

CAN PRESCHOOL AGE CHILDREN BE GROUPED BY TEMPERAMENT?  
A QUANTITATIVE ANALYSIS OF SURVEY DATA

A Thesis  
by  
JANA LYNNE DAGENBACH

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JANA LYNNE DAGENBACH  
MAY 2015

APPROVED BY:

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Timothy J. Huelsman  
Chairperson, Thesis Committee

---

Sandra G. Gagnon  
Member, Thesis Committee

---

Pamela Kidder-Ashley  
Member, Thesis Committee

---

James C. Denniston  
Chairperson, Department of Psychology

---

Max C. Poole  
Dean, Cratis Williams Graduate School

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## **Abstract**

### **CAN PRESCHOOL AGE CHILDREN BE GROUPED BY TEMPERAMENT? A QUANTITATIVE ANALYSIS OF SURVEY DATA**

Jana Lynne Dagenbach  
B.A., University of North Carolina Chapel Hill

Chairperson: Timothy J. Huelsman

Temperament is a widely researched construct and has significant influence in people's lives. Still, theorists differ on their approaches to and perspectives on this topic. In their famous New York Longitudinal Study (NYLS), Thomas, Chess, and Birch (1968) gathered information through parent interviews and observations of 136 children. These investigators categorized children as *easy*, *difficult*, or *slow to warm up* based on the temperament characteristics reported in their study. Other researchers have found temperament profiles in children that are similar but not completely consistent with those of Thomas and colleagues. The purpose of the current study is to corroborate and extend the research that places children into groups based on similarity of temperament. Following previous research, I hypothesized that there would be five groups of children. A cluster analysis was used to identify four groups that converge with the findings in previous research—difficult, diligent, interested, and moderate groups of children—and one group that diverges from previous studies—a disengaged group.

*Keywords: temperament, cluster analysis, preschool children*

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## **Foreword**

This thesis is written in accordance with the style of the *Publication Manual of the American Psychological Association (6<sup>th</sup> Edition)* as required by the Department of Psychology at Appalachian State University.

## **Can Preschool Aged Children Be Grouped By Temperament?**

### **A Quantitative Analysis of Survey Data**

Temperament is an important and widely researched psychological construct. One indicator of the construct's importance is that an October 2014 PsycINFO search using the keyword "temperament" returned 12,353 results. In addition, entire journal issues recently have been devoted to temperament, including the fourth issue in the 2012 *Journal of Individual Differences*, the August 2008 issue of *Infant and Child Development*, and the first and second issues of the 2008 *European Journal of Developmental Science*. Many of these journals have even focused on one aspect or theory of temperament, such as regulative theory (Fajkowska, Wytykowska, & Riemann, 2012), Rothbart's theory (Putnam & Stifter, 2008), or the current trends in the study of child temperament (Zentner, 2008). Numerous studies have been dedicated to investigating the role of temperament in academic performance (Duckworth & Allred, 2012), social development (Calkins & Mackler, 2011), and the workplace (Lanaj, Chang, & Johnson, 2012). Even cursory reviews of these publications make it apparent that not only is temperament a topic of great interest, but also that it may have consequential outcomes.

Among its many effects, temperament has been found to be associated with children's school success, relationships with others, behavior, and social competence. Research has repeatedly demonstrated connections between temperament and school success. For instance, temperament ratings have been useful in predicting academic achievement and performance (Bramlett, Scott, & Rowell, 2000; Colom, Escorial, Shih, & Privado, 2007). Temperament has strong correlations with both grades and standardized tests scores (Martin & Holbrook,

1985). Temperament characteristics also predict children's classroom participation, school liking, and student-teacher relationships (Valiente, Swanson, & Lemery-Chalfant 2012).

Ample evidence suggests that children's success and experiences in school are often related to their relationships with others (Billman & McDevitt, 1980; Keogh & Burstein 1988; Lerner, Lerner, & Zabski, 1985). Not surprisingly, temperament plays an important role in relationships as well. Temperament traits are influential in children's relationships with their parents, teachers, and peers. Children's temperament characteristics have been found to be associated with features of their close friendships and peer relationships (Stocker & Dunn, 1990). Additionally, differences in temperament characteristics are recognized by teachers and are related to the frequency of children's interactions with peers and adults in preschool (Keogh & Burstein, 1988).

Not only does temperament influence relationships and academic success, it also impacts behavioral issues. Temperament is involved in risky behaviors, delinquency, and aggression. According to researchers, temperament and background characteristics influence risky behavior, such as riding in a car without a seatbelt, smoking, drinking, and gang fights (Rudasill, Reio, Stipanovic, & Taylor, 2010). Additionally, certain temperament characteristics have been linked to negative peer influences and later delinquent behavior in early adolescence (Mrug, Madan, & Windle, 2012). Another behavioral issue connected to temperament is aggression. Physical aggression may, in some cases, be associated with temperament, which can lead to peer difficulties (Underwood, 2011). In a study of adolescents, certain temperament traits were positively correlated with relational aggression (Ojanen, Findley, Fuller, 2012).

A large body of research has also been dedicated to investigating the relationship between temperament and mental health. Temperament has been connected to several psychological issues, including externalizing and internalizing disorders. It has been linked to common disruptive behavior disorders, such as Oppositional Defiant Disorder and Attention-Deficient/Hyperactivity Disorder (Martel, Gremillion, & Roberts, 2012). Furthermore, studies suggest that temperament traits are associated with depression and anxiety (Spielberg, Heller, Siltan, Stewart, & Miller, 2011).

Although research has confirmed the broad span of influence that temperament has in children's lives, researchers diverge in their definitions of temperament. Generally, researchers agree that temperament reflects differences in children's behavioral styles that are apparent from early childhood (Sanson, Hemphill, & Smart, 2004). Investigators also agree that temperament is relatively stable. However, temperament researchers and theorists differ with respect to how they conceptualize the construct and its components. The more influential theories of temperament include those of Thomas, Chess, and Birch (1968), Rothbart (1981), Buss and Plomin (1984), and Goldsmith and Campos (1982). These approaches are summarized in Table 1.

Thomas et al. (1968) are credited with pioneering the modern conceptualization of temperament. Throughout the 1940s and 1950s, behavioral differences in children were commonly attributed to the environment alone, particularly placing blame on the mother for any "deviant" behavior or outcome (Chess & Thomas, 1996). Thomas et al. theorized that children's individual differences played an important role in their development. They proposed an interactional framework to explain development, a framework in which temperament interacted with motivation, abilities, and the environment. According to these

researchers, when a child's individual characteristics match the demands of the environment, optimal development can occur and the likelihood of problems is diminished (Kristal, 2005).

Setting out to examine the behavioral differences in children, Thomas and colleagues (1968) conducted the famous New York Longitudinal Study (NYLS) in which they gathered comprehensive information through parent interviews and observations of 136 children. Using a qualitative analysis, Thomas et al. identified nine dimensions of temperament, each of which was scored on a three-point scale (see Table 1; Thomas & Chess, 1977). These traits were areas in which children differed in terms of their behavior and reactions to various stimuli. *Activity level* reflects the child's level, pace, and frequency of motor activity. High activity level is characterized by moving, crawling, or running, while low activity is characterized by lying still or not moving very much. *Rhythmicity* refers to the amount of rhythm or regularity of biological functions such as resting, sleeping, waking, and eating. Examples of regular rhythmicity include waking, napping, and demanding food at the same time each day, while different patterns of these behaviors each day would be irregular. *Approach or withdrawal* describes the child's initial reaction to any new stimulus. Approach refers to children who smile at strangers or play with new toys, whereas withdrawal responses include making a face or crying to new people or toys. *Adaptability* reflects the ease or difficulty in changing the child's initial response to a stimulus. A child with adaptive behavior may show initial dislike or negative reactions to certain foods, baths, or toys, but with time begins to like or accept them. Nonadaptive children continue to show their displeasure over time. *Intensity of reaction* refers to the degree of the child's positive and negative responses. For example, high intensity reactions include crying or laughing loudly in situations, whereas not crying or simply smiling reflects mildly intense reactions. The

*threshold of responsiveness* dimension indicates the intensity of external stimuli that is necessary before the child responds. A child who can stare at a bright light without blinking has a high threshold for visual stimuli; being startled by a door closing is a low threshold response to auditory stimuli. The *quality of mood* dimension rates the amount of pleasant, joyful, and friendly behavior versus unpleasant, crying, unfriendly behavior. For example, positive mood includes smiling and laughing, whereas negative mood includes crying, hitting, or frowning. *Distractibility* reflects the effectiveness of environmental stimuli in interrupting or altering an ongoing behavior. For example, if a child is crying because he is hungry but then stops when he is picked up, he is distractible. A non-distractible child continues to cry until he is fed. The last dimension, *attention span and persistence*, refers to the amount of time a child spends pursuing an activity and whether that activity is maintained in the presence of obstacles. High attention span may be demonstrated by playing with a toy for a long period of time, whereas low attention is playing with a toy for a short amount of time. A child with high persistence may continue playing with a toy even after his or her mother says “no,” while a child with low persistence will stop when directed.

Researchers have employed various strategies to combine the nine temperament dimensions. Using higher-order factor analysis, McDevitt (1977) produced a four-factor solution for temperament in infants. The first factor included approach-withdrawal, adaptability, and distractibility. The second factor included activity and intensity and the third factor was composed of rhythmicity and persistence. Finally, the fourth factor included threshold and mood. In McDevitt’s results, all of the nine dimensions loaded into one of the four factors. The first factor was similar to Thomas and colleagues’ (1968) in that it included approach and adaptability. In an attempt to replicate the findings of the NYLS, Scholom,

Zucker, and Stollak (1979) found three factors of temperament. They categorized these factors as *mood*, *energy*, and *consistency*. The mood factor consisted of the approach, adaptability, mood, and threshold dimensions. The energy factor was composed of activity, intensity, and distractibility. The consistency factor was characterized by regularity and persistence. Scholom and colleagues noted that their mood factor was similar to a NYLS factor in that they both included approach, adaptability, and mood dimensions. Both McDevitt and Scholom and colleagues found high loadings for approach and adaptability on one factor, similar to the NYLS study.

Another influential theorist, Rothbart (1981), had a slightly different approach to temperament that was based on animal research but influenced by the work of Thomas and colleagues (1968). Rothbart and Derryberry (1981) began the development of this theoretical framework by using the dimensions identified by Thomas and colleagues along with additional dimensions reflecting fear, frustration, and distress due to limitations placed on the child. In developing a questionnaire to measure these dimensions, Rothbart discovered that several of the NYLS dimensions did not have strong enough correlations with each other across analyses. Because of this, she decided to exclude some of the dimensions, including intensity, threshold for reaction, adaptability, and rhythmicity from her questionnaire. These findings prompted Rothbart to question Thomas and his colleagues' definition of temperament as a style and take a more biological approach its conceptualization.

Rothbart and Derryberry (1981) defined temperament as individual differences in reactivity and self-regulation and believed that it changes with maturation. Unlike Thomas and colleagues (1968), Rothbart's idea of temperament has a more biological, rather than psychological, base and also includes motivation (Rothbart, 1986). According to her theory,

temperament includes emotional aspects along with motor activation and orienting and attentional characteristics. Emotions include motivation and behavioral tendencies that serve a regulatory function. For example, a person may freeze, run away, or attack when feeling fearful. These emotional reactions influence future experiences (Rothbart, 2011). Whereas Thomas et al. believed that the “match” between an individual’s temperament and the environment affected his or her development, Rothbart’s theory suggests that temperament influences the situations in which an individual chooses to become involved (Goldsmith et al., 1987).

Due to the beliefs that temperament is influenced by maturation and experience, Rothbart, Ahadi, Hershey, and Fisher (2001) studied it in a variety of age groups using questionnaires. The Children’s Behavior Questionnaire (CBQ), developed for use with 3 to 7 year old children, is the most relevant to the current study. This questionnaire measured 15 dimensions of temperament (see Table 1). Factor analysis of the CBQ scale scores returned three factors: *surgency/extraversion*, *negative affectivity*, and *effortful control* (CBQ; Rothbart et al., 2001). Rothbart and colleagues classified surgency/extraversion as displays of positive emotions, approach to rewards, and high activity level. Negative affectivity included fear and anger or frustration. Effortful control measured children’s voluntary attentional focus, inhibitory control, perceptual sensitivity, and low-intensity pleasure. Rothbart later identified an additional factor of temperament, *affiliation*, which refers to closeness with others (Rothbart, 2011).

Similar to Rothbart, the perspective of Buss and Plomin (1984) is strongly biological. Though Rothbart did not specify the exact biological origins of temperament, Buss and Plomin narrowly defined temperament as traits that are inheritable and genetic in origin. The



temperament traits they identified were *emotionality*, *activity*, and *sociability* (see Table 1). Emotionality refers to the tendency to become upset easily or extremely. Activity measures the frequency, duration, and intensity of activities an individual chooses. Sociability refers to the preference for being with others or a preference to be alone. According to Buss and Plomin, temperament is composed solely of “enduring” personality traits that are stable over time. Traits that are more transient, such as rhythmicity, are not included in their model of temperament (Goldsmith et al. 1987).

Buss and Plomin (1984) used a variety of measures to build their theory of temperament, including observations, parent reports, and an instrument called an actometer (to measure activity). Similar to other temperament theorists, Buss and Plomin used factor analysis on data collected from surveys in order to examine the dimensions of temperament. On the parent survey, emotionality was a measure of children’s distress, exemplified by crying, fussing, or becoming upset. Activity measured energy levels, types of games played, and how fast and how often the child moved. Sociability referred to the tendency to enjoy being around others as well as shyness.

Unlike the aforementioned theorists, Goldsmith and Campos (1982) viewed temperament as individual differences in experiencing and expressing primary emotions and arousal. They specified the dimensions of temperament as being affect-related, including both discrete emotions and generalized arousal. Goldsmith and Campos defined emotions as “feeling states” that motivate the individual and communicate socially significant information to others, and they theorized that emotions regulate psychological processes and social behaviors. In contrast to theories from Rothbart (1981) and Buss and Plomin (1984) that viewed temperament as biological in nature, Goldsmith and Campos defined

temperament as behaviorally based, without specifying origin. Their approach focused on the emotional states that are immediately present in infancy. Goldsmith (1996) identified five dimensions of temperament: *activity level*, *joy/pleasure*, *social fearfulness*, *anger proneness*, and *interest/persistence* (see Table 1). According to Goldsmith's theory, infant temperament consists of only primary emotions. Later, other temperament dimensions, such as fear, become integrated with the emotional system (Goldsmith et al., 1987).

Goldsmith and Campos (1982) also used parent ratings on questionnaires to assess their temperament theory. Goldsmith (1996) factor analyzed the Toddler Behavior Assessment Questionnaire (TBAQ) and identified four of the factors previously noted, but interest/persistence was not identified in this analysis. Goldsmith also observed convergence among the scales on the TBAQ scales and with scales used by other theorists. For example, social fearfulness was strongly correlated with an Approach/Withdrawal scale and with Buss and Plomin's (1984) Sociability scale.

In their longitudinal study of children aged 3, 5, 7, and 9, Caspi and Silva (1995) described three different dimensions. In this study, children were observed and rated on twenty-two behavioral items during cognitive and motor evaluations using a three-point scale. The ratings were then factor analyzed. The dimensions that resulted from this study were *lack of control*, *approach*, and *sluggishness*. Lack of control in the early ages referred to emotional lability, restlessness, short attention span, and negativism. According to Caspi and colleagues, this factor also reflected an inability to control impulsive expression, lack of persistence in problem solving, and negative reactions to challenging or stressful tasks. Approach described children who had little caution around the examiner, quick adjustment to the new situation, great ease in social interaction, self-confidence, and self-reliance. The

sluggishness dimension comprised ratings of shyness, fearfulness, limited verbal communication, passivity, and flat affect. Sluggishness described children who were withdrawn and unresponsive in their social behavior.

Although there is some divergence among temperament theorists, there are some commonalities in their conceptualizations of the construct as well as the dimensions. For instance, investigators agree that temperament is relatively stable and can be detected in infancy. The dimensions of temperament are also quite similar, though many of them have different labels. Most theoretical temperament dimensions include activity level, persistence, approach/withdrawal, mood, and the intensity and duration of positive and negative reactions. Both Rothbart (1981) and Buss and Plomin (1984) grouped similar items into larger factor patterns, while Thomas et al. (1968) and Goldsmith (e.g., Goldsmith & Campos, 1982) labeled each item as a dimension itself. Goldsmith also differed from previous approaches by focusing on activity level and primary emotions, rather than the persistence, approach, and intensity of behaviors. Additionally, Thomas et al. collected behavioral data through parent interviews and observations while Rothbart (1981, 1986), Buss and Plomin, and Goldsmith collected information from questionnaires, and Caspi and Silva used behavioral observations during cognitive and motor assessments. All have used factor analytic techniques to explore the structure of temperament.

Aside from the broader conceptual issues and item analyses, temperament research also has investigated whether there are distinct temperament profiles or categories among children based on the similarities in their ratings across dimensions. Thomas et al. (1968) defined three categories of children using qualitative analysis by scoring specific descriptions of behavior from parent interviews on a three-point scale and noticing commonalities across

dimensions. These three categories are *easy*, *difficult*, and *slow to warm up*. The easy category contained dimensions of rhythmicity, quality of mood, adaptability, approach-withdrawal, and intensity of reactions. These children demonstrated regularity in bodily functions, positive mood, high adaptability to change and transitions, a positive approach to new people, places, and things, and low or mild intensity. Forty percent of the children in the NYLS sample were characterized as easy. The difficult category consisted of rhythmicity, approach-withdrawal, adaptability, intensity of reaction, and quality of mood. Difficult children were characterized by low regularity, initial withdrawal from anything new, slow adaptability, high intensity, and negative mood. Ten percent of the children in the NYLS sample fell into this category. The slow to warm up category consisted of intensity of reactions, activity level, adaptability, and approach-withdrawal. Slow to warm up children were low in intensity and activity level, slow adapting, and withdrawing in new situations. This group represented 15% of the children in the NYLS study. Approximately one third of the children in the NYLS did not fall into one of these patterns and did not share enough of the same characteristics to categorize.

In their longitudinal study of children aged 3 to 18, Caspi and Silva (1995) also categorized children according to their ratings across temperament dimensions. After rating behavioral observations of children during cognitive and motor tasks, Caspi and Silva used a cluster-analytic technique and a one-way ANOVA to examine their behavioral ratings. Children at age 3 were grouped into 5 categories: *undercontrolled*, *inhibited*, *confident*, *reserved*, and *well-adjusted*. Undercontrolled children were high on lack of control, irritability, and distractibility. Inhibited children were high on lack of control and sluggishness. Their item level ratings demonstrated inhibition in novel settings and social

reservation. Additionally, during observations, these children had difficulty sustaining attention and were highly distractible. Confident children were high in approach. During observations these children were particularly willing and eager to work on tasks and seemed to adjust to new situations quickly. Reserved children had high scores on sluggishness and were observed to be uncomfortable in the testing situation. In contrast to the inhibited children, this group did not have difficulty maintaining attention and their responses were not as extreme. Well-adjusted children were observed to demonstrate normative behaviors compared to their peers. For instance, these children were capable of controlling themselves, were self-confident, and did not become upset with difficult tasks.

McClowry's (2002) approach to grouping children by temperament used parent ratings of school-aged children on questionnaires. These questionnaires measured the dimensions of negative reactivity, task persistence, approach/withdrawal, and activity. The questionnaire ratings were then scored on the four dimensions and analyzed with factor analysis. Using this approach, McClowry came up with four categories: *high maintenance*, *industrious*, *social/eager to try*, and *cautious/slow to warm up*. High maintenance children were high in activity, high in negative reactivity, and low in task persistence. The mirror image of this category, according to McClowry, were industrious children who were low in activity, low in negative reactivity, and high in task persistence. Social/eager to try children were high in approach and low in negative reactivity. Cautious/slow to warm up children were high in withdrawal and high in negative reactivity. High maintenance and slow to warm up children were considered to be challenging, while industrious or social/eager children were "easy."

McClowry's (2002) temperament profiles identified 42% of the children in her study, with some children falling into both categories of challenging or easy temperament. Eight percent of children were identified as high maintenance only and another 8% were classified as cautious/slow to warm up. Six percent of children had both types of challenging temperaments; they were high maintenance and cautious/slow to warm up. Six percent of the children were industrious only, while 9% were social/eager to try. Four percent of children had both of these types of easy temperaments. McClowry noted in her research the parallels between her findings and those of Thomas and colleagues (1968). According to her, children who were high maintenance and slow to warm up were considered to have challenging temperaments, while children who were industrious or social/eager to try were regarded as easy. Specifically, McClowry saw distinct commonalities between her category of social/eager to try and the easy category, her cautious/slow to warm and the slow to warm up profile, and lastly her high maintenance and the difficult group.

McClowry's (2002) temperament profiles have changed in her more recent work. One of her latest publications examined the relationships between temperament, gender, and disruptive classroom behavior in school-aged children (McClowry, Rodriguez, Tamis-LeMonda, Spellman, Carlson, & Snow, 2013). In this study, McClowry and her colleagues conducted classroom observations and collected temperament ratings from teachers. McClowry and her colleagues found three temperament profiles in their analyses: high maintenance, intermediate, and industrious. Thirty seven percent of children in this study fell into the high maintenance category, 23% in the industrious group, and the other 40% of children were classified as intermediate. Both the high maintenance and the industrious groups were identical to the profiles found in McClowry (2002), which were derived from

parent reports. The intermediate group consisted of the children who were neither high maintenance or industrious. Neither the social/eager to try nor the cautious/slow to warm up categories were found in this study. Withdrawal, a characteristic of the cautious/slow to warm up group, was not a contributing component of the profiles. One explanation proposed by McClowry and colleagues was that teachers might not be as observant of withdrawal tendencies as they are of disruptive behavior.

There is considerable convergence among the various attempts to group children into temperament categories. McClowry (2002) pointed out the similarities between her findings and those of Thomas et al. (1968), remarking that her research provided support for their study. Examining the descriptions more closely, several dimensions align across all of these theorists. Specifically, the temperament profiles can be grouped into five distinct categories: two types of difficult children, two easy groups, and the slow to warm up category (see Table 2). Children in both Caspi and Silva's (1995) undercontrolled group and McClowry's high maintenance group are high in activity and negative mood. This fits part of Thomas and colleagues' description of the difficult child. Another type of difficult child is high in withdrawal, inhibited, and high in negative reactivity, represented by Caspi and Silva's inhibited group. Similarly, there appear to be two types of easy children that fit the descriptions of Thomas and colleagues' easy category. One group of easy children is represented by Caspi and Silva's confident and McClowry's social/eager to try categories. These children are high in approach, low in negative reactivity, and are willing and eager to work on tasks. The second type of easy children is depicted in Caspi and Silva's well-adjusted and McClowry's industrious groups. This category reflects children who are low in activity, low in negative reactivity, and are persistent with difficult tasks. Lastly, Thomas and

colleagues' slow to warm up group closely matches McClowry's cautious/slow to warm up group and Caspi and Silva's reserved category. Children in these groups have low intensity and activity and are withdrawing in new situations.

Previous research on the structure of temperament has focused mostly on scale items, identifying the factors of temperament among children. Few research studies have extended the temperament literature by categorizing children into different temperament groups based on their ratings across dimensions. In these studies, methods used to identify groups of children have varied. Thomas and colleagues (1968) used largely descriptive information from parent interviews. McClowry (2002) used survey data. Caspi and Silva used behavioral observations from a testing situation. The categories have been identified through both qualitative (Thomas et al., 1968) and quantitative analyses (Caspi & Silva, 1995; McClowry, 2002).

Though there is no "right" way to identify groups of children, in the current study I used parent questionnaire ratings of children's temperament and cluster analysis to identify groups of children with similar temperament characteristics. Cluster analytic techniques can be used to create groups of children who are most similar to one another based on their behavioral ratings across dimensions. Instead of showing the potential "overlap" between temperament profiles, as McClowry's (2002) study did, cluster analysis forms specific groups of children who share many characteristics with one another, but are very dissimilar to children in other groups. While Caspi and Silva's (1995) longitudinal study is very similar to the present study because of the analytic techniques used, their temperament data were based on observations during cognitive and motor assessment—a unique situation that is unfamiliar to most children and may not represent their typical behaviors. I used survey data,



because it is the most common method of assessing temperament, and it reflects parents' report of children's behavior across multiple situations, rather than in one particular setting.

The purpose of the present study is to identify quantitatively groups of children based upon their temperaments. Because of the convergence among temperament groupings reported by Thomas et al. (1968), Caspi and Silva (1995), and McClowry (2002) using different methodologies (see again Table 2), I expected to find five groupings of temperament that are similar to the profiles proposed by these theorists. First, I hypothesized that there would be a "difficult" group of children sharing characteristics of high activity and negative mood. Second, I hypothesized that there would be an additional "difficult" group sharing characteristics of high withdrawal, high intensity, and negative mood. Third, I hypothesized that there would be a group of "easy" children who are high in approach, low in intensity, have positive mood, and are willing and eager to work on tasks. Fourth, I hypothesized that there would be a second group of "easy" children who share characteristics of low activity, low intensity, positive mood, and persistence with difficult tasks. Fifth and finally, I hypothesized that there would be a group of children who are "slow to warm up" characterized by low intensity, low activity, and withdrawal in new situations.

## **Method**

### **Participants**

Parents of 85 children participated in this study. Approximately 46 of the children were female and 38 were male (one participant did not respond to this question). They ranged in age from 38 to 68 months and were attending either preschools or daycare centers in urban and rural areas of North Carolina and Tennessee. The majority of the children were

Caucasian (93%), and their parents were well-educated: 38.8% of the participating parents had a graduate or professional school degree, 31.8% had at least a bachelor's degree.

## **Materials**

The *Behavioral Style Questionnaire* (BSQ; McDevitt & Carey, 1978) is a parent rating scale developed for use with children 3 to 7 years of age. It is composed of 110 items describing specific behaviors that are rated on a Likert-type scale according to the frequency of occurrence (1 = *Almost Never* to 6 = *Almost Always*). The subscales in this questionnaire correspond to the nine dimensions of temperament classified by Thomas et al. (1968) in the New York Longitudinal Study (see Table 1). The standardization sample included 350 children aged 3 to 7 years, who were primarily European-American, of middle socioeconomic status, and resided in the eastern United States (*Carey Temperament Scales Test Manual*, 2000). Descriptive statistics and reliabilities for these scales in the current study are described in the Results section and in Table 3.

## **Procedure**

Parents of children in twelve preschools and daycare centers were recruited for participation in this study. Rural and urban populations were sampled from North Carolina and Tennessee. No individuals were excluded on the basis of other cultural characteristics. Written consent was obtained from the childcare directors to recruit parents and teachers for this research. Informed consent forms were then distributed to teachers of children ages 3 to 5. Teachers sent the forms home to parents and those that were interested returned the forms directly to the researchers in self-addressed, stamped envelopes. After consent was received, packets of questionnaires were then delivered to the preschool centers and sent home to

participating parents. Parents returned the completed packets in self-addressed, stamped envelopes. Participants were provided with small monetary compensation (\$10) per child from funds granted by Appalachian State University's Research Council.

## Results

### Descriptive Statistics

Means, standard deviations, correlation coefficients, and Cronbach's alphas for the BSQ scales are presented in Table 3. The data in the current study are largely consistent with those previously reported (*Carey Temperament Scales Test Manual*, 2000).). Using a Bonferroni corrected alpha of .006 ( $\alpha = .05 / 9$  tests), the current sample is higher in Rhythmicity (current  $M = 3.04$ , normative  $M = 2.75$ ;  $t = 4.311$ ,  $p < .001$ ) and is lower in Intensity (current  $M = 4.25$ , normative  $M = 4.52$ ;  $t = -4.802$ ,  $p < .001$ ), Mood (current  $M = 3.05$ , normative  $M = 3.31$ ;  $t = -3.669$ ,  $p < .001$ ), and Threshold (current  $M = 3.70$ , normative  $M = 3.85$ ;  $t = -4.64$ ,  $p < .001$ ) than the normative sample. There are no other statistically significant differences between the normative mean and the current sample mean for any other BSQ scales.

The internal consistency reliability coefficients in the current data ranged from .51 to .83 (see Table 3). These values—including the low reliability coefficients—are consistent with those presented in the test manual (*Carey Temperament Scales Test Manual*, 2000: ranging from .47 to .80) and those observed by previous authors (Gibbs, Reeves, & Cunningham, 1987; Hubert, Wachs, Peters-Martin, & Gandour, 1982; Scheier, Casten, & Fullard, 1995). Huelsman, Gagnon, Kidder-Ashley, and Griggs (2013) commented on the low reliabilities observed for BSQ scales, explaining that some scales may have been developed to produce a set of divergent items to assess the breadth of the constructs, as

opposed to a more homogenous set of items to measure a temperament characteristic. Behavioral manifestations of temperament may vary across time, context, and development. As such, the individual items on the BSQ temperament scales address the variety of behaviors that are reflected in each temperamental trait. For example, Huelsman and colleagues noted that while a child may demonstrate rhythmicity in regular eating and sleeping patterns, his or her bowel and bladder functions might be more inconsistent, yielding a lower index of internal consistency reliability.

In the current sample, girls and boys were reported as quite similar on the BSQ temperament scales. Using a Bonferroni corrected alpha of .006 ( $\alpha = .05 / 9$  tests), girls were rated as lower in Activity ( $M = 3.33, SD = .54$ ) than boys ( $M = 3.74, SD = .56$ ),  $t(82) = -3.38$ ,  $p = .001$ . No other scales were different for girls and boys; thus, gender is not examined in the following analyses.

### **Cluster Analysis**

A hierarchical cluster analysis was conducted using Ward's method with a squared Euclidean distance measure on the BSQ scale scores. I identified likely solutions by examining the agglomeration schedule coefficients (see Table 4). I noted that, as the initial clusters were separated into additional clusters, the coefficient for Stage 7 was considerably larger than in previous stages. Thus, I concluded that the best solution would comprise fewer than 7 clusters. I then examined the dendrogram (see Figure 1). Looking at the breaks between clusters—starting with fewer clusters—I determined that either 4 or 5 clusters were most appropriate. The steps between 1 and 2 clusters, between 2 and 3 clusters, between 3 and 4 clusters, and between 4 and 5 clusters were all noticeably larger than the step between 5 and 6 clusters. After qualitatively examining the data, I determined that the 5-cluster

solution was a better fit for the data than the 4-cluster solution. First, by examining the sample sizes from the 4 and 5 cluster solutions, I determined that the first cluster from the 4-cluster solution was split to form the fifth cluster. I then examined the means and standard errors of the BSQ subscales for meaningful differences (see Table 5). The 5-cluster solution had many notable differences (using a  $>1$  SD criterion) between the first and fifth clusters, and thus appeared to be the better option.

After adopting the 5-cluster solution, I converted the mean scale score (see Table 6) for each cluster into  $z$ -scores. According to the *Carey Temperament Scales Test Manual* (2000),  $z$ -scores can be more helpful in interpreting the BSQ scale scores. Scores greater than +1.0 are considered *high*; *average* scores are those between +1.0 and -1.0, and scores below -1.0 are *low*. These interpretations can be used in order to come up with “key words” that describe each cluster of temperament. Scores greater than 1.0 are the most helpful in understanding a child’s temperament, while scores that are less than 1.0 are less helpful (*Carey Temperament Scales Test Manual*, 2000). The cluster means for the 5-cluster solution are presented in Figure 1 and described in the Discussion.

### **Discussion**

The purpose of the present study was to place children into groups based on temperament using cluster analysis, a quantitative analytic technique that forms groups based on children’s similarities to one another across different dimensions of temperament. Much of the previous research in this area has used qualitative methods for grouping children into categories of temperament through parent interviews and other descriptive data. Few researchers have used quantitative methods to explore categories of temperament (McClowry, 2002; Caspi & Silva, 1995). Further, the present research utilizes a widely

accepted parent-report measure of temperament, the BSQ. While Caspi and Silva's (1995) study also used cluster analysis to determine categories of temperament, their data were collected from observations conducted during cognitive and motor assessments, a strange and uncomfortable situation for many children. In contrast, the present study used parent ratings from the BSQ (McDevitt & Carey, 1978), a questionnaire designed specifically to assess children's temperament and behavioral characteristics across multiple situations.

Based on the current temperament literature, I hypothesized that there would be five groups of children's temperament: two "difficult" groups, two "easy" groups, and one "slow to warm up" group. I identified a five-cluster solution for these temperament data and utilized  $z$ -scores to interpret BSQ scale scores as recommended in the *Carey Temperament Scales Test Manual* (2000). According to those recommendations, BSQ scale scores greater than  $z = 1.00$  and less than  $z = -1.00$  can be used to generate "key words" to describe each temperament cluster. Scores between  $+1$  and  $-1$  are considered unremarkable for the cluster and are not used in characterizing the children in the cluster.

Using these guidelines, children in Cluster 1 (approximately 9% of the current sample) can be described as having mild intensity, positive mood, low distractibility, and high threshold. These children do not have an intense or high energy response to stimuli, are generally pleasant, joyful, and friendly, are not easily diverted by environmental stimuli, and only react to a high amount of sensory stimulation. They are also more persistent with activities compared to children in other clusters. Because these children are characterized by high persistence and low distractibility, children in Cluster 1 can be described as *diligent*. Compared to previous research on the categories of temperament, these children most resemble the easy children identified by Thomas et al. (1968), the industrious category

described by McClowry (2002), and the well-adjusted children identified by Caspi and Silva (1995).

Children in Cluster 2 (approximately 19% of the current sample) are adaptable and have positive mood. These children tend to acclimate to change relatively easily and are also pleasant, joyful, and friendly. Additionally, they are more likely to approach new things and be more distractible than the other clusters of children. Children in Cluster 2 can be categorized as *interested*, because they are willing to try new things, enjoy new situations and people, and are not heavily focused in their activities. Cluster 2 is very similar to the categories of easy (Thomas et al., 1968), social/eager to try (McClowry, 2002), and confident (Caspi & Silva, 1995). Similar to my sample, children in these categories were characterized by high approach and positive mood. In addition, Caspi and Silva (1995) noted that children in their confident group seemed to adjust to new situations quickly, suggesting that they would also be more adaptable to change, similar to my interested group. Because the interested group of children is higher on distractibility, they are more similar to McClowry's (2002) social/eager to try category than her industrious group.

Children in Cluster 3 (approximately 40% of the current sample) do not have notably high or low scores; these children score at or about the mean across all BSQ temperament dimensions. Children in Cluster 3 can be described as *moderate*, because they have neither high nor low levels of activity, rhythmicity, approach, adaptability, intensity, mood, persistence, distractibility, or threshold. Cluster 3 may be similar to McClowry's intermediate category, which was described as being neither high maintenance or industrious.

Children in Cluster 4 (approximately 12% of the current sample) are arrhythmic and non-adaptable and have a markedly negative mood. Additionally, compared to the other

clusters, these children are higher in activity. Children in this cluster have irregularity in their bodily functions (eating, sleeping, toileting), do not adapt well to new situations, tend to display more unpleasant moods, and are more energetic. Children in Cluster 4 can be characterized as *difficult*. This cluster is most similar to the difficult children identified by Thomas et al. (1968), the high maintenance category from McClowry's (2002) study, and the undercontrolled group described by Caspi and Silva (1995). These groupings and categories all characterize the difficult child as displaying high activity and negative mood.

Lastly, Cluster 5 (approximately 20% of the current sample) is composed of children who have mild intensity, positive mood, high threshold, and are non-persistent. These children do not persist in activities, but they are pleasant, joyful, and friendly and do not have an intense or high-energy response to stimuli. Children in Cluster 5 are *disengaged*. In contrast to the interested children in Cluster 2, children in Cluster 5 are markedly non-persistent and often lose interest in the activities in which they engage. Although they generally have a positive mood, these children do not have much interest in pursuing activities and do not seem to observe or respond to changes in their environment. Children in this cluster seem to be somewhat disconnected from their surroundings because they have low persistence and high threshold. These children do not match previous categories of temperament and are quite the opposite of the industrious child described by McClowry and colleagues (2002).

Taken together, these results confirm the hypothesis that there would be five groups; however, the characteristics of each observed cluster are somewhat different from what I hypothesized (see Table 7). I predicted that there would be two difficult groups: one group of children who are high in activity and negative mood and one group of children who are high



in withdrawal, intensity, and negative mood. Instead, I found one difficult group of children who were arhythmic and non-adaptable and had negative mood. I predicted that there would be two easy groups: one group of children who are low in intensity, have positive mood, and are willing and eager to work on tasks and one group characterized by low activity, low intensity, positive mood, and high persistence. However, all four of the other clusters of children are relatively easy. The diligent group is characterized by mild intensity, positive mood, low distractibility, and high threshold. These children have similar characteristics to my first hypothesized “easy” group. Interested children are adaptable and have positive mood. The moderate group consists of children who have neither high or low scores across the dimensions. Finally, disengaged children have mild intensity, positive mood, are non-persistent, and have a high threshold. Additionally, I predicted that there would be a group of children who were “slow to warm up,” who would have low intensity, low activity, and high withdrawal. My analyses did not identify such a group.

A major strength of this study is that it integrates previous findings of the categories of temperament. Through my own analysis, I have found four areas that converge with the findings in previous research: the difficult, diligent, interested, and moderate groups of children. In one regard—the identification of the disengaged group—my findings diverge from those of previous studies. Overall, my findings suggest that there is an emerging order by which we might understand children’s temperament (see Table 7). Additionally, the methods of this study in particular are strong, because the data were collected through parent ratings on the BSQ scales and analyzed with cluster analysis. While past studies have used qualitative methods for categorizing children based on parent interviews and descriptive data, this study adds to the limited quantitative research on temperament. Cluster analysis

quantitatively forms groups of children that are most similar to one another and are dissimilar from other groups. Unlike Caspi and Silva (1995), who also used cluster analysis, I used data obtained from parent ratings on the BSQ scales. Because the children in this sample are preschool-aged, their parents are the best raters of their behaviors, because they can make judgments about their children's characteristics across multiple settings and times.

While my study has strong methodology, there are some limitations. The sample size was relatively small ( $N = 85$ ) and consists of mostly Caucasian children with well-educated parents. Because cluster analytic techniques are dependent on the characteristics and size of the sample, this likely has an impact on my findings. Additionally, it may be harder to compare this study of preschool aged children to studies, such as McClowry's (2002), that examined temperament characteristics of school-aged children. While many of the categories I identified shared similarities with McClowry's findings, the children's age may be an important factor to consider, as it likely influences many of the BSQ dimensions. There is a great need for further research on the categories of temperament, and future research could benefit from conducting this study with a larger, more representative sample of children in order to confirm this emerging grouping of children according to their similarities in temperament.

It would also be useful to conduct a longitudinal study, examining clusters of children and their outcomes over time. Specifically, it would be interesting to gather information about whether clusters of children change characteristics over time or are stable across childhood. This information would advance our understanding of temperament categories as well as the developmental trajectories of children. As temperament is influential throughout our lives, future research should examine academic, behavioral, and social outcomes for

specific clusters of children. This could aid in our identification of “at risk” students for academic problems, delinquency, mental health issues, and poor relationships with others. Additionally, this information could also help to identify gifted children and inform interventions in the field as well as ways to foster positive outcomes for specific groups of children. While research has connected temperament characteristics to academic, behavioral, and social outcomes, it has not investigated the outcomes for children in these various temperament clusters.

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Table 1.

*Description of Temperament Dimensions by Theorist*

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Buss and Plomin (1984)

1. **Emotionality:** the tendency to become upset easily and intensely
  2. **Activity:** the frequency, duration, and intensity of activities and individual will choose
  3. **Sociability:** the preference for being with others or alone
- 

## Goldsmith (1996)

1. **Activity level:** movement during a variety of situations
  2. **Pleasure:** smiling, laughter, and other positive or playful responses.
  3. **Social Fearfulness:** inhibition, distress, withdrawal, or signs of shyness in novel social situations
  4. **Anger Proneness:** crying, protesting, hitting, pouting, or other signs of anger in conflict situations.
  5. **Interest/Persistence:** duration of task engagement
- 

## Rothbart (1981)

1. **Activity level:** the level of gross motor activity
2. **Approach; positive anticipation:** the amount of excitement and positive anticipation for activities
3. **High-intensity pleasure:** the amount of pleasure or enjoyment related to situations involving high stimulus intensity
4. **Impulsivity:** the speed of response
5. **Shyness:** slow or inhibited approach to novel or uncertain situations.
6. **Smiling and Laughter:** amount of positive affect in response to changes in stimulus
7. **Anger/frustration:** the amount of negative affect related to interruption of ongoing tasks or goal blocking
8. **Discomfort:** amount of negative affect related to sensory stimulation
9. **Falling reactivity and soothability:** rate of recovery from distress, excitement, or arousal
10. **Fear:** amount of negative affect including unease, worry, or nervousness
11. **Sadness:** amount of negative affect and lowered mood and energy
12. **Attentional focusing:** tendency to maintain focus on tasks
13. **Inhibitory control:** the ability to plan and suppress approach responses under instructions or in uncertain situations
14. **Low-intensity pleasure:** amount of pleasure or enjoyment from situations involving low stimulus intensity
15. **Perceptual sensitivity:** amount of detection of slight, low-intensity stimuli from the environment

Table 1. continued

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 Thomas Chess and Birch (1968)

1. **Activity Level:** the level, tempo, and frequency of motor skills
  2. **Rhythmicity:** the degree of regularity of body functions, which includes rest and activity, sleeping and waking, eating and appetite, and bowel and bladder functions
  3. **Approach or Withdrawal:** the child's initial reaction to new stimulus
  4. **Adaptability:** responses a child makes to new or altered situations after time
  5. **Intensity of Reaction:** the amount of energy in the child's response to external stimuli, preelimination straining, hunger, repletion, new foods, attempts to control, restraint, diapering and dressing, bath, and play and social contacts
  6. **Threshold of Responsiveness:** the level of extrinsic stimulation (sensory stimuli, environmental objects, social contact) that is necessary to stir up a response
  7. **Quality of Mood:** the amount of pleasant, joyful, friendly behavior and the amount of unpleasant, crying, unfriendly behavior
  8. **Distractibility:** the effectiveness of environmental stimuli in interfering or altering the ongoing behavior
  9. **Attention Span and Persistence:** the length of time an activity is pursued and the maintenance of an activity in the presence of obstacles
-

Table 2.

*Temperament Profiles by Theorist*

<b>Thomas Chess and Birch (1968)</b>	<b>McClowry (2002)</b>	<b>Caspi and Silva (1995)</b>
	High Maintenance	Undercontrolled
Difficult <i>High intensity; negative mood</i>	<i>High activity; high negative reactivity</i>	<i>High lack of control; high irritability; high distractibility</i>
		Inhibited
		<i>High lack of control; high sluggishness; social reservation</i>
	Social/Eager to try	Confident
Easy <i>Positive mood; positive approach</i>	<i>High approach; low negative reactivity</i>	<i>High approach; willing and eager to work on tasks</i>
	Industrious	Well-adjusted
	<i>Low negative reactivity; high task persistence</i>	<i>Self confident; not upset by difficult tasks</i>
Slow to Warm Up	Cautious/Slow to warm	Reserved
<i>Low intensity; withdrawing</i>	<i>High in withdrawal; high negative reactivity</i>	<i>High sluggishness; uncomfortable in testing situation; no difficulty sustaining attention</i>
	Intermediate	
	<i>Neither high maintenance or industrious.</i>	

Table 3.

*Descriptive Statistics for the BSQ Scales*

BSQ Scale	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Activity	.70								
2. Rhythmicity	.16	.55							
3. Approach	.02	-.01	.73						
4. Adaptability	.50	.31	.44	.83					
5. Intensity	.38	.01	.18	.32	.66				
6. Mood	.46	.17	.47	.70	.51	.75			
7. Persistence	.38	.28	.09	.34	-.26	.09	.66		
8. Distractibility	-.19	.01	-.20	-.34	.07	-.27	-.09	.68	
9. Threshold	.06	-.05	.14	.04	.45	.23	-.12	.43	.51
<i>Mean</i>	3.51	3.04	3.14	2.62	4.25	3.05	3.02	3.71	3.70
<i>SD</i>	.58	.63	.73	.73	.52	.65	.64	.62	.55

*Notes.* Entries on the main diagonal are Cronbach's internal consistency reliability estimates. Correlations greater than approximately .18 are statistically significant,  $p \leq .05$ .

Table 4.

*Agglomeration Schedule of Clusters 1-7*

Stage	Cluster 1	Cluster 2	Coefficients
1	49	68	.254
2	28	72	.528
3	30	79	.809
4	50	80	1.104
5	22	30	1.415
6	58	75	1.732
7	23	57	2.079

Table 5.

*Cluster Comparisons Between Mean BSQ Scales.*

	Act	Rhy	Appr	Adapt	Intensity	Mood	Pers	Dist	Thresh
<b>Cluster 1</b>									
Mean	2.88	2.72	3.37	2.00	3.85	2.59	2.44	3.19	3.27
<i>N</i>	8	8	8	8	8	8	8	8	8
<i>SD</i>	.43	.44	.60	.24	.27	.54	.32	.33	.40
Std. Error	.15	.16	.21	.08	.10	.19	.11	.12	.14
<b>Cluster 5</b>									
Mean	3.54	3.27	2.66	2.53	3.75	2.56	3.56	3.48	3.25
<i>N</i>	17	17	17	17	17	17	17	17	17
<i>SD</i>	.51	.50	.73	.47	.56	.36	.49	.53	.45
Std. Error	.12	.12	.18	.11	.14	.09	.19	.13	.11

*Notes.* Act = Activity; Rhy = Rhythmicity; Appr = Approach; Adapt = Adaptability; Pers = Persistence; Dist = Distractibility; Thresh = Threshold.

Table 6.

*Descriptives of Mean BSQ Scales by Cluster*

	Act	Rhym	App	Adapt	Intensity	Mood	Persist	Distr	Thresh
<b>1</b> Mean	2.88	2.72	3.37	2.00	3.85	2.59	2.44	3.19	3.27
N	8	8	8	8	8	8	8	8	8
SD	.43	.44	.60	.24	.27	.54	.32	.33	.40
<b>2</b> Mean	3.16	2.64	2.50	1.79	4.25	2.53	2.61	4.43	3.91
N	16	16	16	16	16	16	16	16	16
SD	.48	.70	.51	.33	.38	.42	.53	.40	.43
<b>3</b> Mean	3.62	3.02	3.52	2.86	4.43	3.36	3.02	3.75	3.92
N	34	34	34	34	34	34	34	34	34
SD	.38	.50	.58	.47	.33	.40	.42	.54	.49
<b>4</b> Mean	4.19	3.64	3.46	3.83	4.78	4.03	3.28	3.25	3.73
N	10	10	10	10	10	10	10	10	10
SD	.70	.69	.54	.27	.51	.25	.97	.39	.60
<b>5</b> Mean	3.54	3.27	2.66	2.53	3.75	2.56	3.56	3.48	3.25
N	17	17	17	17	17	17	17	17	17
SD	.51	.50	.73	.47	.56	.36	.49	.53	.45

*Notes:* Act = Activity; Rhym = Rhythmicity; App = Approach; Adapt = Adaptability; Persist = Persistence; Distr = Distractibility; Thresh = Threshold.



Table 7.

*Temperament Profiles by Theorist, Including Current Analyses*

<b>Thomas Chess and Birch (1968)</b>	<b>McClowry (2002)</b>	<b>Caspi and Silva (1995)</b>	<b>Dagenbach (2015)</b>
Difficult  <i>High intensity; negative mood</i>	High Maintenance	Undercontrolled	Difficult
	<i>High activity; high negative reactivity</i>	<i>High lack of control; high irritability; high distractibility</i>	<i>Arythmic; low adaptability; negative mood; high activity</i>
Easy  <i>Positive mood; positive approach</i>		Inhibited	
		<i>High lack of control; high sluggishness; social reservation</i>	
	Social/Eager to try	Confident	Interested
	<i>High approach; low negative reactivity</i>	<i>High approach; willing and eager to work on tasks</i>	<i>High adaptability; positive mood; high approach; high distractibility</i>
	Industrious	Well-adjusted	Diligent
	<i>Low negative reactivity; high task persistence</i>	<i>Self confident; not upset by difficult tasks</i>	<i>Positive mood; high persistence; low distractibility</i>
			Disengaged
			<i>Positive mood; low persistence; high threshold</i>
Slow to Warm Up  <i>Low intensity; withdrawing</i>	Cautious/Slow to warm	Reserved	
	<i>High in withdrawal; high negative reactivity</i>	<i>High sluggishness; uncomfortable in testing situation; no difficulty sustaining attention</i>	
	Intermediate		Moderate
	<i>Neither high maintenance or industrious</i>		<i>Neither high or low scores across dimensions</i>

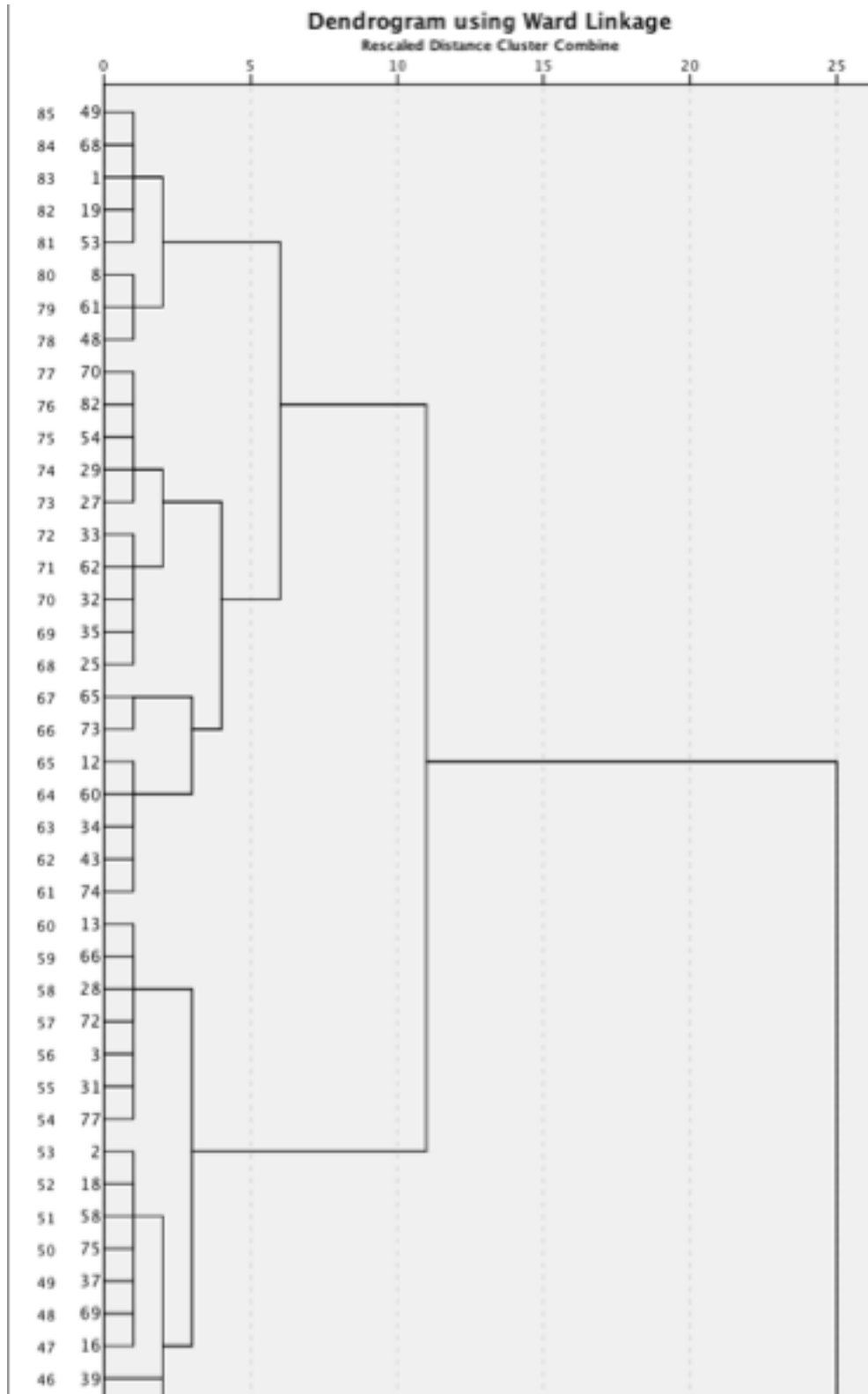


Figure 1. Dendrogram of cluster analysis

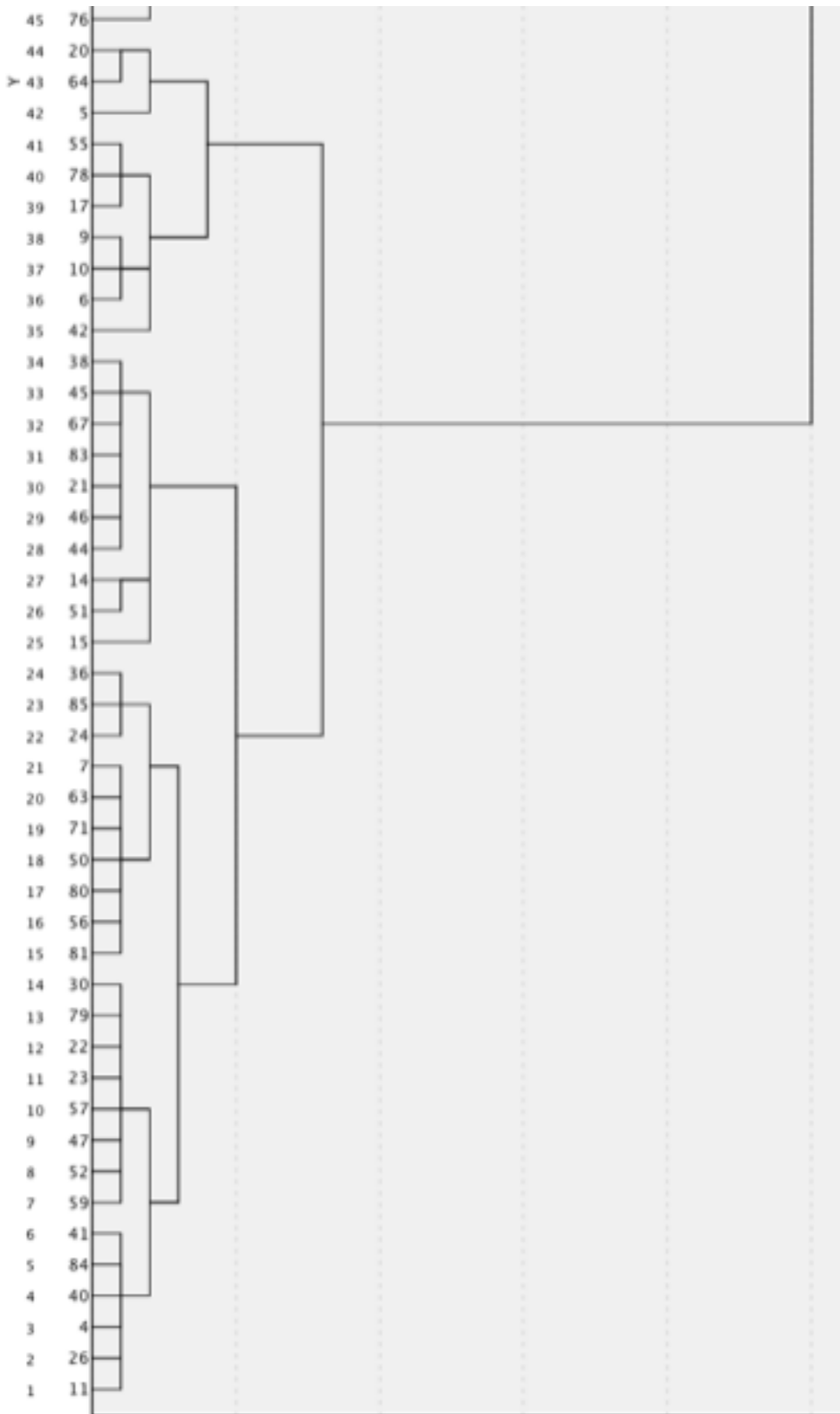


Figure 1. Dendrogram of cluster analysis continued

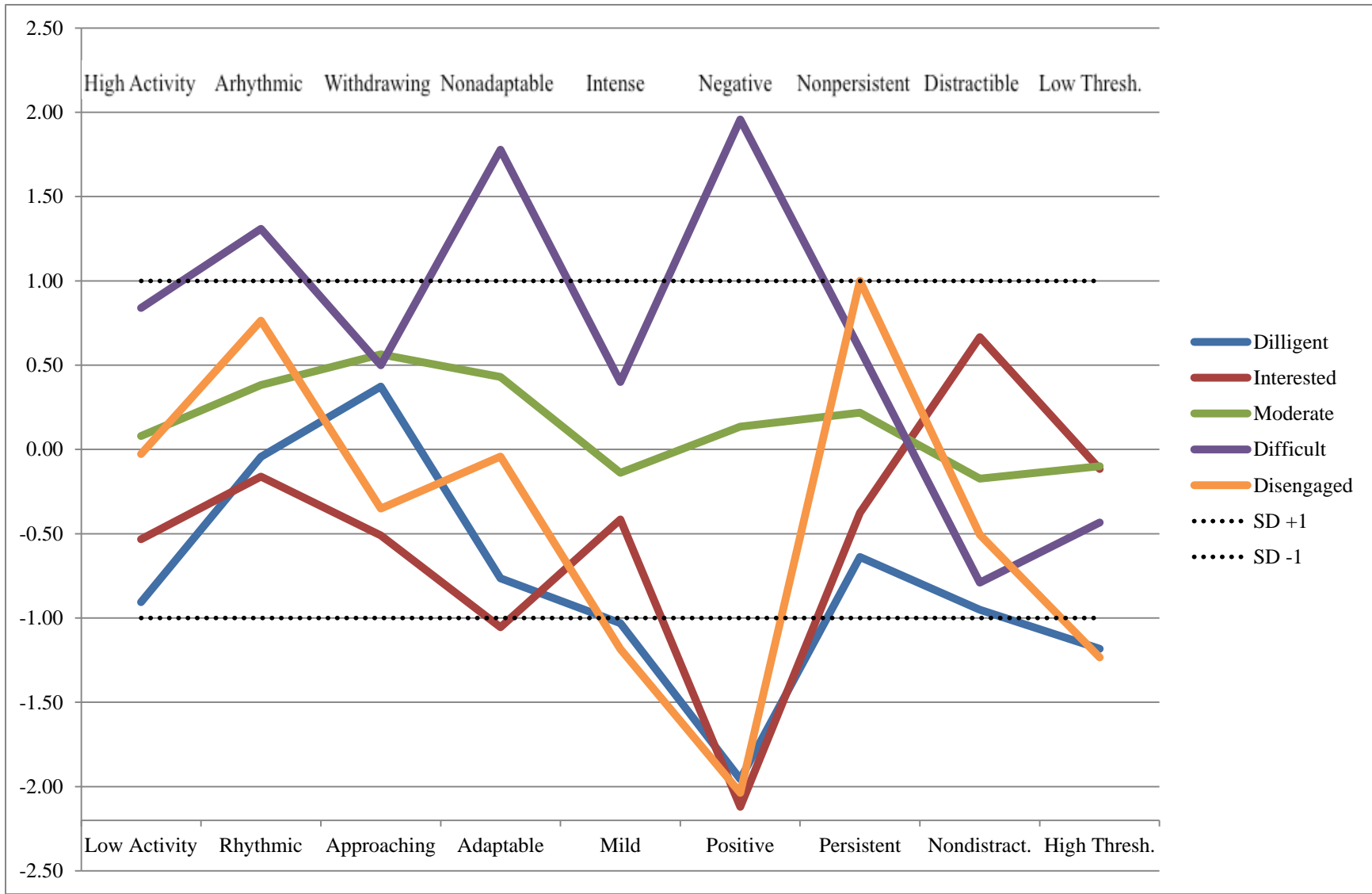


Figure 2. Mean BSQ scale scores by cluster. This figure illustrates the mean ratings for each of the BSQ scale scores for children in each cluster.

**Vita**

Jana Dagenbach was born in Lancaster, Pennsylvania to Linda and Dale Dagenbach. She attended school at the University of North Carolina at Chapel Hill from 2007-2011 and earned her Bachelor of Art degree with a major in psychology. Jana went on to continue her education at Appalachian State University in 2013 and received her Master of Arts and Specialist degree in School Psychology in 2015. She currently works in Onslow County schools as a school psychologist intern and plans on continuing her work in the field in North Carolina schools after obtaining licensure this summer.