evidence of aggregation patterns in utilization rates across three domains including flu (e.g., sore throat, vomiting), fatigue (e.g., poor appetite, fatigue) and

serious (e.g., blood in urine, lump in abdomen). This effect increased in strength with increases in the chronological age of the adolescent.

Moreover, several studies have revealed that it is maternal health care utilization that is a significant predictor of child use of primary care facilities (Newacheck & Halfon, 1986). Similarly, Schor et al. (1987) found that family membership accounted for nearly one-third of the variance in health care utilization patterns with the influence of the mother being 2.3 times that of the father (correlations = .40 and .27 respectively).

As explicated in the previous section, NA has been found to result in misinterpretation or overinterpretation of somatic sensations. As a consequence, such persons repeatedly present in the physicians offices for diffuse and ambiguous complaints that are not amenable to verifiable medical diagnosis. For example, in an early prospective study, Tessler, Mechanic, & Diamond (1976), reported that measures of distress were significantly related to both subjective and objective reports of utilization by enrollees in a prepaid group practice. Consistent with studies of child samples reviewed earlier, the distressed sample did not evidence higher levels of illness, but still presented more often with medical complaints when compared to the nondistressed sample. When distress was entered into a regression equation, it accounted for 16% of the variance in patient initiated utilization.

The studies summarized here point to the robust findings of the relationship between distress and primary care utilization in parents and the concomitant effects on child health outcomes and yields another potential intervention target.

SUMMARY

The literature summarized above suggests that a more comprehensive investigation of child health and academic functioning is necessary to account for differential outcomes in utilization, absenteeism, and achievement. Assessing

psychosocial functioning in a school setting, may help identify some of the relevant child variables that contribute to utilization and academic patterns. Additionally, assessment of familial and maternal variables may reveal the socialization/contextual experiences that are associated with the decisions of the children that present repeatedly in the school clinics. Psychosocial measures for the current study were chosen to address four primary questions:

- 1) What factors predict school health room use?
- 2) What factors predict utilization of primary care?
- 2) What factors predict absenteeism?
- 3) What factors predict achievement functioning?

Materials and Methods

Subjects

A description of the current study and invitation to participate was distributed to the parent(s) of all children in grades 3-5 or ages 8-11 years via letters sent home with each child. Five county elementary schools representing both "urban" and rural areas of the county participated in this recruitment process. Due to the low number of subjects this recruitment method yielded, a follow-up letter was sent to the same group one month later with an incentive to participate (e.g., \$10.00). Additionally, announcements were published in three local newspapers and representatives from the Parent - Teacher Association were contacted at all county schools. Finally, letters were sent to the parents of children in the high absence (e.g., 10 or more) or high school utilization (5 or more visits to the sick room) group by principals. The latter effort was deemed necessary in order to secure representation by these children in the study.

Appointments for participants were scheduled at the Child Study Center or in the home of the subject according to their preference. Upon telephone contact, each family was asked to identify the primary care-taker with regard to health care behaviors. In all cases, this was the mother. The mother was invited to participate along with the child. Participation required approximately 45 minutes. At the time of the appointment, subjects and their mothers were interviewed and completed questionnaires described below.

Descriptive Data

Descriptive data for the children and their mothers who participated in the study are presented in Tables 3. All children in the county except those that were developmentally delayed or had a chronic physical illness were invited to participate. The sample included 78 children in grades 3-5 who represented seven area county public

schools. Table 3 reveals that the majority of children who comprised the sample were Caucasian and came from predominantly two-parent homes. The five children who were not Caucasian were of Asian-American decent. The mean Hollingshead rating was 40.5 (range = 8-66) which is indicative of largely middle- to upper middle-class sample in terms of income and education (medium business, minor professional, technical). The mean age of participants was 9.4 years and correspondingly, the mean grade level was the fourth grade. There were nearly equal numbers of girls as boys in the sample. Sixty-four percent of the mothers were employed either full- or part-time outside the home.

Measures of Predictor Variables

Predictor variables were categorized into 4 components according to previous research findings and/or conceptual fit. Several measures representing each component were chosen as independent variables and are summarized below.

COMPONENT 1 - HEALTH STATUS

General Health Perceptions Scale (GH; Rand Health Insurance Study, 1980)

GH was used to assess health status. The scale is comprised of seven general items that assess current health, resistance/susceptibility, and prior health. A General Health Rating Index was computed from the summation of scores on these scales to represent this component. Normative data for this measure were derived from a combined sample across three sites (N=1473). The mean and standard deviation for children ages 5-13 were 28.38 and 4.46, respectively. The higher the index, the better the perceived health. Internal-consistency reliability for this scale is .76 and evidence of construct validity comes from the association between the General Health Rating Index and an index of physical health (functional limitations due to illness; median gamma =

.42). Overall, the General Health Rating Index correlates more strongly with ratings scales of physical health than with mental health.

Symptom Checklist (SC; Rand Health Insurance Survey, 1980)

A second health status measure, was completed by the parent to account for the frequency of symptoms experienced by the child since the beginning of the school year (i.e., ear ache, flu, fever) and to obtain a more proximal index of health status. A frequency score was used for the current analysis. This instrument was reversed scored to be consistent with the General Health Rating Index so that higher scores represented better health (e.g., the fewer the symptoms).

COMPONENT 2 - CHILD PSYCHOLOGICAL STATUS

The Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983)

The CBCL is a parent completed measure of child behavioral functioning and social competence for children ages 4-18 years. Using a three-point scale, the child is rated for each item as not "true", "somewhat true", "very true" or his/her behavior. Normative data collected on population samples have yielded two factors and a total behavior problem score: Internalizing Behavior Problems (characterized by withdrawal, somatic complaints, and anxiety / depression) and Externalizing Behavior Problems (including delinquency and aggression). The Total Score includes internalizing and externalizing domains as well as social, thought, and attention problems. There are separate norms for males and females and for age ranges 4-11 and 12-18. T-scores from both factors as well as the total score were used for the present study. Higher scores are associated with the presence of behavior problems.

Children's Somatization Inventory (CSI; Garber, Walker, & Zeman, 1990)

The CSI is a child completed self-report instrument consisting of 36 nonspecific physical symptoms. It was developed from the somatization subscale of the Hopkins Symptom Checklist (Derogatis et al., 1974) and from DSM-III criteria for somatization disorder. Using a 4-point scale (ranging from not at all to a whole lot) children rate the degree to which they are presently bothered by each symptom. A total score is obtained by summing the ratings. The higher the score, the greater the somatization. Mean scores for elementary school girls is 22.03 (SD=13.43) and 22.76 (SD=16.21) for boys. These gender differences are not significant.

Child Depression Inventory (CDI; Kovacs 1980/1981)

The CDI is a child completed self-report instrument with 27 items scored on a 3-point scale. Each item represents a depressive symptom and is scored 0 for absence of the symptom and 2 for the most severe form of the symptom. Normative data reveal that the mean for combined male and female samples is 9.09 with a standard deviation of 7.04. Total scores range from 0 to 54. A cutoff score of 19 represents the upper 10% of the distribution. The CDI has adequate internal consistency but test-retest reliability has shown variation across populations and test-retest intervals. Validity studies show high correlations with measures of self concept and the CDI can distinguish children with emotional distress from normal school-age children. There is also evidence that the construct overlaps with anxiety (see review by King, Ollendick, & Gullone, 1991). The total score was used for the present study with higher scores representing greater depression.

Childhood Anxiety Sensitivity Index (CASI; Silverman et al., 1991)

The CASI is an 18-item child completed self-report instrument designed to assess a child's belief that anxiety or fear signals subsequent negative consequences (e.g.,

physical or mental illness). For example, a person with high anxiety sensitivity might interpret abdominal pain as evidence of a severe gastrointestinal disorder. On the CASI, children are asked to rate the aversiveness of anxiety symptoms using a scale ranging from "none" to "alot". The sum of all items represents the total anxiety sensitivity score. The CASI has adequate psychometric properties in both clinical and nonclinical samples. Test-retest reliability was .79 and .76 for clinical and nonclinical, respectively and item-total correlations resulted in a standardized alpha of .87 for both samples. Mean CASI scores for normal children is 26.38 for children 6-11 as compared to 30.70 for those with an anxiety diagnosis (Rabian, Peterson, Richters, & Jensen, 1993). The authors hypothesize that anxiety sensitivity may predispose a child to the development of anxiety disorders. The total anxiety sensitivity score was used, with higher scores representing greater anxiety.

The Fear Survey Schedule for Children-Revised (FSSC-R; Ollendick, 1983)

The FSSC-R is an 80-item self-report instrument initially developed by Scherer and Nakamura (1968). It was subsequently revised by Ollendick (1983). Children are asked to rate their level of fear to different stimuli (e.g., lizards, getting a shot from the doctor, getting sick at school) using a 3-point scale ("none", "some", "a lot"). Scoring provides a measure of frequency, severity, and nature of children's fears. Psychometric properties (internal consistency, test-retest reliability, and construct validity) have been found to be adequate. The validity of the FSSC-R has been revealed through correlations with other similar measures including the Revised Children's Manifest Anxiety Scale (Reynold's & Richmond, 1978), the Children's Depression Inventory (Kovacs, 1980/1981), and the Trait Scale of the State-Trait Anxiety Inventory for Children (Speilberger, 1970). Factor analysis of the FSSC-R yielded five factors (fear of failure/criticism, unknown, injury and small animals, danger and death, and medical

fears) that accounted for 77% of the variance (King et al., 1989). Frequency and factor scores were used for the current analysis. The higher the score, the greater the degree of fear.

COMPONENT 3 - CHILD DEVELOPMENTAL

Child Coping (Compas, Ey, Worsham, Kottmeier, & Bolton, 1993)

Coping behavior was assessed by asking children to spontaneously recall and describe an illness event that occurred in the past 3 months. The children were to generate a list of all the possible ways they could have handled or dealt with the event and checked items that they actually performed to cope with the event as well as the one that they perform most often (primary type). This open-ended format was considered to be more efficacious in assessing coping since presenting subjects with a predetermined list of coping strategies does not necessarily result in accurate assessment of this skill (Compas, Malcarne, & Fondacaro, 1988). Furthermore, using the reconstruction of a personal event is thought to be a more valid method of collecting data about coping responses than using data about one's reaction to a hypothetical stressor or to stressors in general (Lazarus & Folkman, 1984). Each coping strategy was then coded using a system developed by Compas et al. (1993). This system accounts for both the frequency and diversity of the coping response by coding each response at two levels: At Level 1, each strategy is classified into one of seven broad categories (e.g., problem-focused, emotion-focused, relaxation, etc.); At Level 2, each strategy is classified into one of several subcategories (e.g., confrontive, distraction, etc.). An index of the child's coping repertoire related to illness was derived by summing the number of strategies that represent different categories (i.e., CN; non-overlapping coping skills) as well as total number of strategies identified (CPT; coping total score). The greater the number of non-overlapping alternatives generated, the stronger the coping repertoire.

Multidimensional Health Locus of Control (MHLC; Thompson, Butcher, & Berenson, 1987)

The MHLC is a scale designed to assess the extent to which one believes that his/her health is controlled internally (e.g., self-care, preventive behaviors), by chance (e.g., luck), or by powerful others (e.g., physicians, family members). It was originally designed by Wallston and Wallston (1978) to assess the locus of control construct in adults. The scale was subsequently modified for children and emerged as a reliable and valid instrument. Test-retest reliability coefficients for Internal, Chance, and Powerful Others are .62, .80, and .69, respectively. The three factor structure initially proposed by Wallston and Wallston was maintained and provided evidence of the construct validity of the scale. For each item, subjects indicate the extent to which they agree or disagree using a 4-point scale. Scores are obtained by summing the ratings for all items on each factor. The higher the score, the stronger the locus orientation. The three factor scores were used for the current analysis.

Concepts of Illness Protocol (CIL; Bibace & Walsh, 1980)

The CIL is administered in interview format and was developed to assess a child's concepts of illness. Specifically, Piagetian (1929) theory has been adapted to explain children's health related concepts according to cognitive and moral development. Children respond to a series of 12 questions related to common illnesses (e.g., colds and heart attacks) including definitions, causes, and strategies for preventing illness. Responses are scored on a scale of 0-6, corresponding to categories of increasing cognitive sophistication (e.g., ranging from incomprehension to psychophysiological). The CIL was scored by the primary researcher and a random percentage of interviews was also scored by a trained research assistant to estimate reliability. Result of the Kappa statistic was .71 which suggests adequate inter-scorer agreement. Total scores

were used for the current study. The higher the score, the more conceptually sophisticated the child.

COMPONENT 4 - FAMILY/PARENTAL FUNCTIONING STATUS

Brief Symptom Inventory (BSI; Derogatis, 1975)

The BSI is a self-report instrument that was adapted from the SCL-90-R (Derogatis & Cleary, 1977). It was designed to provide multidimensional symptom measurement in a brief period of time (approximately 10-minutes). A total of 53 items are rated on a five-point scale in terms of the level of distress experienced in the previous seven days (ranging from "not at all" to "extremely"). Scoring yields nine primary symptom dimensions and three global indices of distress. T-scores for the Global Severity Index (sum for the nine symptom dimensions divided by total number of responses) were used for the analysis.

Parenting Stress Inventory - Short Form (PSI-SF; Abidin, 1990)

The PSI-SF is a 36-item self-report instrument used to identify the stress a parent experiences as a function of certain salient child characteristics, parent characteristics, and situations which are directly related to the role of being a parent. The instrument yields three subscale scores including: Parental Distress score, Parent-Child Dysfunctional Interaction score, and a Difficult Child score. A Total Stress Score, obtained by summing the three subscale scores, was used for the present study.

Family Environment Scale (FES; Moos, 1974)

The FES is a 90-item self-report instrument designed to assess social-environmental characteristics of families. The instrument yields 10 subscales consisting of 9-items each that tap the domains of relationships, personal growth and system maintenance. The entire instrument will be completed by parents but four subscales of

family functioning that have been demonstrated to be particularly relevant to health issues in families were used for the current study: Conflict (FESCO; the amount of openly expressed anger, aggression and conflict among family members), Expressiveness (FESE; the extent to which family members are encouraged to act openly and to express their feelings directly), Cohesion (FESC; the degree of commitment, help, and support family members provide for one another), and Organization (FESO; the degree of importance of clear organization and structure in planning family activities and responsibilities). Respondents report whether they agree or disagree that items describe their family. The FES has been shown to have reliable subscales, validated in multiple studies and has consistently discriminated between disturbed and normally family populations (Bagarozzi, 1984). T-scores for the subscales were used.

Illness Behavior Encouragement Scale (IBES; Walker & Zeman, 1992).

The IBES is a 24-item verbally administered measure designed to assess the extent to which parents encourage the sick role and reinforce illness symptoms (specifically cold symptoms and gastrointestinal symptoms). This scale represents a modified version of the Illness Reinforcement Scale for adults (Whitehead et al., 1986) and has acceptable psychometric properties. Parallel child and parent forms were developed. The child form was used for the current study which has a mean of 35.77, SD = 15.30. The measure yields three scores: IBES total score (the sum of the 24 items), IBES-colds, and IBES-gastrointestinal scores, which are calculated by summing responses to items in each symptom domain. The total IBES score was used for the current study. The higher the score, the greater the perceived encouragement/reinforcement for symptoms.

Chronic Illness in Family

An index of whether a member of the immediate (CI) or extended family (CE) had a chronic illness was obtained (e.g., asthma, cancer, chronic back pain) to assess for the possible modeling influence of these family members on outcome measures.

Maternal Utilization of Primary Care (MU)

Parental utilization was assessed by asking caretakers to recall the number of visits made to their physician in the previous 12 months.

COMPONENT 5- DEMOGRAPHIC FACTORS

Several sociodemographic factors were also entered in to the regression equations including SES (indexed by the Hollingshead Four Factor Index), race, age, grade, and mother's work status (unemployed, part-time, full-time).

Measures of Outcome Variables

1) Health room encounters were tracked throughout the current school year. All children who presented in the main office with illness complaints were registered in a logbook by the school nurse or secretary. The disposition of the case was also recorded (e.g., the child was sent home; the child stayed in the sick room for x amount of time; the child returned to class) and any other illness information (e.g., temperature, vomiting). This log served as the primary school utilization data. Children who participated were also asked to recall the number of visits to the sick room during the period prior to the study in order to have an index of annual use.

2) Absentee data was collected for each child in the study (including partial and whole days) for the current school year as well as the previous academic year via computerized

tracking system adopted by the county. Both excused absences related to illness reports and unexcused absences (truancy, suspension) were recorded.

3) Data regarding the frequency and nature of primary care encounters was collected. An authorization for release of information was obtained from parents to enable the researcher to have access to health records during the previous 12-months. Each encounter was coded according to ambulatory diagnostic categories (ADC; see Table 1) developed by Starfield et al. (1984).

4) Standard scores (composite score) obtained by children on the Iowa Tests of Basic Skills during the current school-year were used as an index of academic achievement.

Results

Hypotheses

The central hypothesis was as follows: In a sample of elementary school children, health status as indexed by Component 1 will account for a significant proportion of variance in outcome. After controlling for demographic and health factors, child psychological variables (Component 2), child developmental variables (Component 3), and family / parental functioning factors (Component 4) will provide significant increments in the amount of variance explained when added to the equation.

Data Analysis

Preliminary Analysis

The data were analyzed with SAS version 6.03 (SAS Institute, 1988) for mainframe computer systems. Multiple linear regression analyses were performed to test the central hypothesis with each dependent variable (school utilization, physician utilization, absenteeism, and achievement). Because the dependent variables were conceptually related, individual multiple regression tests were performed to control for experimentwise Type I error.

The data were initially analyzed using the MAXR regression procedure. All independent variables comprising each of the five components were entered into the regression equation. The MAXR method selects one variable at a time and makes comparisons by removing one variable and replacing it with another at each step to determine which variable yields the greatest increase in R^2 at that step. Comparisons continue (all possible switches) until the model that yields the largest increase in R^2 is produced. The criteria for selecting the best model is based on the R^2 value and determination of best fit (e.g., Mallows's C_p statistic = or total squared area based on the

comparison between the residual variance for the model being evaluated and an estimate of the residual variance that is typically based on the full model). Table 2 depicts summary statistics for each predictor and outcome variable used in the study.

Second Level of Analysis

Next, the independent variables from the MAXR analysis were retained if they were significant at the .10 alpha level. This level was chosen in order to allow all variables which might account for unique variance in outcome to enter the equation, thereby controlling for Type II error. The level of significance for the overall model was maintained at .05 alpha level. Variables were then analyzed by component using a block-wise regression analysis procedure (Pedhazur, 1982) to produce the final model for each dependent variable. Block-wise regression is a conservative forward selection procedure that was applied to each component of predictors. It was used in an effort to control for Type I errors because of the large number of independent variables relative to the size of the subject pool. For blocks that were significant, variables within the blocks were analyzed using a step-wise procedure to determine which one(s) contributed best to the overall block effect. Demographic variables and measures of health status were forced to enter the equation first. Demographic variables represent relatively static factors that are not amenable to psychosocial intervention and therefore were controlled. Similarly, measures of health status have consistently been found to be predictive of health care use and school absenteeism in previous research (see Joost et al., 1993; Tessler & Mechanic, 1978) and therefore, their predictive influence was controlled. Furthermore, because the health status measures chosen represent measures of physical health status, they are likely more amenable to medical as opposed to psychosocial intervention. The order of the remaining three blocks was not specified so that the

blocks were allowed to compete to determine which ones would yield incremental variance beyond demographic and health status measures.

Regression Results

School Utilization

The MAX-R analysis resulted in a 17-variable model that accounted for 55% of the variance in school utilization. Of those 17 variables in the equation, 11 variables met the .10 criterion for block analysis (see Table 4). Table 5 summarizes the results of the block analysis and Table 6 shows the correlation matrix for variables retained in the final model. The results show that 47% of the variance was predicted with four blocks (7 variables). The demographic block accounted for 2% of the variance with none of the variables emerging as significant. Health status accounted for 9% of the variance with general health (GH) maintaining an inverse relationship with school utilization (i.e., the better the health, the lower the utilization). Predictors comprising the child mental health block accounted for an additional 22% of the variance in school utilization which represents a significant increment over health status variables alone. Of the mental health variables that comprised the block, the strongest predictors in order of strength included fear of injury (FSSCI) which had an inverse relationship with school utilization; total behavior problem scores (CBCLT) which was positively related to school utilization; and depression (CDI) which also maintained a positive relationship with school health care use. When family variables were added to the equation an additional 7% of the variance was predicted. Specifically, family cohesion (FESC) and maternal utilization (MU) were inversely related to school utilization. Finally when developmental factors were added to the equation, an additional 7% of the variance was accounted for. In this block, an external locus of control was positively related to rates of school utilization.

Physician Utilization

The MAX-R analysis resulted in a 15-variable model that accounted for 65% of the variance in physician utilization. Of those 15 variables that comprised the final model, 12 variables representing all five components met the .10 criterion for entry into a block analysis (see Table 7). Table 8 summarizes the results of the block analysis which predicted 63% of the variance with four components and Table 9 shows the correlation matrix for those variables. The demographic block was not significant. Health status as indexed by mother's perception of general health emerged as a significant predictor, accounting for 27% of the variance in physician utilization. When family variables were added to the equation an additional 17% of the variance was predicted. Specifically, family conflict (FESCO) and parental encouragement of illness behavior were positively related to physician utilization. The addition of child psychological factors resulted in a 14% increment in variance predicted. Within the child mental health block, fear of failure (FSSCF) was inversely related to physician utilization while the total fear score (FSSCT) was positively related. Total behavior problems scores (CBCLT) were positively related and internalizing behavior problems (CBCLI) were negatively related to physician utilization. Finally, an index of child endorsed symptoms (CSI) was positively related. Predictors comprising the developmental block contributed an additional 5% of the variance in physician utilization with internal locus of control (LOCIN) resulting in a positive relationship with physician utilization.

Absence Rate

Absence rate from the previous year was used as an additional independent variable in the analysis of current absences. The MAX-R analysis resulted in a 17-variable model that accounted for 61% of the variance in school utilization. Of those 17 variables in the equation, 14 variables met the .10 criterion for entry into a block analysis

(see Table 10). Table 11 shows the results of the block analysis and Table 12 shows the correlation matrix for variables that comprised the final model. The results indicate that nearly 40% of the variance was predicted with four blocks. Demographic variables accounted for 16% of the variance with SES and RACE emerging as significant contributors with both having an inverse relationship with absence rate (the higher the SES, the lower the absence rate; non-caucasian children had lower absence rates). Health status accounted for 6% of the variance with the parent completed symptom checklist (SC) emerging as the only predictor (i.e., the better the health or fewer the symptoms, the lower the absence rate). Predictors comprising the child mental health block accounted for an additional 12% of the variance in school utilization with fear of failure (FSSCF) emerging as the only significant predictor which was inversely related. When developmental variables were added to the equation an additional 6% of the variance was predicted by an inverse relationship with the number of non-overlapping coping strategies utilized (CN) and a positive relationship with the total number of coping strategies available to utilize when ill (e.g., includes redundancy in categories). The family component was not significant.

Achievement

The MAX-R analysis resulted in a 16-variable model that accounted for 50% of the variance in achievement. Of those 16 variables in the equation only 5 variables met the .10 criterion for entry into a block analysis (see Table 13). Table 15 summarizes the results of the block analysis which predicted nearly 35% of the variance with three blocks (3 variables) and Table 16 shows the correlation matrix for those variables. Demographic variables accounted for 9% of the variance, however, only SES was a significant contributor and had a positive relationship with achievement. The health status block was not significant and did not enter. The developmental block accounted

for 17% of the variance with one factor, children's concepts of illness (CIL), which was positively related to achievement. When the family block was added to the equation, an additional 8% of the variance was predicted. Maternal utilization of physician services was the only significant predictor that emerged and had an inverse relationship with achievement. The child mental health block was not significant and did not enter the equation.

Discussion

The current study examined the association between psychosocial variables and child health and school outcomes in a sample of elementary school children (see Table 16). Unlike previous studies that have identified a limited number of static variables (e.g., sociodemographic factors), this study explored variables from several domains including child, school, and family. The selection of predictor variables in the present study was guided by the work of Lazarus and Folkman (1984) and Tinsley (1992) who have illustrated the importance of psychosocial processes of children and their families above and beyond the contribution of health and demographic factors in the prediction of child outcomes.

Health Behavior

School Health Room Use. In the prediction of school utilization an additional 36% of the variance beyond that predicted by health status was accounted for with child psychological, developmental, and family variables. In this sample, no demographic variables emerged as significant predictors of the criterion. However, child mental health factors were particularly robust and alone accounted for more of the variance than health status (e.g., 22%). In particular, the greater the parent endorsed problems in overall child behavior functioning, the more frequent the visits to the school health room. Because only the total behavior problem scale (CBCLT) was significant and not the internalizing and externalizing scales alone, the association with school utilization may reflect the contribution of the social, thought, and attentional problems factors of the CBCL that are included in the total behavior problem score. Furthermore, the influence of internalizing problems may have been best accounted for by the emergence of child depression as a significant variable in the mental health block. Specifically, the higher the child endorsed symptoms of depression, the higher the utilization of school

health services. Although none of the children in the sample were clinically depressed, these findings may suggest that part of what mothers refer to as "behavior problems" are manifestations of depression in the children as these scales were significantly correlated. Furthermore, there is some evidence that children who experience diffuse, ambiguous or uncertain onset of symptoms experience higher levels of depression (Bennett, 1994) and examination of ADG categories represented by this sample (see Table 1) reveals a high incidence of acute URI's, but also recurrent symptoms including headaches, stomachaches, and uncertain symptoms. Child-endorsed fear of injury also emerged as a significant predictor and had an inverse relationship with school utilization. This factor of the Fear Survey Scale represents fear of minor injury and small animals and includes items such as spiders, sharp objects, getting a cut or injury, and the sight of blood. Because there are generally no small animals at school, the latter items may make children resistant to entering a school sick room.

In the developmental domain, having an external locus of control was associated with visits to the school health room. This is consistent with the literature that suggests that external control perceptions are associated with more distress and less adaptive responding to symptoms (Strickland, 1978). Specifically, these children attribute their symptoms to external or chance factors (e.g., luck) and consequently, look to resources outside of themselves (e.g., utilization) to address their symptoms.

In the family domain, family cohesion emerged as a significant predictor of school utilization. Specifically, the lower the cohesion (e.g., degree of commitment, help, and support family members provide one another), the higher the utilization. This suggests that factors that occur at home may continue to impact a child in the school environment. If a family does not have the resources to come together to deal with stressful events at home, the child may appear at school in need of additional assistance. The individual attention given in the school health room may help satisfy this need for

additional social support. In the family domain, maternal utilization of health care also emerged as a significant predictor of school utilization, however, it had an inverse relationship in this sample. That is, children who visited the health room more often had mothers who reported using medical services less often. Previous research has demonstrated family aggregation with regard to physician utilization (Craig & Pratkan, 1970); however, physician utilization is largely parent initiated. In the school context, use of the health room is child initiated which may explain the inverse relationship. In fact, school utilization and child physician utilization are not significantly correlated (see Table 17) and the regression models are relatively distinctive (see Table 16) in this sample which suggests that different factors are operative to produce these outcomes. Data were not collected on paternal or sibling utilization where the family aggregation effect could have been localized given that most families in the current sample were two parent families.

Physician Utilization. With regard to physician utilization, an additional 37% of the variance was predicted beyond that of physical health status alone with significant contributions from variables comprising the child psychological, developmental, and family blocks. No demographic factors were significant. Consistent with the school utilization data, overall child behavioral functioning was positively related to utilization. Interestingly, however, while the total score was positively related, examination of the parameter estimate of the internalizing scale of the child behavior checklist reveals an inverse relationship with utilization (the higher the internalizing score the lower the physician utilization), in spite of the positive raw correlation between these variables. A similar result was evidenced with regard to total fear scores on the Fear Survey Schedule. These findings suggest that in this regression analysis, classical suppression is operative (see Cohen & Cohen, 1975). Specifically, a suppressor variable is a variable

that has a zero, or close to zero, correlation with the criterion but is correlated with one or more than one of the predictor variables. These variables impact the analysis by increasing partial correlations because they suppress or control for irrelevant variance that is shared with the predictors and not with the criterion. Consequently, the parameter estimate reflects the relationship between the variable and the criterion when the effects of other variables are controlled or partialled out (e.g., the parameter estimate), and may result in the sign of the relationship being different from the raw correlations. In the current analysis, the partial correlation between CBCLI and physician utilization is actually negative, while the raw correlations alone would suggest that it is positive. Therefore, when interpreting the results of the regression, only the parameter estimates should be used.

The results suggest that as with school utilization, the relationship between behavioral functioning and physician utilization may reflect the contribution of the social, thought, and attentional factors of the CBCL that are included in the total behavior problem score. However, although the "internalizers" (anxiety/depression, withdrawal, somatization) are inversely related to utilization, child endorsed somatic symptoms on the CSI are positively related to utilization. The CSI correlates significantly and positively with depression (CDI; .34) and anxiety (CASI; .46) but the correlations are not strong enough to suggest that the somatization that is reflected by this scale serves as a proxy for the anxiety or depression constructs. It may suggest, however, that the internalizers' symptoms may not be recognized as consistent with anxiety or depression by the parent and consequently, they are not observed as such, whereas mothers of children with attention and social problems may "notice" more problems. In other words, unless the internalizers, who are high on the somatization scale, have other more observable behavior problems, they are not coming to the attention of the parent and consequently, the physician. Indeed, analysis of the

developmental block suggests that having an internal locus of control is predictive of high utilization which is contrary to previous findings that have demonstrated an internal locus to be related to active, self-reliant, problem-focused coping around symptomatology. However, because the parent generally initiates physician services, having an internal locus of control with regard to health symptoms may not be as important for whether services are sought or not. Instead, a measure of parent locus of control over the health of her child may have been more useful (Tinsley, 1992).

Similarly, what may be more important to understanding physician utilization, because it is parent initiated, are the family variables that were significant in this analysis.

Specifically, parent encouragement of illness behaviors and family conflict were both positively related to physician utilization. This suggests that in a family environment characterized by conflict (e.g., family members openly express anger, aggression, and conflict), having somatic complaints may result in more positive attention for their symptoms and this attention is related to whether or not the child is taken to the doctor. In contrast with previous research, maternal utilization did not emerge as a significant predictor of child use of physician services (Mechanic, 1983; Riley et al., 1994). This difference may be attributed to methodological differences between this study and earlier studies of utilization. Specifically, the rate of maternal utilization was obtained by maternal self-report as opposed to review of her medical records. It is possible that the mothers in this study overlooked some visits given that they were asked to recall all visits during the course of a year time interval. Access to medical records would be necessary to gain a reliable index of all visits. Interestingly, however, maternal distress, as indexed by the BSI, was significantly correlated with maternal use which is consistent with previous findings (Mechanic, 1983).

The effects of suppression were also observed with regard to the total fear survey score. Analysis of the raw correlations reveals that the total score is inversely related to

physician utilization, while the parameter estimate in the regression analysis reveals that it is positively related (the higher the total fears, the higher the utilization). Interestingly, the total score of the Fear Survey is not correlated with the CBCLI but both are significantly correlated with depression (FSSCT=.44 and CBCLI=.37), while only the FSSCT is significantly correlated with another internalizing behavior, anxiety sensitivity (.56). This may indicate that the total score of the Fear Survey is accounting for the influence of anxiety on utilization while the CBCLI is not reflecting this important anxiety dimension, and therefore, has an inverse relationship. Importantly, the children completed the Fear Survey Schedule while the mothers completed the CBCLI. Therefore, these children may indeed have symptoms of negative affectivity that are manifested in the form of generalized child reported fear, somatic complaints (CSI), and anxiety sensitivity as opposed to parent perceived anxiety. As suggested earlier, mothers may serve as a better observer of overt behavior problems than for affective problems. Furthermore, Rabian et al. (1993) found that CASI scores of an anxiety diagnostic group were not significantly different from those of an externalizing behavior problem group which suggests that anxiety may be masked by other predictor variables related to behavioral functioning. Furthermore, because the Fear Survey Schedule is correlated with trait anxiety, it may have accounted for the influence of anxiety on health outcomes. Although the measure of anxiety sensitivity used in the current study (CASI) did not emerge as a significant predictor of health care utilization, the mean score for this sample was nearly consistent with that of an anxiety diagnostic group (29.4 vs. 30.70; Rabian, Peterson, Richters, & Jensen, 1993). Furthermore, the CASI was significantly correlated with the child endorsed symptom checklist that was developed on the basis of the somatization scale of the Hopkins Symptom Checklist (Deragotis et al., 1974). This may suggest that the symptoms experienced by the children in the current sample do indeed reflect negative affectivity. That is, the physiological

symptoms experienced by the children in the current sample do not necessarily represent the belief that the symptoms will lead to "severe" consequences (e.g., illness) as the construct of anxiety sensitivity is thought to assess, but instead, serve as a marker for anxiety in other domains (school, social, family). Indeed, their physiological symptomatology may be functional in reducing stress or eliciting attention. Because the CASI is related to several other predictor variables, it may be useful to use a different measure of the anxiety construct (e.g., structured interview) to determine if it yields prediction of more incremental variance. Finally, the negative relationship found between fear of failure and criticism and physician utilization (the higher the fear, the lower the utilization) may suggest that children who are fearful of being punished or criticized by their parents may issue less complaints and consequently, their symptoms are not noticed.

Implications for Interventions. Overall then, when designing interventions related to health care utilization, the results of the current analysis suggest that school utilization and physician utilization are conceptually related although a relatively different constellation of psychosocial factors emerged. Consistent across both equations was a positive relationship between overall behavioral functioning (CBCLT) and the influence of family factors (e.g., low cohesion and high conflict are related to utilization). Differences in the equations include the relationship between child endorsed depression which was predictive of school utilization behavior but not physician utilization, and the differential relationship between locus of control (external is related to school use while internal is related to physician use). The latter likely reflects the fact that physician visits are typically based on parental judgment of the nature and severity of symptomatology, while at school, the child's perception of the symptoms and his/her ability to control them are influential. For example, if a child has

difficulty with a particular teacher, peer, or subject or feels depressed, the child may rely on external means to deal with the problems. Indeed, these findings are consistent with Lewis and Lewis (1985) who found that children who initiated school services were described as having social and behavioral problems and scored high on a psychological index of "feeling bad" in the absence of chronic medical problems. At home, where it is typically decided by the parent whether or not a child will go to the doctor, the fact that they have an internal locus of control may be less consequential to this outcome. Furthermore, symptoms of negative affectivity (child endorsed depression in the school analysis; child endorsed fear and somatization in the physician analysis) may be masked in parent reports of behavior problems, particularly since an inverse relationship emerged between parent reported internalizing problems and physician utilization. Finally, encouragement of illness behavior emerged as significant for physician utilization but not school utilization. This is not surprising given the fact that parents are not at school to encourage illness symptoms whereas child symptom complaints may be particularly functional in a conflictual home environment. It should be noted, however, that parents might encourage school use of health services indirectly when they pick up their child from school or when they are called to pick up the child because of symptom complaints. However, the school personnel generally only encourage calling when the child has a temperature or other evidence of a verifiable illness.

Therefore, when considering interventions to impact health-care utilization, those that target child behavioral and affective functioning may be useful. Furthermore, because family factors emerged as important, a behavioral family intervention may be most efficacious. This type of intervention would target individual child characteristics in the context of the family environment that is important to the socialization of illness behaviors. The efficacy of such interventions has been demonstrated in families with chronically ill children (see Finney & Bonner, 1992 for a review).

Contrary to expectation, child coping skills did not emerge as a significant predictor of health outcome, despite the importance of this process for dealing with stress (Lazarus & Folkman, 1984) in the academic domain (Compas, 1987), in medical settings (Melamed & Siegel, 1975; Peterson & Shigetomi, 1981) and in adult samples (Gil, Williams, Thompson, & Kinney, 1991). However, the method of assessing coping in this study did not tap the important cognitive process of perceived efficacy. That is, while the children were able to generate a list of strategies used for coping with a recent illness situation, this does not necessarily imply that they believed they could successfully apply those strategies in other stressful situations or that those strategies would result in behavioral change. This is particularly important since efficacy expectations have been found to influence the initiation and persistence of coping behaviors (Bandura, 1977). Because none of the children in this sample had documented chronic illnesses (with the exception of two asthmatic children), many of their symptoms may have been influenced or exacerbated by stress. Indeed, in the school utilization analysis, the relationship between external locus of control and utilization may suggest that the high utilizers believe that utilization is the only alternative that assists in stress relief. Specifically, utilization may represent a short-term palliative measure to deal with the stress encountered at school or the residual stress from the home environment. In subsequent studies then, it will be important to assess efficacy expectations and include a measure of stressful events (e.g., daily hassles) that might make the symptom experience more difficult to tolerate. The lack of a significant finding in this study then should not preclude a coping skills intervention to address health behaviors.

School Behavior

Absences. Overall, an additional 18% of the variance beyond that predicted by health status and demographic variables was accounted for by child psychological and

developmental variables when predicting school absenteeism. Regarding the health status block, the symptom checklist emerged as the best predictor accounting for almost 6% of the variance, while the measure of general health was a significant predictor of health outcome variables. Specifically, the greater the number of symptoms experienced in the previous 30 days, the higher the absence/tardy rate for that school year. Because the symptom score yields a more specific and proximal index of current health, it may reflect the type of demand characteristic necessary to result in a parent allowing the child to arrive at school late or miss a day altogether, but does not always result in physician utilization. Parent judgment is operative in both of these decisions and hence the parent decides when it is necessary for a child to be absent and when symptoms are severe enough warrant physician intervention.

With regard to demographic factors, 16% of the variance was accounted for by race and SES both of which were inversely related to absence rate (lower SES and Caucasian race were predictive of higher absenteeism). Although the association between SES and school outcomes has been established in the literature (see Wolfe, 1985), the relationship between race and absenteeism is difficult to explain. There were only five non-Caucasian subjects in the sample. Race may be a proxy for other factors such as parent work status, cultural values of school attendance, or illness, and these factors may be operative in determining low absence. More specific measures would be necessary to speculate further about why this finding occurred.

With regard to psychosocial variables, a fear of failure and criticism emerged as predictive of absenteeism. This factor of the Fear Survey Schedule includes a number of school-based fear behaviors (including getting a report card; going to school; being sent to the principal; and failing a test). However, an inverse relationship between this factor and absenteeism was revealed in this sample (e.g., the higher the fear of failure, the lower the absences), contrary to what was expected. However, when interpreted with

regard to the inverse relationship between a diverse coping repertoire (CN; nonoverlapping coping strategies) that was found, this pattern of findings may suggest that while these children endorse high fears of failure, having a diverse coping repertoire enables them to effectively ameliorate the impact of those fears. The total number of coping strategies (CT; coping total), which includes redundancy in strategy type (e.g., take aspirin, take cough medicine), was positively related, which suggests that having a number of similar coping strategies is not enough but that diversity is important to low absenteeism. Indeed, the coping strategy used most often by children without a diverse repertoire may have been to refrain from going to school. Consequently, interventions that address coping skills may be particularly useful in addressing absence rates. A program designed by Dubow et al. (1993) demonstrated the efficacy of such an intervention. Specifically, they designed a school-based primary prevention program to enhance children's ability to cope with stressful events. Results revealed improvements in coping repertoire and efficacy expectations when compared to a delayed intervention group. No other psychosocial factors including family variables emerged as significant as significant in the prediction of this criterion.

Achievement. Overall, an additional 25 % of the variance was accounted for by developmental and family variables in the prediction of achievement over health and demographic factors. Health status did not enter the equation while SES accounted for 9% of the variance.

With regard to psychosocial variables, none of the child mental health factors was significant and only one of the developmental variables emerged as predictive. Specifically and not surprisingly, children's conception of illness was positively related to achievement which suggests that the more knowledge a child has regarding the etiology, nature, and treatment of illnesses, the higher his/her achievement status. Only

one family variable emerged as significant, maternal utilization of health care, which was inversely related to achievement. From the outset, this relationship does not appear very meaningful, however, analysis of the overall correlation matrix reveals that child utilization of health care (school and physician) is also significantly correlated with achievement. These results suggest that child and family health variables, which have strong relations to psychosocial functioning, are indeed important to achievement, although causality cannot be determined. Future studies should look at utilization patterns as a predictor of achievement given that children who are focused on symptomatology (whether organic or stress related) may not be able to perform as well academically. Additionally, the results of achievement as a predictor of health outcomes should also be explored given the relationship between concepts of illness and achievement.

The latter result in conjunction with the emergence of psychosocial variables across both health and school analyses, suggests that another useful intervention may be to help children recognize that stress may influence some of their symptoms, particularly when they are at school and have some independence in interpreting their symptoms. The mean response of the current sample on the Concepts of Illness Scale reflects functioning at the beginning concrete-logical reasoning stage which is characterized by the ability to differentiate that which is internal from that which is external to the organism. More specifically, the children in the current sample fall in the "contamination" stage which implies that the children view illness as the result of physical contact with a stimulus. This level of conceptualization is consistent with the 7-10 year age group which is commensurate with the mean age of the current sample. Therefore, in conjunction with coping skills interventions, helping children develop broader conceptions of illness may be efficacious. This and other psychosocial interventions suggested above have financial implications when making decisions about

the allocation of medical (e.g., school nurse) and mental health resources for school environments.

Summary

The current study represented an attempt to lay the groundwork for variable selection from which predictive models and interventions can subsequently be constructed and tested. Parameters of health, sociodemographic status, psychosocial well being, and family functioning were explored. Overall, the regression models that emerged suggest that psychosocial and family factors were most useful in the prediction of health outcomes. This is consistent with the well documented influence of adaptational or psychological processes that mediate the relationship between chronic illness and adjustment in the pediatric psychology literature (e.g., Thompson, Gustafson, George, & Spock, 1994; Thompson et al., 1993). While health status continued to be a significant predictor in most of the equations, behaviors such as health care utilization do not necessarily indicate that the symptoms are solely biologically based. Although the etiology of the symptomatology may be biological, it may be more efficacious to conceptualize the symptoms as a function of the continual interaction between the developing organism and his/her environment. Biological processes do not occur in isolation and hence it is necessary to explore multiple factors that contribute to adaptation and adjustment. Intervention studies that target the psychosocial processes that mediate the relationship between physical health status and health outcome need to be undertaken.

While the results were robust for health care utilization outcomes implications of these data are less clear for school outcomes. In particular, the high rate of attendance in the current sample made it difficult to explore psychological factors that may be associated with children who are at risk for high absenteeism. Furthermore, school absenteeism and health status are related conceptually, and yet, the predictive models in the current study were distinct. This suggests the need for additional research to

identify models with variables common to both school and health outcomes so that intervention efforts in the school context can be maximized.

Additionally, generalization from these results remains tenuous, pending cross validation studies and those that replicate the findings after addressing methodological weaknesses. Specifically, several limitations characterized the current study.

First sample recruitment proved to be labor intensive and necessitated the addition of a monetary incentive to obtain volunteers. Although the incentive was of nominal value, it likely functioned to help busy families justify the time required for participation. Consequently, the sample size was small and likely limited the power of the results. Furthermore, deliberate sampling for heterogeneity was attempted in terms of absence and utilization rates, but it was difficult to recruit high use and high absence children. Additionally, the sample used for the current study was predominantly Caucasian, middle class, high achieving youngsters, and therefore the results may not be generalizable to other samples. Furthermore, the rates of mother and child reported symptoms of poor adjustment was suggestive of a non-deviant sample which raises the question about the extent to which the findings may reflect sample characteristics that are unique to the study.

Secondly, although a significant portion of the variance in health and school outcome is accounted for by psychosocial variables used in the current study, there is still a substantial portion of unexplained variance that remains. This suggests the need for additional and, in some cases, better measures of child and family functioning to be incorporated into the model. For example, structured interviews to help clarify the presence of internalizing disorders may be useful given the differences that emerged between child versus parent completed questionnaires. Additionally, as suggested earlier, the coping measure used in the present study did not assess efficacy expectations of the child, and therefore, may not have sufficiently captured the child's coping

repertoire. Furthermore, additional dimensions of maternal stress and distress as well as her cognitive appraisal of stress (e.g., maternal locus of control) may be useful in predicting child outcome. Additionally, more objective measures of maternal utilization (e.g., medical records) are preferable to self-report of visits. Finally, assessment of paternal and sibling functioning may also provide useful and largely unexplored data.

It should also be noted that in the present study, component groupings were formed on the basis of theoretical and clinical evidence, not statistically determined. Therefore, a factor analysis of the data could be undertaken to evaluate the efficacy of the current groupings. Logistical regression analyses could then be performed to compare subsets of high and low users and high and low absences.

Once these methodological problems have been ameliorated, research should advance to an experimental level in which interventions can be designed. Conceptualizing health care and school functioning as psychosocial processes suggests that psychological treatment interventions may reduce over-utilization and high absenteeism. To accomplish this, cooperation among multiple settings is crucial including physicians, mental health professionals, school personnel, and families. This will be complicated by the fact that most children appear in the physician's office or the school health room and not mental health facilities. Consequently, attention is directed toward health rather than mental health factors. Additionally, with the rapid movement toward managed health care, physicians and insurance agencies will become even more powerful gatekeepers of health and mental health services.

This suggests that interventions that integrate health and mental health services may be most effectively initiated in conjunction with visits to the physician. Specifically, routine individual and family assessment for children with high rates of medical care use as well as increased screening of children and parents in general, could be conducted by a trained clinician. Ideally, services could be provided directly by

psychologists within the physician's office during medical visits as the parents and children may be more receptive to mental health treatment services in a familiar "medical" context. Having an already established relationship with the physician may help parents feel more comfortable and perceive less stigma associated with psychological services. The interventions could be evaluated by post-treatment assessment of psychological adjustment, decreases in utilization rate, and parent-child reported satisfaction with services. A useful model to follow for this type of intervention is that developed by Finney et al. (1991) described earlier. Specifically, these researchers developed a consultation service that assessed and delivered brief targeted therapy to children in need of psychological services within a health maintenance organization.

Additionally, mental health services could be provided in the school environment as part of the child's educational programming. These services could be delivered via contracts with local mental health professionals or by trained guidance counselors. These interventions could include increasing the child's resources for dealing with diverse stressors (e.g., teach more effective organization and study skills, social skills, and relaxation techniques) and/or providing opportunities for the child to experience success at school for behaviors that are incompatible with the his/her somatic behavior. Importantly, however, school-based services alone may not be sufficient to ameliorate symptoms if family adjustment is also problematic, and should therefore, be used in conjunction with other mental health services for the family when indicated. Furthermore, most public school systems, including the one used in the current sample, allocate only limited resources to address health and mental health problems. Therefore, both the health-care and school systems will benefit from continued research that justifies the need for such services as it relates to health and educational outcomes.

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Appendix A
Tables 1-17

Table 1

<u>Ambulatory Diagnostic Groups (ADG)</u>	<u>N</u>
1) Time Limited: Minor (dermatitis, poison ivy)	29
2) Time Limited: Minor/Primary Infections (acute URI-bronchitis)	72
3) Time Limited: Major (sinusitis)	5
4) Time Limited: Major/Primary Infections (influenza; pneumonia)	22
5) Allergies (allergic rhinitis)	12
6) Asthma	2
7) Likely to Recur: Discrete (gastritis)	6
8) Likely to Recur: Discrete-Infections (otitis media)	35
9) Likely to Recur: Progressive (diabetes)	0
10) Chronic Medical: Stable (hypertension)	0
11) Chronic Medical: Unstable (coronary atherosclerosis)	0
12) Chronic Specialty: Stable-Orthopedic (chondromalacia patellae)	0
13) Chronic Specialty: Stable-Ear, Nose, Throat (hearing loss)	0
14) Chronic Specialty: Stable-Eye (Refraction disorder)	0
15) Chronic Specialty: Stable-other (polycystic ovaries)	0
16) Chronic Specialty: Unstable-Orthopedic (juvenile osteochondrosis)	0
17) Chronic Specialty: Unstable-Ear, Nose, Throat (chronic sinusitis)	7
18) Chronic Specialty: Unstable-Eye (glaucoma)	2
19) Chronic Specialty: Unstable-other (pseudotumor cerebri)	0
20) Dermatologic (acne)	0
21) Injuries/ Adverse Effects: Minor (ankle sprain)	10
22) Injuries/ Adverse Effects: Major (tear of meniscus)	6
23) Psychosocial: Chronic (ADHD)	0
24) Psychosocial: Other (adjustment reaction)	0
25) Psychophysiologic (migraine)	11
26) Signs/Symptoms: Minor (headache)	6
27) Signs/Symptoms: Uncertain (palpitation)	3
28) Signs/Symptoms: Major (chest pain)	1
29) Discretionary (sebaceous cyst)	0
30) See and Reassure (skin scar/fibrosis)	0
31) Prevention/ Administrative (routine medical exam; physical)	22
32) Malignancy (malignant skin neoplasm)	0
33) Pregnancy (pregnant state)	0
34) Dental (chronic gingivitis)	0

Table 2

Summary Statistics of Predictor and Outcome Variables

Variable	Mean	SD
Predictor		
GH	24.30	4.00
SC	45.27	2.34
CBCL-T	50.12	10.65
CBCL-E	50.85	10.56
CBCL-I	54.41	9.89
CSI	22.89	20.83
CDI	5.15	4.52
CASI	29.04	4.99
FSSCT	130.36	26.35
FSSCF	37.00	8.03
FSSCU	27.49	6.80
FSSCI	26.19	6.76
FSSCD	25.26	5.89
FSSCM	6.56	2.02
CN	2.19	0.82
CT	3.27	1.09
CPT	3.86	2.43
LOCPO	15.67	3.89
LOCIN	17.09	3.62
LOCEX	12.13	3.86
CIL	15.46	5.69
IBES	24.09	7.28
PSI	72.99	18.19
BSI	52.78	10.01
FESC	50.59	11.64
FESO	53.92	10.55
FESE	51.54	11.10
FESCO	56.71	11.17
MU	2.68	3.59
AGE	9.4	1.00
GRADE	3.8	0.82
WS	1.23	0.92
SES	40.46	15.90
Outcome		
PU	2.96	3.02
SU	3.54	8.17
ABS	9.26	8.81
ACH	71.19	25.26

Table 3

Demographic Variables for Total Sample

<u>Variable</u>	<u>Mean</u>	<u>SD</u>
Age	9.4	1.00
Grade	3.8	0.82
Hollingshead Rating	40.46	15.90

	<u>N</u>	<u>Percent %</u>
• Race		
caucasian	73	94
• Parent Marital Status		
married	66	85
• Mother's Employment Status		
fulltime	38	49
part-time	12	15
unemployed	28	36
• Gender		
female	43	55

Table 4

MAXR Analysis for Variable SU

<u>Variable</u>	<u>F</u>	<u>p <</u>
Age	1.92	ns
Gender	5.23	.02
SES	2.54	ns
WS	4.71	.03
GH	6.47	.01
CBCLT	4.83	.03
CDI	8.83	.004
FSSCU	2.72	.105
FSSCI	12.89	.001
FSSCM	1.75	ns
LOCIN	4.10	.05
LOCEX	8.89	.004
CIL	0.54	ns
IBES	1.92	ns
BSI	1.41	ns
FESC	7.94	.007
MU	5.45	.02

Cumulative R²=.549

Table 5

Blockwise Analysis for Variable SU- Final Model

<u>BLOCK</u>	<u>VARIABLES</u>	<u>PARTIAL R²</u>	<u>MODEL R²</u>	<u>F</u>	<u>df</u>	<u>P <</u>
Demographic		.0218	.0218	3.27		.0441
	Gender (-)			3.62		ns
	WS			2.51		ns
Health		.0914	.1089	7.24	(3,74)	.0090
	GH (-)			7.24		.0090
Child MH		.2207	.3297	5.76	(7,70)	.0005
	FSSCI (-)			12.05		.0009
	CBCLT (+)			8.59		.0046
	CDI (+)			7.33		.0086
	FSSCU (+)			2.04		ns
Family		.0699	.3996	3.96	(9,68)	.0236
	FESC (-)			6.87		.0108
	MU (-)			4.37		.0404
Developmental		.0727	.4723	4.54	(11,66)	.0142
	LOCEX (+)			8.33		.0053
	LOCIN (-)			3.41		ns

Cumulative R²=.4723

* direction of the parameter estimate

Table 6

Correlation Matrix for Variable SU

	<u>GH</u>	<u>CBCLT</u>	<u>CDI</u>	<u>FSSCI</u>	<u>LOCEX</u>	<u>FESC</u>	<u>MU</u>	<u>SU</u>
GH	*	-.217	-.091	-.096	-.013	-.161	-.225 ^b	-.316 ^a
CBCLT		*	.410 ^a	.070	-.201	.341 ^a	.300 ^a	.274 ^a
CDI			*	.330 ^a	.129	.087	.239 ^b	.340 ^a
FSSCI				*	.122	-.100	.163	-.128
LOCEX					*	-.022	-.078	.178
FESC						*	-.122	-.027
MU							*	-.013
SU								*

a= p<.01

b= p<.05

Table 7**MAXR Analysis for Variable PU**

<u>Variable</u>	<u>F</u>	<u>p <</u>
Age	0.79	ns
Race	2.93	.0918
GH	42.07	.0001
CBCLT	4.49	.0382
CBCLI	3.35	.0721
CSI	8.03	.0062
CDI	1.90	ns
FSSCT	5.70	.0200
FSSCF	9.20	.0035
FSSCD	.0481	.0481
CPT	1.43	ns
LOCIN	7.64	.0075
IBES	11.71	.0011
FESCO	6.35	.0143
CI	4.13	.0463

Cumulative $R^2=.6539$

Table 8

Blockwise Analysis for Variable PU- Final Model

BLOCK	VARIABLES	PARTIAL R²	MODEL R²	F	df	P<
Demographic						ns
Health	GH (-)*	.2657	.2657	48.55 48.55	(2, 75)	.0001 .0001
<hr/>						
Family		.1691	.4348	7.79	(5,72)	.0002
	IBES (+)			13.32		.0005
	FESCO (+)			5.40		.0233
	CI (+)			2.65		ns
Child MH		.1447	.5795	5.08	(11,66)	.0002
	FSSCF (-)			13.61		.0005
	CSI (+)			7.83		.0167
	FSSCT (+)			6.13		.0159
	CBCLT (+)			3.91		.0524
	CBCLI (-)			3.91		.0521
	FSSCD (-)			3.56		ns
Developmental		.0521	.6316	9.18	(12,65)	.0035
	LOCIN (+)			9.18		.0035

Cumulative R²=.6316

* direction of parameter estimate

Table 9

Correlation Matrix for Variable PU

	<u>GH</u>	<u>CBCLT</u>	<u>CBCLI</u>	<u>CSI</u>	<u>FSSCT</u>	<u>FSSCF</u>	<u>LOCIN</u>	<u>IBES</u>	<u>FESCO</u>	<u>PU</u>
GH	*	-.217	-.394 ^a	-.131	-.061	-.085	-.334 ^a	-.077	.157	-.508 ^a
CBCLT		*	.828 ^a	.293 ^a	.079	.128	-.085	.014	-.407 ^a	.164
CBCLI			*	.336 ^a	.114	.132	-.055	.046	-.404 ^a	.198
CSI				*	.370 ^a	.330 ^a	-.189	.016	-.023	.205
FSSCT					*	.864 ^a	-.018	-.100	.181	-.080
FSSCF						*	-.014	-.128	.043	-.204
LOCIN							*	-.061	.016	-.085
IBES								*	-.012	.359 ^a
FESCO									*	.136
PU										*

a= p<.01

Table 10

MAXR Analysis for Variable ABS

<u>Variable</u>	<u>F</u>	<u>p <</u>
ABP	25.22	.0001
RACE	3.39	.0705
SES	5.54	.0218
WS	5.95	.0177
SC	8.00	.0063
CSI	7.57	.0078
FSSCT	3.21	.0781
FSSCF	7.13	.0098
FSSCD	3.42	.0692
FSSCM	7.70	.0074
CN	5.51	.0222
CT	3.00	.0882
LOCPO	2.20	ns
CIL	1.11	ns
IBES	1.12	ns
BSI	3.20	.0786
CI	2.02	.1609

Cumulative R²=.613

Table 11

Blockwise Analysis for Variable ABS- Final Model

<u>BLOCK</u>	<u>VARIABLES</u>	<u>PARTIAL R²</u>	<u>MODEL R²</u>	<u>F</u>	<u>df</u>	<u>P <</u>
Demographic		.1591	.1591	4.49		.0029
	RACE (-)*			4.27		.0427
	SES (-)			12.31		.0008
	WS (+)			3.10		ns
	ABP (-)			.56		ns
Health		.0582	.2172	9.66	(5,72)	.0028
	SC (-)			9.66		.0028
Child MH		.1176	.3348	2.90	(10,67)	.0202
	CSI (+)			2.67		ns
	FSSCT (+)			1.79		ns
	FSSCF (-)			5.15		.0266
	FSSCD (+)			2.13		ns
	FSSCM(-)			2.00		ns
Developmental		.0600	.3948	3.50	(12,65)	.0362
	CN (-)			6.78		.0115
	CT (+)			4.16		.0455
Family						ns

Cumulative R²=.3948

* direction of parameter estimate

Table 12

Correlation Matrix for Variable ABS

	<u>SC</u>	<u>RACE</u>	<u>SES</u>	<u>FSSCF</u>	<u>CN</u>	<u>CT</u>	<u>ABS</u>
SC	*	-.052	.094	.043	.027	.109	-.244 ^b
RACE		*	-.003	-.153	-.055	.050	-.111
SES			*	.110	.137	.140	-.342 ^a
FSSCF				*	.055	-.104	-.093
CN					*	.637 ^a	-.165
CT						*	-.001
ABS							*

a= p<.01

b= p<.05

Table 13

MAXR Analysis for Variable ACH

<u>Variable</u>	<u>F</u>	<u>p <</u>
SES	11.84	.0010
CBCLT	2.63	ns
FSSCF	2.68	ns
FSSCD	2.93	.0921
CN	1.15	ns
CT	1.97	ns
CPT	1.80	ns
LOCIN	1.56	ns
LOCEX	1.04	ns
CIL	12.72	.0007
IBES	2.67	ns
BSI	3.40	.0700
FESC	.59	ns
FESO	.67	ns
FESCO	2.25	ns
MU	12.39	.0008

Cumulative $R^2=.504$

Table 14

Blockwise Analysis for Variable ACH- Final Model

<u>BLOCK</u>	<u>VARIABLES</u>	<u>PARTIAL R²</u>	<u>MODEL R²</u>	<u>F</u>	<u>df</u>	<u>P<</u>
Demographic		.0910	.0910	10.62	(1,76)	.0017
	SES (+)*			10.62		.0017
Health						ns
<hr/>						
Developmental		.1734	.2644	19.74	(2,75)	.0001
	CIL (+)			19.74		.0001
Family		.0848	.3492	4.76	(4,73)	.0114
	MU (-)			9.46		.0030
	BSI (+)			1.57		ns
Child MH						ns

Cumulative R²=**.3492**

* direction of parameter estimate

Table 15

Correlation Matrix for Variable ACH

	<u>SES</u>	<u>CIL</u>	<u>MU</u>	<u>ACH</u>
SES	*	.073	.086	.259 ^b
CIL		*	-.021	.402 ^a
MU			*	-.241 ^b
ACH				*

Table 16

Regression Equations

PREDICTORS					OUTCOME = R ²
HEALTH	DEMOGRAPHIC	PSYCHOSOCIAL			
		Child MH	Child Dev.	Family	
GH (-)	NS	CBCLT (+) FSSCI (-) CDI (+)	LOCEX (+)	FESC (-) MU (-)	SU = .4723
GH (-)	NS	CBCLT (+) CBCLI (-) FSSCF (-) FSSCT (+) CSI (+)	LOCIN (-)	FESCO (+) IBES (+)	PU = .6316
SC (-)	SES (-) RACE (-)	FSSCF (-)	CN (-) CT (+)	none	ABS = .3948
NS	SES (+)	NS	CIL (+)	MU (-)	ACH = .3492

Table 17**CORRELATION MATRIX FOR DEPENDENT VARIABLES**

	SU	PU	ABS	ACH
SU	*	.188	-.034	-.265 ^a
PU		*	.117	-.267 ^a
ABS			*	-.041
ACH				*

a= p<.01

APPENDIX B
Questionnaires

Consent Forms (parent and child)
General Health Rating Index (Rand Publication Series, 1980)
Symptom Checklist (Rand Publication Series, 1980)
Child Behavior Checklist - Ages 4-18(Achenbach, 1991; Achenbach & Edelbrock, 1983)
Brief Symptom Inventory (Derogatis, 1975)
Parenting Stress Index - Short Form (Abidin, 1990)
Family Environment Scale - Form R (Moos, 1974)
Child Depression Inventory (Kovacs, 1980)
Childhood Anxiety Sensitivity Index (Silverman, Fleisig, Rabian, & Peterson, 1991)
Illness Behavior Encouragement Scale (Walker & Zeman, 1993)
Multidimensional Health Locus of Control (Thompson, Butcher, & Berenson, 1987)
The Fear Survey Schedule for Children-Revised (Ollendick, 1983)
Children's Somatization Inventory (Garber, Walker, & Zeman, 1990)
Concepts of Illness Interview (Bibace & Walsh, 1980)
Coping Interview (Compas et al., 1993)

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8/90-1/92: Undergraduate Advisor: Department of Psychology, Va. Tech

- assisted undergraduate psychology majors in course planning

8/92-12/92: Graduate Teaching Assistant: Dept. of Psychology, Va. Tech

- assisted with a Clinical Psychology graduate course in Intellectual Assessment
- supervised 48 assessments including clients referred for assessment of Learning Disabilities and/or Attention Deficit Hyperactivity Disorder
- duties included supervision of administration, scoring, interpretation, and report writing of assessment battery

1/93-5/93: Graduate Teaching Assistant: Dept. of Psychology, Va. Tech

- assisted with an undergraduate course in Abnormal Psychology

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8/90-5/91: Clinical Practicum: Psychological Services Center and Child Study Center, Va. Tech. Supervisors: Jack W. Finney, Ph.D. and Ross Greene, Ph.D.

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- maintained an outpatient caseload of 10-12 clients
- duties included assessment/treatment of adults, children, and families

8/91-5/92: Clinical Practicum: Psychological Services Center and Child Study Center, Va. Tech. Supervisors: Thomas H. Ollendick, Ph.D. and Ellie T. Sturgis, Ph.D.

- completed a 480 hour Clinical Practicum
- training included assessment/treatment of four child clients and two adults

1/92-8/92: National Institute of Mental Health Training Fellowship

Supervisor: Thomas H. Ollendick, Ph.D.

- duties included assessment and treatment services for emotionally disturbed children in the public school system including individual therapy and group counseling
- research assistant on a project designed to explore the comorbidity of depressive disorders and disruptive behavior disorders in hospitalized adolescents

6/92-8/92: Clinical Externship - Kennedy Krieger Institute/Johns Hopkins University School of Medicine, Baltimore, MD. Supervisor: Gina Richman, Ph.D.

- completed a 480 hour Clinical Externship in the Department of Behavioral Psychology, Child and Family Therapy Clinic
- maintained a caseload of 15 outpatients
- duties included evaluation of and treatment of child and family clientele,

8/92-5/93: Graduate Assistantship: Psychological Services Center and Child Study Center, Va. Tech. Supervisors: Jack W. Finney, Ph.D. and Thomas H. Ollendick, Ph.D.

- completed a 15-hour/week assistantship which included assessment/treatment of two child clients and one adolescent client
- other responsibilities included administrative duties and client file reviews

5/93-8/93: Clinical Specialist II - Kennedy Krieger Institute/Johns Hopkins University School of Medicine, Baltimore, MD. Supervisor: Gina Richman, Ph.D.

- completed 480 hours of clinical training as a Clinical Specialist II for the department of Behavioral Psychology, Child and Family Therapy Clinic
- maintained a caseload of 30-35 outpatients
- duties included evaluation and treatment of child and family clientele, participation in research, and attendance at family therapy seminars

8/93-5/94: Clinical Practicum: Psychological Services Center and Child Study Center, Va. Tech. Supervisors: Jack W. Finney, Ph.D. and Robert S. Stephens, Ph.D.

- completed a 240 hour Clinical Practicum
- training included assessment and treatment of two child clients and one adult client
- supervised first year Clinical Psychology graduate students

7/94-present

• pre-doctoral internship program in the Division of Psychiatry, Department of Medical Psychology, Duke University Medical Center, Durham, NC.

- training includes:
 - neuropsychological assessment of pediatric brain tumor patients, sickle-cell disease patients, pulmonary patients, and heart/lung transplant candidates through the Pediatric Psychology Service (Supervisor, Robert J. Thompson, Jr. Ph.D.)
 - treatment of psychological adjustment disorders of medically - challenged children through the Pediatric Psychology Service (Supervisor, Katheryn Gustfson, Ph.D.)
 - treatment of dysfunctional families through the Family Studies Program and Clinic (Supervisor, Karen Wells, Ph.D.)
 - treatment of children with mental health needs through the Dept. of Child Psychiatry, Community Guidance Clinic (Supervisor, Richard Rumer, Ph.D.)

RESEARCH EXPERIENCE

6/92: Masters Thesis: *A Behavioral Family Intervention to Assess the Relationship Between Adherence and Metabolic Control in Insulin-Dependent Diabetics.* Chair: Jack W. Finney, Ph.D.

5/93: Preliminary Examination: *Maternal Negative Affect and the Socialization of Illness Behavior in Children.* Chair: Jack W. Finney, Ph.D.

10/93: Dissertation: *Psychosocial Predictors of Health-Care Encounters and School Functioning in an Elementary School Setting.* Chair: Jack W. Finney, Ph.D.

12/87 - 5/89: Clinical Research Assistant

Research study involving the assessment and treatment of 25 chronic tension headache patients. Supervisor: Debra F. Neff, Ph.D.

- administered structured interviews and psychological tests to subjects
- screened patients to provisionally diagnose headache type and to assess study participation qualifications
- performed 90 psychophysiological assessments to measure EMG patterns in frontalis and trapezius muscles
- evaluated muscle discrimination ability following a magnitude production procedure
- operated Coulbourn equipment and trained other technicians

4/88 - 8/91: Clinical Research Assistant

Research study involving the assessment and treatment of 17 children with recurrent abdominal pain. Supervisor: Jack W. Finney, Ph.D.

- conducted child interviews to assess stomachache history
- monitored children throughout baseline, treatment, and follow-up
- administered relaxation therapy and evaluated performance
- conducted weekly home visits to evaluate treatment progress
- assisted in data analysis and interpretation of results

1/89 - 1/90: Research Assistant and Project Manager

Research study designed to investigate muscle discrimination ability in tension headache sufferers and controls. Supervisor: Jack W. Finney, Ph.D.

- conducted psychophysiological assessments to measure EMG patterns
- administered stress inducing tasks and evaluated performance on a magnitude estimation procedure
- interpreted EMG graphs and assisted in data analysis

8/89 - 6/90: Laboratory Administrator and Research Assistant

Administrative and Research Assistant for research grants and projects in the Applied Behavioral Systems Laboratory, Va. Tech. Supervisor: E. Scott Geller, Ph.D.

- manuscript processing for the Editorial Office of *Journal of Applied Behavior Analysis*
- designed an assessment tool to assess the impact of a corporate safety seminar
- data analysis/interpretation for health and safety grants
- completed Final report for the Virginia Department of Motor Vehicles, Project no.: 230-11-110c-053-402293-1 - *Establishing corporate-based programs to increase the use of safety belts*

PUBLICATIONS

Bonner, M.J. and Finney, J.W. A behavioral family intervention to improve compliance and metabolic control in children with IDDM. *Manuscript in preparation.*

Bonner, M.J. and Finney, J.W. Maternal negative affect and the socialization of illness behaviors in children. Chapter accepted for *Advances Series in Clinical Child Psychology, Vol. 18.*

Edwards, M.C., Finney, J.W., and Bonner, M.J. (1991). Matching treatment with recurrent abdominal pain symptoms: An evaluation of dietary fiber and relaxation treatments. *Behavior Therapy*, 22, 257-267.

Finney, J.W. and Bonner, M.J. (1992). The influence of behavioral family intervention on children's health and health care use. *Behavior Change*, 9, 157-170.

Putnam, D. E., Finney, J.W., Barkley, P.L., & Bonner, M.J. (1994). Enhancing commitment improves adherence to a medical regimen. *Journal of Consulting and Clinical Psychology*.

PUBLISHED ABSTRACT

Bonner, M.J., Kalsher, M.J., & Burnette, L.C. (1988, May). Behavioral intentions and alcohol consumption: A field study. *Virginia Journal of Science*, 39, 191.

- Paper presented at the 1988 meeting of the Virginia Academy of Science, Charlottesville, VA.

PROFESSIONAL PRESENTATIONS

Finney, J.W., Bonner, M.J., & Riley, A.W. (1993, November). *Evaluating a psychosocial model of health-care utilization: Implications for changing the health care systems*. Association for the Advancement of Behavior Therapy, Atlanta.

Bonner, M.J. and Finney, J.W. (1993, April). *A behavioral family intervention to improve compliance and metabolic control in children with IDDM*. Fourth Florida Conference on Child Health Psychology, Gainesville.

Putnam, D.E., Finney, J.W., Barkley, P.L., & Bonner, M.J. (1991, March). *Enhancing commitment increases adherence to medical regimen*. Society of Behavioral Medicine, Washington, D.C.

Glindemann, K.E., Geller, E.S., Bonner, M.J., & Lugo, M.C. (1990, April). *Use of an intoxication detection aid to assess BAC levels at university fraternity parties*. Southeastern Psychological Association, Atlanta.

Glindemann, K.E., Bonner, M.J., Clarke, S.W., & Brooks, A. (1990, May). *Development of a behavioral checklist for estimating blood alcohol concentration*. Association for Behavior Analysis, Nashville.

Gilmore, M.R. and Bonner, M.J. (1990, August). *Community-based interventions for children: Rewards, Prompts, Education, and Policy*. American Psychological Association, Boston.

Kalsher, M.J., Clarke, S.W., & Bonner, M.J. (1989, March). *A behavior analysis of party drinking: Self-service vs. bartenders*. Southeastern Psychological Association, Washington D.C.

Neff, D.F., Broyles, S., Edwards, M.C., Sikemma, I., Crowe, H., Gould, R., Jasie, D., Kudlas, J., Bonner, M.J., & Keister, L.M. (1989, April). *The influence of success experiences on chronic tension headache treatment outcome*. Society of Behavioral Medicine, San Francisco.

Edwards, M.C., Bonner, M.J., & Finney, J.W. (1989, November). *Recurrent abdominal pain: Matching treatment with symptom presentation*. Association for the Advancement of Behavior Therapy, Washington, D.C.

Edwards, M.C., Bonner, M.J., Keister, L.M., & Finney, J.W. (1989, November). *A comparison of muscle discrimination ability in tension headache sufferers and controls*. Association for the Advancement of Behavior Therapy, Washington, D.C.

TRAINING MANUAL

Geller, E.S., Kello, J.E., Bonner, M.J., & Gilmore, M.R. (1989, December). *Achieving occupational health and safety: Safety motivation and presentation skills*. Detroit, MI: UAW Chrysler Corporation.

JOURNAL REVIEWS

Student reviewer for two issues of *Journal of Applied Behavior Analysis*.

HONORS

- NIMH Fellow
- Financial award given by the Graduate Research Development Project for Masters Thesis research
- Graduated Cum Laude, B.S.- Psychology
- Psi Chi National Honor Society in Psychology
- Phi Kappa Phi National Honor Society
- Gamma Beta Phi National Honor Society
- Golden Key National Honor Society

PROFESSIONAL AFFILIATIONS

- American Psychological Association, Student Affiliate
- APA, Division 12 - Clinical Psychology
 - Section 1: Clinical Child Psychology
 - Section 3: Society for a Science of Clinical Psychology
 - Section 5: Society of Pediatric Psychology
- Association for the Advancement of Behavior Therapy
- Association for Behavioral Analysis

Signed: Melanie J. Bonner

Date: 11/94