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Does SES Moderate the Relationship Between Temperament and Emotional and Behavioral Disorders?.

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Does SES Moderate the Relationship Between Temperament and Emotional and Behavioral Disorders?

A thesis
presented to
the faculty of the Department of Psychology
East Tennessee State University
In partial fulfillment
of the requirements for the degree
Master of Arts in Psychology

by
Jessica L. Scott
December 2011

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Keywords: socioeconomic status, temperament, emotional disorders, behavioral disorders, statistical moderation
ABSTRACT

Does SES Moderate the Relationship Between Temperament and Emotional and Behavioral Disorders?

by

Jessica L. Scott

This study explored whether the relationship between temperament and emotional and behavioral disorders (EBDs) is moderated by socioeconomic status (SES) in a sample of 73 children ages 5 through 15 years. Caregivers completed the Rothbart temperament surveys and the Child Behavior Checklist (CBCL). Indicators of SES included total household income and occupational status, while indicators of EBDs included the Internalizing Problems, Externalizing Problems, and Total Problems scales of the CBCL. Temperament variables included Fear, Frustration, Sadness, and Shyness. Hierarchical regression analyses revealed 4 regressions significant for moderation. A conclusion gleaned from these results is that the relationship between particular temperament dimensions and Externalizing Problems and Total Problems is stronger in low-SES children than high-SES children but only when taking into account occupational status.
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CHAPTER 1
INTRODUCTION

Given the prevalence of childhood emotional and behavioral disorders (EBDs) today (estimates range from 1 to 20%; Friedman, Katz-Leavy, Manderscheid, & Sondheimer, 1998; Kendziora, 2004; Walker, Nishioka, Zeller, Severson, & Feil, 2000), and the devastating effects they can have on children, families, and society (Quinn & Poirier, 2004), it is clear that studies on the etiology, course, and treatment of these disorders serve an important purpose. Research goals often include determining specific risk factors for EBDs, while at the same time, creating more effective intervention strategies and treatments. Although EBDs are the focus of considerable research, scientists are also beginning to pay more attention to individual differences in temperament that may play a contributing role in the development of EBDs. There is often a high degree of correlation between specific dimensions of temperament and EBDs. For example, children with “difficult” temperaments tend to have increased rates of emotional and behavior problems (Guerin, Gottfried, Oliver, & Thomas, 2003; Thomas, Chess, & Birch, 1968; Maziade et al., 1990). If temperament can be reliably shown to indicate high risk for EBDs, awareness surrounding temperament in very early childhood may lead to early interventions and eventually decrease the risk of EBDs in the future.

In addition to temperament, other factors such as socioeconomic status (SES) appear to predict a variety of poor outcomes (Tolani & Brooks-Gunn, 2006). For example, children from families of low SES have been shown to demonstrate higher rates of EBDs than those who are not (Costello, Compton, Keeler, & Angold, 2003; Dearing, McCartney, & Taylor, 2001; Lipman, Offord, & Boyle, 1994), as well as lower levels of self-esteem (Pagani, Boucherice, & Tremblay, 1997). However, SES may play a larger role in children’s development; that of influencing the
individual differences we see in children. Indeed, SES appears to be linked to temperament in
that children from low SES families have been shown to demonstrate more characteristics
associated with difficult temperaments than children who are not (Prior, 1992), thereby
predicting a greater risk for poor outcomes.

What follows is a discussion of EBDs and temperament separately, followed by a review
of the literature demonstrating associations between the two. Then, I discuss measurement issues
pertaining to SES, as well as how low-SES has been linked to both EBDs and temperament. I
conclude with a proposal for a research investigation that will explore interrelationships among
these three constructs, as well as specific hypotheses derived from the relevant literature that
were tested in a sample of older children. These hypotheses focus on the possibility that SES
may moderate the relationship between temperament and EBDs.

**Emotional and Behavioral Disorders (EBDs)**

**History of EBDs**

According to Kauffman, Brigham, and Mock (2004) descriptions of childhood EBDs
prior to the 1900s were fairly subjective and relied primarily on clinical observations. They note
that in the 20th century, however, professionals began to develop formal classification systems
and to record detailed descriptions of deviant behaviors that today are known as attention deficit
with hyperactivity disorder (ADHD), autism, and conduct disorder. After the 1950s, conceptual
models and a growing number of empirical studies led to behavioral intervention strategies.
Although progress has obviously been made, coming to an agreement as to the classification of
EBDs has proven difficult for professionals in the field. As described in the next few
paragraphs, at least four systems of classification have been used to diagnose EBDs.
Among the most popular classification systems employed by psychologists is the externalizing-internalizing distinction popularized by Achenbach and Edelbrock (1981, 1984). Children with externalizing disorders are often described as disruptive, noncompliant, and aggressive, displaying acting out behaviors. Children with internalizing disorders, however, tend to be withdrawn, anxious, or depressed. This “external-internal” classification resulted mainly from the work of Achenbach’s development of the Child Behavior Checklist (Achenbach & Edelbrock, 1981, 1984; Merrell, 2002). It is important to point out that although children’s EBDs can be classified as externalizing versus internalizing, many children display behaviors consistent with both (Kauffman, Brigham, & Mock, 2004).

A second classification system, based on a medical model that presumes that EBDs are symptomatic of underlying organic dysfunction, is the method currently used by the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV; American Psychiatric Association, 1994). This system classifies EBDs as “a collection of maladaptive and distressing behaviors, emotions, and thoughts that (are) qualitatively different from normality” (Cullinan, 2004, p. 33). The DSM-IV divides EBDs into subtypes based on the presentation of a particular set of symptoms, often with defining features. This classification system suggests that different types of EBDs have distinct and clear boundaries, although this is not always the case (American Psychiatric Association, 1994). Typical EBDs under this classification system include Conduct Disorder, Oppositional Defiant Disorder, and Attention-Deficit/Hyperactivity Disorder.

The third classification system is multidimensional, and classifies EBDs as “a collection of problems involving behaviors, emotions, and thoughts that all people experience to some extent. Those who experience problems to an extreme extent (unusual frequency, duration, intensity, or other aspect) are more likely to have an EBD” (Cullinan, 2004, p. 34). In other
words, all behaviors lie on a continuum between normal and abnormal, and the difference between normal and abnormal is quantitative rather than qualitative. An example of this approach can be seen in the case of hand washing. Although some individuals wash their hands more frequently than others, those who wash their hands with excessive frequency and for an excessive length of time are displaying abnormally deviant behaviors that may be characterized as symptoms of an anxiety disorder such as obsessive-compulsive disorder.

Despite the fact that all three of the above classification systems are popular methods of classifying EBDs, public school systems are required to use a fourth set of criteria in order to determine when students are in need of disability services. The U.S. Department of Education passed the Individuals with Disabilities Education Act (IDEA) in 1997. The purpose of the resulting law was to ensure that children with disabilities would have access to free and appropriate public education; that they receive an education that is individualized and designed to meet their special needs; and that their education be provided in the least restrictive environment possible. The law also provided safeguards to ensure that the rights of children and their families would be protected.

The IDEA states that for children to qualify for school-based services for an emotional disorder, they must exhibit one or more of the following characteristics over a long period of time and to such a marked degree that the child’s educational performance is adversely affected. These characteristics include: (a) an inability to learn that cannot be explained by intellectual, sensory, or health factors; (b) an inability to build or maintain satisfactory interpersonal relationships with peers and teachers; (c) inappropriate types of behaviors or feelings under normal circumstances; (d) a general pervasive mood of unhappiness or depression; or (e) a tendency to develop physical symptoms or fears associated with personal or school problems.
Within this rubric, emotional disorders include schizophrenia, and do not apply to children who are socially maladjusted unless it is determined that they have an emotional disturbance.

**Detection of EBDs**

Diagnosing EBDs involves a wide range of clinical tools and depends on both the classification system under consideration and the objective or purpose of the diagnosis. For example, in medical and clinical settings where third-party payers assume financial liability for the costs of detection and treatment of EBDs, *DSM-IV* criteria employed by a licensed, often doctoral level clinician may be mandated. In research settings, however, the minimization of expenses may be most important, and researchers may employ any of a number of popular but low-cost rating scales (e.g. the Child Behavior Checklist, Achenbach, 1991, Achenbach & Rescorla, 2001; the Conners’ Rating Scales- Revised, Conners et al., 1997; the School Social Behavior Scales, Merrell, 1993; and the Behavior Assessment for Children, Reynolds & Kamphaus, 1992).

Although ratings scales are not diagnostic tools per se, they can be helpful adjuncts to more comprehensive assessment strategies. Rating scales are valuable because they help describe and categorize behaviors, can be used to evaluate the effectiveness of a given treatment, are easy to use, have generally strong psychometric properties, and can be used as many times as needed. In contrast, comprehensive diagnostic tests are typically lengthy, expensive, and require a great deal of training in order to administer them (Elliott & Busse, 2004; Merrell, 2000). In addition, some assessment protocols do not permit repeated administrations within defined periods of time.

Quick and easy assessment tools such as rating scales are also popular because of the recent trend among primary care providers to improve mental and behavioral health services. It
is much easier and less expensive, for example, for primary care providers to employ rating scales in the exam room as screeners for the detection of children at risk for EBDs than it is to refer patients to mental health specialists for a full-scale diagnostic assessment, an appointment their patients may never keep. Although 21% of mental health visits are to mental health professionals and 3% occur in hospitals and nursing homes, a much larger number (60%) are to primary care providers. Additionally, of all visits to primary care providers, 15% to 25% are for mental health reasons (Magill & Garrett, 1988).

Due to the high number of mental health services provided by primary care providers, as well as pressure from managed care (Achenbach & Ruffle, 2000), physicians are expected to offer a wide variety of services as well as provide extensive documentation of their efforts, while, at the same time, decreasing the amount of time spent per patient. With respect to identifying EBDs in childhood, it is important that physicians gather information as quickly and inexpensively as possible from informants who have as much contact with the child as possible. Such assessments usually amount to parent- and teacher-completed rating forms. Children who are old enough, however, can provide information about themselves (Achenbach & Ruffle, 2000). In sum, because of the efficiency of rating scales, they have become popular tools used not only by mental health professionals but also physicians, whose time with patients is limited.

Limitations to Identification

Unfortunately, identification of EBDs in children is not without difficulty. Conroy and Brown (2004) discussed several problems that make working with EBDs challenging. First is the difficulty of reliably and consistently defining EBDs, especially in light of the four different classification systems now in widespread use. For example, the eligibility criteria currently proposed by the U.S. Department of Education exclude many children who are in need of
services. Specifically, the authors argue that the IDEA criteria require impairment in academic achievement, which by default, automatically excludes children not yet in the school system. The authors also argue that the IDEA criteria are not sensitive to delays in social functioning that are not connected to delays in academic achievement. Thus, children who are socially maladjusted do not meet the eligibility requirements to be identified as having a disability, whether or not they have been diagnosed with an EBD through alternative means (e.g. attention deficit disorder or conduct disorders; Conroy & Brown, 2004). In other words, there are considerable inconsistencies between the IDEA eligibility criteria employed in the public school system, and the *DSM-IV* diagnostic criteria employed by mental health professionals (Forness, Kavale, MacMillan, Asarnow, & Duncan, 1996). Other challenges exist related to identifying EBDs in children. For instance, there is often a reluctance to provide children with stigmatizing labels. Also, economic pressures exist for schools not to identify EBDs because they will be required to provide disabilities services to meet these students’ needs (Landrum, 2000).

With such inconsistencies across these various settings, it is not surprising that professionals within the fields of early childhood education, early intervention, special education, child psychology, and medicine are often at odds on how to identify and treat EBDs (Conroy & Brown, 2004). For example, there is a lack of communication and interaction among these fields, and differences in professional focus, training requirements, and philosophical perspectives lead to competing conceptualizations as to the nature of EBDs, all of which impact the rates of identification as well as the nature of service delivery (Conroy & Brown, 2004).

Lack of financial support by policy makers at the local, state, and national levels, as well as reactive rather than proactive stances particularly in educational settings, furthers the challenge of identifying children with EBDs. According to Landrum (2000) even in the presence
of EBDs, the unwillingness by educators and school administrators to take action early on due to economic pressures or the reluctance to use stigmatizing labels, all contribute to a system in which only the most severe cases receive help and where EBDs are not identified until late childhood or adolescence (Conroy & Brown, 2004; Landrum, 2000). Despite the issues surrounding EBDs, researchers and professionals are taking steps to more accurately diagnose and treat children diagnosed with EBDs, and a focus on prevention is becoming increasingly common.

**Prevalence**

Because of the variance in EBD classification systems, as well as the other limitations discussed above, statistics on the prevalence of EBDs in children vary. Forness and Kavale (2001) argue that the number of children diagnosed with EBDs using the IDEA system is lower than the actual figure because schools are overly-focused on academic difficulties rather than behavioral and emotional difficulties. Walker et al. (2000) also examined the underidentification of EBDs in school settings and found that current rates of identification using IDEA criteria are around 1%, even though estimates range far above this (up to 20% based on *DSM-IV* criteria; Friedman, Katz-Leavy, Manderscheid, & Sondheimer, 1998). Similarly, Kendziora (2004) reported that EBDs, using IDEA criteria, are present in 1%-5% of the school population and account for more than 50% of reported behavioral incidents in schools. Kendziora reported also that about 10% of young children have problems with disruptive behaviors per IDEA criteria.

Additionally, it appears that EBDs are not typically diagnosed until early adolescence, thus making the prevalence of EBDs in childhood appear lower than what it may actually be. For example, Walker et al. (2000) reported that the highest number of referrals for identifying EBDs is for adolescents ages 14 to 15 years.
Impact of EBDs

Research has been conducted on the possible individual effects of EBDs and the burden they place on families and society. According to Quinn and Poirier (2004) children with EBDs are more likely to drop out of school, which diminishes their employment and income opportunities. As adults they are more likely to employ corporal punishment as a disciplinary tactic with their own children and to exhibit a higher incidence of marital problems. Furthermore, these effects may create familial patterns that contribute to poor stress management, substance abuse, or relationship violence, which can negatively impact future generations. In addition to the personal costs of EBDs, there are also costs to communities and society in general, both in terms of real dollars and in the loss of future contributors to society (Quinn & Poirier, 2004). Although only a small subset of children with EBDs will actually go on to become criminals, the cost of them doing so is high. For example, Cohen (1998) estimated that the average cost of a juvenile delinquent’s criminal career was between $83,000 and $335,000, thus only reinforcing the need for prevention strategies. It is important to remember, however, that these relationships are only correlations and do not necessarily mean that EBDs are the cause of these negative outcomes.

Intervention

Educational settings. As discussed in the limitations to identification section, methods of intervention vary depending on the field of the health care provider (e.g., childhood education, early intervention, special education, child psychology, healthcare specialist). Forness et al. (1996) suggest that professionals in day care centers and schools employ common interventions that include parent education, classroom management instruction, and the promotion of open channels of communication between teachers and parents. The authors also recommend that
emphasis be placed on training teachers to manage disruptive behavior in the classroom, and that such training should consist of the use of positive and corrective feedback, effective disciplinary strategies, and the establishment of rule- and direction-following guidelines. Additionally, Forness et al. advise that treatments for students at-risk for EBDs be tailored to student needs, with academic and social skills instruction and the inclusion of outside organizations and mental health professionals as needed. Collaboration with outside professionals may be useful, particularly if the child has an Individualized Education Program (IEP), to provide consultation when more intense or specific interventions are deemed necessary.

**Mental health settings.** Treatments and interventions provided by mental health professionals and/or child psychologists involve a variety of approaches and may depend on whether the EBD is primarily externalizing or internalizing. Psychodynamic approaches are sometimes desired for externalizing behaviors and disorders; however, cognitive and behavioral approaches have empirical support and appear to be most effective (Hinshaw, 1992; for further review see Pelham & Fabiano, 2008). An example of a behavioral approach would be implementing a cost-reward system, while directly teaching coping strategies via the identification and modification of maladaptive thinking patterns is an example of a cognitive intervention. Most often, however, a combination of these two approaches (“cognitive-behavioral therapy”) is used. Psychopharmacological methods may serve as effective add-ons for cognitive-behavioral interventions, particularly for the treatment of ADHD (Hinshaw, 1992). However, inpatient facilities may still be needed for the most severe cases of EBDs.

Research on intervention and treatment strategies for childhood internalizing behaviors and disorders is less extensive than that for externalizing disorders (Compton, Burns, Egger, & Robertson, 2002; Kendziora, 2004). One reason may be that externalizing disorders are reported
more often than internalizing disorders (Ollendick & King, 1994). Externalizing symptoms are much more disruptive than internalizing symptoms, making them easier to detect and diagnose, whereas internalizing symptoms are often valued in academic settings (Compton et al., 2002; Kendziora, 2004). In general, however, cognitive-behavioral therapies are the most common approach to internalizing disorders that often include strategies such as cognitive restructuring, social and interpersonal problem-solving skills, decision making skills, relaxation training, coping strategies, and skill generalization strategies (Compton et al., 2002).

Psychopharmacological approaches are also commonly used, while exposure- and imagery-based strategies, which immerse patients into a feared situation, are popular with anxiety disorders (Compton et al., 2002).

**All settings.** In summarizing the extant literature, Ramey and Ramey (1998) proposed six principles that characterize the efficacy of various early intervention efforts provided by all types of professionals regardless of disciplinary specialization. These principles are based on studies of children facing both biological and psychosocial risks, exposure to poverty, and those with developmental disabilities. Principle 1 deals with timing, and essentially states that the earlier the intervention occurs and the longer it lasts, the greater the benefits. Principle 2 states that the more intensive the intervention, the more effective it is. Principle 3 states that direct interventions are more effective than indirect ones. For example, intermediary interventions such as parent education and family support programs (where caregivers are taught new approaches of interacting with their children) have been less successful than direct interventions where professionals work one-on-one with the child. Principle 4 states that all-encompassing intervention programs that target the “whole-child” are more beneficial than those that target subsets of children’s problematic behaviors. Principle 5 emphasizes that different children will
benefit differently from the same intervention, and that some children may require a variety of different methods to arrive at effective outcome. For example, children at greater risk for EBDs may require different interventions than those at lesser risk, resulting in the need to “match” children of different levels of impairment with the appropriate intervention. Finally, Principle 6 specifies that long-term effects of early intervention decrease with time. That is, contextual variables such as environment and life experiences may moderate the efficacy of particular intervention efforts and may do so cumulatively over time (Ramey & Ramey, 1998).

In conclusion, the identification and treatment of EBDs involves a variety of partnerships including the school system, early intervention programs, and medical and mental health professionals. However, identification and intervention services remain reactive rather than proactive, and current EBD definitions and criteria are inconsistent and vary across professional settings such that certain subsets of at-risk children may not qualify for needed services (Conroy, Hendrickson, & Hester, 2004).

Despite the recent emergence of empirically supported treatments for EBDs, Conroy and Brown (2004) argue that comprehensive services for childhood EBDs remain seriously lacking. They suggest that future intervention efforts should target at-risk populations toward the reduction of risk factors while encouraging the development of buffering factors that may promote resilience. These risk factors may include an impoverished status, a history of physical or emotional abuse or neglect, and having teenage parents. A child’s nature in itself may also be considered a risk factor for EBDs. For example, certain temperamental characteristics may make it more difficult for a child to cope in a high-risk environment than others. Additionally, a child’s temperament can influence reactions from caregivers (and others) that shape the child’s own development. In this case, temperamental characteristics deemed undesirable by a caregiver may
elicit negative responses leading to negative parenting practices, thus putting the child at-risk. The concept of temperament and its relationship with other variables of interest are discussed in greater detail below.

**Temperament**

**Introduction to Temperament**

Although the concept of temperament has existed since ancient times, there has been considerable modern debate as to how to define, measure, and apply theories of temperament. One of the first major studies of children’s temperament was the New York Longitudinal Study (NYLS) begun by Thomas, Chess, and colleagues in 1956 (Thomas & Chess, 1977; Thomas, Chess, & Birch, 1968). The authors collected in-depth interviews from parents regarding their infants’ behavior in different contexts. From their clinical interviews, Thomas and Chess derived nine dimensions of temperament and suggested that temperament was biosocial. In other words, not only does temperament have biological roots, but it is also considerably modifiable by the environment (Prior, 1992).

Thomas and Chess’s (Thomas et al., 1968) nine dimensions included: (a) activity level: the level, tempo, and frequency with which a motor component is present in the child’s functioning; (b) approach or withdrawal: the child’s initial reaction to any new stimulus; (c) adaptability: the ease or difficulty with which the child’s initial pattern of response can be modified in the direction desired by parents or others; (d) mood: the amount of pleasant, friendly behavior versus unpleasant, unfriendly behavior; (e) threshold: the level of extrinsic stimulation that is necessary to evoke a discernible response; (f) intensity: the energy content of the response, irrespective of its direction; (g) distractibility: the effectiveness of extraneous environmental stimuli in interfering with, or in altering the direction of, the ongoing behavior; (h) rhythmicity:
the regularity of repetitive biological functions; and (i) attention span and persistence that contains two related subcategories: the length of time a particular activity is pursued and the child’s ability to maintain an activity in face of obstacles to its continuation (Thomas et al., 1968; pp. 20-24).

Thomas, Chess, and colleagues’ pioneering, albeit clinically-based, conceptualizations of temperament have served as the foundation for more modern, biologically-based temperament theories. Of the latter, perhaps Mary K. Rothbart’s model has gained the largest following. In developing her model, Rothbart (1981) argued that the temperamental dimensions of Thomas, Chess, and colleagues involved too much conceptual overlap and the dimensions were not sufficiently linked to neurobiological functioning. She therefore set out to develop a systematic theory of temperament that was linked to basic neurobiological functioning that included conceptually independent dimensions and, importantly, that could be implemented across the lifespan, from infancy to adulthood.

The Rothbart Model

Rothbart summarized her conceptual view of temperament as comprising “biologically based individual differences in reactivity and self-regulation” (Goldsmith et al., 1987, p. 510; Rothbart & Bates, 1998). Rothbart distinguished her model as representing more than just the behavioral style notion of Thomas and Chess, that is, the “how” of children’s behaviors, and included children’s predispositions toward particular kinds of behaviors, that is, the “why” of their behaviors. Beyond a focus on behaviors, Rothbart’s model included individual differences in phenomenological experience (e.g. energy, interest, and affect) as well as psychophysiological functions such as central nervous, endocrine, and autonomic system responses (Goldsmith et al., 1987).
For Rothbart, temperament remains stable across time and situations; however, the expression of temperament may develop over time as a natural result of maturation (Goldsmith et al., 1987; Putnam, Ellis, & Rothbart, 2001; Rothbart, Ahadi, Hershey, & Fisher, 2001; Rothbart & Bates, 1998). Rothbart also characterized temperament as the substrate from which personality characteristics would eventually evolve. In differentiating the two, Rothbart characterized personality as a much broader concept (including cognitive structures as well as expectations and attitudes) that takes time to develop. In contrast, temperament is present at birth and serves as the biological foundation for personality (Goldsmith et al., 1987). Additionally, Rothbart considered temperament to interact bidirectionally with children’s physical and social environments, meaning that one’s temperament both influences and is influenced by the environment (Goldsmith et al., 1987).

Although Rothbart’s model has seen many changes, recent versions are comprised mainly of three broad constructs that are theorized to function similarly across the lifespan (Putnam et al., 2001). These constructs include Surgency, Negative Affectivity, and Affiliation/Orienting (which is referred to as Effortful Control in childhood). These constructs are derived from subsets of more basic subcomponents of temperament. Putnam et al., (2001) describe Surgency as being defined by elements such as “emotional responses to high-intensity stimuli, general activity level, and levels of impulsivity and shyness,” (p. 176). Thus, high levels of Surgency in infants would be characterized by having high activity levels, smiling and vocalizing, high approach to novel objects, and enjoyment of intense stimulation. During toddlerhood, Surgency would be characterized by impulsivity and seeking out intense experiences. Developmentally, older children demonstrate higher levels of Surgency by boldness or a lack of shyness (Putnam et al., 2001) as compared to younger children.
Negative Affectivity comprises the subdimensions of sadness, fear, shyness (slow or inhibited approach in situations involving novelty or uncertainty), frustration, distress to limitations, discomfort, and soothability. Negative Affectivity in infancy and childhood is expressed by subdimensions such as frustration, sadness, and fear. Toddlers and older children may also display Negative Affectivity through discomfort and low tolerance for particular sensory stimuli and an inability to soothe one’s self (Putnam et al., 2001).

Finally, Affiliation or Orienting comprises cuddliness, soothability, low-intensity pleasure, and attention or duration of orienting (how long an individual pays attention to an object) during infancy and toddlerhood. It also includes inhibitory control and perceptual sensitivity (Putnam et al., 2001). Infants high in affiliation or orienting enjoy cuddling with caregivers, are able to pay attention to objects for long periods of time, and respond to soothing efforts. This dimension is commonly measured by several indices including behavioral and attentional regulation whereby a child can willingly shift his or her attention even in the presence of distracters and that may also be displayed by exercising self-control over emotions and behaviors (inhibitory control), or by behaving in ways that go against one’s inner state or feelings of resistance (activation control; Eisenberg, 2006; Putnam et al., 2001; Rothbart, 1991).

Temperament and EBDs

Incorporating temperament into the study of the identification and treatment of EBDs has several implications. For one thing, temperament may predict parent-child interaction quality, parental adjustment, and EBDs (Sheeber & McDevitt, 1998). Accordingly, temperament may be a predictor of the need for early intervention. Thus, it is the relationship between temperament and EBDs that I am particularly interested in, and I examine this relationship in greater detail below.
Temperament has been linked to EBDs in several different ways. However, because of the number of dimensions involved in the concept of temperament, as well as the many ways used to define EBDs, the literature reporting these associations exhibits considerable complexity. Table 1 helps categorize and summarize the kinds of empirical associations that have been reported in the literature.
## Table 1.

**Associations Between Temperament and EBDs in Past Literature**

<table>
<thead>
<tr>
<th>Rothbart Temperament Constructs</th>
<th>Subtype</th>
<th>Outcomes</th>
<th>Authors</th>
<th>Brown’s (2007) Relationship Type</th>
<th>SES of Study Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Levels of Activity</td>
<td>Higher risk of EBDs diagnosis</td>
<td>Prior, Sanson, Smart, &amp; Oberklaid (1999)</td>
<td>Predispositional</td>
<td>Mean scores were 2.99 and 2.97 for fathers’ and mothers’ occupation on a 6-point scale, where 1 indicates a professional occupation and 6 indicates an unskilled occupation. Mean scores were 4.21 and 4.60 for fathers’ and mothers’ education on an 8-point scale, where 1 indicates a postgraduate qualification, and 8 indicates elementary school level</td>
</tr>
<tr>
<td>Surgency</td>
<td>High Intensity</td>
<td>Greater number of EBD symptomology</td>
<td>Maziade et al. (1990)</td>
<td>Predispositional</td>
<td>10% of participants were in class 1, 13% in class 2, 24% in class 3, 37% in class 4, and 16% in class 5</td>
</tr>
<tr>
<td></td>
<td>High Intensity Behaviors</td>
<td>EBDs, “Behavioral Disturbance” Reactive or Neurotic Behavior Disorder”</td>
<td>Thomas, Chess, &amp; Birch (1968)</td>
<td>Predispositional</td>
<td>Families were of middle- or upper-middle-class background</td>
</tr>
<tr>
<td></td>
<td>High Reactivity, Low Approach/Sociability</td>
<td>Higher risk of EBD diagnosis</td>
<td>Prior, Sanson, Smart, &amp; Oberklaid (1999)</td>
<td>Presidpositional or continuity spectrum</td>
<td>Mean scores were 2.99 and 2.97 for fathers’ and mothers’ occupation on a 6-point scale, where 1 indicates a professional occupation and 6 indicates an unskilled occupation. Mean scores were 4.21 and 4.60 for fathers’ and mothers’ education on an 8-point scale, where 1 indicates a postgraduate qualification, and 8 indicates elementary school level</td>
</tr>
<tr>
<td>负性特质</td>
<td>Shy-Inhibited Temperament</td>
<td>Anxiety</td>
<td>Prior, Smart, Sanson, &amp; Oberklaid (2000)</td>
<td>Presidpositional</td>
<td>Participants were selected to be representative of the state population on SES, but there had been some selective loss of low SES and non-Anglo background families</td>
</tr>
<tr>
<td></td>
<td>Withdrawal from Novelty, Low Adaptability, Negative Mood</td>
<td>Greater number of EBD symptomology</td>
<td>Maziade, et al. (1990)</td>
<td>Predispositional</td>
<td>10% of participants were in class 1, 13% in class 2, 24% in class 3, 37% in class 4, and 16% in class 5</td>
</tr>
<tr>
<td></td>
<td>Low Approach</td>
<td>Internalizing behavior problems (anxiety and loneliness)</td>
<td>Paterson &amp; Sanson (1999)</td>
<td>Predispositional</td>
<td>Participants were primarily lower middle-class</td>
</tr>
</tbody>
</table>
Table 1. (continued)

<table>
<thead>
<tr>
<th>Negative Affectivity (continued)</th>
<th>Effortful Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Adaptability, Negative Mood</td>
<td>Low Persistence</td>
</tr>
<tr>
<td>Low Adaptability, Negative Mood, Low Approach</td>
<td>High Persistence</td>
</tr>
<tr>
<td>High Inhibition</td>
<td>Low Persistence</td>
</tr>
<tr>
<td>Low Persistence</td>
<td>High Persistence</td>
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<tr>
<td>Low Persistence</td>
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</table>

Mean scores were 2.99 and 2.97 for fathers’ and mothers’ occupation on a 6-point scale, where 1 indicates a professional occupation and 6 indicates an unskilled occupation. Mean scores were 4.21 and 4.60 for fathers’ and mothers’ education on an 8-point scale, where 1 indicates a postgraduate qualification, and 8 indicates elementary school level.
In terms of theoretically possible ways that temperament may be linked to EBDs, Brown (2007) provides a particularly useful conceptualization. He suggests four means through which the two constructs may be related. The first type is predispositional, whereby certain dimensions of temperament may make one more vulnerable to the development of EBDs. For example, a highly inhibited child may be more prone to developing an anxiety disorder. The second type of association can be described as pathoplastic, in which temperament influences the course and expression of EBDs. For example, a child who scores high on the intensity dimension of temperament and who has oppositional defiant disorder may display acting out behaviors that are more extreme than a child with oppositional defiant disorder who does not score high on the temperament dimension of intensity. Third is the complication/scar association, in which EBDs lead to changes in temperament. For example, a child who once scored low on negative affectivity may score high on this dimension of temperament after the development of a disorder such as depression. Finally, continuity spectrum associations represent the fourth type, where temperament and EBDs are essentially synonymous, reflecting the same underlying processes, and EBDs can be described as an extreme form of certain temperament dimensions. For example, a child with attention deficit disorder may be equivalent to a child who scores extremely low on temperamental characteristics such as effortful control and duration of orienting.

As noted in Table 1, research linking temperament with EBDs has largely been consistent with Brown’s (2007) predispositional type. However, it is sometimes impossible to detect the difference between predispositional and continuity spectrum types of relationships when characterizing temperament-EBD relationships.
In their research on correlations between EBDs and temperament, Prior, Sanson, Smart, and Oberklaid (1999) found that when comparing a group of 11-to-12-year-olds who were at risk for having a diagnosable disorder to a group who did not have adjustment difficulties and who were not considered at risk, the two groups scored significantly differently on several temperament dimensions. Specifically, the at-risk group had more difficult temperamental characteristics such as higher levels of activity and reactivity as well as being less sociable and less persistent (Prior et al., 1999). These findings support the idea that negative temperamental characteristics may put children at risk for EBDs.

Similarly, Prior, Smart, Sanson, and Oberklaid (2000) investigated whether shy-inhibited temperament in childhood predicted anxiety problems in adolescence. Shy-inhibited temperament was defined as “high levels of withdrawal from new people and stimuli (pg. 462).” The authors found that the more a child was labeled as shy-inhibited through the years (6 or more occasions over 8 surveys), the more likely the child was to experience anxiety in adolescence. Prior et al. (2000) concluded that the ability of shyness to predict emotional disorders is significant, if modest, and that extreme shy-inhibited behavior may make one vulnerable to, or be an early measure of these disorders, particularly if there are added influences such as family or environmental risk factors.

Maziade et al. (1990) investigated temperamentally extreme groups of children, comparing children with extremely easy temperaments to children with extremely difficult temperaments with respect to risk of being diagnosed with EBDs in adolescence. Difficult temperament was defined as withdrawing from novelty, being low on adaptability, displaying high intensity behaviors, and being characterized by negative mood (Maziade et al., 1990). Data were collected on 38 children at 7 years old, and again at age 16 years. The authors found that
the temperamentally difficult children displayed more EBD symptoms in adolescence than the temperamentally easy children. However, there was not a significant difference in the number of actual diagnoses between the groups (Maziade et al., 1990).

In other studies, Paterson and Sanson (1999) found that internalizing behavior problems were predicted by low temperamental approach, while externalizing behavior problems were predicted by low levels of persistence. Thomas et al. (1968) retrospectively examined longitudinal data from the NYLS and found that when comparing clinical groups of children to nonclinical groups of children over a span of 5 years, the clinical group was less adaptable and exhibited more negative mood, more high intensity behaviors, and a greater level of persistence.

Based on both concurrent and longitudinal data from the Fullerton Longitudinal Study, Guerin, Gottfried, Oliver, and Thomas (2003) found that low adaptability, negative mood, low persistence, and low approach were all concurrently associated with higher levels of behavior problems in preschool children (4-5 years old). Likewise, Guerin et al. found that low adaptability, low persistence, and negative mood were concurrently associated with behavioral problems during childhood (6-12 years old). Similarly, during adolescence (13-17 years old) it was found that those with high levels of flexibility and persistence, as well as rhythmicity of eating, reported fewer concurrent behavior problems. The authors also reported that infants labeled as fussy and difficult at age 1.5 years obtained more behavioral problem scores that were in a clinically significant range during preschool than infants who were not labeled as such. This relationship occurred, likewise, for those in middle childhood. The predictive power of these temperament dimensions into adolescence, however, was reduced.

Finally, Kagan, Reznick, Snidman, Gibbons, and Johnson (1988) examined inhibition and lack of inhibition in two groups of 21-month-old children. Inhibition was defined as
retreating from unfamiliar objects, remaining close to the mother, and hesitating to interact with unfamiliar adults (Kagan et al., 1988). These children were then assessed again at 4, 5 ½, and 7 ½ years of age. At 4 years, the children’s degree of inhibition persisted, and at 5 ½ years, the inhibited children were less talkative and less interactive. When assessed at 7 ½ years, the inhibited children took more time to initiate conversation with strangers, spoke less frequently, and spent more time playing alone than the uninhibited children (Kagan et al., 1988). Although not directly related to EBDs, these findings support the idea that certain temperamental characteristics may predispose children to later internalizing symptomology (Brown, 2007), particularly if paired with other risk factors such as poor parenting or low socioeconomic status.

In conclusion, although the associations between temperament and EBDs are complex, the literature indicates that dimensions of temperament are reliable predictors of the emergence of various EBDs, or at least some of the symptomatology of EBDs. Most researches are likely to agree that certain dimensions of temperament may make children more vulnerable to poorer outcomes. However, more research is needed to explain why EBDs emerge in some temperamentally at-risk children but not in others. One factor that may play an important moderating role is Socioeconomic Status (SES). SES has been implicated in associations with both temperament and EBDs. For example, low SES is associated with both temperamental difficulty (Fullard, Simeonsson, & Huntington, 1989; Prior et al., 1989) and high rates of EBDs (Brooks-Gunn, Duncan, & Maritato, 1997; Fish, Jacquet, & Frye, 2002; Hanson, McLanahan, & Thomson, 1997). As such, SES may play a role in moderating the association between temperament and the emergence of EBDs and may provide researchers with another avenue by which to explore these associations. Thus, a more detailed examination of this factor is presented below.
**Socioeconomic Status (SES)**

**Measuring and Defining SES**

Throughout the literature, characterization of SES has proved to be complex and multi-dimensional. Researchers have adopted a number of methodological approaches towards its classification including focusing on: 1) household income, 2) parental or maternal educational level, 3) family structure, and 4) quality and condition of the neighborhood of residence (Tolani & Brooks-Gunn, 2006). In income-based studies of SES, family income is usually characterized as a function of Median Family Income (MFI). Thus, determination of SES is calculated by dividing actual family income by the estimated national (or state) MFI. National MFI in 2007 was $59,000. Oftentimes this method is used to determine eligibility for government programs. For example, according to U.S. Department of Housing and Urban Development (HUD) guidelines, families at 50% of the national MFI may be considered to be “very low income,” while those at 80% of the federal MFI may be considered “low income” (HUD, 2007). Additionally, several other governmental entities use the federal poverty line to measure SES. In the case of the U. S. Census Bureau, this poverty line is an income threshold based on size of family and ages of family members. If a family’s total income equals less than its threshold, it is considered to be in poverty (U. S. Census Bureau, 2011).

Education-based classifications of SES are determined by the highest grade or type of education completed by the child’s parents, although maternal education is typically employed more frequently than paternal. In this conceptualization, educational-level is used as an indicator of human capital. Importantly for present purposes, education-based SES measures have served as indicators of parental cognitive abilities, which have themselves been associated with
children’s outcomes such as language skills, academic achievement, and possibly behavior (Tolani & Brooks-Gunn, 2006).

Family structure-based measures of SES are typically measured by collecting information regarding with whom the child lives. Specifically, SES is determined by whether or not the child lives with two biological parents, one parent only, or one biological parent and one stepparent (Schneider, Atteberry, & Owens, 2005). As an index of SES, family structure is meaningful because it has a large impact on the number and quality of resources available for children, and in turn, their well-being (Tolani & Brooks-Gunn, 2006). McLanahan (1997) found that the proportion of children living in single-parent homes, particularly mother-only homes, has increased dramatically in the last few decades, with that number reaching approximately 40% in 1995, with at least half of these families living in poverty as defined by extreme lack of income.

Finally, there is no set way to measure quality and condition of neighborhood, but researchers who have adopted neighborhood-based measures of SES have taken into account income and occupations of one’s surrounding neighbors, unemployment rates, the level of neighborhood crime, number of single parent families, ethnic diversity, residential instability, as well as the availability of community resources such as libraries and parks (Leventhal & Brooks-Gunn, 2000). The practice of using neighborhood as a measure of SES has been given more consideration as the notion of bidirectionality (that children both affect and are affected by a variety of contexts) has become more widespread (Tolani & Brooks-Gunn, 2006).

**SES and EBDs**

Generally speaking, low-SES has widely been associated with poorer outcomes in the emotional, behavioral, and social realms (Brooks-Gunn, Duncan, & Maritato, 1997; Fish, Jacquet, & Frye, 2002; Hanson, McLanahan, & Thomson, 1997). For example, in an 8-year
study, Costello, Compton, Keeler, and Angold (2003) examined mental health outcomes on an American Indian reservation where a casino had recently opened. The expectation was that by providing the population with a greater number of jobs and a share of the casino’s profits, community resources would help offset the development of behavioral and emotional disorders in children. Indeed, the authors found that there was a significant decrease in psychiatric symptoms for children who moved above the federal poverty line, while those who were never poor and those who remained in poverty demonstrated no change in psychiatric symptomology. However, this effect appeared to be stronger for externalizing symptoms than for internalizing symptoms. Specifically, there was a greater decline in behaviors associated with conduct and oppositional defiant disorders for children whose family income changed as compared to changes in anxiety and depression.

Similarly, Lipman, Offord, and Boyle (1994) found that the odds of having a psychiatric disorder among impoverished children (defined as those from families with a yearly income of less than $10,000) aged 4 to 11 was three times that of children who did not live in poverty. Although some studies have not found an association between income and child behavioral and emotional outcomes, in general, the majority of studies have found that children from low-income families have higher rates of EBDs than those who are not (Ackerman, Brown, & Izard, 2004; Campbell, Breaux, Ewing, & Szumowski, 1986; McLeod & Shanahan, 1996; Patterson, Kupersmidt, & Vaden, 1990). A similar relationship has been demonstrated between maternal level of education and child behavioral and emotional outcomes. Dearing, McCartney, and Taylor (2001) found that increasing maternal education was related to higher rates of prosocial behavior along with lower rates of behavioral problems in their children. Lipman and Offord
(1997) found that low levels of maternal education coupled with living in a single-parent home predicted a higher risk of children having EBDs.

Researchers who have used family structure as in index of SES have also reported associations with EBDs in children. Pagani, Boulerice, and Tremblay (1997) found that children from single-parent homes appeared to fare worse than those living with both biological parents in terms of depression and self-esteem. Dearing, McCartney, and Taylor (2001) found similar results; namely, that children in single-parent homes had significantly more behavior problems than those living with married biological parents.

Finally, neighborhood conditions have been associated with mental health outcomes for children. Brooks-Gunn, Duncan, Klebanov, and Sealand (1993) found that the absence of professionals in the neighborhood was associated with more internalizing and externalizing behavior problems in 3-year-olds. Duncan, Brooks-Gunn, and Klebanov (1994) found a similar association between the externalizing behaviors of 5-year-olds and the presence of low-income neighbors, while Tolani and Brooks-Gunn (2006) found that having low-SES neighbors was related to a greater display of externalizing behaviors but less so to the existence of internalizing behaviors, particularly in adolescence. Thus, neighborhood type may be predictive of only certain kinds of developmental outcomes.

It is clear that SES measured in multiple ways is associated with EBDs. It is unclear, however, exactly why these relationships exist. At least two main processes have been proposed to explain the association between SES and EBDs. The first is the family stress model (Conger, Conger, & Elder, 1997) that can be described as a process in which building economic pressures negatively affect parents’ health. Such economic stress may lead to depression, anxiety or anger, or to the use of unhealthy coping strategies (such as substance use and abuse) among parents that
may in turn lead to poorer outcomes for their children (Conger & Donnellan, 2007; Mayer, 1997; Tolani & Brooks-Gunn, 2006). The second is the family investment model, whereby parents’ limited access to capital (in terms of income, education, and social status) means that they have less to invest in their children’s development and must focus instead on their immediate needs such as providing shelter and food (Conger & Donnellan, 2007; Mayer, 1997; Tolani & Brooks-Gunn, 2006). For example, Bradley, Corwyn, McAdoo, and Garcia (2001) found that when comparing families in and out of poverty, children who were wealthier had greater access to stimulating materials and activities, individualized attention, safer homes, received more affection and respect, and experienced less physical punishment. The first model implies that low income decreases quality of parenting and hence impacts children nondirectly, while the second model implies that lack of resources negatively impacts children directly (Mayer, 1997). Although these two processes describe different ways to arrive at the same point, it is quite possible that both processes can be occurring at the same time.

**SES and Temperament**

Although research on the links between SES and temperament is scarce, there is some evidence that temperamental differences occur in children of different social classes. For instance, it has been found that mothers from lower SES strata rate their children as having more difficult temperaments than do their middle class counterparts (Fullard, Simeonsson, & Huntington, 1989; Prior, Sanson, Carroll, & Oberklaid, 1989). Similarly, Simonds and Simonds (1982), using the Behavioral Style Questionnaire (BSQ) that places children in one of four temperament categories (Difficult, Easy, Slow-to-Warm-Up, and Intermediate), and generating social class based on a combined educational and occupational index, found that children classified in either “easy” or “slow to warm up” categories came primarily from the top two
levels of SES, while children classified as “intermediate” came primarily from the three lower levels of SES.

Using a variety of SES measures such as maternal and paternal level of education, family income, and maternal occupational status, Jansen et al. (2008) found that lower SES was associated with a more difficult temperament in a Dutch sample of 6-month-old infants. In contrast, Maziade, Boutin, Cote, and Thivierge (1986), Persson-Blennow and McNeil (1981), and Maziade, Boudreault, Thivierge, Capera, and Cote (1984) found no or only a slight relationship between temperament dimensions and SES.
CHAPTER 2
CURRENT STUDY

Purpose

The purpose of the current study is to further investigate the relationships among temperament dimensions and EBDs, particularly as a function of how they may vary by SES. Although past research has demonstrated that early temperament predicts the later emergence of EBDs, most of the evidence to date has dealt primarily with children from middle- to high-income families (refer to Table 1). It is not clear whether the same pattern of relationship would emerge in lower SES populations. This is significant because, as noted, low SES has been linked to a higher prevalence of both EBDs and difficult temperament classification. Hence, if temperament is to be used as an early marker or predictor of later EBDs, then it must be established first that temperament is an equally valid marker of EBDs across SES strata. Thus, in the present investigation I begin to consider this latter question by exploring whether dimensions of temperament are associated with EBD symptomatology in a sample of mixed-income children.

Importantly, it may be the case that SES moderates the link between temperament and EBDs such that the relationship may not exist to the same extent across SES strata. As stated previously, research confirms that favorable environments may predict a lower incidence of emotional, behavioral, and temperamental difficulties in children. Therefore, it could be expected that the correlation between temperament and EBDs would be much stronger in low SES children because of their high risk status, and correspondingly, that the correlation would be weaker in high SES children because their environment protects them against these poor outcomes. On the other hand, Flouri (2008) suggests that genetics and heritability plays a larger
role in high SES families, whereas shared environment is more important in low SES families regarding the development of EBDs. In this case, because of the biological underpinnings of temperament, a temperament-EBD relationship would be more likely to occur in high-SES environments. Lending at least partial support for this idea, Lemery-Chalfant, Doelger, and Goldsmith (2008) reported that shared genes, rather than environment, accounted for the covariation between effortful control and EBD symptomology in a sample of 8-year-old twins. Although the authors did not examine SES differences, the majority of the twins were from families making a minimum of $50,000 a year, with only 4% from families making less than $20,000 a year.

In sum, by investigating temperament-EBD associations in high- and low-SES samples, I am testing two hypotheses. The first is that the temperament/EBD relationship will occur in low-SES children. The second is that SES will moderate the relationship between temperament and EBDs. Note that two directions have been suggested for this predicted moderating effect. Specifically, the claims of Flouri lead one to expect stronger correlations among upper SES groups, whereas the claims of those who have studied the effects of low SES lead to the expectation of stronger correlations among lower SES groups. To my knowledge, this investigation is the first to formally investigate the potentially moderating role of SES in accounting for temperament-EBD associations.

Methods

Participants. Children ages 5- to 15-years-old from a nonprofit after-school and summer program as well as from a K-12 laboratory school on a university campus in northeast Tennessee were recruited to participate in the study. The parents of 73 children (52% girls), mainly Caucasian (88%), completed and returned their questionnaires. Sixty-nine (95%) primary
caregivers provided their highest level of education: 1 – less than high school; 4 – high school graduate; 19 – some college; 5 – two-year degree; 16 – four-year degree; 4 – some graduate education; 15 – masters degree; and 5 – doctorate. Likewise, 60 (82%) caregivers reported the highest level of education of a second caregiver in the home: 2 – less than high school; 12 – high school graduate; 8 – some college; 5 – two-year degree; 12 – four-year degree; 1 – some graduate education; 12 – masters degree; and 8 – doctorate. The mean income for the primary caregiver was $27,185.67 (SD = $28,634.20), and the mean income for the second caregiver was $72,133.33 (SD = $105,711.00). Additionally, the primary caregiver had a mean Nam-Powers-Boyd (NPB) occupational status code of 46, with the secondary caregiver having a mean NPB occupational status code of 68 (refer to the Measures section for the description of this code). Meanwhile, mean total household income was $92,207.21 (SD = $102,990.00). See Figure 1 for the distribution of total household income of study participants. (Because of missing income data from 12 cases, the mean total household income was not equal to the mean of the individual caregiver means.)
Figure 1. Distribution of Total Household Income of Participants
Measures.

*The Pregnancy and Birth Stress Inventory (PBSI).* The PBSI (Clements, Dixon, & Gorniewicz, 2006) was used to assess demographic information including age, blood relation to child, occupation, and annual income of all primary caregivers in the home; gender, age, and blood relation of all siblings in the home; ethnicity of both primary caregivers and the child in question; and the highest level of education attained by the primary caregivers in the home.

*Child Behavior Checklist (CBCL).* The CBCL/6-18 (Achenbach & Rescorla, 2001) is a normed rating scale for children ages 6 to 18 years old. Ratings of children’s behaviors are completed by caregivers and are comprised of descriptions of common childhood emotional and behavioral problems. Parents indicate on a 0- to 2-point scale (“Not True,” “Somewhat or Sometimes True,” or “Very True or Often True”) the extent to which each item describes the child’s behavior within the past 6 months. The CBCL/6-18 contains 118 items and provides raw scores and percentile scores for eight syndrome scales, which are sets of commonly co-occurring problems, as well as for DSM-IV oriented scales meant to aid practitioners in the formal diagnosis of disorders such as Oppositional Defiant Disorder or Attention Deficit/Hyperactivity Disorder. Competence is also assessed in different areas such as school performance and functioning, and the amount and quality of involvement in activities and social relationships. Finally, the CBCL/6-18 provides raw scores and percentile scores for an Internalizing scale that reflects problems within the self, an Externalizing scale that reflects problems with other people and their expectations, and a Total Problems scale. The Total Problems scale is the sum of the scores for Internalizing and Externalizing Problems, plus the highest score of any additional problems indicated by a parent in response to the item, “Please write in any problems the pupil has that were not listed above.” Test-retest and inter-interviewer intraclass correlations among
the CBCL/6-18 standardization samples ranged from $r = .93$ to 1.00, with a mean score of $r = .90$. Internal consistencies across all scales were found to range from $\alpha = .63$ to .79.

**Child Behavior Questionnaire-Short Form (CBQ-SF).** The CBQ-SF (Putnam & Rothbart, 2006) is designed to assess temperament among children ages 3 to 7 years old. Caregivers are asked to rate how true a statement is of their child’s behaviors using a 7-point scale on 94 items, with 1 being “extremely untrue,” and 7 being “extremely true.” Fifteen scales are derived from the items, including activity level, anger/frustration, approach/positive anticipation, attentional focusing, discomfort, soothability, fear, high intensity pleasure, impulsivity, inhibitory control, low intensity pleasure, perceptual sensitivity, sadness, shyness, and smiling and laughter. In the original published report, internal consistencies ranged from $\alpha = .67$ to .94, with a mean $\alpha$ of .77 across scales (Ahadi, Rothbart, & Ye, 1993).

**Temperament in Middle Childhood Questionnaire (TMCQ).** The TMCQ (Simonds & Rothbart, 2004) is designed to assess temperament among children ages 7-10 years old, and has one additional construct not contained in the CBQ, which is Affiliation (Sociability). Parents rate how true a statement is of their child’s behavior on a 5-point scale, with 1 being “almost always untrue,” and 5 being “almost always true.” The TMCQ contains 157 items comprising 17 dimensions, including: activation control, activity level, affiliation, anger/frustration, assertiveness/dominance, attention focusing, discomfort, fantasy/openness, fear, high intensity pleasure, impulsivity, inhibitory control, low intensity pleasure, perceptual sensitivity, sadness, shyness, and soothability/falling reactivity. Internal consistencies in the standardization sample ranged from $\alpha = .69$ to .90.

**Early Adolescent Temperament Questionnaire-Revised (EATQ-R).** This 103-item measure (Ellis & Rothbart, 2001) is designed to assess temperament among children ages 9-15
years old. Parents are asked to rate how true a statement is of their child’s behavior on a 5-point scale, with 1 being “almost always untrue,” and 5 being “almost always true.” Its 10 scales include activation control, affiliation, aggression, attention, depressive mood, fear, frustration, high intensity pleasure, inhibitory control, and shyness. Reliability estimates ranged from $\alpha = .64$ to .81.

**Nam-Powers-Boyd Occupational Status Scale (NPB).** Originally created in the 1960s, Nam, Powers, and associates formulated a ranking system designed to reflect the average education and income for individual occupations based on data gathered by the Census Bureau. Since that time, updated versions of the measure have been created using the most recently released Census data. In their most recent version, Nam and Boyd (2004) assign scores that range from one to 100 based on year 2000 census data. Higher scores represent higher average education and income and lower scores represent lower average education and income.

Regarding reliability, Miller and Salkind (2002) reported a correlation coefficient of .96 when comparing sets of men’s scores on the 1950 and 1960 versions. Likewise, when comparing men’s scores on the 1950 and 1970 versions, a correlation coefficient of .91 was found. For women, the correlation coefficient between scores from 1960 and 1970 was found to be .85 (men’s and women’s scores were eventually combined in 1980). These correlations indicate a great deal of stability over time. As an index of convergent validity, high correlations are also reported when comparing Occupational Status Scale scores to similar measures such as the popular Duncan’s Socioeconomic Index (SEI; Duncan, 1961). To index occupational status in the present investigation, parents who provided occupational information were assigned a NPB occupational status code based on the occupational score list found in Appendix A of Nam and Boyd (2004).
Procedures. Staff and faculty at participating locations sent informed consent documents, behavior and temperament surveys, and the PBSI home to parents to complete and return to their respective sites. Parents were also given the option to complete their surveys online. Because all temperament measures were developed within Rothbart and colleagues’ conceptual framework, there is sufficient conceptual overlap to permit temperament comparisons among children of different ages, despite the use of different temperament instruments. Hence, it was possible to include children of a wide array of ages.

Data Analysis Plan

The specific dimensions of temperament of interest in the present investigation included Fear, Frustration, Sadness, and Shyness because these dimensions have most consistently been identified as predictors of EBD symptomology in past research (see Table 1). Because the CBQ temperament measure had a different measurement scale than both the EATQ-R and the TMCQ, values for all temperament variables were transformed into $z$-scores to allow comparison across measures.

The NPB occupational codes were used in a variety of ways to calculate household SES. As a continuous variable, SES was classified using the mean NPB code of both caregivers as well as the highest household NPB code of either caregiver. As a dichotomous variable, SES was calculated by dichotomizing these two continuous variables via median split. As an alternative means to investigate potential moderating effects of SES, SES was also defined as a function of total household income both continuously, as a raw income measure, and dichotomously, via median split. In sum, SES was calculated six ways: 1) mean NPB code of household, 2) dichotomized NPB code of household, 3) highest NPB code of household, 4) dichotomized
highest NPB code of household, 5) total household income, and 6) dichotomized total household income.

Lastly, adhering to the manualized scoring procedures (Achenbach & Rescorla, 2001), the CBCL Internalizing, Externalizing, and Total Problems scales were converted to T-scores. The T-scores were analyzed both continuously and dichotomously. However, unlike with measures of SES, the CBCL T-scores were dichotomized at the 60th percentile, as suggested by the scale’s authors.

To test the hypothesis of a moderating effect of SES on the relationship between temperament and EBDs, a series of hierarchical moderated regression analyses were conducted (Baron & Kenny, 1986), in which each of the three dependent variables (Internalizing T-scores, Externalizing T-scores, Total T-scores) were regressed in a stepwise fashion first on the temperament dimension of interest (the “predictor”), then the SES dimension of interest (the “moderator”), and then an interaction term created by multiplying the temperament dimension score x the SES dimension. In this procedure, the finding of a significant interaction term indicates that SES moderates the effect of the temperament dimension on the EBD outcome measure. To eliminate multicollinearity effects between the predictor, the moderator, and the interaction term, the predictor and moderator variables were centered before creation of the interaction term by subtracting the mean value for each of the predictors from individual scores. Additionally, any significant interaction effects were further explored through a decomposition analysis using procedures described by Aiken and West (1991). This enabled a graphical comparison of the slopes of significant regression analyses and the ability to determine the nature of any moderating relationships.
CHAPTER 3

RESULTS

Descriptive Statistics

Means and standard deviations of the main study variables and interaction terms can be found in Table 2.
### Table 2.

*Mean and Standard Deviation for Main Study Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emotional and Behavioral Disorders</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Externalizing Problems</td>
<td>48.35</td>
<td>11.02</td>
</tr>
<tr>
<td>Internalizing Problems</td>
<td>49.92</td>
<td>10.89</td>
</tr>
<tr>
<td>Total Problems</td>
<td>48.90</td>
<td>11.28</td>
</tr>
<tr>
<td>Highest NPB Code</td>
<td>72.95</td>
<td>24.17</td>
</tr>
<tr>
<td><strong>Temperament</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear</td>
<td>.00</td>
<td>.99</td>
</tr>
<tr>
<td>Frustration</td>
<td>.00</td>
<td>.99</td>
</tr>
<tr>
<td>Sadness</td>
<td>.00</td>
<td>.99</td>
</tr>
<tr>
<td>Shyness</td>
<td>.00</td>
<td>.99</td>
</tr>
<tr>
<td><strong>Interaction Terms</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fearxC_NPBHighest</td>
<td>-2.37</td>
<td>28.09</td>
</tr>
<tr>
<td>frusxC_NPBHighest</td>
<td>-5.46</td>
<td>30.39</td>
</tr>
<tr>
<td>sadxC_NPBHighest</td>
<td>-1.42</td>
<td>32.18</td>
</tr>
<tr>
<td>shyxC_NPBHighest</td>
<td>.89</td>
<td>28.66</td>
</tr>
</tbody>
</table>
Inferential Statistics

Intercorrelations between the main study variables can be found in Tables 3 and 4. In general, SES was not correlated with either the temperament or the EBD outcomes; however, as expected, there were significant correlations between children’s temperament and EBD scores.

Table 3.

Intercorrelations Between Temperament and SES Variables

<table>
<thead>
<tr>
<th></th>
<th>Fear</th>
<th>Frustration</th>
<th>Sadness</th>
<th>Shyness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest NPB Code</td>
<td>-.10</td>
<td>-.23</td>
<td>-.06</td>
<td>.04</td>
</tr>
<tr>
<td>Mean NPB Code</td>
<td>-.13</td>
<td>-.08</td>
<td>.10</td>
<td>-.01</td>
</tr>
<tr>
<td>Total Household Income</td>
<td>.12</td>
<td>.04</td>
<td>.03</td>
<td>.06</td>
</tr>
<tr>
<td>Total Household Income Dichotomized</td>
<td>-.01</td>
<td>-.05</td>
<td>.07</td>
<td>.02</td>
</tr>
<tr>
<td>Mean NPB Code Dichotomized</td>
<td>-.08</td>
<td>.01</td>
<td>.14</td>
<td>.07</td>
</tr>
<tr>
<td>Highest NPB Code Dichotomized</td>
<td>.10</td>
<td>-.18</td>
<td>.04</td>
<td>.15</td>
</tr>
</tbody>
</table>

N = 60; All r n.s.
Table 4.

*Intercorrelations Between EBDs and Temperament and SES Variables*

<table>
<thead>
<tr>
<th></th>
<th>Externalizing</th>
<th>Internalizing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear</td>
<td>.16</td>
<td>.41**</td>
<td>.27*</td>
</tr>
<tr>
<td>Frustration</td>
<td>.56**</td>
<td>.57**</td>
<td>.57**</td>
</tr>
<tr>
<td>Sadness</td>
<td>.43**</td>
<td>.60**</td>
<td>.51**</td>
</tr>
<tr>
<td>Shyness</td>
<td>.16</td>
<td>.46**</td>
<td>.24</td>
</tr>
</tbody>
</table>

N = 63; *p < .05, **p<.001

<table>
<thead>
<tr>
<th></th>
<th>Externalizing</th>
<th>Internalizing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest NPB Code</td>
<td>-.24</td>
<td>-.22</td>
<td>-.29*</td>
</tr>
<tr>
<td>Mean NPB Code</td>
<td>-.16</td>
<td>-.09</td>
<td>-.15</td>
</tr>
<tr>
<td>Total Household Income</td>
<td>-.09</td>
<td>-.09</td>
<td>-.11</td>
</tr>
<tr>
<td>Total Household Income Dichotomized</td>
<td>-.03</td>
<td>-.12</td>
<td>-.08</td>
</tr>
<tr>
<td>Mean NPB Code Dichotomized</td>
<td>-.06</td>
<td>.08</td>
<td>-.01</td>
</tr>
<tr>
<td>Highest NPB Code Dichotomized</td>
<td>-.17</td>
<td>-.13</td>
<td>-.19</td>
</tr>
</tbody>
</table>

N = 56; *p < .05
As described earlier, the primary analyses of interest involved testing whether SES moderated relationships between temperament and EBDs. Hence a series of moderated regression analyses were conducted for each measure of SES employed. Although several main effects were found, moderating relationships involving SES were rare. To simplify presentation of the results, I focus on those moderation analyses involving the SES measure most frequently involved in significant effects. The SES measure that produced the highest number of significant moderating relationships was the continuous variable, highest NPB code in the household, combined with the continuous CBCL T-scores (rather than the dichotomized T-scores). Main and interaction effects of SES (when measured in this manner) and temperament on Externalizing, Internalizing, and Total T-scores can be seen in Tables 5, 6, and 7, respectively.

Additionally, because of the difficulty of rendering and understanding interaction effects involving continuous variables, moderation effects were displayed graphically using procedures described by Aiken and West (1991). This approach, called decomposition analysis, allows one to portray the continuous, moderator variable SES as if it were a categorical variable representing children with “high” or “low” SES by plotting predicted scores for individuals one standard deviation above and below the mean, respectively. Decomposition analysis also allows for the estimation and comparison of slopes resulting from regression analyses representing implied groups otherwise defined by continuous variables. Although the regression analyses described above resulted in four significant moderation effects, the decomposition analyses did not reveal slopes significantly different from zero. The regression and decomposition results are discussed below.
**Externalizing problems.** Consistent with expectations, several temperament dimensions were significantly associated with children’s Externalizing Problems. In particular, as shown in Table 5, the temperament variables of Frustration and Sadness were both statistically predictive of Externalizing Problems ($p$’s < .001). Additionally, three out of the four moderation analyses resulted in a significant $R^2$ change, indicating a moderating effect of SES. It thus appears that SES is a significant moderator of the link between the temperament dimensions of Frustration, Sadness, and Shyness and the EBD measure Externalizing Problems (all $p$’s < .05). But these moderation effects appear limited to primarily one SES dimension, namely, highest NPB code in the household.
Table 5.

Main and Moderating Effects of Temperament and SES on Externalizing Problems

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SEB</th>
<th>β</th>
<th>ΔR²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear</td>
<td>1.81</td>
<td>1.54</td>
<td>.16</td>
<td></td>
</tr>
<tr>
<td>C_NPBHighest</td>
<td>-.11</td>
<td>.07</td>
<td>-.22</td>
<td></td>
</tr>
<tr>
<td>FearxC_NPBHighest</td>
<td>-.11</td>
<td>.05</td>
<td>-.27</td>
<td>.07</td>
</tr>
<tr>
<td>Total R²</td>
<td></td>
<td></td>
<td></td>
<td>.15</td>
</tr>
<tr>
<td>Frustration</td>
<td>7.39</td>
<td>1.20</td>
<td>.65**</td>
<td></td>
</tr>
<tr>
<td>C_NPBHighest</td>
<td>-.07</td>
<td>.05</td>
<td>-.14</td>
<td></td>
</tr>
<tr>
<td>FrusxC_NPBHighest</td>
<td>-.09</td>
<td>.04</td>
<td>-.23*</td>
<td>.05*</td>
</tr>
<tr>
<td>Total R²</td>
<td></td>
<td></td>
<td></td>
<td>.52*</td>
</tr>
<tr>
<td>Sadness</td>
<td>5.62</td>
<td>1.25</td>
<td>.52**</td>
<td></td>
</tr>
<tr>
<td>C_NPBHighest</td>
<td>-.11</td>
<td>.06</td>
<td>-.22</td>
<td></td>
</tr>
<tr>
<td>SadxC_NPBHighest</td>
<td>-.09</td>
<td>.04</td>
<td>-.29*</td>
<td>.08*</td>
</tr>
<tr>
<td>Total R²</td>
<td></td>
<td></td>
<td></td>
<td>.41*</td>
</tr>
<tr>
<td>Shyness</td>
<td>2.68</td>
<td>1.54</td>
<td>.24</td>
<td></td>
</tr>
<tr>
<td>C_NPBHighest</td>
<td>-.12</td>
<td>.06</td>
<td>-.26</td>
<td></td>
</tr>
<tr>
<td>ShyxC_NPBHighest</td>
<td>-.12</td>
<td>.05</td>
<td>-.32*</td>
<td>.10*</td>
</tr>
<tr>
<td>Total R²</td>
<td></td>
<td></td>
<td></td>
<td>.21*</td>
</tr>
</tbody>
</table>

N = 52, *p < .05, ** p < .001

Externalizing problems and frustration. Figure 2 indicates that low-SES children have higher levels of Externalizing Problems when they have higher levels of Frustration. The same relationship is found for high-SES, but the slope is not as steep, and therefore the relationship is not as strong. Although the individual slopes of these relationships did not differ significantly from zero, the overall moderation effect was statistically significant (Table 5).
Figure 2. Decomposition Analysis for Externalizing Problems and Frustration

Externalizing problems and sadness. Figure 3 indicates that low-SES children have higher levels of Externalizing Problems when they have higher levels of Sadness. The same relationship was found for high-SES children, but again, the slope is not as steep, and therefore the relationship not as strong. As above, the individual slopes did not differ significantly from zero, but the overall moderation effect was statistically significant (Table 5).
Figure 3. Decomposition Analysis for Externalizing Problems and Sadness

*Externalizing problems and shyness.* Figure 4 indicates that low-SES children have higher levels of Externalizing Problems when they have higher levels of Shyness. This was not found for those with high-SES, and in fact, their levels of Externalizing Problems stay the same or decrease slightly as levels of Shyness increase. Although the individual slopes did not differ significantly from zero, there was a statistically significant moderation effect (Table 5).
Figure 4. Decomposition Analysis for Externalizing Problems and Shyness

**Internalizing problems.** Also consistent with expectations, all four temperament variables, Shyness and Frustration, (p’s < .001) and Sadness and Fear (p’s < .05) were statistically associated with children’s Internalizing Problems (see Table 6). For Internalizing Problems, however, no significant moderating effects of SES were found, and thus no decomposition analyses were conducted.
Table 6.

*Main and Moderating Effects of Temperament and SES on Internalizing Problems*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SEB</th>
<th>β</th>
<th>ΔR²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear</td>
<td>3.92</td>
<td>1.42</td>
<td>.36*</td>
<td></td>
</tr>
<tr>
<td>C_NPBHighest</td>
<td>-.08</td>
<td>.06</td>
<td>-.18</td>
<td></td>
</tr>
<tr>
<td>Fear × C_NPBHighest</td>
<td>-.03</td>
<td>.05</td>
<td>-.08</td>
<td>.01</td>
</tr>
<tr>
<td>Total R²</td>
<td></td>
<td></td>
<td></td>
<td>.18</td>
</tr>
<tr>
<td>Frustration</td>
<td>6.39</td>
<td>1.27</td>
<td>.58**</td>
<td></td>
</tr>
<tr>
<td>C_NPBHighest</td>
<td>-.06</td>
<td>.05</td>
<td>-.13</td>
<td></td>
</tr>
<tr>
<td>FruxC_NPBHighest</td>
<td>-.06</td>
<td>.05</td>
<td>-.15</td>
<td>.02</td>
</tr>
<tr>
<td>Total R²</td>
<td></td>
<td></td>
<td></td>
<td>.39</td>
</tr>
<tr>
<td>Sadness</td>
<td>6.36</td>
<td>1.13</td>
<td>.61*</td>
<td></td>
</tr>
<tr>
<td>C_NPBHighest</td>
<td>-.09</td>
<td>.05</td>
<td>-.20</td>
<td></td>
</tr>
<tr>
<td>SadxC_NPBHighest</td>
<td>-.04</td>
<td>.04</td>
<td>-.13</td>
<td>.02</td>
</tr>
<tr>
<td>Total R²</td>
<td></td>
<td></td>
<td></td>
<td>.44</td>
</tr>
<tr>
<td>Shyness</td>
<td>6.40</td>
<td>1.24</td>
<td>.58**</td>
<td></td>
</tr>
<tr>
<td>C_NPBHighest</td>
<td>-.12</td>
<td>.05</td>
<td>-.26*</td>
<td></td>
</tr>
<tr>
<td>ShyxC_NPBHighest</td>
<td>-.04</td>
<td>.04</td>
<td>-.10</td>
<td>.01</td>
</tr>
<tr>
<td>Total R²</td>
<td></td>
<td></td>
<td></td>
<td>.39</td>
</tr>
</tbody>
</table>

N = 52, *p < .05, **p < .001

**Total problems.** The temperament variables of Frustration, Sadness (*p < .001*), and Shyness (*p < .05*), were statistically associated with Total Problems, indicating main effects of these predictors. Only one analysis produced a significant $R^2$ change indicating a moderating relationship, and that was with the Sadness temperament variable (see Table 7). The results of the subsequent decomposition analysis are discussed below.
Table 7.

*Main and Moderating Effects of Temperament and SES on Total Problems*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SEB</th>
<th>β</th>
<th>ΔR²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear</td>
<td>2.81</td>
<td>1.52</td>
<td>.25</td>
<td></td>
</tr>
<tr>
<td>C_NPBHighest</td>
<td>-.13</td>
<td>.07</td>
<td>-.26</td>
<td></td>
</tr>
<tr>
<td>FearxC_NPBHighest</td>
<td>-.05</td>
<td>.06</td>
<td>-.12</td>
<td>.01</td>
</tr>
<tr>
<td>Total R²</td>
<td>.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frustration</td>
<td>7.45</td>
<td>1.20</td>
<td>.64**</td>
<td></td>
</tr>
<tr>
<td>C_NPBHighest</td>
<td>-.09</td>
<td>.05</td>
<td>-.19</td>
<td></td>
</tr>
<tr>
<td>FrusxC_NPBHighest</td>
<td>-.07</td>
<td>.04</td>
<td>-.18</td>
<td>.03</td>
</tr>
<tr>
<td>Total R²</td>
<td>.52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sadness</td>
<td>6.37</td>
<td>1.18</td>
<td>.59**</td>
<td></td>
</tr>
<tr>
<td>C_NPBHighest</td>
<td>-.13</td>
<td>.05</td>
<td>-.27*</td>
<td>.05*</td>
</tr>
<tr>
<td>SadxC_NPBHighest</td>
<td>-.07</td>
<td>.04</td>
<td>-.22*</td>
<td>.05*</td>
</tr>
<tr>
<td>Total R²</td>
<td>.47*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shyness</td>
<td>4.08</td>
<td>1.48</td>
<td>.35*</td>
<td></td>
</tr>
<tr>
<td>C_NPBHighest</td>
<td>-.15</td>
<td>.06</td>
<td>-.31*</td>
<td></td>
</tr>
<tr>
<td>ShyxC_NPBHighest</td>
<td>-.09</td>
<td>.05</td>
<td>-.24</td>
<td>.06</td>
</tr>
<tr>
<td>Total R²</td>
<td>.26</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 52, *p < .05, ** p < .001

*Total problems and sadness.* Figure 5 indicates that low-SES children have higher levels of Total Problems when they have higher levels of Sadness. The same was found for high-SES children, but this latter relationship is weaker than that of the former because the slope is not as steep. Although the individual slopes of these relationships did not differ significantly from zero, the overall moderation effect was statistically significant.
Figure 5. Decomposition Analysis for Total Problems and Sadness
CHAPTER 4

DISCUSSION

Discussion of Results

The purpose of the current investigation was to further explore the relationships between temperament and EBDs and to explore whether these relationships were moderated by SES. As noted above, past research has demonstrated that certain dimensions of temperament are associated with the emergence of EBDs. However, the majority of those studies were conducted with children from middle-to-high income families. A goal of the present project was to see if these relationships would still obtain with children from low-SES families. Based on Flouri (2008), I expected that SES would moderate the relationship between temperament and EBDs, but that the direction of the moderating effect could go either way.

In the present study, there were several regressions reflecting main effects of SES on the outcome variable. Specifically, the highest NPB code in the household and the mean NPB code both predicted Externalizing, Internalizing, and Total Problems. These findings are consistent with past research suggesting associations between SES and EBDs (Brooks-Gunn, Duncan, & Maritato, 1997; Fish, Jacquet, & Frye, 2002; Hanson, McLanahan, & Thomson, 1997). Additionally, all four temperament variables were correlated with one or more of the EBD measures, which support the results of numerous previous studies (see Table 1).

Any global and robust involvement of SES as a moderator of these relationships, however, is suspect. Only a handful of significant moderating relationships were found between temperament and EBDs in the current study, with the majority occurring when Externalizing Problems was the outcome variable and SES was defined as the highest NPB code in the household. Specifically, the relationships between Externalizing Problems and Frustration,
Sadness, and Shyness were all moderated by SES. Similar patterns of association were found for Total Problems and the Sadness temperament dimension. One can conclude from these analyses that the relationship between particular temperament dimensions and Externalizing Problems and Total Problems is stronger in low-SES children than high-SES children, but only when taking into account occupational status, and not family household income. In any case, the finding of a significant moderation effect is consistent with the hypothesis proposed at the outset that the environment of high-SES children protects them from EBDs, whereas the environment of low-SES children puts them at a higher risk for EBDs.

It is interesting that no significant moderating relationships were found with Internalizing Problems as the outcome variable. Why SES did not affect the relationship between temperament and Internalizing Problems is unclear. In fact, this finding is surprising given past research that has shown that Internalizing Problems may be explained more by environment than by genetics. For example, in a study of 7-year-old twins, van der Valk, van den Oord, Verhulst, and Boomsma (2003b) found that individual variation due to genetic factors was 65% for Externalizing Disorders, while only 35% for Internalizing Disorders. Similarly, in examining the continuity of EBDs, van der Valk, van den Oord, Verhulst, and Boomsma (2003a) found that the stability of Externalizing Problems was explained mostly by genetic factors while the stability of Internalizing Problems was explained mostly by nonshared environmental factors such as unique experiences with peers as well as diseases and accidents. These studies suggest that the relationship between temperament and Internalizing Problems would be even more susceptible to varying environmental conditions such as SES than the relationship between temperament and Externalizing Problems, but that was not the case in the present study.
It is important to keep in mind, however, that the majority of analyses failed to show SES as a moderator of temperament-EBD relationships. As a moderator of temperament-EBD relationships, the effects of SES seem to be highly constrained. If majority rules, the general lack of SES moderating effects challenges the hypothesis that the relationship between temperament and EBDs varies as a function of SES. These data are consistent with the possibility that temperament may predict the onset of EBDs regardless of income level. If so, then early assessment of temperament may serve as useful risk indicators of later EBDs regardless of income. Of course, knowing that temperament is a risk indicator for the emergence of EBDs does not explain why certain temperamentally at-risk children go on to develop EBDs. From the present study, at least, it appears that any moderating effects of SES are limited to indices of occupational status and to externalizing outcomes.

Finally, it was interesting that the presence or absence of main or moderating effects depended on how SES was defined. For example, using income alone, continuously or dichotomously, did not produce any significant main effects or moderation effects. However, both continuous or dichotomous forms of the NPB code revealed significant main and moderating effects on child behavior outcomes. It is unclear why this occurred. Smith and Graham (1995) suggested that not all measures of SES are equal, and that some may have more influence over specific outcomes than others. In their review, Smith and Graham outlined several studies in which outcomes differed depending on the SES indicators used. For example, when measuring wives’ marital quality, Vannoy and Philliber (1992) found that while neither the occupation nor the income of either the husband or the wife had any effect, the husband’s education did. Furthermore, both Entwisle and Astone (1994) and Duncan and Magnuson (2003) argued that reliance on a single index fails to capture the richly multi-dimensional character of
SES, and that a combination of indicators such as education, income, and occupation is more accurate than any one by itself (White, 1982). From this perspective, incorporation of an occupational-status type indicator of SES may be preferred because of its close relation to both education and income. Additionally, because income appears to vary more in the short-term than occupation, it may be a less accurate representation of a family’s long-term SES or economic well-being (Duncan & Magnuson, 2003; Entwisle & Astone, 1994; Hauser, 1994). In sum, it appears clear that future researchers interested in the extent that temperamental difficulty serves as a risk indicator of later problem behavior should take into effect comprehensive indices of SES as potential moderators rather than relying solely on income.

**Limitations**

To be sure, the present findings are limited by a relatively small sample size overall, and by disproportionately low representation of low-SES families relative to middle- and high-SES families. On the other hand, this is a common problem in SES-focused research as low SES families are not only difficult to find, they produce lower response rates (Goyder, Warriner, & Miller, 2002; Jackson et al., 1996). However, because of the low number of low-SES participants, it is possible that the number of significant outcomes was limited by a restriction of range for SES. Perhaps inclusion of more low-SES families would have increased the number and size of effects found. Additionally, the generalizability of the present results are further constrained by the fact that families were drawn from a rural Appalachian region of the American Southeast and may engage in culturally different parenting and child-rearing practices than families in other geographic regions throughout the United States (Rural and Appalachian Youth and Families Consortium, 1996). Finally, considering the number of analyses performed, the issue of experimentwise error suggests that these results should be treated with caution. On
the other hand, these results also generate future hypotheses to be tested by researchers interested in SES as a moderator of temperament-EBD relationships.

Conclusions

The present investigation makes a unique contribution to the study of temperament links to emotional and behavior disorders in children. These results not only replicate previous research linking temperamental difficulty to negative behavioral outcomes, but they address these associations in children older than previously studied while taking into account SES as a potentially moderating factor. The finding that difficult temperament places low SES children at significantly greater risk for later behavior disorders is especially important and adds to the list of problematic outcomes that low SES children are at risk for. Future research should focus not only on replicating these results but also on exploring the extent to which other temperament variables might contribute to behavior outcomes in children, and whether these links might also be moderated by SES.

Future researchers should also begin to evaluate the specific mechanisms that may underlie the limited SES moderation effects reported here. It could reflect for example, the family stress model (Conger, Conger, & Elder, 1997) in which low SES decreases the quality of parenting that children receive. For instance, low SES parents are known to rely upon more authoritarian parenting strategies than parents from middle to upper SES backgrounds (McLoyd, 1990), and so parenting tactics may be the source of the different outcomes of high versus low SES temperamentally difficult children. In the present investigation, because income was found to have no effects, one could say that the education portion of the NPB occupational code was what was moderating the relationship between temperament and EBDs, suggesting that perhaps those with a higher education are better equipped to parent temperamentally at-risk children than
those with less education. Likewise, it could be a reflection of the family investment model in which the lack of resources experienced by low SES families directly impacts children. For example, low SES parents have less to devote to their children’s development and instead must focus on the basic necessities of providing food and shelter rather than activities, materials, and opportunities (Conger & Donnellan, 2007; Mayer, 1997; Tolani & Brooks-Gunn, 2006). As such, perhaps this lack of resources and investment in their development makes temperamentally difficult children more susceptible to developing EBDs than their high SES counterparts. But if so, the relevant resources provided by parents would be those stemming from occupational status rather than income per se.

In conclusion, researchers are making progress in identifying potential sources of child behavior problems. A long literature attests to the validity of temperament as a risk factor for behavioral difficulty, but the present findings also suggest the importance of taking into account children’s family contexts, particularly occupational status, in considering the degree to which temperament may serve as a risk factor. From a translational perspective, family context is at least one aspect of children’s lives amenable to early intervention. Despite this progress however, considerable research is still needed before scientists can develop intervention strategies that are simple and effective, and in turn, determine how to implement those strategies appropriately.
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