ABSTRACT

Title of Document: THE DEVELOPMENT OF THE CHILDREN'S BEHAVIOR QUESTIONNAIRE, TEACHER VERSION (CBQ-T)

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Information is provided about the development of a teacher version of the Children's Behavior Questionnaire Short Form (CBQ Short Form; Putnam & Rothbart, 2006). The CBQ Short Form, designed for caregivers, was modified by changing the item wording for the preschool classroom and is termed the CBQ, Teacher Version (CBQ-T). Both measures were administered to the caregivers and teachers of preschoolers ages 3 to 6 years. The CBQ-T was found to be as reliable as the CBQ Short Form with two scales falling short of adequate internal consistency. Few correlations were found between parents and teachers in accord with literature documenting low to moderate agreement between the two raters. Several temperament scales were correlated with age for parents and teachers, none were correlated with gender as rated by parents, and several were correlated with gender as rated by teachers. Further validation of the CBQ-T with varying populations would be beneficial.

THE DEVELOPMENT OF THE CHILDREN'S BEHAVIOR QUESTIONNAIRE, TEACHER VERSION (CBQ-T)

By

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Chapter 1: Introduction

Temperament

Temperament is defined as the biologically-based dimensions of individuality that influence outcomes throughout development by shaping how one engages with his or her environment (Rothbart & Bates, 1998; Rothbart, Ahadi, & Evans, 2000). Other researchers have described temperament predispositions as heritable, appearing early in life, and remaining relatively stable over time, yet their expression is still influenced by maturation, experience, and environment (Rothbart, 1989; Rothbart & Derryberry, 1981; for a review, see Teglasi, 2006). The factors that have emerged from children's temperament research have shown strong conceptual similarity with the Big Five of adult personality (Shiner, 2010).

Various theoretical perspectives related to temperament have evolved over time and are currently debated, as well as the psychometric properties and conceptual value of measures (see review, Teglasi, 1998). Thomas, Chess, Birch, Hertzig, and Korn (1963) found nine dimensions of temperament in their famous New York Longitudinal Study (NYLS) of infants, during which they interviewed parents about their infants' behavior in different contexts. Thomas, Chess, and Birch (1968) inductively sorted the reported behaviors into the nine dimensions of Activity Level, Approach/Withdrawal, Adaptability, Mood, Threshold, Intensity, Distractibility, Rhythmicity, and Attention Span/Persistence. These dimensions are based on infants 2 to 6 months of age, and thus do not incorporate temperamental aspects that develop later than early infancy (Rothbart, et al., 2000). Additionally, the NYLS dimensions came about for clinical purposes without an initial conceptual framework in place, causing research based on the Thomas

and Chess model to show less temperamental variability than originally thought (Rothbart, et al., 2000; see reviews by Martin, Wisenbaker, & Huttunen, 1994; Rothbart & Mauro, 1990; Sanson, Smart, Prior, Oberklaid, & Pedlow, 1994).

Through a different approach, Buss and Plomin (1975, 1984) developed their Emotionality-Activity-Sociability (EAS) approach by creating a list of temperament dimensions based on early appearance and heritability. Rowe and Plomin (1977) combined a selected set of items from the NYLS and EAS measures and administered them to a sample of children ages 1 to 6 years. Through an item-level factor analysis, the dimensions of Emotionality, Soothability, Activity Level, Attention Span, and Sociability were found.

In a third approach, Rothbart, Ahadi, Hershey, and Fisher (2001) have consistently found three broad dimensions of temperament including Surgency/Extraversion, Negative Affectivity, and Effortful Control through their work with the Children's Behavior Questionnaire (CBQ) given to caregivers, which is later discussed in greater detail.

Measuring Temperament

Questionnaires are the most common approach to assessing temperament due to its ease and low-cost (Teglasi, 1998). Parents of children are considered to be good informants due to their vested interest in closely observing their child on a daily basis as well as their ability to report on subtleties of behavior that many not be observable by others. However, inadequacy in parent questionnaires has been criticized for a number of reasons including systematic bias due to individual differences in the parent and their differences in interpretation of behaviors and questionnaire items. Also, lack of a

normative reference point has been problematic in parent ratings. A parent with limited experience with other children besides their own may have difficulty making accurate judgments about particular behaviors (Rothbart & Bates, 1998; Rothbart & Goldsmith, 1985). Low agreement between parent report and standard laboratory observations has been typical with findings in the .20 to .40 range (Bornstein, Gaughran, & Segui, 1991).

Teachers are also considered to be a strong source of information regarding children's temperament due to their daily interaction with the child and their distinct position to view children in a more structured context with peers that requires more demands on the child. Agreement between informants tends to be low and each perspective provides a unique source of information.

Examining studies that measure temperament in preschoolers and compare informant ratings are summarized in Chapter Two and will help clarify how other researchers in the field are measuring preschoolers' temperament and how they make sense of informant ratings.

Research Questions

The remaining chapters will outline the conceptualization of temperament in preschoolers, specifically Rothbart's approach to temperament. They will also detail the measurement of temperament, particularly with more than one rater. The overall research question addresses the psychometric properties of the newly developed Children's Behavior Questionnaire-Teacher Form (CBQ-T) and how it compares to the original CBQ Short Form (Putnam & Rothbart, 2006). This question will be addressed by examining the following sub-questions: (1) What are the internal consistencies (reliability) and correlations (convergent validity) of the parent and teacher responses on

the CBQ and CBQ-T?; (2) Are there any recommendations for CBQ-T scale revisions based on the findings?; (3) Are there age and gender differences on the CBQ and CBQ-T? The specifics of data analysis will be further detailed in Chapters 3 and 4.

Chapter 2: A Review of the Literature

Rothbart's Approach to Temperament

Conceptualization.

Rothbart and Derryberry (1981) define temperament as the emotional, motor, and attentional reactivity measured by latency, intensity, and recovery of response, and self-regulation processes such as effortful control that modulate reactivity. Rothbart et al. (2001) note that much previous work on temperament had been restricted to distinctive styles of behavioral response (e.g., Buss & Plomin, 1975; Thomas & Chess, 1977). They also assert that, similar to Allport's (1937) view, temperament has been viewed as an individual's affective qualities, such as emotional reactivity (Rothbart, et al., 2001). This emphasis on the emotions has led to research on the understanding of primary emotion (Izard, 1977), such as positive and negative emotionality but Rothbart and her colleagues have challenged the idea that temperament processes are entirely synonymous with affective processes (Rothbart, 1981, 1989; Rothbart, et al., 2000; Rothbart & Derryberry, 1981; Rothbart & Posner, 1985).

Temperament is also influenced by maturation, experience, and environment (for review, see Teglasi, 2006). For instance, fear does not emerge until about 6 to 7 months of age, executive attention and self-regulation are not seen until about 10 to 12 months of age, and the executive system undergoes rapid development in the toddler and preschool years (Posner & Rothbart, 1998; Rothbart, 1998; Rothbart, et al., 2001). Rothbart et al. (2001) anticipated that temperamental characteristics seen in infancy, as well as adulthood, would be present at the preschool age. Therefore, the CBQ was designed to

measure temperamental constructs “upward in age from the Infant Behavior Questionnaire (IBQ; Rothbart, 1981) and downward in age from the Physiological Reactions Questionnaire (PRQ) developed” to measure adult temperament (Rothbart, Derryberry, & Hershey, 2000).

Overall, the CBQ was designed by Rothbart et al. (2001) to assess constitutionally-based temperament, individual differences in reactivity, and self-regulation. Rothbart et al. (2001) differ from previous approaches due to their addition of reactivity and self-regulation as central constructs of temperament. Rothbart et al. (2001) described constitutionally-based temperament to mean “the individual’s relatively enduring biological make-up, influenced over time by heredity, maturation, and experience” (p. 1395; Rothbart, 1989; Rothbart & Derryberry, 1981). Reactivity points to the arousability of motor, affective, and sensory response systems (Rothbart & Derryberry, 1981), and self-regulation refers to the processes that modulate reactivity, such as attentional focusing and inhibitory control (Rothbart, et al., 2001). This framework put forth by Rothbart et al. (2001) provided a view of temperamental variability that assesses the individual differences in positive emotional reactivity (smiling/laughter, pleasure), negative emotional reactivity (fear, distress, sadness), self-regulation (including attention), activity, behavioral inhibition (fear or shyness), and inhibitory control. Rothbart et al. (2001) further defined this framework based on their work with the CBQ to three broad dimensions: effortful control, negative affectivity, and extraversion/surgency.

Effortful Control.

The construct of effortful control (EC) surfaced from psychometric studies of

caregiver reports as well as laboratory studies (Rothbart & Bates, 2006). EC describes children's ability to plan, choose an action when conflicted, and notice errors (Rothbart, 2007). EC has been linked to several developmental outcomes, including behavior problems.

EC is related to self-regulation and executive attention, involves specific genes, and has been identified in imaging studies (Posner, Rothbart, & Sheese, 2007; Rothbart, 2007). EC is an attentional control system that allows for the flexible inhibition of an action, facilitation of a new action, the detection of errors, and planning. Based on laboratory tasks, EC develops most prominently in the preschool years. By 30 months, consistency is seen in performance across tasks, which is followed by the stability of EC into the school years (Rothbart, 2007; Kochanska, Murray, & Harlan, 2000).

EC has also been found to positively predict the development of conscience (Kochanska, et al., 2000), as well as empathy, guilt, and low aggression (Rothbart, 2007). It is thought that EC contributes to the development of empathy as it provides the attentional flexibility required to react to others' negative feelings without becoming too overwhelmed by them (Rothbart, 2007). Furthermore, EC influences conscience in the ability to relate such feelings to the sense of responsibility for one's own actions (Rothbart, 2007).

Low EC is consistently found to be a strong predictor of externalizing problems, but less so for internalizing problems (Rothbart, 2007). EC also moderates the effects of negative affectivity, as highly negative children are less likely to exhibit problems when they have more EC (Rothbart & Bates, 2006; Rothbart & Posner, 2006). Research on attention systems, particularly those related to executive and effortful control, suggests

individual differences in self-regulation as a basic component of temperament and is measured by the CBQ (Rothbart, et al., 2001).

The CBQ defines EC based on four scales (Rothbart, 2007). The first scale, attentional focusing, is the capacity to focus and shift attention when desired. It is the same dimension as the Attention Span/Persistence scale on the NYLS and Duration of Orienting on the IBQ (Rothbart, et al., 2001). Attentional Focusing and Attentional Shifting are highly intercorrelated (Derryberry & Rothbart, 1988), but Rothbart et al. (2001) note that, when combined, the two scales did not hold together in an item analysis. Thus, only items for Attentional Focusing are included in the CBQ because the item analysis did not produce enough items for the Attentional Shifting scale (Rothbart, et al., 2001). Second, inhibitory control is the capacity to plan future action and suppress inappropriate reactions. Inhibitory control develops after early infancy and is not assessed on the NYLS or IBQ (Rothbart, et al, 2001). However, it is included on the PRQ (Derryberry & Rothbart, 1988) and is appropriate to assess for the CBQ age range (ages 3-7 years; Rothbart, et al., 2001). Third, perceptual sensitivity refers to the detection or perceptual awareness of slight, low-intensity stimulation. It is measured on the NYLS as Threshold and the PRQ as External Sensitivity (Rothbart, et al., 2001). It is also related to the attentional systems of orienting (Posner & Raichle, 1994; Rothbart, et al., 2001). Fourth, low intensity pleasure is the pleasure drawn from activities or stimuli that have low intensity, rate, complexity, novelty, and incongruity. It is also assessed on the PRQ (Derryberry & Rothbart, 1988).

The CBQ was designed to assess temperament based on differences in reactivity and self-regulation, and Rothbart et al. (2001) view the dimension of effortful control as a

self-regulatory aspect of temperament, as self-regulation encompasses one's attentional focusing and inhibitory control.

Negative Affectivity.

Anger and frustration have been found to predict both internalizing and externalizing problems. However fear is more strongly related to internalizing problems whereas anger tends to be related to externalizing problems (Rothbart, 2007). The CBQ includes five scales in the negative affectivity dimension (Rothbart, 2007). First, anger/frustration is the negative affect related to interruption of ongoing tasks or goal blocking. Anger/frustration has been labeled as a primary emotion (Izard, 1977) and is related to approach-anticipation as the strength of expectation of reward and to aggressive self-regulation (Rothbart & Bates, 1998; Rothbart, et al., 2001). It is included as part of the Emotionality construct in the EAS, Mood construct in the NYLS, and the same construct is labeled Distress to Limitations in the IBQ (Rothbart, et al., 2001). Second, fear is related to the anticipation of distress. It is included in the Emotionality dimension of the EAS and is measured on the IBQ as a Fear dimension. Fear also corresponds to the Withdrawal pole of the NYLS Approach-Withdrawal dimension and has been identified as a primary emotion (Izard, 1977; Rothbart, et al., 2001). Third, discomfort is related to the sensory qualities of stimulation, including intensity, rate, or complexity of light, movement, sound, or texture. Discomfort corresponds to the primary emotion of distress (Izard, 1977). Fourth, sadness is the lowered mood and energy related to exposure to suffering, disappointment, and object loss. It is not assessed in the IBQ or other infant and child measures, though it is measured in the PRQ and is considered a primary emotion (Izard, 1977; Rothbart, et al., 2001). Fifth, falling reactivity/soothability

is the rate of recovery from peak distress, excitement, or general arousal. This dimension is also assessed in the IBQ as Soothability, though it is not usually assessed in infant scales (Rothbart, et al., 2001). In terms of reactivity and self-regulation, Rothbart et al. (2001) view the dimension of negative reactivity as emerging from the motor, affective, and sensory response systems. In addition, they view it in relation to self-regulation because it serves as a process that modulates reactivity and regulates one's arousal.

Extraversion/Surgency.

Extraversion/surgency is related to greater externalizing problems and to fewer internalizing problems (Rothbart, 2007). The CBQ defines extraversion/surgency based on six scales (Rothbart, 2007). First, activity level encompasses gross motor activity including the rate and extent of locomotion. It is widely measured by temperament researchers, including questionnaires based on the NYLS (i.e., McDevitt & Carey, 1981), the EAS, and the IBQ. Second, shyness is behavioral inhibition related to novelty and challenge, especially those that are social. It corresponds to one dimension of Kagan and colleagues' behavioral inhibition construct (Kagan, Reznick, & Snidman, 1988; Rothbart & Mauro, 1990; Rothbart, et al., 2001). Third, high-intensity pleasure refers to activities involving high intensity or novelty. It is measured on the PRQ (Derryberry & Rothbart, 1988; Rothbart, et al., 2001), and appears to compare to Zukerman's (1979, 1990) sensation-seeking construct (Rothbart, et al., 2001). Fourth, smiling and laughter is the positive affect that results in response to changes in stimulus intensity, rate, complexity, and incongruity. It is not assessed in the EAS, but seems to relate to the positive pole of the NYLS Mood dimension. It is assessed in the IBQ (Rothbart, 1981), and Rothbart et al. (2001) expected it to be related to the primary emotion of joy (Izard, 1977). Fifth,

impulsivity is the speed of response initiation. Impulsivity was originally included in Buss and Plomin's (1984) EASI (Emotionality-Activity-Sociability-Impulsivity), which was the precursor to the EAS. However, they later removed the dimension from the EAS due to the lack of evidence for its heritability (Rothbart, et al., 2001). Rothbart et al. (2001) include it as part of the CBQ because they have found it to be an important part of the construct of approach in their other laboratory work and it is included in other theoretical models (see review by Rothbart, Derryberry, & Posner, 1994). Sixth, positive anticipation is the positive excitement for expected pleasurable activities. It is assessed in the NYLS through the Approach pole on the Approach/Withdrawal dimension in relation to novel situations (Rothbart, et al., 2001). It is not assessed on the EAS or IBQ, but is assessed on the adult PRQ (Rothbart, et al., 2001). Positive anticipation also corresponds to Gray's (1982, 1987), Panskepp's (1982, 1998), and Depue and colleagues' (Depue & Collins, 1999; Depue & Iacono, 1989) dimensions in their biological models of temperament (see review by Rothbart, et al., 1994; Rothbart, et al., 2001).

Rothbart et al. (2001) view the dimension of extraversion/surgency in relation to both reactivity and self-regulation. Extraversion/surgency emerges from one's motor, affective, and sensory response systems. Additionally, self-regulation serves to modulate one's arousal, including extraversion/surgency.

Rothbart's Generation of Items.

Based on their previous work (Capaldi & Rothbart, 1992; Derryberry & Rothbart, 1988) and the work of Fiske (1966, 1971), Rothbart et al. (2001) "rationally generated [items on the CBQ] to assess theoretically derived temperament dimensions" that reflect central constructs of temperament based on modern theory (p. 1394). The central

constructs of emotional reactivity, arousability, and self-regulation were "further decomposed into subconstructs" and items were generated to reflect them (p. 1394). In other words, Rothbart et al. (2001) uniquely identified temperamental constructs and then used them to create related items, which is described as a bottom-up approach to scale development and understanding differences in temperament. This allows an investigation of the patterns of correlations among subconstructs to understand the broader constructs. Items derived from specific constructs are more narrowly focused and homogenous than items that might be related to broader constructs like higher order factors (i.e., self-regulation). As a result, the constructs are derived from more homogeneous components compared to factor-derived scales, which tend to be more heterogeneous (Rothbart, et al., 2001).

Rater Agreement

Interrater agreement on child temperament measures has consistently been shown to be low to moderate (Billman & McDevitt, 1980; Diener, Goldstein, & Mangelsdorf, 1995; Field & Greenberg, 1982; Huitt & Ashton, 1982; Matheny, Wilson, & Thoben, 1987; Northam, Prior, Sanson, & Oberklaid, 1987; Seifer, Sameroff, Barrett, & Krafchuk, 1994; Thomas, Chess, & Korn, 1982). Correlations between two parent ratings of their child's temperament tend to be approximately .40 to .65, and correlations between parent and observer ratings tend to be approximately .30 to .35 (Bates, 1980; Strelau, 1998). Seifer and Sameroff (1986) argue that these findings suggest that parental reports are unreliable measures of child temperament.

A meta-analysis of 119 studies found that the ratings of social, emotional, and behavioral problems were discrepant among different informants' (parents, teachers, and

children's self-reports; Achenbach, McConaughy, & Howell, 1987), and this has consistently been found in studies that look at informant discrepancies (De Los Reyes & Kazdin, 2005).

De Los Reyes and Kazdin (2005) assert that there is a need to incorporate data from multiple informants because, though a child may be observed in similar contexts or environments, informants have differing motivations for the ratings they provide and perceptions of what comprises normal behavior in children. Previous research examining informant discrepancies has been inconsistent, largely descriptive, and atheoretical. It has been unable to explain informant discrepancies and very little is known about why ratings are often discrepant from one another and what can be done to lessen such discrepancies. Discrepancies have often been attributed to differences in the context in which the child is seen by the informants and differences in the perspectives of the informants. Some informants may also be affected by emotion and negative affect when reporting on a child, and parents are especially prone to this (De Los Reyes & Kazdin, 2005).

There are several possibilities as to why temperament ratings tend to differ across sources. First, certain aspects of temperament may vary in different contexts and raters might simply report what they observe in the context in which they see the child. Though different environments elicit different behaviors, some stability in temperament should be apparent across contexts in varying situations (Goldsmith, Reiser-Danner, & Briggs, 1991; Northam et al., 1987; Strelau, 1998).

A second reason for differing temperament ratings of one child is that the individual differences across raters may bias the way in which they view the child.

Characteristics such as socioeconomic status, cultural background, gender, and psychological attributes likely impact the way in which the individual views the child, and subsequently, the way that they rate the child's temperament (Crockenburg & Acredolo, 1983; Matheny et al., 1987; Northam et al., 1987).

A third reason might be the stability of temperament, particularly a "difficult temperament." Difficult temperament dimensions tend to have a higher level of agreement across raters. Huitt and Ashton (1982) found that four of the five temperament dimensions (Activity, Rhythmicity, Threshold, Intensity, and Mood) that were agreed upon by two different parents were related to measures of temperament difficulty. Also, Billman and McDevitt (1980) found that mothers and observers agreed upon temperamental dimensions that were related to temperament difficulty.

Informant Sources for Ratings.

Comparisons of temperament ratings derived from different sources are often used to determine the level of consensus across raters or as an indicator of either the reliability or validity of the rating scale (Rothbart & Bates, 1998; Strelau, 1998). Mother and father ratings are compared to examine the level of agreement between two individuals who have similar experience with a child within a similar context. Parent ratings have also been compared to laboratory ratings completed by trained observers and such comparisons are important for determining the external validity of parent ratings. Other studies have compared parent ratings to teacher ratings in order to determine the level of agreement across sources who view the child in differing environments.

Discrepancies between pairs of observer informants (parent-teacher, mother-father) can be anticipated because each informant may recall information about the child

from memory that is consistent with their different perspectives. Additionally, differences in the contexts in which parents and teachers observe the child exacerbate discrepancies between their ratings, whereas similarities in the contexts in which mothers and fathers observe their child reduce the discrepancies between their ratings. Overall, differences across informant pairs with regard to discrepancies between their attributions of the child's behavior, the perspectives through which they provide information of the child, and the extent to which informants' attributions and perspectives are discrepant with the goal of the assessment process, transfer the highest level of discrepancy to parent-child and teacher-child pairs, and the lowest level to mother-father and parent-teacher pairs (Strelau, 1998).

Mother-father informant pairs. A central question in the study of interrater reports of temperament is whether two parents who know a child well, interact with the child daily, and within the same environment can agree upon a child's temperamental characteristics (Bates, 1980). Several studies have shown that mother-father agreement on temperament ratings are only moderately high and range between .40 to .65 (Bates, 1980; Strelau, 1998). Most studies indicate that, despite parents not completely agreeing upon their perceptions of their child, they tend to have higher agreement compared to parent-teacher or parent-observer rating comparisons (Diener et al., 1995; Field, Vega-Lahr, Scafidi, & Goldstein, 1987; Strelau, 1998).

Huitt and Ashton (1982) compared mothers' and fathers' ratings of their children (N=28) on the Perception of Baby Temperament Scale (PBT; Pederson, Anderson, & Cain, 1976) at two different time periods (19-31 and 37-49 weeks). Mothers and fathers were found to agree at both points in time on five of the nine temperament dimensions

(Activity, Rhythmicity, Threshold, Intensity, and Mood). The level of agreement was moderate across both times of measurement (mean *r*=.47, ranging from .00 to .69) and these five dimensions were reliably reported by both parents.

In another study, Diener et al. (1995) compared mothers' and fathers' ratings of temperament (*N*=70 and 44, respectively) using the Infant Characteristics Questionnaire (ICQ; Bates, Freeland, & Lounsbury, 1979). In this study, significant levels of agreement were found between mothers' and fathers' ratings of their 3-month-old infants on all four ICQ dimensions (Fussiness, Unadaptability, Unpredictability, and Dullness). These findings suggest evidence of moderately high levels of agreement between mothers' and fathers' ratings of temperament (mean *r*=.53 and .47, respectively).

A third study by Wolk, Zeanah, Garcia Coll, and Carr (1992) compared mothers' and fathers' ratings of their children's temperament based on the ICQ prenatally and postnatally. The parents did not significantly agree on any of the prenatally assessed temperament dimensions (mean *r*=.14), but did significantly agree on the postnatal ratings (*r*=.59). This suggests that the agreement of temperament ratings might reflect agreement on actual observable behaviors.

Kochanska, Coy, Tjebkes, and Husarek (1998) also found significant agreement between mothers' and fathers' ratings of temperament. Both parents rated their 8-month-old infants on the IBQ (Rothbart, 1981). Notable levels of agreement were found for parents' ratings on five of the six temperament dimensions (Activity *r*=.36, Distress to Limitations *r*=.42, Distress to Sudden or Novel Stimuli *r*=.40, Duration of Orienting *r*=.46, and Smiling and Laughter *r*=.37).

Parent-teacher informant pairs.

Rating discrepancies. A central question of the current study addresses the parent-teacher discrepancy, and although both informants have comparable attributions, they may have different perspectives because of memory recall. Informants may recall different behaviors because they perceive different behaviors as problematic, which are only exacerbated by observations of the child in different contexts (at home and in the classroom). The literature has commonly found low to moderate correlations between parent and teacher ratings of temperament (Billman & McDevitt, 1980; Field & Greenberg, 1982; Goldsmith, Rieser-Danner, & Briggs, 1991; Jewsuwan, Luster, & Kostelnik, 1993; Northam et al., 1987).

Jewsuwan et al. (1993) administered the Colorado Childhood Temperament Inventory (CCTI; Rowe & Plomin, 1977) to parents and teachers and were asked to rate their preschoolers (*N*=35). They found that mothers and fathers significantly agreed on four of the five temperament dimensions (Sociability, Emotionality, Activity, and Attention Span/Persistence; mean *r*=.47, range .09 to .63). Fathers and teachers showed significant agreement on the dimensions of Sociability, Emotionality, and Activity (mean *r*=.37, range .00 to .64), whereas mothers and teachers showed significant agreement on Sociability and Emotionality (mean *r*=.41, range .15 to .70). This study found mother-father agreement to be higher than parent-teacher agreement, though there were still moderate levels of agreement between parents and teachers.

Field and Greenberg (1982) asked parents and daycare/preschool teachers (both head and assistant teachers) to rate infants (4-12 months of age; *N*=16) and toddlers/preschoolers (18-32 months of age; *N*=33) on their temperament. The Revised Infant Temperament Questionnaire (RITQ; Carey & McDevitt, 1978) was used for the

infants and the Toddler Temperament Scale (TTS; Fullard, McDevitt, & Carey, 1984) was used for the toddlers/preschoolers. The authors found significantly higher agreement between parents for both the infant and toddler/preschooler groups (r=.36 and .46, respectively) compared to father-teacher (r=.30 and .39), mother-teacher (r=.20 and .35), or inter-teacher (r=.29 and .37) ratings.

Goldsmith et al. (1991) compared mother and teacher ratings of infants (N=33), toddlers (N=36), and preschoolers (N=45). The infant group was rated using the RITQ (Carey & McDevitt, 1978), ICQ (Bates, et al., 1979), and IBQ (Rothbart, 1981). The agreement found between mothers and teachers was moderately low (mean r=.36, range .17 to .50). The toddler group was rated using the TTS, EAS, and Toddler Behavior Assessment Questionnaire (TBAQ; Goldsmith, 1996). The agreement found for ratings of toddlers was much lower than that found for infants (mean r=.15, range -.05 to .35). The preschooler group was rated using the Behavioral Styles Questionnaire (BSQ; McDevitt & Carey, 1978), EAS, and Dimensions of Temperament Scale (DOTS; Lerner, Palermo, Spiro, & Nesselroade, 1982). The agreement was also low for the preschooler group (mean r=.28, range .00 to .60). The authors found that the mother and teacher agreement on the Fear scale on the IBQ was the only correlation significant enough to suggest consistency across raters and contexts. Overall, they found the level of agreement between parent and teacher raters to be insignificant.

Differing factor structures. In addition to studying rater discrepancies between parents and teachers, researchers have also studied the differing factor structures that emerge from parent ratings versus teacher ratings. Presley and Martin (1994) have compared the factor structure of parent and teacher temperament ratings. They

summarized the findings from eleven large-sample studies that compared mother and teacher ratings of preschoolers' temperament. They noted that the data on teacher ratings is limited and found that the two studies that used teacher ratings extracted fewer factors than are typically extracted from other sources, such as parents. Keogh, Pullis, and Cadwell (1982) found three factors, while Baker and Velicer (1982) found four factors. Presley and Martin (1994) explained the discrepant factor structures by noting that teachers are not able to observe a child's behavior in as many situations as parents. Therefore, teachers may not have the ability to describe a child's temperament in as fine-tuned of a fashion as parents, especially due to the classroom focus on task-oriented behavior and the constriction of the classroom context. It is unclear whether the age of the student, the context of the observation, or the behaviors being rated account for a difference in structural outcome compared to parents. They note that the general pattern of results shows that six factors tend to emerge from parent ratings of temperament and three or four factors tend to emerge from teacher ratings. These findings may indicate parents' broader knowledge of and experience with their children's behavior compared to teachers.

Presley and Martin (1994) further investigated the structure of temperament ratings and how they compare between raters by using the Temperament Assessment Battery for Children (TABC; Martin, 1988), which uses different forms for mothers and teachers. The mothers' ratings loaded onto five factors, including Social Inhibition, Negative Emotionality, Adaptability, Activity Level, and Task Persistence. However, the teachers' ratings loaded onto three factors, including Task Persistence, Inhibition, and Negative Emotionality, which is consistent with what the authors found when reviewing

other studies that compared mother and teacher temperament rating scale factor structures.

Similarly, Martin, Wisenbaker, and Huttunen (1994) compared 12 large-sample studies investigating the factor structure of parent and teacher ratings of children (ages 2 months-11 years and 3-11 years, respectively). In line with other findings, the authors reliably found fewer factors in teacher ratings of temperament compared to parent ratings. Again, the authors found five factors across parent ratings: Activity, Negative Emotionality, Task Persistence, Agreeableness/Adaptability, and Inhibition. They also found notable consistency across factors that emerged from the teacher ratings, though there were only three: Negative Emotionality, Task Persistence, and Inhibition. It is noteworthy that these are the same three factors that derived from the teacher ratings in the previous study by Presley and Martin (1994), who suggested that Negative Emotionality, Task Persistence, and Inhibition may be particularly salient behaviors in the classroom context.

Minimizing Informant Error.

Researchers have attempted to minimize sources of error in ratings. Parents and teachers are usually asked to report on specific, observable behaviors within the past one to two weeks and to avoid making judgments regarding the motive or reasoning behind the behavior observed (Rothbart & Goldsmith, 1985; Vaughn, Bradley, Joffe, Seifer, & Barglow, 1987). Other researchers have found that some parent ratings of temperament were less prone to rater bias than others, namely those that focus on specific, concrete behaviors rather than global judgments of behavior (Gagne at el. (2011) explicitly cited the CBQ as a temperament measure for caregivers that uses “specific content and time

frames in items that allow parents to access more specific memories of their child's behavior (e.g., 'has difficulty sitting still at dinner')" (p. 338). Though there are limitations to parent and teacher ratings, they continue to be accepted as valid (Gagne, Van Hulle, Aksan, Essex, & Goldsmith, 2011) and important indicators of child behavior (DiLalla & Jones, 2000; Guerin & Gottfried, 1994; Pedlow, Sanson, Prior, Oberklaid, 1993; Rothbart & Bates, 1998; Rothbart & Mauro, 1990).

De Los Reyes and Kazdin (2005) offer their ABC Model as a theoretical framework for interpreting informant discrepancies with the goal of gathering information of a child's difficulties from multiple informants. They acknowledge that informants may have discrepant motivations for providing information about a child, and as a result, may partake in different processes when thinking about the child's behavior and how to report it. Also, informants may have discrepant attributions of the causes of behaviors and may have differing perspectives about whether the child's behaviors are problematic. Given the reality of informant differences, it would be useful to have a teacher version of the CBQ to supplement the original caregiver version.

Chapter 3: Methods

Purpose

This study sought to compare the properties of a new temperament scale, the CBQ-T, to the CBQ Short Form (Putnam & Rothbart, 2006) as reported by the caregiver and describe its psychometric properties. In light of the documented low agreement between informants shown in the previously reviewed studies, a teacher version of the CBQ Short Form might serve as a basis for discussion between the parent and teacher if a child shows problems regulating behavior or emotion.

Design

This study investigated the quantitative information collected from the CBQ and CBQ-T. The data collected is part of a larger correlational study. However, since the CBQ and CBQ-T are the only measures used in this study, the method described will be limited to the planning, administering, and analysis of the CBQ and CBQ-T measure.

Measures

CBQ Short Form.

The CBQ, as described above, is a caregiver report measure designed to provide a detailed assessment of temperament in children aged 3-7 years (Rothbart, et al., 2001). The version used in the current study is the CBQ Short Form which was derived from the original CBQ (Putnam & Rothbart, 2006). The CBQ Short Form consists of 94 items and individual differences are assessed on fifteen primary temperament characteristics: Positive Anticipation, Smiling/ Laughter, High Intensity Pleasure, Activity Level, Impulsivity, Shyness, Discomfort, Fear, Anger/ Frustration, Sadness, Soothability, Inhibitory Control, Attentional Focusing, Low Intensity Pleasure, and Perceptual Sensitivity. Putnam and Rothbart (2006) conducted factor analyses of CBQ scales using

590 children (285 female) and reliably recovered a three-factor solution indicating three broad dimensions of temperament, extraversion/surgency, negative affectivity, and effortful control, which are described in greater detail in Chapter 2. The fifteen primary temperament characteristics assessed by the CBQ and the three broad dimensions of temperament on which they fall is shown in Table 1.

Table 1

Dimensions of Temperament and the Corresponding Primary Temperament Characteristics

Extraversion/ Surgency	Negative Affectivity	Effortful Control
Impulsivity	Anger	Inhibitory Control
Shyness	Discomfort	Attentional Focusing
Activity Level	Sadness	Low Intensity Pleasure
High Intensity Pleasure	Soothability/Falling Reactivity	Perceptual Sensitivity
Smiling/Laughter	Fear	
Positive Anticipation		

CBQ-T.

The CBQ-T was constructed based on the CBQ Short Form with permission from its original authors (Putnam & Rothbart, 2006). The new items were kept as close to the original wording as possible and word changes were made to make the items appropriate to the preschool classroom but without altering the temperament concept measured (a total of 20 altered items). The newly constructed CBQ-T was given as a pilot study to 12 preschool summer camp teachers, and they were asked to help construct a temperament scale that was appropriate for the preschool classroom. The instructions for the original CBQ were modified by replacing the words “your child” with “the above named child,”

and the teachers were asked to complete the scale about a former student of their choice. They were asked to place the child's first initial in the space provided and to comment on the applicability of each of the items to their classroom. Based on these comments, revisions were made to 6 additional items with the intent to keep the original meaning of the item for a total of 26 altered items. Items that were altered are outlined in Table 2. The modified CBQ was then administered to an additional 20 preschool teachers.

Table 2

Items Modified for the CBQ-T and Their Original CBQ Short Form Wording

Item Number	Original CBQ Short Form Wording	Modified CBQ-T Wording
2	Gets angry when told s/he has to go to bed.	Gets angry when told s/he has to remain still during rest time.
8	Cries sadly when a favorite toy gets lost or broken.	Cries sadly when a toy he or she likes gets lost or broken.
12	Tends to run rather than walk from room to room.	Tends to run rather than walk from place to place.
13	Notices it when parents are wearing new clothing.	Notices it when others are wearing new clothing.
17	Is afraid when hearing of burglars or the "boogie man."	Is afraid when hearing about ideas such as the "boogie man" or when hearing about "burglars" or others who pose a threat.
20	Tends to become sad if the family's plans don't work out.	Tends to become sad if plans (for a special event or activity) don't work out.
22	Moves about actively (runs, climbs, jumps) when playing in the house.	Moves about actively (runs, climbs, jumps) when playing indoors.
26	Enjoys taking warm baths.	Enjoys quiet, soothing activities.
31	Becomes upset when loved relatives or friends are getting ready to leave following a visit.	Becomes upset when friends are getting ready to leave the classroom.
32	Comments when a parent has changed his/her appearance.	Comments when someone (teacher, classmate) has changed his/her appearance.

39	Enjoys “snuggling up” next to a parent or babysitter.	Enjoys “snuggling up” next to an adult.
41	Is afraid of fire.	Is afraid of things such as fire or the loud noise of a fire drill.
45	Prepares for trips and outings by planning things s/he will need.	Plans for new activities or changes in routine to make sure s/he has what will be needed.
46	Becomes very excited while planning for trips.	Becomes very excited while planning for new activities such as field trips.
47	Is quickly aware of some new item in the living room.	Is quickly aware of some new item in the classroom.
53	Has trouble sitting still when s/he is told to (at movies, church, etc.).	Has trouble sitting still when s/he is told to (story time, etc.).
56	Rarely becomes upset when watching a sad event in a TV show.	Rarely becomes upset when listening to a sad story.
58	Becomes very excited before an outing (e.g., picnic, party).	Becomes very excited before a special class event (e.g., outing, picnic, party).
61	Rarely gets upset when told s/he has to go to bed.	Rarely gets upset when told s/he has to remain quiet during rest times.
64	Is likely to cry when even a little bit hurt.	Is likely to cry even if a little bit hurt.
68	Is rarely frightened by “monsters” seen on TV or at movies.	Is rarely frightened by “monsters” in stories or films.
73	Approaches places s/he has been told are dangerous slowly and cautiously.	Approaches places that s/he thinks might be “risky” slowly and cautiously.
80	Rarely laughs aloud while watching TV or movie comedies.	Rarely laughs aloud in the classroom.
85	Is full of energy, even in the evening.	Is full of energy, even during quiet times.
86	Enjoys sitting on parent’s lap.	Enjoys sitting on adult’s lap.
87	Gets angry when called in from play before s/he is ready to quit.	Gets angry when called away from an activity or game before s/he is ready to quit.
92	Looks forward to family outings, but does not get too excited about them.	Looks forward to special class events, but does not get too excited about them.

The original authors of the CBQ Short Version (Putnam & Rothbart, 2006) approved the final version of the CBQ-T.

Participants

The participants in this study were the parents (or guardians; *N*=106) and teachers (or assistant teachers; *N*=14) of preschool students (*N*=134; 46.5% males, 51.4% females) who attended an on-campus preschool at a large university in the Mid-Atlantic region of the United States. All of the families at the preschool were affiliated with the university in some capacity.

The mean age of the preschoolers was 57.38 months, ranging from 38 to 82 months of age. The students made up an ethnically diverse sample, including 35.9 percent "European-American," 9.2 percent "African-American," 9.9 percent "Asian-American," 9.9 percent "Other," and 13.4 percent were missing ethnicity data.

The parents of the preschool children were from a mostly middle-class sample, based on their self-reported level of employment. None of the parent participants reported having jobs that would only require a high school level of education, while 24.6 percent reported having jobs that require a four-year college degree, and 29.6 percent reported having jobs that require a professional or graduate level degree. 45.8 percent of the sample chose not to report this information. Age and ethnicity data were not available for the parents of the participating children.

The teachers were also from a mostly middle-class sample, based on the four-year college degree requirement to become a preschool teacher at the school in which data were collected. Based on observation, 86 percent of the teachers were European-American and 100 percent were female. Data were not available for the ages of the teachers.

Procedure

Most of the data included in this study is archival as it was collected and entered beginning in 2006. First, the researchers discussed the objectives of this research with preschool staff and parents at "Back-to-School Night." The researchers then disseminated an informational letter and consent forms to parents of children in the relevant age range. Families were given several opportunities over the course of data collection to participate in the study. The only basis for selection into this study was the age of the child and whether parental permission was granted.

An additional informational cover letter and informed consent form describing the study were distributed to the parents of the participating preschoolers. Signed consent forms from the parents or caregivers signified informed consent on behalf of the child, though each child participant is given the opportunity to refuse participation when asked to complete tasks for the study.

A team of seven data collectors were assigned to a classroom and particular children who were participating in the study. Each data collector was trained in the data-collection protocol.

Packets containing the CBQ-T for children with parent or caregiver consent were placed in teacher mailboxes to be completed and returned. Packets containing the CBQ for parents and caregivers who gave consent also were placed in their child's mailbox to be completed and returned. Researchers followed-up with parents and teachers to collect the completed packet and the packets were checked for missing items and redistributed if necessary.

All materials and data collected were confidential and stored in locked file cabinets in the office of Dr. Hedwig Teglasi on campus at the University of Maryland.

Only the research team had access to the materials and all names were removed from the data collected. There was a file folder for each child in which all data for that child was kept, and each child (including the corresponding parent and teacher) was assigned a participant number. A master sheet of names corresponding with participant number was kept in a locked file drawer in the same office. Data entry took place on a secure computer and each child was only identified by participant number. All data was double entered to ensure accuracy.

Chapter 4: Results

Internal Consistency Reliability

Table 3 presents the internal consistencies, as measured by Cronbach's alpha, of each of the CBQ and CBQ-T scales. Internal consistency values were generally acceptable for both the parent and teacher versions with an alpha at or above .70. Several scales on the CBQ did not exhibit adequate internal consistency, including Activity Level (α=.69), Approach/Positive Anticipation (α=.68), Inhibitory Control (α=.65), Low Intensity Pleasure (α=.66), Sadness (α=.65), and Smiling and Laughter (α=.61). Two scales on the CBQ-T did not exhibit adequate internal consistency as well, including Low Intensity Pleasure (α=.67), and Sadness (α=.68).

Table 3

Internal Consistencies (Alpha Coefficient) of the CBQ and CBQ-T

Scale (N items)	CBQ	CBQ-T
Activity Level (7)	.69	.88
Anger/Frustration (6)	.80	.86
Approach/Positive Anticipation (6)	.68	.81
Attentional Focusing (6)	.78	.79
Discomfort (6)	.86	.83
Falling Reactivity/Soothability (6)	.79	.80
Fear (6)	.74	.70
High Intensity Pleasure (6)	.74	.89
Impulsivity (6)	.73	.83
Inhibitory Control (6)	.65	.82
Low Intensity Pleasure (8)	.67	.67
Perceptual Sensitivity (6)	.76	.71
Sadness (7)	.65	.68
Shyness (6)	.86	.88
Smiling & Laughter (6)	.61	.87

Item Analysis to Improve Internal Consistency and Correlations

The Corrected Item-Total Correlation for each item and Cronbach's Alpha if an item was deleted were calculated for the CBQ-T scales (Low Intensity Pleasure and

Sadness) that had an internal consistency that fell below .70. A total of four items on the CBQ-T were flagged due to their lowering the internal consistency of its corresponding scale. All four items had a corrected item-total correlation of less than one, though they did not result in an alpha above .70 for that scale if removed (Table 4).

Table 4

CBQ-T Item Level Statistics

CBQ-T Scale	Item Number	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Low Intensity Pleasure	Item 26	.20	.68
Low Intensity Pleasure	Item 94	.15	.69
Sadness	Item 54	.21	.69
Sadness	Item 56	.23	.68

Descriptive Statistics

The mean, standard deviation, and range for the samples in the current study were calculated by age (3-year olds, 4- and 5-year olds, and 6- and 7-year olds) and are displayed below (Table 5).

Table 5

Mean Scale Scores for the CBQ Short Form (with the Current Sample) and the CBQ-T

Scale	3-Year-Olds				4- and 5-Year-Olds				6- and 7-Year Olds			
	N	*M*	*SD*	Range	*N*	*M*	*SD*	Range	*N*	*M*	*SD*	Range
Activity Level	21	4.77	.95	2.96-5.68	76	4.78	.96	3.08-5.90	7	4.92	.96	3.57-6.00
	/23	/3.98	/.71	/3.26-5.48	/84	/4.08	/.70	/3.31-5.47	/9	/5.76	/.48	/4.89-6.22
Anger/Frustration	22	4.34	.54	3.77-4.91	74	4.12	.78	3.22-5.24	6	4.98	.60	4.14-5.86
	/20	/3.46	/.50	/2.74-4.13	/73	/3.36	/.62	/2.56-4.32	/9	/3.32	/1.05	/2.11-5.00
Approach/Positive	20	4.92	.90	3.96-6.18	73	5.21	.86	4.15-6.11	7	5.19	1.00	3.71-6.14
Anticipation	/23	/4.38	/1.08	/3.22-5.87	/83	/4.55	/1.00	/3.51-5.73	/8	/5.16	/1.01	/4.06-6.67
Attentional Focusing	22	4.89	.49	4.14-5.41	75	5.27	.46	4.62-5.83	6	5.48	.69	4.86-6.43
	/23	/5.04	/.32	/4.78-5.65	/83	/5.20	/.49	/4.54-5.88	/9	/4.98	/1.23	/3.56-6.44
Discomfort	20	3.66	.18	3.48-4.00	74	3.98	.28	3.61-4.34	7	4.88	.35	4.29-5.29
	/21	/4.05	/.25	/3.71-4.39	/76	/3.61	/.26	/3.37-3.99	/7	/3.60	/.53	/3.11-4.52
Falling	21	5.17	.66	4.09-6.00	74	4.89	.57	3.97-5.47	7	4.43	.63	3.43-5.00
Reactivity/Soothability	/23	/4.60	/.25	/4.30-4.96	/85	/4.61	/.17	/4.28-4.79	/7	/4.16	/.75	/2.67-4.58
Fear	17	4.05	.39	3.33-4.50	56	4.09	.28	3.64-4.48	6	4.48	.80	3.16-5.43
	/2	/3.75	/.17	/3.63-4.08	/26	/3.82	/.29	/3.56-4.37	/4	/3.46	/.86	/2.11-4.40
High Intensity Pleasure	22	4.80	1.27	3.38-6.71	70	4.87	1.17	3.33-6.42	6	5.07	.84	3.83-6.14
	/16	/4.00	/.85	/2.74-4.68	/67	/4.25	/.76	/3.08-4.91	/6	/4.82	/.79	/3.67-5.67
Impulsivity	21	4.07	.39	3.50-4.50	69	3.95	.58	3.25-4.88	7	3.91	.91	2.71-5.43
	/22	/3.75	/.61	/3.04-4.52	/85	/3.89	/.64	/3.19-4.90	/9	/5.43	/.47	/4.78-6.00
Inhibitory Control	18	4.88	.73	3.91-5.55	73	4.95	.75	3.96-5.61	7	4.69	1.00	2.71-5.29
	/18	/4.87	/.57	/3.94-5.48	/75	/4.81	/.46	/4.24-5.50	/5	/4.28	/.71	/3.22-5.11
Low Intensity Pleasure	20	6.03	.42	5.14-6.41	71	5.93	.52	4.72-6.34	6	5.30	.46	4.56-6.00
	/15	/5.05	/.53	/4.51-6.13	/75	/4.90	/.69	/4.18-6.16	/6	/4.94	/.97	/3.67-6.11
Perceptual Sensitivity	22	5.63	.19	5.41-5.87	68	5.54	.21	5.20-5.75	6	5.67	.50	4.66-6.00
	/17	/5.00	/.38	/4.61-5.61	/64	/5.04	/.30	/4.70-5.48	/7	/4.87	/.68	/4.11-5.67
Sadness	16	4.10	.58	3.09-4.55	59	4.21	.32	3.69-4.53	7	5.00	.44	4.43-5.43
	/12	/4.15	/.44	/3.61-4.83	/59	/3.82	/.38	/3.41-4.56	/6	/3.96	/.39	/3.56-4.63
Shyness	21	3.70	.73	2.76-4.64	72	3.60	.68	2.66-4.43	7	3.64	.80	2.29-4.57
	/22	/3.63	/.65	/2.74-4.34	/84	/3.80	/.61	/2.73-4.27	/9	/2.44	/.42	/1.78-2.89
Smiling & Laughter	20	6.10	.44	5.41-6.50	74	5.95	.26	5.57-6.21	6	5.81	.33	5.43-6.29
	/21	/5.31	/.21	/5.02-5.57	/83	/5.49	/.24	/5.04-5.71	/9	/5.89	/.50	/5.11-6.67

Correlations of CBQ-T Scales with Age and Gender

The Pearson correlation between each of the CBQ scales and age (in months) were determined for both the parent and teacher measures (Table 6). The Sadness (r=.23) scale was significantly positively correlated with age on the CBQ, while the Falling Reactivity (r=-.21) and Low Intensity Pleasure (r=-.25) scales were significantly negatively correlated with age. On the CBQ-T, the scales of Activity Level (r=.33), Approach/Positive Anticipation (r=.23), High Intensity Pleasure (r=.26), Impulsivity (r=.28), and Smiling/Laughter (r=.37) were significantly positively correlated with age, while Fear (r=-.46) was significantly negatively correlated.

The Spearman correlation between each of the scales and gender were also calculated (Table 4). None of the scales were significantly correlated with gender on the CBQ, though several were found to be significant on the CBQ-T. The scales of Attentional Focusing (r=.18), Inhibitory Control (r=.21), Low Intensity Pleasure (r=.39), Perceptual Sensitivity (r=.29) were rated higher for girls than for boys. The scales of Activity Level (r=-.34), High Intensity Pleasure (r=-.39), and Impulsivity (r=-.20) were rated higher for boys than for girls and these were significantly positively correlated with boys.

Table 6

Correlations of Each CBQ Scale with Age and Gender

Scale (*N* completing all items on the CBQ, CBQ-T)	CBQ		CBQ-T	
	Age	Gender	Age	Gender
Activity Level (105, 124)	.04	-.18	.33**	-.34**
Anger/Frustration (103, 108)	.06	.05	.11	-.13
Approach/Positive Anticipation (101, 122)	.13	.14	.23**	-.11
Attentional Focusing (104, 123)	.10	-.10	-.06	.18*
Discomfort (102, 111)	.17	.19	-.05	.14
Falling Reactivity/Soothability (103, 123)	-.21*	-.10	-.18	.16
Fear (80, 35)	.08	.01	-.46**	.10
High Intensity Pleasure (99, 97)	.04	-.16	.26**	-.39**
Impulsivity (98, 124)	.01	-.17	.28**	-.20*
Inhibitory Control (99, 106)	.00	.00	-.14	.21*
Low Intensity Pleasure (97, 103)	-.25*	.11	-.19	.39**
Perceptual Sensitivity (96, 95)	.05	.12	-.11	.29**
Sadness (82, 85)	.23*	.02	-.06	.15
Shyness (100, 123)	-.02	-.02	-.07	-.01
Smiling & Laughter (100, 121)	-.21	.05	.37**	.12

*p < .05. **p < .01.
Males coded as 1, Females coded as 2

Parent and Teacher Agreement

To examine the degree of parental and teacher agreement on the CBQ and CBQ-T scales, correlations between parent and teacher ratings for the same child on the fifteen CBQ scales were examined (Table 7). Correlations between parent and teacher ratings ranged from -.20 to .54. Teachers and parents tended to agree most when rating Impulsivity (r=.38), Inhibitory Control (r=.30), and Shyness (r=.54) (all significant at the $p < .01$ level). Raters also significantly agreed (at the $p < .05$ level) when rating Activity Level (r=.24), Approach/Positive Anticipation (r=.22), and High Intensity Pleasure (r=.29). Parent and teacher raters tended to disagree the most on the scale of Fear (r=-.20), though it was not found to be significant.

Table 7

Correlations Between Parent and Teacher Responses

Scale (N items)	CBQ & CBQ-T Agreement
Activity Level (7)	.24*
Anger/Frustration (6)	.21
Approach/Positive Anticipation (6)	.22*
Attentional Focusing (6)	.14
Discomfort (6)	.08
Falling Reactivity/Soothability (6)	.19
Fear (6)	-.20
High Intensity Pleasure (6)	.29*
Impulsivity (6)	.38**
Inhibitory Control (6)	.30**
Low Intensity Pleasure (8)	.22
Perceptual Sensitivity (6)	.12
Sadness (7)	.22
Shyness (6)	.54**
Smiling & Laughter (6)	.14

*p < .05. **p < .01.

Chapter 5: Discussion

The CBQ-T was developed to provide a differentiated measure of childhood temperament conforming to Rothbart's (1981, 1989; Rothbart & Derryberry, 1981; Rothbart & Posner, 1985) reactive and self-regulative model of temperament, and the scale was based on the Short Form of the CBQ introduced by Putnam and Rothbart (2006). The goal of the current study was to examine the psychometric properties of the newly developed CBQ-T and its implications. The measure's internal consistency and correlations with age and gender were examined, as well as the degree of parent and teacher agreement on the CBQ Short Form (administered to the current sample) and CBQ-T. An item analysis to improve the internal consistency was also conducted and is discussed. Finally, the mean, standard deviation, and range for each of the fifteen scales of the CBQ-T was calculated and a comparison to the CBQ Short Form given in this study is discussed below.

Internal Consistency Reliability

Overall, the CBQ-T was found to be as reliable as the CBQ Short Form when administered to the current sample. As presented in Table 3, the CBQ-T scales generally demonstrated adequate internal consistency with an alpha at or above .70 and two scales fell below this level, including Low Intensity Pleasure and Sadness. Though an alpha of .70 is widely considered the standard for adequate internal consistency, DeVellis (1991) considered alphas of .60 as undesirable, but not unacceptable.

The internal consistency of Low Intensity Pleasure was the lowest on the CBQ-T (.67), though it is perplexing as its corresponding items tend to align with the low intensity and less novel types of activities that typically occur in the classroom setting.

However, it should be noted that Low Intensity Pleasure had a comparable internal consistency (.66) on the parent form, suggesting that the items used to measure this scale may be difficult for raters to answer based on their observations of a child. Sadness had a relatively low internal consistency (.65) on the parent form as well. Similarly, while developing the CBQ Short Form, Putnam and Rothbart (2006) found that only the Sadness scale had an alpha below .65. Examination of internal consistency estimates suggests that future revisions of the CBQ-T would benefit from greater homogeneity in the item content within the Low Intensity Pleasure and Sadness scales.

It is important to note that the use of Cronbach's alpha as a measure of reliability has recently come under scrutiny, with some researchers discouraging its use altogether (e.g., Green &Yang, 2009). This stems from the fact that the assumption of alpha is that the scale measures a single construct, but researchers may not have addressed this assumption. According to Green and Yang (2009), coefficient alpha, when applied to a multidimensional scale (such as the CBQ), may be a lower bound estimate of reliability.

On the CBQ Short Form, Putnam and Rothbart (2006) found four scales, Approach/Positive Anticipation, Inhibitory Control, Fear, and Sadness, to fall below an alpha of .70 with one below .65 (the Sadness scale, as discussed above). Overall, the CBQ-T exhibited stronger internal consistency compared to the CBQ when administered with our sample, though the two measures were comparable.

Item Analysis to Improve Internal Consistency and Correlations

On the CBQ-T, only the two scales of Low Intensity Pleasure and Sadness fell short of an alpha of .70. After conducting an item analysis, it was determined that

deleting items from these two scales would still allow alpha to approach .70, though it did not raise alpha above .70. Thus, there is no gain by deleting these items.

Descriptive Statistics

Most of the existing body of literature incorporates the standard form of the CBQ (Rothbart, et al., 2001), preventing the possibility of comparing the descriptive statistics of the CBQ-T with those of the original validation study of the CBQ Short Form (Putnam & Rothbart, 2006) because the data are unavailable. However, Tables 5 and 8 display the descriptive statistics of the CBQ Short Form that was administered to the sample in the current study to the CBQ-T.

Overall, parent means were higher than teacher means, with the exceptions of the Impulsivity and Shyness scales. The Smiling and Laughter scale had the highest overall mean for both the CBQ Short Form and the CBQ-T. Shyness had the lowest overall mean reported by parents while Anger/Frustration had the lowest mean reported by teachers. Scale means on Activity Level, Anger/Frustration, Attentional Focusing, Discomfort, Falling Reactivity/Soothability, Fear, High Intensity Pleasure, Impulsivity, and Shyness differed between parents and teachers by more than one standard deviation. The Approach/Positive Anticipation, Inhibitory Control, Low Intensity Pleasure, Perceptual Sensitivity, Sadness, and Smiling and Laughter scales means differed between parents and teachers by greater than a half of one standard deviation, though still less than one standard deviation. None of the scale means were comparable between the two rater groups and within one half of a standard deviation from one another.

Table 8

Mean Scale Score and Standard Deviations for the CBQ Short Form (with the Current Sample) and the CBQ-T

Scale	CBQ Short Form Mean (SD)	CBQ-T Mean (SD)
Activity Level	4.78 (.84)	4.19 (1.39)
Anger/Frustration	4.25 (1.17)	3.30 (1.39)
Approach/Positive Anticipation	5.15 (.84)	4.54 (.97)
Attentional Focusing	5.21 (.98)	5.10 (1.04)
Discomfort	3.97 (1.36)	3.71 (1.19)
Falling Reactivity/Soothability	4.94 (1.05)	4.57 (1.13)
Fear	4.14 (1.24)	3.79 (1.07)
High Intensity Pleasure	4.83 (1.05)	4.30 (1.40)
Impulsivity	3.97 (1.07)	4.00 (1.22)
Inhibitory Control	4.90 (.84)	4.80 (1.12)
Low Intensity Pleasure	5.90 (.65)	4.93 (.82)
Perceptual Sensitivity	5.55 (.90)	5.01 (.84)
Sadness	4.29 (.93)	3.93 (.97)
Shyness	3.64 (1.34)	3.68 (1.31)
Smiling & Laughter	5.98 (.64)	5.44 (1.07)

Correlations of CBQ-T Scales with Age and Gender

Age.

On the CBQ, older children were rated as having higher levels of Sadness than younger children by parents. This result was unexpected due to the fact that some research has shown that parents describe their children as becoming more positive in mood with increasing age during the preschool period (across ages 3, 3.5, and 5 years; Guerin & Gottfried, 1994). It was found that Falling Reactivity was significantly negatively correlated with age, as reported by a caregiver. It is possible that older children may have been less soothable compared to younger children due to their developing cognitive skills, particularly goal-directed thinking and long-term memory. These emergent skills allow for goals to be kept in mind, potentially causing greater frustration and a lower likelihood for soothability (Gartstein & Rothbart, 2003). Low Intensity Pleasure was also significantly negatively correlated with age, meaning that parents rated older children as drawing less pleasure from low intensity activities. Guerin and Gottfried (1994) found that preschoolers became less intense with increasing age based on parent ratings, which contradicts these results found in the current study.

On the CBQ-T, teachers rated older children as having higher levels of Positive Anticipation for expected pleasurable activities and higher positive affect through Smiling and Laughter. This finding is corroborated by Guerin and Gottfried's (1994) work that showed increasing positive affect and mood with age in the preschool years. The current study also found that older children were rated as having lower levels of Fear than younger children by teachers. Similarly, Zhao and Wang (2009) found that preschoolers' level of fear and symptoms of anxiety significantly decreased with age

from 4 to 6 years old. This finding from teachers is not surprising as it is expected that older preschool children would adjust to the school setting after some time, assuming that the older children had previously attended preschool.

Teachers also rated older children to have higher Activity Level, more of a preference for High Intensity Pleasure, and higher levels of Impulsivity. These results were unexpected as several studies have shown increased attentional and behavioral self-regulation with increasing age during childhood (Guerin & Gottfried, 1994). Additionally, the maturation of the attention system develops over the preschool years, with a notable development between the ages of 36 to 48 months (Jones, Rothbart, & Posner, 2003). This allows children to engage in and persist longer during activities, including those of lower intensity or novelty, as well as inhibit impulsive responses (Posner & Rothbart, 1991; Jones, et al., 2003).

Gender.

Parent ratings on the CBQ were not significantly correlated with gender. This is in line with other studies that have reported insignificant or no gender differences based on parent ratings. In their meta-analysis of gender differences in temperament, Else-Quest, Hyde, Goldsmith, and Van Hulle (2006) offer the explanation that teachers are more likely to witness children interacting in peer groups with the same gender, thus magnifying gender differences. They also note that because parents are the primary socializers of their children, including gender roles, parents' perceptions of their child may be biased by their own gender role stereotypes (Else-Quest, et al., 2006).

On the CBQ-T, however, there were significant gender differences. Girls were rated as having significantly higher levels of Attentional Focusing, Inhibitory Control,

Low Intensity Pleasure, and Perceptual Sensitivity by teachers, all of which load on the effortful control factor. Several studies have found a notably large and significant gender difference on the factor of effortful control (Else-Quest, et al., 2006). On the dimensions within the factor, Attentional Focusing and Low Intensity Pleasure were found to have significant, yet small, gender differences (Else-Quest, et al., 2006). Perceptual Sensitivity displayed small to moderate differences and Inhibitory Control was moderate in magnitude (Else-Quest, et al., 2006).

Teachers rated boys higher than girls on Activity Level, High Intensity Pleasure, and Impulsivity. Else-Quest, et al.'s (2006) meta-analysis also found small effect sizes favoring boys on the dimensions of Activity Level, High Intensity Pleasure, and Impulsivity. It is not surprising that a significant gender difference was found for Activity Level favoring boys, as this finding has been found repeatedly in the literature (Martin, Wisenbaker, Baker, and Huttunen, 1997). After 18 months, a male increase is seen for Activity Level, and at the preschool age, the gender difference for Activity Level remains (Else-Quest, et al., 2006). When considering theories of gender differences in children and gender role norms, the findings for Low- and High Intensity Pleasure are also expected and consistent with Maccoby's (1998) theory and work (Else-Quest, et al., 2006). The theory posits that children tend to favor same-gender peer play, where low-intensity activities (e.g., girls playing dress-up) and high-intensity activities (e.g., boys engaging in rough-and-tumble play) are likely to take place in disjointed groups (Else-Quest, et al., 2006).

Parent and Teacher Agreement

In accord with the literature documenting low to moderate agreement between parent and teacher informants on questionnaire measures, correlations between parents and teachers in the current study were not significant with a few exceptions (Billman & McDevitt, 1980; Field & Greenberg, 1982; Goldsmith, Rieser-Danner, & Briggs, 1991; Jewsuwan, Luster, & Kostelnik, 1993; Northam et al., 1987). Teachers and parents tended to agree most when rating Impulsivity, Inhibitory Control, and Shyness. There were other significant, yet weaker, correlations when rating Activity Level, Approach/Positive Anticipation, and High Intensity Pleasure. Parent and teacher raters tended to disagree the most on the scale of Fear, though it was not found to be significant.

Compared to the CBQ Short Form, Putnam and Rothbart (2006) found generally high interparent agreement across all scales. However, Perceptual Sensitivity and Approach/Positive Anticipation had notably low interrater agreement between mothers and fathers (at 46 months of age). They noted that the standard form also showed lower interrater agreement on these scales and that it was not specific to the short form. This lower agreement may be due to the fact that different caretakers elicit varying behaviors from a child or that rater subjectivity in the ratings of a child is more likely to occur for these types of behaviors (Putnam & Rothbart, 2006).

Overall, it appears that raters have consistently higher levels of agreement on some temperament dimensions, whereas they show lower levels of agreement for other temperament dimensions. It is not clear why this occurs, though there are several possible explanations. As noted in the review of the literature, temperamental characteristics that result in highly overt behavioral manifestations (e.g., shyness, impulsivity, inhibitory control) or ones that are considered more “difficult temperament

dimensions" lend themselves to higher levels of agreement (Huitt & Ashton, 1982; Billman & McDevitt, 1980). It may also be that some traits are more subject to role expectations (e.g., boys may be less prone to show fear around their fathers than around their mothers).

Though different environments elicit different behaviors, some stability in temperament should be apparent across contexts (Goldsmith, Reiser-Danner, & Briggs, 1991; Northam et al., 1987; Strelau, 1998), and parents and teachers showed significant levels of agreement on some scales of the CBQ. However, it is important to ask why even greater agreement was not found as agreement appeared to vary across scales with some scales showing higher levels of agreement than others. It is possible that the reports on temperamental shyness, impulsivity, and inhibitory control were more reliable because these characteristics were more easily observed, whereas a child's fear was less observable in the classroom where teachers take care to minimize fear elicitors in the classroom. As discussed in Chapter 2, contextual factors, biases, and familiarity are important determinants of parental agreement in ratings of temperament. Also, some informants are affected by their own emotion and negative affect when reporting on a child and parents are especially prone to this (De Los Reyes & Kazdin, 2005).

Limitations and Future Directions

First, a potential limitation of the study is the homogeneity of the socioeconomic status of the children participants in this study, on whom the parent and teacher rating scales were based. Further studies validating the CBQ-T should be conducted with a larger and more diverse sample. Second, a relatively small sample size might also limit the findings of the current study, as the sample may be too small to find significant

correlations in some areas. However, a power analysis (with a significance criterion of .05 and a large effect size of .80) was calculated to determine the sample size needed to conduct correlational testing and indicated that a sample size of 126-153 should provide sufficient power to investigate the psychometric properties of the CBQ-T (Crocker & Algina, 1986). Third, this study was conducted with a combination of lead and assistant preschool teachers and future research might investigate teacher agreement (Munis, Greenfield, Henderson, & George, 2007).

Again, though there are limitations to parent and teacher ratings in general, they continue to be accepted as valid and important indicators of child behavior and further research on the CBQ-T would prove beneficial (Munis, et al., 2007). Many temperament measures are heavily weighted with items regarding child-parent interactions that occur in the home environment (Keogh & Burstein, 1988). Overall, given the reality of informant differences, it would be useful to further study a teacher version of the CBQ to supplement the caregiver version (De Los Reyes & Kazdin, 2005). In addition, parental reports of child behavior show only modest correlations with teacher reports (Achenbach, McConaughy, & Howell, 1987). For these reasons, parental reports of temperament have been consistently challenged but also consistently relied upon.

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