ABSTRACT

Title of Dissertation: UNDERSTANDING PARENT AND TEACHER
                          PERSPECTIVES OF TEMPERAMENT
                          PROFILES IN YOUNG CHILDREN

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The study of temperament profiles is considered a person-centered approach to understanding temperament, as it takes into consideration the complex combinations and interactions of multiple traits that characterize an individual. However, most studies of temperament profiles have focused on reactive traits in infants and toddlers using parent ratings and/or laboratory conditions and since outdated methodologies. This study contributed to the temperament profile literature by exploring profiles based on parent and teacher ratings of reactive and regulatory traits of young children in kindergarten using the modern statistical technique of latent profile analysis. Kindergarten is a unique and critical time in development in which children are suddenly learning new academic, social, and self-regulatory skills as they begin formal education. Parent and teacher ratings of kindergarteners' temperament were analyzed separately and the behavioral profiles produced by each were described. When only reactivity traits were included in the analyses, the profiles that emerged were mostly consistent with the three to four profiles that have been found in previous studies, including inhibited, exuberant, average, and/or low reactive profiles. When both reactive and regulation traits were

included in the analyses, more nuanced profiles emerged that generally reflected subdivisions of the traditional reactivity profiles found in the literature but with varying levels of regulation. There were many similarities but important distinctions among the profile numbers, temperament patterns, and proportion sizes of the parent and teacher profile solutions. Neither child age nor child sex were found to be important predictors of profile membership. Despite its own limitations, the present study serves as a model for how previous methodological limitations in the field may be addressed to enhance our understanding of the complexity and nuances of temperament development and continue to push the field forward. Through such person-centered approaches, the field may one day guide parents, educators, and practitioners towards meeting the diverse needs of children with various temperament dispositions.

UNDERSTANDING PARENT AND TEACHER PERSPECTIVES OF TEMPERAMENT
PROFILES IN YOUNG CHILDREN

by

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Chapter 1: Introduction

Parents, educators, and practitioners who care for children know that each child is unique. One child may adapt to routines quickly while another may take many months to do so. One may feel shy around new people and in new settings, while another may approach new situations with enthusiasm. One may enjoy active and exciting activities, while another may prefer quiet and sedentary ones. Early individual differences such as these are referred to as temperament traits in the child development literature. Temperament traits are biologically based, present early in life, and considered to be relatively stable across time and situations (Rothbart & Bates, 2006).

In the temperament literature, most studies have taken a variable-centered approach, as they focus on identifying and measuring temperament traits and linking one or a few traits to later developmental outcomes (Zentner & Shiner, 2012). Thus, researchers have traditionally focused on the individual effects of specific temperament traits on child development. However, a child's development is not shaped by any one temperament trait, but by the complex combination and interaction of their many temperament traits together as they engage with their environment – or a child's unique temperament profile. The study of temperament profiles is considered a person-centered approach to understanding temperament, as it takes into consideration many traits that characterize an individual simultaneously.

Most temperament profile studies are of temperament traits demonstrated in infancy or toddlerhood; therefore, they tend to focus on children's reactive tendencies and how reactive profiles relate to later developmental outcomes. However, children's regulatory capacities drastically increase in the early years of life to also shape development, especially as children learn to adjust to the demands of school in preschool and kindergarten (Kochanska et al., 2000; Murphy et al., 1999). According to Rothbart's theory of temperament, the most widely accepted

temperament theory to date, reactivity and regulation are both central constructs to temperament (Rothbart et al., 2006). Yet, regulatory traits are rarely accounted for in temperament profile studies. Accounting for both reactive and regulatory traits seem to produce more nuanced profiles than those based only on reactive traits (Martin et al., 2020; Prokasky et al., 2017). Profiles demonstrated in the unique developmental period of kindergarten, in which children are first adjusting to the demands of school, may differ from those that have been reported in samples of younger children with less school and life experience (Prokasky et al., 2017) and older children with more experience (Martin et al., 2020).

Additionally, most temperament profile studies have measured temperament traits using observer ratings in unfamiliar lab conditions or behavior ratings by parents, again due to most studies exploring temperament profiles in infancy and toddlerhood. Studying temperament profiles among kindergarten children, rather than infants and toddlers, provides the opportunity to explore both parent and teacher perspectives of temperament profiles. Although agreement between parent and teacher behavior ratings is typically low (De Los Reyes & Kazdin, 2005), these informants have demonstrated similar perspectives of behavioral profiles in a sample of children ages 8 to 12 years (Martin et al., 2020). Congruence between parent and teacher perspectives of temperament profiles has yet to be explored in a sample of children in the developmental period between infancy and middle childhood. However, parent and teacher agreement on temperamental attributes of preschool and kindergarten age children is also low (Teglasi, et al, 2015).

The primary purpose of the present study is to fill a gap in the literature in which little is known about temperament profiles in young children considering both reactive and regulatory tendencies and according to both parent and teacher informants. This study also aims to help

parents, educators, and practitioners better understand the children whom they care for and inspire future studies of temperament in young children using person-centered frameworks and methodologies.

Chapter 2: Literature Review

As previously discussed, temperament traits comprise individual differences in reactive and regulatory responses to one's surroundings that are present early in life and relatively stable across time and situations (Rothbart & Bates, 2006). They influence developmental outcomes by shaping how one engages with their environment (Rothbart, Ahadi, & Evans, 2000; Rothbart & Bates, 2006). Temperament profiles capture combinations of traits that reflect a particular behavioral pattern or style (Martin et al., 2020). Temperament profile research is important for many reasons, including: 1) revealing how temperament traits combine and interact to shape the whole person; 2) shedding light on developmental pathways toward psychological adjustment; and 3) helping parents, educators, and practitioners understand the children whom they care for and modify their approaches to fit children's temperament needs. Therefore, the study of temperament profiles reflects a person-centered approach in psychological research and practice.

The Origins of Temperament Profile Research

Temperament profile research began when Alexander Thomas, Stella Chess, and colleagues interviewed parents about their infants' behavior beginning in the 1950s and followed the children into adulthood, known as the New York Longitudinal Study (NYLS; Thomas et al., 1968; Thomas et al., 1977). Expert consensus of the interviews identified nine temperament traits in infants as young as two months of age, including activity level, adaptability, approach/withdrawal, attention span/persistence, distractibility, intensity, mood, threshold, and rhythmicity (Thomas et al., 1968). The researchers noticed patterns among the relations between these traits and asserted that there were three temperament profiles among infants (Thomas et al., 1977). Easy infants, comprising 40% of their sample, adjusted easily to routines and new situations, generally demonstrated positive emotions, and calmed down quickly in the face of

distress. Difficult infants, comprising 10% of their sample, demonstrated difficulty adjusting to routines, reacted intensely and negatively to new situations, and had trouble calming down when distressed. Slow-to-warm-up infants, comprising 15% of their sample, showed initially negative reactions to new routines and situations, but adapted to new experience with exposure over time. Of note, although these three temperament profiles described much of the sample, their theoretical framework did not describe the behavioral patterns of the remaining 35% of the infants in the sample. Even still, Thomas and Chess' temperament framework was groundbreaking in the child development field, inspiring a new area of study.

The Extreme Group Approach

In the 1990s, Jerome Kagan and colleagues focused on linking early reactive tendencies in infancy with later temperament types and developmental outcomes in a series of studies involving predominantly White, middle class families (Kagan et al., 1987; Kagan & Snidman, 1991; Schwartz et al., 1996; Schwartz et al., 1999). Kagan and Snidman (1991) observed and rated initial motor activity levels and negative affect during an unfamiliar laboratory condition at four months, classifying infants as high reactive, low reactive, or neither based on score cutoffs. Infants who were either high or low reactive were tested again across a variety of unfamiliar lab conditions at 14 and 21 months. They found that infants who demonstrated high reactivity at four months later demonstrated profiles of high negative affect and low approach in the face of unfamiliar situations at 14 and 21 months of age. On the other hand, initially low reactive infants later demonstrated low negative affect and high approach profiles in the face of unfamiliar situations. Based on the previous work of Kagan and colleagues (1987), these profiles were identified as inhibited and uninhibited temperament types, respectively. Studies have since linked the inhibited type with later internalizing problems (Schwartz et al., 1999) and the

uninhibited type with externalizing problems (Schwartz et al., 1996) extending into adolescence.

Therefore, Kagan and colleagues demonstrated pioneering work linking early reactive tendencies

with major developmental outcomes later in life.

In the 1990s, Fox and colleagues expanded upon Kagan's work to account for positive

affect in examining infants' responses to unfamiliar situations (Calkins et al., 1996; Fox et al.,

2001). Using the same research design as Kagan and Snidman (1991), Fox et al. (2001) observed

and rated predominantly White infants' initial reactivity during unfamiliar lab conditions at four

months of age. The researchers classified the infants into three temperament types based on their

motor activity, negative affect, and positive affect scores: 1) an inhibited type (14%)

characterized by high motor activity, high negative affect, and low positive affect in infancy,

consistent with Kagan's work; 2) an exuberant type (11%) characterized by high motor activity,

high positive affect, and low negative affect in infancy; and 3) a low reactive type (14%)

characterized by low motor activity, negative affect, and positive affect. Consistent with previous

studies, Fox et al. (2001) found that inhibited infants exhibited more shyness and internalizing

problems and exuberant infants exhibited more sociability at four-years-old according to parent

ratings. Parent ratings of externalizing problems in early childhood were similar between the

inhibited and exuberant groups. Fox et al. (2001) demonstrated how subtleties within broad

temperament types may be revealed by simply accounting for an additional temperament trait.

Kagan and Fox's work inspired many future studies in the temperament literature further

examining the developmental trajectories of the inhibited and exuberant temperament types.

Kagan and Fox were pioneers who helped demonstrate the importance of temperament

and shape the temperament field, but their work was limited to the developmental trajectories of

a few extreme temperament profiles. Classifications of these extreme groups were based on score

cutoffs of a few reactivity traits demonstrated under very specific lab conditions – identified here as the extreme group approach. This methodological approach left approximately 60% of their full samples unaccounted for in their typologies and excluded from further analyses, leaving other researchers to wonder what other temperament profiles might exist among children.

The Cluster Analysis Approach

Cluster analysis refers to a family of exploratory analyses used to identify groups of cases that are more similar to each other across a number of variables than they are to cases in any other group based on distance between values (Mooi & Sarstedt, 2011). In temperament research, cluster analysis can be used to identify groups of participants with similar patterns of scores across temperament traits, otherwise known as behavioral types or profiles (Prokasky et al., 2017; Putnam & Stifter, 2005; Stifter et al., 2008). A major advantage of using cluster analysis to explore temperament profiles is that it classifies *all* participants with complete data in a sample into mutually exclusive groups, so it is not necessary to preemptively exclude participants based on score cutoffs. Some limitations of this approach include that it is nonparametric, sensitive to outliers due to its reliance on distance, and limited to continuous variables. The most common approach for using cluster analysis in temperament profile research is the application of both hierarchical and k-means clustering (Prokasky et al., 2017). When the number of clusters in the data are unknown, hierarchical clustering guides decision-making in determining the number of clusters that best fits the data (Hair et al., 2019). The technique involves linking pairs of cases with the smallest distance between them until all cases are linked into one cluster. Then, researchers examine dendrograms (which are tree diagrams displaying the distance at which individual cases were combined into clusters) to determine the cluster solution with the greatest differentiation between different clusters and the least distance within the same

cluster. Ultimately, the most appropriate number of clusters is determined by researchers'

judgement and theoretical framework. K-means clustering requires an a priori selection of the

number of clusters, informed by either the literature or hierarchical clustering (Mooi & Sarstedt,

2011). Cases are randomly assigned to the specified number of clusters, then reassigned to other

clusters until within-group variance is minimized and between-group distance is maximized.

Therefore, k-means clustering maximizes the homogeneity within each cluster. K-means

clustering is less sensitive to outliers than hierarchical clustering, but works best with clusters of

similar size. While these traditional clustering techniques have some drawbacks, their application

in temperament profile research has been hugely beneficial for the identification of person-

centered temperament profiles.

Putnam and colleagues expanded upon Fox's work by using cluster analysis, rather than

an extreme group approach, to explore reactive tendencies in predominantly White infants

(Putnam & Stifter, 2005; Stifter et al., 2008). Putnam and Stifter (2005) examined observer

ratings of two-year-olds' positive affect, negative affect, and approach/withdrawal during

unfamiliar lab conditions similar to those of Kagan and Fox. Hierarchical and k-means clustering

suggested a four-cluster solution of temperament types within the sample. A highly inhibited

group (2%) was characterized by high negative affect, low positive affect, and low approach. An

inhibited group (24%) demonstrated a similar, but less extreme, pattern of behavior as the highly

inhibited group. An exuberant group (38%) was characterized by high positive affect, high

approach, and low negative affect. Lastly, a low reactive group (36%) demonstrated low levels

of positive and negative affect and moderate levels of approach. Additionally, Putnam and

colleagues (Putnam & Stifter, 2005; Stifter et al., 2008) found that exuberant infants were most

likely to exhibit externalizing problems, inhibited infants were most likely to exhibit

internalizing problems, and low reactive infants were least likely to demonstrate either at ages two- and four-years-old according to parent ratings. Overall, the typology of Putnam, Stifter, and colleagues (Putnam & Stifter, 2005; Stifter et al., 2008) was very similar to those of Kagan (Kagan et al., 1987) and Fox (Fox et al., 2001). However, using cluster analysis allowed the researchers to describe their whole sample, rather than only describing extreme profiles.

Leading up to the 2000s, most study designs were characterized by the following characteristics: child temperament was represented by a select few reactivity traits (i.e., negative affect, positive affect, motor activity, and approach/withdrawal); temperament traits were measured by observer ratings during laboratory conditions unfamiliar to the child; temperament was measured within the first two years of life (although many studies followed-up on related variables later in childhood); score cutoffs were used to classify participants into extreme groups, as previously described; and samples were comprised of predominantly (sometimes entirely) White, middle class children and families. Therefore, temperament profile research was rather limited in scope until the 2010s.

In recent years, researchers have expanded the scope of temperament profile research in many ways. Major shifts in temperament profile research design stemmed from the work of Rothbart and colleagues, whose theoretical framework dates back to the 1980s but became the dominant temperament theory by the early 2000s (Rothbart, 1981, 1989; Rothbart & Derryberry, 1981; Rothbart & Posner, 1985; Rothbart et al., 2000). Previous conceptualizations of temperament were largely restricted to behavioral response patterns that emphasized individuals' affective qualities, or how they reacted to their environment. However, Rothbart et al. (2001) challenged the notion that temperament was synonymous with affective disposition, asserting that it also included regulatory skills that develop over time. For example, children's regulation

of their attention begins to develop at about 10 months of age and the executive function system develops rapidly throughout the toddler and preschool years (Posner & Rothbart, 1998; Rothbart et al., 2001). Much of Rothbart's work focused on refining the construct and measurement of temperament and understanding how temperament variables relate to each other via factor analysis.

Rothbart and colleagues developed the Children's Behavior Questionnaire (CBQ) to measure temperament in the developmental period between three to seven years of age using parent ratings (Rothbart et al., 2001). The measure included reactivity and self-regulation as central constructs of temperament. Reactivity refers to motor, affective, and sensory arousal tendencies (Rothbart & Derryberry, 1981), while self-regulation refers to the processes that modulate reactivity, such as attentional and behavioral control (Rothbart et al., 2001). The CBQ includes 15 composite scales, measuring 11 reactivity traits and 4 regulatory traits. These scales make up three broader temperament dimensions of surgency/extraversion, negative affectivity, and effortful control (Rothbart et al., 2001). The development of the CBQ allowed researchers to examine temperament after infancy, according to several reactive and regulatory traits, and in settings beyond one-time laboratory conditions. The CBQ has also been adapted into shorter versions for parents (Children's Behavior Questionnaire – Short Form; CBQ-SF; Putnam & Rothbart, 2006) and teachers (Children's Behavior Questionnaire – Teacher Short Form ; CBQ-TSF; Teglasi et al., 2015). Since its development, various versions of the CBQ have commonly been used in place of or in addition to laboratory conditions of temperament.

In accordance with Rothbart's theoretical framework, Prokasky et al. (2017) explored patterns among reactive *and* regulatory characteristics in young children using cluster analysis of parent ratings on the CBQ, instead of laboratory conditions, to measure temperament in

preschool children ages three to five years. Hierarchical and k-means clustering of five reactivity traits (i.e., motor activity, anger, approach, fear, and shyness) and two regulatory traits (i.e., attentional focusing and inhibitory control) suggested a six cluster solution of temperament types among each of three preschool samples. The three samples varied in child age (means of 50.64, 49.51, and 55.54 months), parent age (means of 35.39, 34.62, and 28.48 years), years of parent education (means of 16.46, 14.79, and 14.32 years), annual income (not directly comparable, but ~62% of one sample earned over $75,000 a year, ~89% of one sample earned less than $75,000, and one sample earned a mean of ~$56,000), and racial/ethnic makeup (not directly comparable, but one sample was predominantly White, one sample was 80% White and ~13% multiracial, and one sample was more nationally representative). The six temperament profiles found across the samples included: 1) an unregulated type characterized by high activity, anger, and approach, average fear and shyness, and very low attentional focusing and inhibitory control; 2) a high reactive type characterized by high anger and fear, average activity, attentional focusing, and inhibitory control, and average to high approach and shyness; 3) a bold type characterized by high activity and approach, average anger, attentional focusing, and inhibitory control, and very low fear and shyness; 4) an average type characterized by generally average scores, with the exceptions of low approach across all samples and high shyness in one sample; 5) a well-adjusted type characterized by high scores on the regulatory traits of attentional focusing and inhibitory control and average scores across all reactive traits; and 6) a regulated type characterized by very high scores on the regulatory traits, average fear and shyness, and very low activity, anger, and approach. The proportions of each temperament profile were not reported. The work of Prokasky et al. (2017) is notable for many reasons: the inclusion of multiple reactive and regulatory temperament traits using a person-centered approach provided more

nuanced temperament profiles than previous studies; the application of temperament profile research to preschool children has important implications for parents, early childhood educators, and practitioners; the use of parent ratings in place of laboratory conditions may have resulted in more accurate depictions of participants' temperament across time and situations; and diversity within and across the three samples enhanced the generalizability of the researchers' findings compared to previous studies.

The Latent Profile Analysis Approach

Latent profile analysis (LPA) is a model-based approach in the same statistical family as cluster analysis that reveals hidden groups in data by modeling the probability of each case belonging to different behavioral profiles (Ferguson et al., 2020). The purpose is to determine the smallest number of clusters that sufficiently describe observed associations among the variables included (Martin et al., 2020). Typically, a wide range of models with various numbers of clusters are tested and statistical criteria are applied to determine the model that best fits the data (Ferguson et al., 2020). LPA has many advantages compared to traditional clustering techniques, including that 1) cases are classified using a formal statistical model based on probabilities; 2) all available data is used, as model parameters can be informed by cases with missing data through maximum likelihood estimation; 3) variables may be continuous, categorical, or a combination of these; and 4) associations between profile membership and covariates (such as demographic variables) can be examined to further describe each profile (Magidson & Vermunt, 2004; Vermunt & Magidson, 2002). With such advantages, the use of LPA is considered the most modern, best practice approach for person-centered temperament profile research (Garstein et al., 2017). However, a major limitation of LPA is that proper profile membership is not clear-cut nor guaranteed, but indicated based on probabilities, which can make membership decisions

challenging for researchers. It is also a relatively new type of analysis for which best practices are still being developed and established.

Dollar et al. (2017) used a combination of LPA and multiple regression to explore the presence and developmental pathways of temperament profiles in a sample of young children entering kindergarten. The researchers used observer ratings during laboratory conditions similar to those of Kagan and Snidman (1991) to measure children's motor activity, positive affect, negative affect, and approach/withdrawal at 3.5-years-old. Using LPA, the results suggested there were three profiles of reactivity in the sample, including exuberant, inhibited, and average children, consistent with the typology of Fox et al. (2001). Using multiple regression, the researchers examined the interaction of each reactivity profile with specific regulatory traits to predict peer acceptance in kindergarten. Children's attentional focusing and inhibitory control were measured using parent ratings on the CBQ-SF prior to entering kindergarten. Children's peer acceptance was measured using parent ratings on the Peer Acceptance/Rejection scale of the MacArthur Health Behavior Questionnaire (HBQ; Armstrong & Goldstein, 2003) in the fall of their kindergarten year. The researchers found that inhibitory control was particularly important for exuberant children's acceptance by their peers, whereas attentional focusing was particularly important for inhibited children's peer acceptance. Dollar and et al. (2017) not only shed light on the roles of specific self-regulatory characteristics in predicting the developmental trajectories of children with different reactivity profiles, but extended the temperament profile research into kindergarten – when self-regulatory skills increase drastically and become particularly important for children's adjustment to school. While this study is notable for demonstrating how reactivity profiles interact with regulatory characteristics to predict important outcomes, it has several limitations. Because the temperament profiles were based solely on variables of reactivity, it is

unclear if the inclusion of regulatory variables in the LPA would have produced more nuanced temperament profiles, if certain reactive profiles are more or less likely to correspond with regulatory characteristics, and the proportions of various temperament profiles when accounting for regulatory tendencies. Additionally, it is unusual that the researchers used such different methods to measure children's reactive versus regulatory temperament characteristics, which may have underestimated the relations among these variables. Lastly, as with most studies in the temperament profile literature, the sample was comprised of predominantly White, middle class families, limiting the generalizability of the findings. Therefore, a similar study of temperament profiles among kindergarteners accounting for both reactive and regulatory traits using LPA would be valuable for the field.

Martin et al. (2020) analyzed parent and teacher ratings of behavioral characteristics across three nationally representative samples of children ages 8- to 12-years-old using LPA. Child participants included 1,150 children in the United States rated by their parents using the Survey of Individual Differences of Children and Adolescents (SIDCA), 912 children in the U.S. rated by their teachers using the Inventory of Child Individual Differences (ICID), and 538 Russian children rated by their parents using the ICID. The three large samples allowed the researchers to examine trends in behavioral profiles among parent and teacher ratings in the U.S. and parent ratings between two different cultural settings, the U.S. and Russia. Fifteen scales were used to measure eight behavioral tendencies, including activity level, irritability/antagonism, attention regulation, shyness, fear/insecurity, prosocial behavior, academic ability, and academic motivation. It is important to highlight that the researchers included specific scales pertaining to attentional control and disorganization but not behavioral control. For each sample, the researchers used LPA to test the fit of models with three to ten

groups. Then, the researchers combined each sample with another (U.S. and Russian parent ratings, U.S. parent and teacher ratings, Russian parent and U.S. teacher ratings) to examine the extent to which different models replicated across samples.

Martin et al. (2020) found that an eight-cluster model fit the data best across the samples, although one cluster was excluded because it only described 2% of the data. The seven most common behavioral profiles included: 1) Exceptionally Well-Adjusted High-Achievers characterized by much academic talent, motivation, positive emotion, and social competence; 2) High Average Self-Regulators characterized generally average scores, but demonstrating high average self-regulation, academic talent, and motivation and low average behavioral problems; 3) Low Average Self-Regulators characterized by generally average scores, but demonstrating low average self-regulation, academic talent, and motivation and high average behavioral problems; 4) Withdrawn High Achievers characterized by high shyness and insecurity as well as academic talent, motivation, and self-regulation; 5) Withdrawn Low Achievers characterized by high shyness and insecurity, low self-regulation and achievement, and much emotional, behavioral, and peer problems; 6) Poorly Regulated High Achievers characterized by poor attentional, behavioral, and emotional control but much academic talent; and 7) Poorly Regulated Low Achievers characterized by poor attentional, behavioral, and emotional control with low academic talent. The researchers concluded that these behavioral profiles described subdivisions of four broad temperament profiles typically found in previous studies, including well-adjusted, over-controlled, under-controlled, and average profiles, but further differentiated by varying levels of self-regulation and/or achievement. To the author's knowledge, no known study has used LPA to explore profiles of both reactive and regulatory characteristics in young children,

which may also yield subdivisions of the most commonly found temperament types with varying levels of self-regulation.

It is notable that Martin et al. (2020) found parents and teachers to have similar perspectives of temperament profiles among children in middle childhood. In the child development literature, convergence of parent and teacher perspectives using behavior ratings is typically rather low. This is not necessarily due to issues of reliability or validity in the informants' reports, but because each may observe unique behaviors, some behaviors may be situation specific, and/or certain behaviors may vary across situations (De Los Reyes & Kazdin, 2005; Dirks et al., 2012). Parents are most often used as informants in the measurement of child temperament, because they are exposed to the subtleties of a child's behavior across multiple settings on a daily basis. However, parents may have difficulty making accurate judgements about their child's behavior if they have limited experience with other children who are similar and different from the particular child (Rothbart & Bates, 1998; Rothbart & Goldsmith, 1985). Similarly to parents, teachers interact with the children in their classrooms almost daily. A major benefit of teacher report is that they have a normative reference point for child behavior given their regular exposure to children of various temperament dispositions (Saudino et al., 2005). However, teachers' observations are limited to school settings and the specific situations that arise in them (De Los Reyes et al., 2009). These situations tend to be more structured and demanding than most situations outside of school (De Los Reyes et al., 2009; Saudino et al., 2005). For example, in the classroom, students are expected to regulate their attention, behavior, and emotions to complete tasks and follow rules. Students who cannot meet these expectations may be perceived by their teachers as inattentive, impulsive, or difficult to manage. When children are at home, parents typically impose fewer restrictions upon them than teachers do and

allow for more choice, exploration, and expression. So, children who are perceived as difficult to manage at school may be perceived differently by their parents viewing them in more relaxed settings. On the other hand, children whose parents find them difficult to manage at home may benefit from the expectations and structure imposed by teachers at school. Therefore, differences between parent and teacher reports are generally expected and informative.

To the author's knowledge, no study has compared parent and teacher perspectives of temperament profiles among young children. Martin et al.'s (2020) finding that parents and teachers reported similar behavioral profiles in middle childhood suggests that these informants may also report similar temperament profiles among young children. Additionally, factor analyses of parent and teacher ratings of young children's temperament using the CBQ have shown similar underlying structures of temperament despite low agreement across informants about the attributes of particular children (Teglasi et al., 2015). Therefore, parents and teachers may report observing similar temperament profiles in a sample of young children, even if they demonstrate low agreement in their ratings.

The Present Study

The present study is largely inspired by Rothbart's theoretical framework of temperament (Rothbart & Bates, 2006) and Martin's person-centered typology research of middle childhood (Martin et al., 2020). The primary purpose of this study is to fill gaps in the temperament profile literature due to most previous studies focusing on reactivity in infants and toddlers, according to either parent perspectives in naturalistic settings or (more often) researcher perspectives in laboratory settings, and using methodologies that have since become outdated. The present study focused on temperament profiles considering both reactive and regulatory tendencies in young children, according to parent and teacher perspectives in naturalistic settings, and using more

modern methodologies. Ultimately, this study aims to help parents, educators, and practitioners better understand the young children whom they care for and inspire future person-centered studies of temperament in young children.

This study first looked at the same or similar reactivity variables that have previously been considered in the literature, but in a kindergarten sample, using parent and teacher ratings of child temperament, and the statistical technique of latent profile analysis (LPA). Then, the procedures were repeated but with the inclusion of both reactive and regulatory variables, which has rarely been done in previous studies. Parent and teacher ratings were analyzed separately. The best profile solutions for each informant were selected using multiple criteria and described. Then the profiles emerging from parent and teacher perspectives were compared with respect to the number of profiles, temperament patterns, and proportions falling within each profile. The following exploratory questions were posed:

1) *What profiles emerge when only reactive traits are included in the analyses?*

   Hypothesis 1: When only reactive traits were included in the analyses, the three to four profiles that have previously been found in the literature were expected to emerge, including inhibited, exuberant, average, and/or low reactive profiles.

2) *What profiles emerge when both reactive and regulatory traits are included in the analyses?*

   Hypothesis 2: When both reactive and regulatory traits were included in the analyses, subdivisions of the reactivity profiles that have previously been found in the literature were expected to emerge with varying levels of regulation, consistent with the findings of Prokasky and colleagues (2017) and Martin and colleagues (2020). More

specific hypotheses about profiles could not be made, because this study used different methodologies than did previous studies.

3) *To what extent are the best temperament profile solutions congruent across parent and teacher informants?*

Hypothesis 3: As in the study of Martin and colleagues' (2020) regarding older children, the profile numbers, temperament patterns, and proportion sizes of the best solutions of young children were expected to be similar, although not identical, across parent and teacher informants. Despite the expectation of similar profiles emerging, parents and teachers were not expected to classify the same children into the similar profiles, as convergence of parent and teacher perspectives using behavior ratings is typically rather low (De Los Reyes & Kazdin, 2005; Dirks et al., 2012; Teglasi et al., 2015). If the profiles of the best solutions were not comparable across informants, congruence in classification across informants could not be meaningfully addressed.

4) *Are child age and/or sex important predictors of profile membership, and if so, in what ways?*

Hypothesis 4: Child age and sex are expected to be predict profile membership. Based on previous research suggesting that self-regulation skills develop rapidly with age in early childhood (Kochanska et al., 2000; Murphy et al., 1999) and female children have more developed self-regulation than male children (Eisenberg et al., 2007; Olsen et al., 2005), profiles with higher levels of regulation are expected to be older and include more female children than profiles with lower levels of regulation. However, the effects of age on profile membership may be small, because the sample includes only kindergarten participants with a small age range.

Chapter 3: Methods

Design

The present study examined quantitative archival data collected as part of a larger study of the development of self-regulation and social competence in kindergarten children, the Teglasi Kindergarten Study (Annotti & Teglasi, 2017; Teglasi et al., 2015; Teglasi et al., 2017). Data includes temperament ratings by parents (Children's Behavior Questionnaire – Short Form; CBQ-SF; Putnam & Rothbart, 2006) and teachers (Children's Behavior Questionnaire – Teacher Short Form; CBQ-TSF; Teglasi et al., 2015), as well as some basic demographic information.

Data Collection and Procedures

The data were from new participants every school year from 2015 to 2019 with approval from the University of Maryland Institutional Review Board (IRB). The researchers obtained consent to conduct research from private schools with kindergarten students. Informed consent forms were distributed to all parents and teachers of kindergarten students at each school. Once informed consent was received, parents were given the CBQ-SF and teachers were given the CBQ-TSF to complete about each child participant. Other rating scales and laboratory tasks were administered that were not used in this study.

Each child participant was given an individual case number, under which all data were stored. Participant names and corresponding case numbers were kept in a master document, of which a hard copy was kept in a locked file cabinet and an electronic copy was kept in a password-protected spreadsheet. All measures were stored in locked file cabinets in the office of the principal investigator of the Teglasi Kindergarten Study, Dr. Hedwig Teglasi. Measures were scored and data were double entered into a Microsoft Excel spreadsheet by two independent

graduate researchers. Verified scores were transferred from Microsoft Excel into Mplus Version 8 for analysis.

Participants

Parent and teacher temperament ratings were available for 134 kindergarteners from the larger research sample. Parents also reported on child age, sex, and race/ethnicity and parent education level and occupation. The kindergarten participants were nested into 29 classrooms across 11 schools. The number of participants within each classroom and school varied greatly, as classrooms included 1 to 19 participants and schools included 1 to 42 participants. Across the school years, there were 41 participants in the 2015-2016 cohort, 36 in the 2016-2017 cohort, 28 in the 2017-2018 cohort, and 29 in the 2018-2019 cohort.

Kindergarten participants' ages ranged from 58 to 83 months ($M = 68.64$ months; $SD = 5.05$ months) and were normally distributed. The sample was comprised of 57% males and 43% females. The racial/ethnic makeup of the sample was 59% European American or White, 13% Asian American, 10% Multiracial, 8% African American or Black, 8% Latinx, and 2% Unknown. Information about parent education and occupation suggested that the sample was largely middle class.

Measures

The present study used the adapted Short Forms of the Children's Behavior Questionnaire to measure parents' (CBQ-SF; Putnam & Rothbart, 2006) and teachers' (CBQ-TSF; Teglasi et al., 2015) perspectives of each kindergarten participants' temperament. The CBQ-SF and CBQ-TSF measure all 11 reactivity traits and 4 self-regulatory traits of Rothbart's temperament theory for a total of 15 scales based on mean scores. These scales make up three broader temperament dimensions of surgency/extraversion, negative affectivity, and effortful

control (Rothbart et al., 2001). Informants were instructed to "read each statement and decide whether it is a true or untrue description of the above-named child's reaction within the past six months." Children are rated on 94 items, using a 7-point Likert scale ranging from 1 (*extremely untrue of your child*) to 7 (*extremely true of your child*). The items also include a Not Applicable (N/A) option to be selected if the informant has never seen the child in the situation described. Increases in scores reflect greater levels of each temperament trait. Among samples of young children, internal consistency values of have been reported to be acceptable for the CBQ-SF ($\alpha = .55 - .89$; Putnam & Rothbart, 2006; Teglasi et al., 2015) and CBQ-TSF ($\alpha = .68 - .92$; Teglasi et al., 2015).

In the present sample, scores were calculated for all 15 scales of the CBQ-SF and CBQ-TSF. For a summary of the descriptive statistics of each scale, see Tables 1 and 2. Most scales were normally distributed with the exceptions of slight negative skew for the perceptual sensitivity and smiling/laughter scales of the CBQ-SF, slight negative skew for the smiling/laughter and soothability scales of the CBQ-TSF, and slight positive skew for the anger scale of the CBQ-TSF. All scales demonstrated acceptable internal consistency, with α-values ranging from .60 to .90 for the CBQ-SF and .69 to .91 for the CBQ-TSF. The intercorrelations of the scales of the CBQ-SF and CBQ-TSF were examined (see Tables 3 and 4) and found to be consistent with those in the literature (Putnam & Rothbart, 2006; Teglasi et al., 2015).

Table 1

Parent CBQ-SF Scale Descriptive Statistics

CBQ-SF Scale	*n*	Mean	SD	Skewness	Kurtosis	α
Activity	134	4.66	.90	-.20	-.60	.72
Anger	134	4.16	1.13	-.26	-.54	.80
Approach	134	5.03	.81	-.41	.68	.62
Attentional Focusing	134	5.12	.95	-.66	.56	.73
Discomfort	134	4.24	1.20	-.12	-.46	.80
Fear	134	3.91	1.19	-.16	-.37	.74
High Intensity Pleasure	134	4.67	1.04	-.04	-.50	.75
Impulsivity	134	4.05	1.06	.00	.04	.71
Inhibitory Control	134	4.92	.96	-.32	-.44	.69
Low Intensity Pleasure	134	5.81	.60	-.22	-.49	.62
Perceptual Sensitivity	134	5.35	.93	-1.14	1.60	.73
Sadness	134	4.32	.86	-.33	-.09	.60
Shyness	134	3.65	1.50	.13	-.77	.90
Smiling/Laughter	134	5.97	.75	-1.14	1.92	.76
Soothability	134	4.78	1.02	-.33	-.35	.80

Table 2

Teacher CBQ-TSF Scale Descriptive Statistics

CBQ-TSF Scale	*n*	Mean	SD	Skewness	Kurtosis	α
Activity	134	4.37	1.23	.24	-.88	.84
Anger	134	2.59	1.34	1.10	.52	.86
Approach	134	4.54	.87	.07	.26	.76
Attentional Focusing	134	4.98	1.14	-.89	.70	.79
Discomfort	134	3.26	1.04	.60	-.08	.80
Fear	134	2.60	1.03	.95	2.01	.79
High Intensity Pleasure	134	4.46	1.27	.12	-.79	.91
Impulsivity	134	4.09	1.14	.28	-.74	.77
Inhibitory Control	134	4.83	1.15	-.93	.94	.80
Low Intensity Pleasure	134	4.95	.77	-.18	-.04	.71
Perceptual Sensitivity	132	4.53	1.11	-.70	.40	.81
Sadness	134	3.03	.97	.07	-.05	.69
Shyness	134	3.15	1.21	.38	-.36	.87
Smiling/Laughter	134	5.63	.80	-1.28	2.79	.76
Soothability	134	4.97	.97	-1.40	2.29	.74

Table 3

Parent CBQ-SF Scale Intercorrelations

Scale	Activity	Anger	Appro	Atten Focus	Discom	Fear	High Intens	Impuls	Inhibit	Low Intens	Pers Sens	Sad	Shy	Smil	Sooth
Activity	-														
Anger	.19*	-													
Approach	.41**	.19*	-												
Attention	-.27**	-.27**	-.03	-											
Discomfort	-.11	.33**	-.06	-.12	-										
Fear	-.20*	.25**	-.07	-.06	.32**	-									
High Intensity	.64**	.18*	.36**	-.15	-.18*	.25**	-								
Impulsivity	.58**	.10	.49**	-.19*	-.16	-.22*	.55**	-							
Inhibitory Control	-.30**	-.47**	-.10	.48**	-.06	-.09	-.31**	-.26**	-						
Low Intensity	-.09	-.09	.05	.27*	.06	-.08	-.05	-.02	.36**	-					
Perceptual Sensitivity	-.05	-.07	.12	.16	.21*	.23**	-.03	-.15	.28**	.29**	-				
Sadness	-.01	.46**	.14	-.15	.34**	.40**	-.04	-.03	-.27*	.05	.09	-			
Shyness	-.23**	.24**	-.31**	-.10	.15	.27**	-.19*	-.60**	-.06	-.11	.12	.09	-		
Smile/Laugh	.13	-.06	.31**	.09	.00	-.05	.04	.23**	.07	.29**	.08	.03	-.39**	-	
Soothability	-.06	-.60**	-.05	.21*	-.30**	-.23*	-.02	.06	.48**	.26**	.25**	-.36**	-.23**	.21*	-
Age	.05	-.01	.00	.09	-.09	.10	.09	.09	.06	-.10	.01	-.13	-.07	.08	.08
Sex[a]	.10	.05	.11	-.12	.12	-.06	-.02	.12	.14	.19*	.12	.00	-.02	.04	.02

* $p < .05$
** $p < .01$
[a] 1 = male and 2 = female

Table 4

Teacher CBQ-SF Scale Intercorrelations

Scale	Activity	Anger	Appro	Atten Focus	Discom	Fear	High Intens	Impuls	Inhibit	Low Intens	Pers Sens	Sad	Shy	Smil	Sooth
Activity	-														
Anger	.41**	-													
Approach	.61**	.26**	-												
Attention	-.39**	-.23**	-.21*	-											
Discomfort	.02	.28**	.20*	-.12	-										
Fear	-.21*	.19*	.00	-.07	.44**	-									
High Intensity	.63**	.26**	.45**	-.15	-.13	-.24**	-								
Impulsivity	.76**	.31**	.53**	-.35**	.00	-.24**	.48**	-							
Inhibitory Control	-.58**	-.43**	-.36**	.72**	-.08	.08	-.34**	-.52**	-						
Low Intensity	-.29**	-.01	.02	.32**	.21*	.16	-.21*	-.15	.29**	-					
Perceptual Sensitivity	-.28**	.03	-.09	.23**	.01	.03	-.12	.00	.30**	.28*	-				
Sadness	-.10	.54**	.00	-.11	.42**	.48**	-.04	-.21*	-.02	.13	.20*	-			
Shyness	-.37**	-.03	-.26**	.08	.08	.37**	-.17	-.58**	.24**	.02	-.16	.24**	-		
Smile/Laugh	.35**	-.06	.41**	.01	-.07	-.16	.35**	.42**	-.21*	.08	-.05	-.30**	-.42**	-	
Soothability	-.28**	-.66**	-.22**	.35**	-.36**	-.28*	-.12	-.13	.46**	.06	.16	-.44**	-.09	.06	-
Age	.15	-.03	.09	-.09	.02	.10	.11	.15	-.07	-.34**	.08	-.08	-.12	.14	-.09
Sex[a]	-.16	-.13	-.12	-.06	.07	.16	-.33*	.04	.05	.30*	.20*	-.06	.00	.06	.13

* $p < .05$

** $p < .01$

[a] 1 = male and 2 = female

Rationale for Selecting Variables

In latent profile analyses of reactivity, decisions for inclusion of CBQ scales were largely based on the reactivity traits most commonly studied in previous temperament profile research. Variance in motor activity has previously been established as an important contributor in behavior profiles of children in infancy (Fox et al., 2001; Kagan & Snidman, 1991), early childhood (Dollar et al., 2017; Prokasky et al., 2017), and middle childhood (Martin et al., 2020). Variance in approach has been established as an important contributor in early childhood (Dollar et al., 2017; Kagan & Snidman, 1991; Prokasky et al., 2017; Putnam & Stifter, 2005). Variance in positive affect, which will be examined in the present study by the smiling/laughter scale of the CBQ, has been established as a contributor in infancy (Calkins et al., 1996; Fox et al., 2001) and early childhood (Dollar et al., 2017; Putnam & Stifter, 2005). Lastly, variance in negative affect has also been established as an important contributor in infancy (Fox et al., 2001; Kagan & Snidman, 1991), early childhood (Dollar et al., 2017; Prokasky et al., 2017), and middle childhood (Martin et al., 2020). Negative affect has typically been measured broadly in studies using unfamiliar laboratory conditions (Dollar et al., 2017; Fox et al., 2001; Kagan & Snidman, 1991), but more specific negative emotions (i.e., anger/irritability and fear) have occasionally been measured in studies using parent and/or teacher ratings (Martin et al., 2020; Prokasky et al., 2017). Because negative affect has more often been unspecified in previous studies, all specific negative emotion scales of the CBQ (i.e., anger, discomfort, sadness, and fear) were included in the reactivity profile analyses of the present study. While the soothability scale of the CBQ is also considered a part of the construct of negative affectivity according to Rothbart's theory and previous factor analytic work of the CBQ (Putnam & Rothbart, 2006; Rothbart et al., 2001; Teglasi et al., 2015), it was excluded from the reactivity analyses because it was considered a

measure of emotion regulation in the context of the present study. Therefore, profile analyses of reactivity traits in the present study included activity, approach, positive affect (smiling/laughter), anger, discomfort, fear, and sadness scales.

In latent profile analyses of both reactivity and regulation, the original objective was to include all 15 scales of the CBQ due to the exploratory nature of the study. However, preliminary analyses with all 15 variables suggested that there were too few degrees of freedom given the sample size and number of variables to provide adequate power for such analyses. Instead, each of the 15 CBQ scales was individually considered for inclusion in the reactivity and regulation profile analyses. Decisions for inclusion were based largely on theoretical importance and previous factor analytic work of the CBQ, including factor analyses of the CBQ-SF and CBQ-TSF (Putnam & Rothbart, 2006; Rothbart et al., 2001; Teglasi et al., 2015). Some variables were considered to be conceptually distinct and remained separate variables. Other scales were combined into composite variables based on conceptual similarities, previous factor analytic work, and present intercorrelations. Composite variables were created by taking the mean of the items across multiple scales. Definitions, conceptualization under Rothbart's original framework for the CBQ, and inclusion decisions for each of the CBQ scales in the reactivity and regulation profile analyses are summarized in Table 5.

Table 5

Present Study Variables Drawn from the CBQ

CBQ Factors	CBQ Scales	CBQ Scale Definitions	Present Study Variables
Surgency/ Extraversion	Activity	Level of gross motor activity including rate and extent of locomotion	Exuberance
	Approach	Amount of excitement and positive anticipation for expected pleasurable activities	
	High Intensity Pleasure	Amount of pleasure or enjoyment related to situations involving high stimulus intensity, rate, complexity, novelty and incongruity	
	Shyness	Slow or inhibited approach in situations involving novelty or uncertainty; reverse scored when composited	
	Impulsivity	Speed of response initiation	–
	Smiling/Laughter	Amount of positive affect in response to changes in stimulus intensity, rate, complexity, and incongruity	Positive Affect
Negative Affectivity	Anger	Amount of negative affect related to interruption of ongoing tasks or goal blocking	Anger
	Fear	Amount of negative affect pertaining to unease, worry or nervousness related to anticipated pain or distress and/or potentially threatening situations.	Internalizing Emotion
	Sadness	Amount of negative affect and lowered mood and energy related to exposure to suffering, disappointment, and/or object loss	
	Discomfort	Amount of negative affect related to sensory qualities of stimulation, including intensity, rate, or complexity of light, movement, sound, texture	-
	Soothability	Rate of recovery from peak distress, excitement, or general arousal	Emotion Regulation
Effortful Control	Attentional Focusing	Tendency to maintain attentional focus upon task-related channels	Behavior Regulation
	Inhibitory Control	The capacity to plan and to suppress inappropriate approach responses under instructions or in novel or uncertain situations	
	Low Intensity Pleasure	Amount of pleasure or enjoyment related to situations involving low stimulus intensity, rate, complexity, novelty and incongruity	Low Intensity Pleasure
	Perceptual Sensitivity	Amount of detection of slight, low intensity stimuli from the external environment	Perceptual Sensitivity

From the surgency/extroversion factor of the CBQ, the activity, approach, high intensity pleasure, and shyness scales were each deemed to be theoretically important for the present study. They were considered to similarly reflect one's energy, excitability and approach tendency and also shared moderate to strong intercorrelations (see Tables 3 and 4). Therefore these

variables were combined into a composite measure of exuberance with shyness being reverse-scored. The exuberance composite scale was normally distributed and demonstrated acceptable internal consistency (see Tables 6 and 7). The smiling/laughter scale from the surgency/extroversion factor was also included in the analyses, but remained a separate variable due to its conceptual distinctions as a measure of positive affect and less consistent intercorrelations with the other scales of the factor in the present study. The impulsivity scale of this factor, which is a measure of response initiation speed, was excluded from further analyses for two reasons. First, the content of the items suggested that the scale reflected an inherent lack of regulation (e.g., "usually rushes into an activity without thinking about it"), which may have confounded the exuberance and regulation variables. Secondly, due to the strong correlations of the impulsivity scale with the activity and shyness scales, some aspects of impulsivity were believed to already be reflected in the exuberance composite without adding the potentially confounding items. Therefore, the present study included the variables of exuberance and positive affect from the surgency/extroversion factor of the CBQ.

From the negative affectivity factor of the CBQ, the anger, fear, sadness, and soothability scales were each deemed to be theoretically important. The fear and sadness scales of this factor were thought to similarly reflect the internalization of emotion and shared moderate intercorrelations (see Tables 3 and 4), and were combined into a composite measure of internalizing emotion. The internalizing emotion composite scale was normally distributed and demonstrated acceptable internal consistency (see Tables 6 and 7). The anger scale of this factor remained a separate variable due to its conceptual distinctions as a measure of the externalization of emotion. The soothability scale of this factor, which is the rate of recovery from arousal of both positive and negative emotions, also remained a separate variable due to its conceptual

distinctions as a measure of emotion regulation. The discomfort scale of this factor, which represents the tendency to experience negative emotion in response to physical discomfort, such as being sick, cold, or hurt, was deemed to be conceptually distinct from the other scales of this factor. However, it was not considered to be of particular interest in the reactivity and regulation analyses and was excluded. Therefore, the present study included the variables of anger, internalizing emotion, and emotion regulation from the negative affectivity factor of the CBQ.

From the effortful control factor of the CBQ, the attentional focusing, inhibitory control, low intensity pleasure, and perceptual sensitivity scales were all deemed to be theoretically important. The attentional focusing and inhibitory control scales of this factor were thought to similarly reflect aspects of behavior regulation and shared strong intercorrelations (see Tables 3 and 4), therefore were combined into a composite measure of behavior regulation. The behavior regulation composite scale was normally distributed and demonstrated acceptable internal consistency (see Tables 6 and 7). The low intensity pleasure and perceptual sensitivity scales were also thought to similarly reflect aspects of information processing and shared moderate intercorrelations (see Tables 3 and 4). However, they remained as separate variables because they have been understudied in the temperament profile literature and their unique contributions to behavioral profiles are unknown. Therefore, the present study included the variables of behavior regulation, low intensity pleasure, and perceptual sensitivity from the effortful control factor of the CBQ. For intercorrelations of parent and teacher variables included in further analyses, see Tables 8 and 9.

Of the variables that were selected for inclusion in the latent profile analyses of either reactivity or both reactivity and regulation, agreement between parent and teacher perspectives of the kindergarteners varied greatly (see Table 10). Convergence across informants was

moderately strong in several areas, which tended to be those that were more easily observable, such as aspects of exuberance (i.e., activity, high intensity pleasure, and shyness), aspects of behavior regulation (i.e., attentional focusing and inhibitory control), and anger. There was also little to no convergence in several areas, which tended to pertain to internal experiences and were likely more difficult to observe directly, such as aspects of internal emotions (i.e., discomfort, fear, and sadness) and information processing (i.e., low intensity pleasure and perceptual sensitivity). There was also no convergence of approach, an aspect of exuberance. This may be due to school activities being rather consistent, predictable, and modelled by peers, compared to activities outside of school which are possibly more varied and unexpected. Low convergence between parent and teacher perspectives of children's behavior is consistent with the literature and, therefore, expected (De Los Reyes & Kazdin, 2005; Dirks et al., 2012; Teglasi et al., 2015).

Table 6

Descriptive Statistics of Parent-Rated Variables

Variable	*n*	Mean	SD	Skewness	Kurtosis	α
Exuberance	133	4.51	.57	-.12	-.25	.77
Activity	133	4.68	.89	-.18	-.61	.72
Approach	133	5.03	.81	-.42	.70	.62
High Intensity Pleasure	133	4.68	1.03	-.02	-.50	.75
Shyness	133	3.63	1.50	.12	-.77	.90
Positive Affect	133	5.99	.70	-.83	.45	.76
Anger	133	4.16	1.13	-.25	-.54	.80
Internalizing Emotion	133	4.11	.86	-.33	-.04	.75
Fear	133	3.90	1.18	-.15	-.35	.74
Sadness	133	4.32	.86	-.33	-.12	.60
Emotion Regulation	133	4.80	1.02	-.35	-.30	.80
Behavior Regulation	133	5.01	.81	-.51	.26	.79
Attentional Focusing	133	5.11	.95	-.68	.59	.73
Inhibitory Control	133	4.91	.95	-.31	-.43	.69
Low Intensity Pleasure	133	5.81	.59	-.22	-.48	.62
Perceptual Sensitivity	133	5.34	.93	-1.14	1.62	.73

Table 7

Descriptive Statistics of Teacher-Rated Variables

Variable	n	Mean	SD	Skewness	Kurtosis	α
Exuberance	133	4.14	.69	.23	-.34	.77
Activity	133	4.38	1.22	.24	-.88	.84
Approach	133	4.54	.87	.07	.26	.84
High Intensity Pleasure	133	4.59	1.26	.06	-.85	.91
Shyness	133	3.13	1.21	.40	-.33	.87
Positive Affect	133	5.63	.80	-1.28	2.79	.76
Anger	133	2.58	1.31	1.09	.54	.86
Internalizing Emotion	133	2.81	.88	.26	.23	.82
Fear	133	2.62	1.03	1.03	2.38	.79
Sadness	133	3.04	.98	.07	.02	.69
Emotion Regulation	133	4.97	.97	-1.40	2.28	.76
Behavior Regulation	133	4.91	1.06	-.99	1.23	.88
Attentional Focusing	133	4.98	1.14	-.89	.67	.79
Inhibitory Control	133	4.82	1.16	-.91	.88	.80
Low Intensity Pleasure	133	4.93	.78	-.11	.04	.71
Perceptual Sensitivity	131	4.56	1.10	-.71	.47	.81

Table 8

Intercorrelations of Parent-Rated Variables

Variable	Exuberance	Positive Affect	Anger	Internal. Emotion	Emotion Regulation	Behavior Regulation	Low Intensity	Percep. Sensiti.
Exuberance	-							
Positive Affect	-.08	-						
Anger	.38**	-.06	-					
Internalizing Emotion	.02	-.02	.40**	-				
Emotion Regulation	-.21*	.21*	-.60**	-.34**	-			
Behavior Regulation	-.34**	.09	-.43**	.18*	.41**	-		
Low Intensity Pleasure	-.10	.29**	-.09	-.03	.26**	.37**	-	
Perceptual Sensitivity	.08	.08	-.07	.20*	.25**	.25**	.29**	-
Age	.01	.08	-.01	-.05	.08	.09	-.10	.01
Sex[a]	.05	.04	.05	.00	.02	.01	.19*	.12

* $p < .05$
** $p < .01$
[a] 1 = male and 2 = female

Table 9

Intercorrelations of Teacher-Rated Variables

Variable	Exuberance	Positive Affect	Anger	Internal. Emotion	Emotion Regulation	Behavior Regulation	Low Intensity	Percep. Sensiti.
Exuberance	-							
Positive Affect	.26**	-						
Anger	.39**	-.06	-					
Internalizing Emotion	.00	-.25**	.48**	-				
Emotion Regulation	.29**	.06	-.66**	-.42**	-			
Behavior Regulation	-.39**	-.11	-.40**	-.02	.43**	-		
Low Intensity Pleasure	-.21*	.08	-.01	.17	.06	.27**	-	
Perceptual Sensitivity	.25**	-.05	.03	.14	.16	.26**	.28*	-
Age	.10	.14	-.03	-.02	-.09	-.08	-.34**	.08
Sex[a]	-.27**	.06	-.13	.03	.13	.00	.30*	.20*

* $p < .05$
** $p < .01$
[a] 1 = male and 2 = female

Table 10

Convergence of Parent and Teacher Ratings

Variable	r
Exuberance	.13[a]
Activity	.34**
Approach	.00
High Intensity Pleasure	.32**
Shyness	.36**
Positive Affect	.12[a]
Anger	.23**
Discomfort	.05
Internalizing Emotion	.12[a]
Fear	.09
Sadness	.11
Emotion Regulation	.18*
Behavior Regulation	.46**
Attentional Focusing	.38**
Inhibitory Control	.49**
Low Intensity Pleasure	.00
Perceptual Sensitivity	.13[a]

* $p < .05$
** $p < .01$
[a] Trending towards significance at $p < .10$

Data Analytic Procedures

Procedures for Missing Data

Item-level data of the present study were examined. Some raters, especially teachers, selected the Not Applicable (N/A) option in their ratings of the kindergarteners. Raters indicated that items were N/A for .7% of all parent items using the CBQ-SF and 6.3% of all teacher items on the CBQ-TSF. Regarding truly missing data, only .08% of all parent items using the CBQ-SF and .07% of all teacher items on the CBQ-TSF were left blank. No item was missing more than 1.7% of data for the CBQ-SF and 2.2% of data for the CBQ-TSF.

CBQ guidelines indicate that 'Not Applicable' and missing item responses should be replaced with the mean of the available numeric responses for the items of the scale. Researchers using the CBQ typically follow these guidelines. In accordance with these guidelines, the scale scores for each participant were calculated by taking the mean of their available items for each scale. Two teachers were found to have selected N/A for all items of the perceptual sensitivity scale of the CBQ-TSF. Because there was no available data to calculate these scale scores, they were estimated using Full Information Maximum Likelihood (FIML). FIML estimates the value of the population parameter by determining the value that maximizes the likelihood function based on the available data of the sample.

Procedures for Outliers

To determine the presence of multivariate outliers, the Mahalanobis distance of each case was calculated based on the variables included in the latent profile analyses of parent and teacher ratings (7 reactivity variables and 8 reactivity/regulation variables). The Mahalanobis distance is a measure of distance relative to a central point in multivariate space that reflects the overall mean of multivariate data. A large Mahalanobis distance with a *p*-value of < .001 indicates a

highly unusual case. In examining the Mahalanobis distances for the different sets of variables, one case among the parent ratings and no cases among the teacher ratings emerged as outliers. The case was excluded from all subsequent analyses, bringing the overall sample size from 134 to 133 participants for the latent profile analyses.

Procedures for Latent Profile Analyses

Latent profile analysis (LPA) was used to estimate models of behavioral profiles among kindergarteners based on patterns among parent and teacher ratings of temperament traits. First, models of reactivity traits were estimated using seven variables, including activity, approach, positive affect (smiling/laughter), anger, discomfort, fear, and sadness (see Appendices A and B for examples of *Mplus* coding). Then, models of reactivity and regulatory traits were estimated using eight variables, including exuberance, positive affect (smiling/laughter), anger, internalizing emotion, emotion regulation (soothability), behavior regulation, low intensity pleasure, and perceptual sensitivity (see Appendix C and D for examples of *Mplus* coding). Because some of the raw data were not normally distributed, the Maximum Likelihood with Robust Standard Errors (MLR) module in *Mplus* was used to develop maximum likelihood parameter estimates with standard errors that were robust to deviations from normality in the data. While the best approach for modelling the data would likely be to allow the means, variances, and covariances to vary freely, there were too few degrees of freedom given the sample size and number of variables of the present study to provide adequate power for this approach. Because mean differences across profiles were of primary interest in the present study, only means were allowed to vary while variances were restricted to be equal and covariances were restricted to be zero across profiles.

Models of two to eight temperament profiles were estimated and final profile solutions were selected using multiple criteria, including entropy values to indicate classification certainty (with values of > 0.60 suggesting adequate certainty and > 0.80 suggesting strong certainty; Clark & Muthén, 2009; Jung & Wickrama, 2008; Muthén, 2004), Sample-Adjusted Bayesian Information Criterion (SABIC) values to indicate goodness-of-fit (with lower values suggesting better fit due to less discrepancy between the observed and predicted covariance matrices), Adjusted Lo-Mendell-Rubin (ALMR) likelihood ratio tests to statistically compare the relative fit of two models with k-1 classes versus k classes (with a significance level of $p < 0.05$ suggesting that the model with k-1 classes should be rejected in favor of the model with k classes), and theoretical plausibility of group profiles and proportion sizes. Small groups with less than or equal to four participants or about 3% of the overall sample were examined and remained separate if theoretically plausible and conceptually distinct, combined with another profile if theoretically plausible but conceptually similar to a larger profile, or discarded if not supported by theory. Once final parent and teacher profile solutions were selected, congruence across raters was examined based on the number of profiles, profile patterns, and proportion sizes across raters.

Procedures for Nesting Effects

Kindergarten participants were nested within 29 classrooms across 11 schools. Each teacher rated as few as 1 and as many as 19 kindergarten participants. It is important to address possible nesting effects in models that assume independence of observations because such models will otherwise underestimate standard errors and increase the likelihood of false positive results. Nesting effects can be addressed by adjusting the standard errors and/or fit statistics through either design-based or model-based methods (McNeish & Harring, 2017). In design-

based methods, a separate general linear model is estimated, which provides standard errors that are robust to misspecifications of the covariance matrix to replace the original standard errors. In model-based methods, nesting is handled directly as a specific part of the model and between and within group variation is estimated as random effects. In the present study, a design-based method was used to address possible nesting effects for the following reasons: 1) nesting was viewed as a methodological issue to be addressed; 2) specific between and within group effects were not of interest in this study; and 3) such an approach would not put further strain on the statistical power of the analyses. The COMPLEX module in *Mplus* was used to adjust the standard errors through a heteroscedasticity-corrected covariance estimator or sandwich estimator.

Whether using a design-based or model-based method, both approaches can produce downwardly biased standard errors through likelihood-based estimation when the number of nesting or clustering units is not adequately large. For design-based approaches, the typical recommendation is to have 50 clustering units for continuous outcomes (Emrich & Piedmonte, 1992; Gunsolley et al., 1995; Mancl & DeRouen, 2001; Morel et al., 2003; Pan & Wall, 2002), although simulation studies suggest that 20-30 clustering units will suffice (Maas and Hox, 2004, 2005). In the present study, the clustering unit size for nesting at the classroom level is 29. Due to concerns that addressing nested effects may produce downwardly biased estimates in the present study, teacher ratings were analyzed both with and without adjusting the standard errors to address nested effects at the classroom level. Adjusting the standard errors affects significance tests, but not parameter estimates. So, the profiles that emerged from the model solutions remained the same, regardless of whether or not the standard errors were changed, while the *p*-values of the likelihood ratio tests were adjusted.

Procedures for Covariate Effects

Multinomial logistic regression was used to examine if the covariates of child age and sex were important predictors of profile membership according to parents and teachers. While the author would have liked to examine if child race/ethnicity and family socioeconomic status were also important predictors of profile membership, this could not be meaningfully assessed due to limitations in the data available. Various racial groups were represented in the sample, but the sizes of such groups were too disproportionate to be fairly compared. Data were collected on parent occupation and education level, which suggested that the sample was largely middle class, but family income was not ascertained. Therefore, there was not enough information available to fairly compare socioeconomic status either.

Child age and sex were found to be correlated with certain temperament traits according to parents and/or teachers (see Tables 8 and 9). Age was negatively correlated with low intensity pleasure according to teachers, such that older children were found to be less content with low intensity activities. Sex was positively correlated with low intensity pleasure according to both parents and teachers, such that females were found to be more content with low intensity activities than males. Additionally, according to teachers, sex was positively correlated with perceptual sensitivity, such that females were found to be more sensitive to changes in their environments than males. Teachers also reported that sex was negatively correlated with exuberance, such that females were found to be less exuberant than males. Using the AUXILIARY option in *Mplus*, membership for each latent profile based on posterior probability served as categorical variables and was regressed onto child age and sex.

Chapter 4: Results

Latent Profile Analyses of Reactivity

To facilitate discussions and comparisons of the various reactivity profiles that emerged from the latent profile analyses, a general naming convention was used to provide a shorthand label for each profile (see Table 11). Profiles that showed overall elevated, average, or decreased levels across most or all variables of exuberance, positive emotional reactivity, and negative emotional reactivity were labelled as 'high Reactive', 'average reactive', or 'low reactive', respectively. Most profiles required more nuanced labels based on their unique patterns of variation across the reactivity variables. Profiles that showed elevated levels of both activity and approach were labelled as 'exuberant' to be consistent with the literature. Those that showed decreased levels of these variables were labelled as 'reserved' - unless they also showed elevated levels of at least one variable of negative emotional reactivity, in which case they were labeled as 'inhibited' to be consistent with the literature. Profiles that showed elevated levels of positive affectivity were labelled as 'positively emotionally reactive'. Profiles that showed elevated levels across most or all negative emotional reactivity variables, including anger, discomfort, fear, and sadness, were labelled as 'negative emotionally reactive'. Some profiles were elevated in only one variable of negative emotional reactivity, in which case they were labelled as being 'prone to' that particular emotion. It is important to note that, while these were the general labels used to describe the profiles, not all profiles fit neatly into this naming convention. Therefore, some profiles were given the most similar label according to the naming convention or given a unique label as needed to keep profile labels relatively brief and simple.

Table 11

Descriptive Labels for Profiles of Reactivity

Profile Label	Description
High Reactive	Elevated levels across most or all variables of exuberance, positive emotional reactivity, and negative emotional reactivity
Average Reactive	Average levels across most or all variables of exuberance, positive emotional reactivity, and negative emotional reactivity
Low Reactive	Decreased levels across most or all variables of exuberance, positive emotional reactivity, and negative emotional reactivity
Exuberant	Elevated levels of both activity and approach
Reserved	Decreased levels of both activity and approach
Inhibited	Reserved, but with elevated levels in at least one variable of negative emotional reactivity
Positively Emotionally Reactive	Elevated levels of positive affectivity
Negatively Emotionally Reactive	Elevated levels across all or most variables of negative emotional reactivity
Prone to (Anger, Discomfort, Fear, Sadness)	Elevated levels in one variable of negative emotional reactivity

Reactivity Profiles According to Parents

Of the solutions with two to eight profiles based on parent ratings of reactivity, the two-profile solution was the only one to have a significant likelihood ratio test, suggesting that two profiles describe the data better than none. However, all solutions demonstrated adequate entropy and the SABIC values descended as the number of profiles increased, suggesting increasingly better fit. Therefore, the theoretical plausibility of each profile solution was considered in determining the best solution. The effects of child age and sex were not significant across any of the profile solutions. See Table 12 for a summary of the statistical qualities of the various solutions of parent-rated reactivity. See Appendix E for the means and standard deviations of each profile across the various solutions.

Table 12

Summary of Parent-Rated Reactivity Solutions

# of Profiles	Entropy	SABIC	Log Likelihood	*p*-Value	# of Cases in Each Profile	# of Free Parameters	Age and Gender Effects
2	.698	2501.83	42.75	.0043	1: 64 2: 69	22	None
3	.686	2480.61	34.16	ns	1: 53 2: 45 3: 35	30	None
4	.774	2471.15	22.70	ns	1: 50 2: 16 3: 18 4: 49	38	None
5	.842	2459.79	25.28	ns	1: 4 2: 7 3: 61 4: 42 5: 19	46	None
6	.810	2452.17	20.90	ns	1: 4 2: 4 3: 34 4: 30 5: 21 6: 40	54	None
7	.830	2441.14	22.99	ns	1: 6 2: 5 3: 2 4: 19 5: 40 6: 31 7: 30	62	None
8	.849	2433.54	21.60	ns	1: 4 2: 40 3: 6 4: 19 5: 17 6: 36 7: 4 8: 7	70	None

After carefully considering each solution of parent-rated reactivity, the three-profile solution was deemed to be the best solution (see Figure 1). The extracted profiles of the three-profile solution were all moderate in size with some variation in proportion. Profile 1 was comprised of 53 cases (40%) and characterized by moderately low levels of anger, discomfort,

fear, and sadness. Profile 2 was comprised of 45 cases (34%) and characterized by moderately high levels of activity, approach, anger, and sadness. Profile 3 was comprised of 35 cases (26%) and characterized by moderately low levels of activity, approach, and positive affect and moderately high fear. The three profiles were described as 'low to average reactive', 'exuberant', and 'inhibited', respectively. These profiles were found to be very consistent with those previously found in the literature using other methodologies.

The solution with fewer than three profiles was found to lack an expected profile (e.g., 'exuberant'). Solutions with more than three profiles tended to have one or more profiles that were highly nuanced (e.g., 'prone to sadness'), did not make much theoretical sense (e.g., 'energetic reactive), and/or were very small in size (e.g., 'low reactive' and 'positively emotionally reactive'). For more information about the other solutions of parent-rated reactivity, see Appendix E.

Figure 1

Solution of Parent-Rated Reactivity
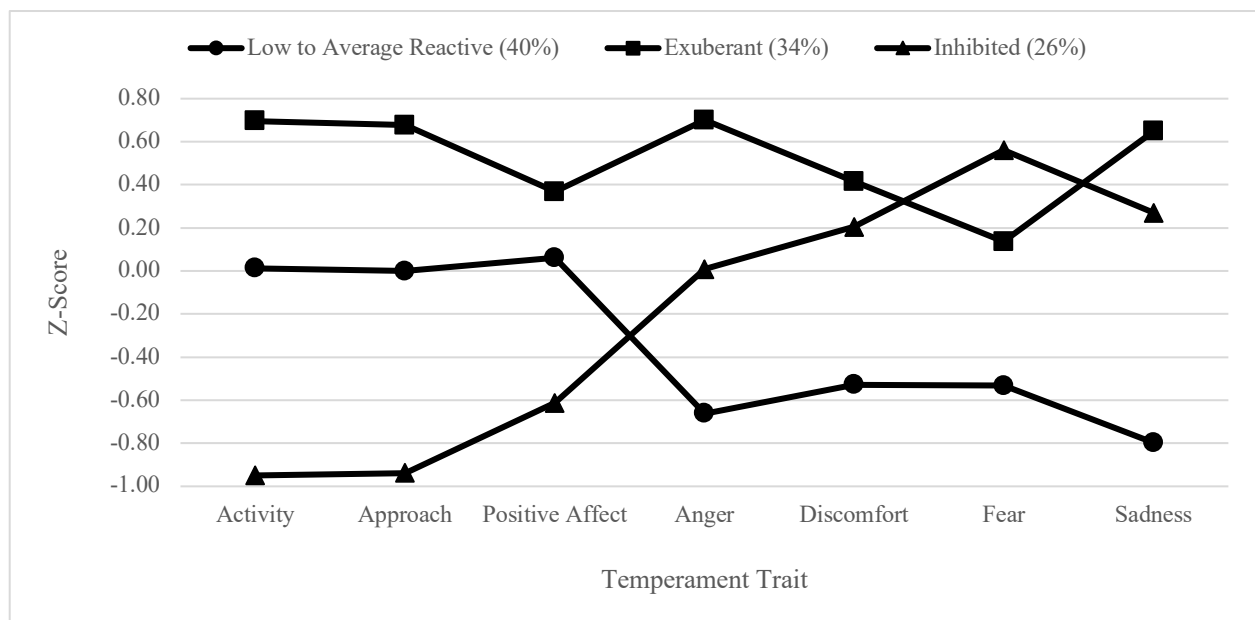
Reactivity Profiles According to Teachers

Solutions with two to eight profiles based on teacher ratings of reactivity were conducted with and without addressing nested effects at the classroom level. When standard errors were not adjusted to address nesting effects, the four-profile solution was the only one to have a significant likelihood ratio test, suggesting that four profiles describe the data better than three. However, when standard errors were adjusted to address classroom nesting effects, the likelihood ratio tests were not significant for any of the solutions. All of the solutions demonstrated high entropy and the SABIC values descended as the number of profiles increased, suggesting increasingly better fit. Therefore, the theoretical plausibility of each profile solution was considered in determining the best solution. The effects of child age and sex were not significant across any of the profile solutions. See Table 13 for a summary of the statistical qualities of the various solutions of teacher-rated reactivity. See Appendix F for the means and standard deviations of each profile across the various solutions.

After carefully considering each solution of teacher-rated reactivity, the four-profile solution was deemed to be the best solution (see Figure 2). The extracted profiles of the four-profile solution ranged from small to moderate in size. Profile 1 was comprised of 12 cases (9%) and characterized by low levels of approach and positive affect and moderately low activity. Profile 2 was comprised of 30 cases (23%) and characterized by high levels of activity and approach, moderately high positive affect, and moderately low levels of fear and sadness. Profile 3 was comprised of 66 cases (50%) and characterized by average ratings across all areas assessed. Profile 4 was comprised of 25 cases (19%) and characterized by high levels of discomfort, fear, and sadness and moderately high anger. The four profiles were described as 'reserved', 'exuberant', 'average reactive', and 'negatively emotionally reactive', respectively.

These profiles were found to be largely consistent with the inhibited, exuberant, and low to average reactivity profiles commonly found in the literature using other methodologies. However, this solution importantly distinguished between 'reserved' and 'negatively emotionally reactive' profiles, rather than grouping them together into a single inhibited profile, as has often been the case in the literature.

Table 13

Summary of Teacher-Rated Reactivity Solutions

# of Profiles	Entropy	SABIC	Log Likelihood	Unadjusted *p*-Value	Adjusted *p*-Value	# of Cases in Each Profile	# of Free Parameters	Age and Gender Effects
2	.835	2514.22	106.82	ns	ns	1: 98 2: 35	22	None
3	.866	2432.50	93.16	ns	ns	1: 79 2: 32 3: 22	30	None
4	.885	2393.67	51.33	.0373	ns	1: 12 2: 30 3: 66 4: 25	38	None
5	.891	2356.82	49.41	ns	ns	1: 13 2: 60 3: 24 4: 19 5: 17	46	None
6	.901	2335.28	34.48	ns	ns	1: 26 2: 13 3: 60 4: 14 5: 14 6: 6	54	None
7	.902	2321.09	27.31	ns	ns	1: 17 2: 13 3: 58 4: 14 5: 14 6: 12 7: 5	62	None
8	.910	2299.58	34.45	ns	ns	1: 12 2: 6 3: 13 4: 12 5: 53 6: 17 7: 5 8: 15	70	None

Solutions with fewer than four profiles were found to lack certain expected profiles (e.g., 'reserved' or 'inhibited'). Solutions with more than four profiles tended to have one or more profiles that were highly nuanced (e.g., 'exuberant' profiles that were prone to low, average, and/or high negative emotional reactivity), did not make much theoretical sense (e.g., 'negatively emotionally reactive profiles' that were prone to fear and discomfort versus anger and sadness), and/or were very small in size (e.g., 'positively emotionally reactive'). For more information about the other solutions of teacher-rated reactivity, see Appendix F.

Figure 2

Solution of Teacher-Rated Reactivity
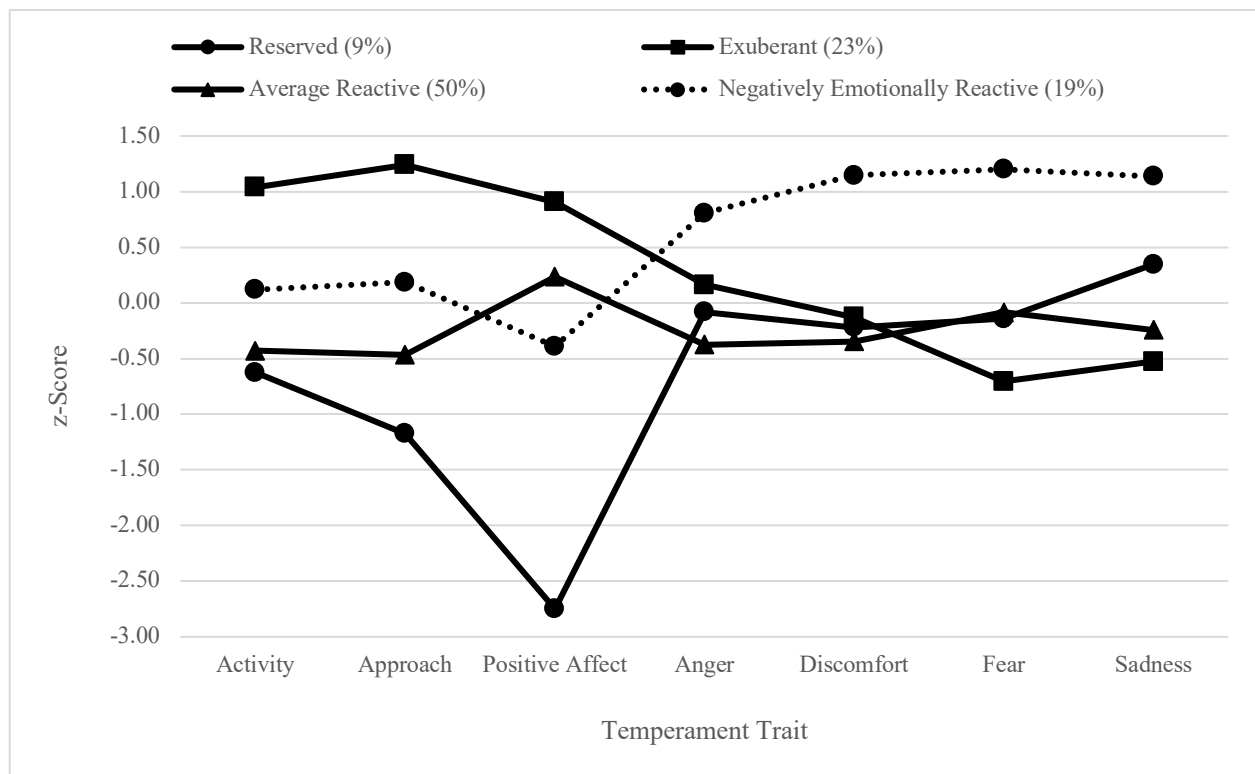
Latent Profile Analysis of Reactivity and Regulation

To further facilitate discussions and comparisons of the various reactivity and regulation profiles that emerged from the latent profile analyses, the naming convention used to label each reactivity profile was modified to account for the specific variables used in the reactivity and regulation analyses (see Table 14). Labels used to describe patterns of reactivity among the profiles generally remained the same. However, additional labels were needed to describe patterns of regulation among the profiles. Profiles that showed elevated or decreased levels of both variables of regulation, including emotion regulation and behavior regulation, were labelled as 'well-regulated' or 'dysregulated', respectively. Those that showed at least average levels of variation across both regulation variables, including those with elevated levels in one but not both variables, were labelled as 'regulated'. Profiles that showed elevated levels of one or both variables of information processing, including perceptual sensitivity and low intensity pleasure, were labelled as 'highly attuned to subtlety'. Those that showed decreased levels of one or both variables of information processing were labelled as 'under attuned to subtlety'. It was not uncommon for multiple reactivity and/or regulatory labels to describe a particular profile. To keep profile labels relatively brief and simple, profiles were sometimes described by combining the most dominant reactivity pattern (e.g., exuberant) and regulation pattern (e.g., dysregulated) into one label, when additional labels could have been used to provide longer and more detailed descriptions (e.g., exuberant, under attuned, and dysregulated).

Table 14

Descriptive Labels for Profiles of Reactivity and Regulation

Profile Label	Description
High Reactive	Elevated levels across most or all variables of exuberance, positive emotional reactivity, and negative emotional reactivity
Average Reactive	Average levels across most or all variables of exuberance, positive emotional reactivity, and negative emotional reactivity
Low Reactive	Decreased levels across most or all variables of exuberance, positive emotional reactivity, and negative emotional reactivity
Exuberant	Elevated levels of exuberance
Reserved	Decreased levels of exuberance
Inhibited	Reserved, but with elevated levels of internalizing emotion
Positively Emotionally Reactive	Elevated levels of positive affectivity
Negatively Emotionally Reactive	Elevated levels of both anger and internalizing emotion
Prone to (Anger, Internalizing Emotion)	Elevated levels in one variable of negative emotional reactivity
Well-Regulated	Consistently elevated levels across both variables of regulation
Regulated	At least average levels across both variables of regulation, with elevated levels for up to one variable
Dysregulated	Decreased levels of both variables of regulation
Highly Attuned to Subtlety	Elevated levels of one or both variables of information processing
Under Attuned to Subtlety	Decreased levels of one or both variables of information processing

Reactivity and Regulation Profiles According to Parents

Of the solutions with two to eight profiles based on parent ratings of reactivity and regulation, the two-profile solution was the only one to have a significant likelihood ratio test, suggesting that two profiles describe the data better than none. However, all solutions demonstrated adequate entropy and the SABIC values descended as the number of profiles increased, suggesting increasingly better fit. Therefore, the theoretical plausibility of each profile solution was considered in determining the best solution. See Table 15 for a summary of the statistical qualities of the various solutions of parent-rated reactivity and regulation. See Appendix G for the means and standard deviations of each profile across the various solutions.

After carefully considering each solution of parent-rated reactivity and regulation, the six-profile solution was deemed to be the best solution (see Figure 3). The extracted profiles of the six-profile solution ranged from very small to moderate in size. Profile 1 was comprised of

17 cases (13%) and characterized by low perceptual sensitivity and moderately low levels of internalizing emotion, emotion regulation, and low intensity pleasure. Profile 2 was comprised of 13 cases (10%) and characterized by moderately high internalizing emotion, low levels of positive affect, emotion regulation, behavior regulation, and low intensity pleasure, and moderately low perceptual sensitivity. Profile 3 was comprised of 3 cases (2%) and characterized by moderately high levels of exuberance and emotion regulation and low levels of positive affect, anger, and internalizing emotion. Profile 4 was comprised of 21 cases (16%) and characterized by low levels of exuberance and positive affect, but otherwise average ratings. Profile 5 was comprised of 38 cases (29%) and characterized by moderately high levels of exuberance, positive affect, and anger and moderately low levels of behavior regulation. Lastly, profile 6 was comprised of 41 cases (31%) and characterized by moderately high levels of emotion regulation, behavior regulation, positive affect, and low intensity pleasure and moderately low anger. The six profiles were described as 'under attuned to subtlety and dysregulated', 'negatively emotionally reactive and dysregulated', 'exuberant and regulated', 'reserved and regulated', 'exuberant and dysregulated', and 'positively emotionally reactive, highly attuned to subtlety, and well-regulated', respectively. While the 'exuberant and regulated' profile was very small (2%), it was considered to be theoretically plausible and very likely to exist in the population. These six profiles were found to broadly reflect the inhibited, exuberant, and low to average reactivity profiles commonly found in the literature and in the present study – but with varying degrees of regulation. More specifically, rather than a single inhibited profile, the solution revealed a 'negatively emotionally reactive and dysregulated' profile and a 'reserved and regulated' profile. Rather than a single exuberant profile, the solution revealed one that was regulated and one that was dysregulated. Lastly, rather than a single low to average reactivity

profile, the solution revealed one that was under attuned to subtlety and dysregulated and one

that was highly attuned to subtlety and well-regulated.

Table 15

Summary of Parent-Rated Reactivity and Regulation Solutions

# of Profiles	Entropy	SABIC	Log Likelihood	*p*-Value	# of Cases in Each Profile	# of Free Parameters	Age and Gender Effects
2	.773	2544.58	118.18	.0001	1: 79 2: 54	25	None
3	.815	2520.62	38.63	ns	1: 18 2: 51 3: 64	34	Some effects of gender
4	.778	2510.87	24.74	ns	1: 19 2: 19 3: 58 4: 37	43	None
5	.830	2497.34	28.42	ns	1: 14 2: 31 3: 4 4: 45 5: 39	52	None
6	.850	2479.64	28.91	ns	1: 17 2: 13 3: 3 4: 21 5: 38 6: 41	61	None
7	.842	2471.63	23.03	ns	1: 13 2: 3 3: 20 4: 17 5: 35 6: 38 7: 7	70	None
8	.868	2452.96	31.06	ns	1: 11 2: 13 3: 22 4: 3 5: 13 6: 39 7: 8 8: 24	79	None

Solutions with fewer than six profiles were found to lack certain expected profiles (e.g.,

'reserved and regulated'). Solutions with more than six profiles were found to have one or more

profiles that were highly nuanced (e.g., exuberant and regulated versus well-regulated), did not

make much theoretical sense (e.g., 'under attuned to subtlety and regulated'), and/or were very

small in size (e.g., 'exuberant and regulated' and 'exuberant and well-regulated'). While these

solutions were not found to be entirely implausible, the additional profiles did not seem to add

much value. So, the simplest model with the most theoretically plausible combination of profiles

was favored. For more information about the other solutions of parent-rated reactivity and

regulation, see Appendix G.

Figure 3

Solution of Parent-Rated Reactivity and Regulation
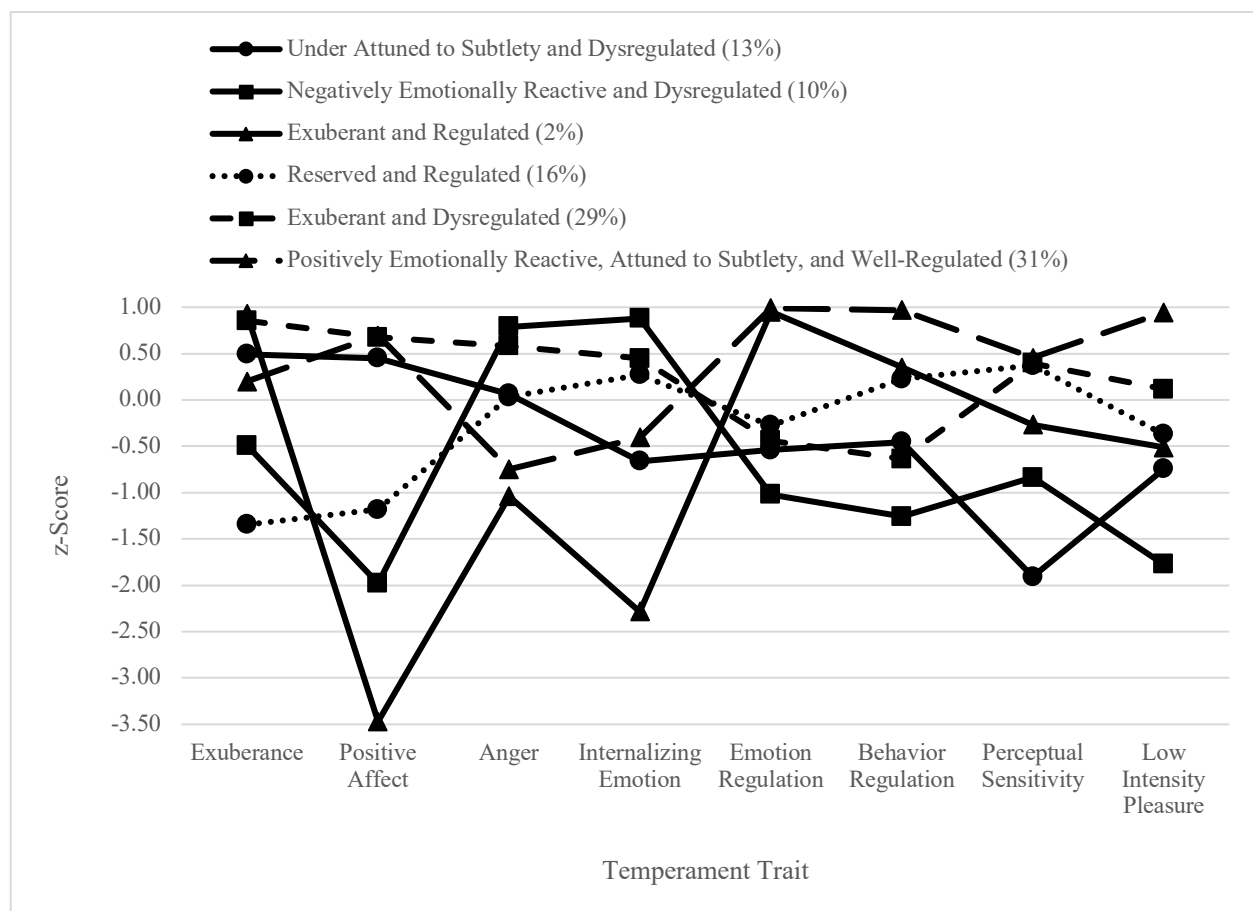
Reactivity and Regulation Profiles According to Teachers

Solutions with two to eight profiles based on teacher ratings of reactivity and regulation were conducted with and without addressing nested effects at the classroom level. When standard errors were not adjusted to address nesting effects, the two- and three-profile solutions were the only ones to have significant likelihood ratio tests. While both solutions had significant likelihood ratio tests, the three-profile solution had a much smaller SABIC value than the two-profile solution, suggesting that three profiles describe the data better than two profiles. However, when standard errors were adjusted to address classroom nesting effects, the likelihood ratio tests were not significant for any of the solutions. All of the solutions demonstrated high entropy and the SABIC values descended as the number of profiles increased, suggesting increasingly better fit. Therefore, the theoretical plausibility of each profile solution was considered in determining the best solution. See Table 16 for a summary of the statistical qualities of the various solutions of teacher-rated reactivity and regulation. See Appendix H for the means and standard deviations of each profile across the various solutions.

After carefully considering each solution of teacher-rated reactivity and regulation, the seven-profile solution was deemed to be the best solution (see Figure 4). The extracted profiles of the seven-profile solution ranged from very small to moderate in size. Profile 1 was comprised of 5 cases (4%) and characterized by high exuberance, moderately high positive affect, low levels of behavior regulation and low intensity pleasure, and moderately low levels of emotion regulation, internalizing emotion, and perceptual sensitivity. Profile 2 was comprised of 11 cases (8%) and characterized by low levels of exuberance and positive affect, but otherwise average ratings. Profile 3 was comprised of 49 cases (37%) and characterized by moderately low exuberance, moderately high behavior regulation, and otherwise average ratings. Profile 4 was

comprised of 31 cases (23%) and characterized by moderately high levels of exuberance, positive affect, and emotion regulation, low internalizing emotion, and moderately low levels of perceptual sensitivity and low intensity pleasure. Profile 5 was comprised of 22 cases (17%) and characterized by moderately high levels of anger and internalizing emotion, but otherwise average ratings. Profile 6 was comprised of 12 cases (9%) and characterized by high levels of anger and internalizing emotion, low emotion regulation, and moderately low levels of behavior regulation and positive affect. Lastly, profile 7 was comprised of 3 cases (2%) and characterized by high levels of exuberance, positive affect, and anger, low levels of emotion regulation and behavior regulation, and moderately low levels of perceptual sensitivity and low intensity pleasure. The seven profiles were described as 'exuberant and dysregulated', 'reserved and regulated', 'low to average reactive and regulated', 'exuberant and regulated', 'negatively emotionally reactive but regulated', 'negatively emotionally reactive and dysregulated', and 'high reactive and dysregulated'. While the 'exuberant and dysregulated' (4%) and 'high reactive and dysregulated' (2%) profiles were very small, they were considered to be theoretically plausible and have potentially important clinical implications. The seven profiles were found to broadly reflect the reserved, exuberant, average reactive, and negatively emotionally reactive profiles found in the present study, but with varying degrees of regulation. More specifically, rather than a single exuberant profile, the solution revealed an 'exuberant and dysregulated' profile and an 'exuberant and regulated' profile. Rather than a single negatively emotionally reactive profile, the solution revealed one that was regulated and one that was dysregulated. The solution also yielded 'reserved and regulated', 'low to average reactive and regulated', and generally 'high reactive and dysregulated' profiles, showing various combinations of reactivity and regulation.

Table 16

Summary of Teacher-Rated Reactivity and Regulation Solutions

# of Profiles	Entropy	SABIC	Log Likelihood	Unadjusted *p*-Value	Adjusted *p*-Value	# of Cases in Each Profile	# of Free Parameters	Age and Gender Effects
2	.946	2714.87	156.69	.0019	ns	1: 114 2: 19	25	None
3	.867	2660.42	68.44	.0220	ns	1: 19 2: 88 3: 26	34	None
4	.858	2629.80	45.14	ns	ns	1: 63 2: 31 3: 22 4: 17	43	None
5	.855	2601.35	43.02	ns	ns	1: 17 2: 46 3: 32 4: 33 5: 5	52	None
6	.868	2577.05	38.95	ns	ns	1: 11 2: 31 3: 5 4: 50 5: 21 6: 15	61	Some effects of age
7	.888	2561.86	30.06	ns	ns	1: 5 2: 11 3: 49 4: 31 5: 22 6: 12 7: 3	70	None
8	.877	2550.18	26.62	ns	ns	1: 31 2: 44 3: 7 4: 21 5: 5 6: 12 7: 10 8: 3	79	None

Solutions with fewer than seven profiles were found to lack certain expected profiles (e.g., negatively emotionally reactive and dysregulated). The eight profile solution was found to have one or more profiles that were highly nuanced (e.g., 'prone to internalizing but regulated'), did not make much theoretical sense (e.g., a 'reserved and regulated' profile that was moderately

low in low intensity pleasure), and/or were very small in size (e.g., 'reserved and regulated', 'exuberant and dysregulated', and 'high reactive and dysregulated'). As in the case of the parent-rated solutions of reactivity and regulation, these solutions of teacher-rated reactivity and regulation were not found to be entirely implausible. However, the additional profiles did not seem to add much value, so the simplest model with the most theoretically plausible combination of profiles was, again, favored. For more information about the other solutions of teacher-rated reactivity and regulation, see Appendix H.

Figure 4

Solution of Teacher-Rated Reactivity and Regulation
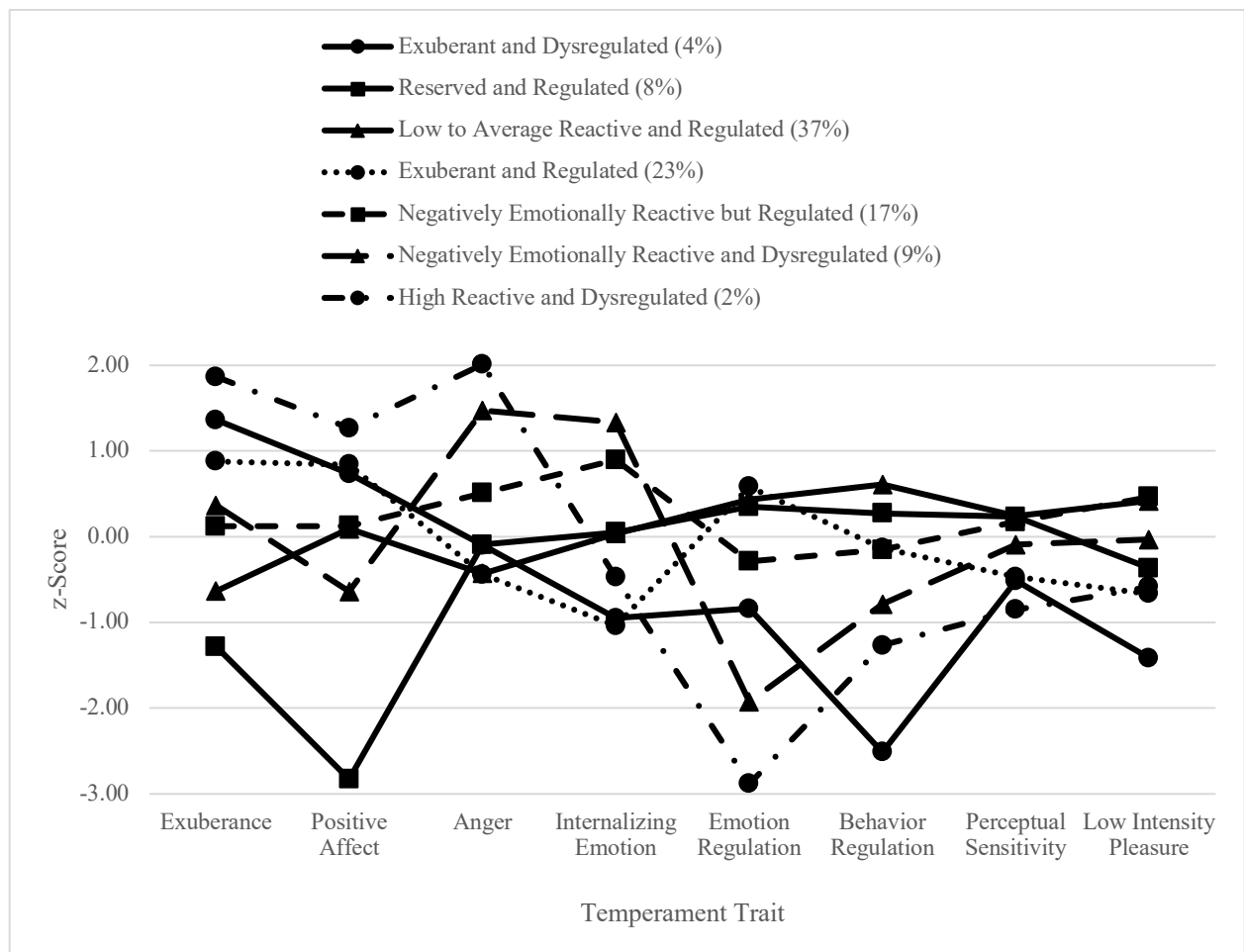
Relating Findings to Research Questions and Hypotheses

Question 1: What profiles emerge when only reactive traits are included in the analyses? To view the reactivity profile labels and corresponding proportion sizes of both parents and teachers, see Table 17. Consistent with Hypothesis 1, when only reactive traits were included in the analyses, the profiles that emerged in the present study were mostly consistent with the three to four profiles that have been found in previous studies, including inhibited, exuberant, average, and/or low reactive profiles. This was especially true of the parent profiles, which were 'low to average reactive', 'exuberant', and 'inhibited'. The teacher profiles, which were 'average reactive', 'exuberant', 'reserved', and 'negatively emotionally reactive', were very similar to the parent profiles. Although, two more nuanced profiles of 'reserved' and 'negatively emotionally reactive' emerged in place of the traditional inhibited profile found in previous studies and in the present study according to parents. Therefore, Hypothesis 1 was generally supported.

Question 2: What profiles emerge when both reactive and regulatory traits are included in the analyses? To view the reactivity and regulation profile labels and corresponding proportion sizes of both parents and teachers, see Table 18. Consistent with Hypothesis 2, when regulatory variables were included in the analyses in addition to reactivity variables, more nuanced profiles with various combinations of reactivity and regulation emerged. These more nuanced profiles generally reflected subdivisions of the traditional reactivity profiles found in the literature but with varying levels of regulation. More specifically, the traditional low/average reactive profile was reflected in the 'under attuned to subtlety and dysregulated' and 'positively emotionally reactive, highly attuned to subtlety, and well-regulated profiles' found using parent ratings and the 'low to average reactive and regulated' profile found using teacher ratings. The traditional exuberant profile was reflected in the 'exuberant and regulated' and 'exuberant and

dysregulated' profiles found using both informant ratings, in addition to the 'high reactive and dysregulated' profile (marked by high levels of exuberance, anger, and positive affect) found using teacher ratings. Lastly, the traditional inhibited profile was reflected in the 'reserved and regulated' and 'negatively emotional reactive and dysregulated' profiles found using both informant ratings and the 'negatively emotionally reactive but regulated' profile found using teacher ratings. Therefore, Hypothesis 2 was generally supported.

Table 17

Reactivity Profile Labels and Proportion Sizes by Informant

Traditional Reactivity Profiles	Parent Reactivity Profiles	Teacher Reactivity Profiles
Low/Average Reactive	Low to Average Reactive (40%)	Average Reactive (50%)
Exuberant	Exuberant (34%)	Exuberant (23%)
Inhibited	Inhibited (26%) - -	- Reserved (9%) Negatively Emotionally Reactive (19%)

Table 18

Reactivity and Regulation Profile Labels and Proportion Sizes by Informant

Traditional Reactivity Profiles	Parent Reactivity and Regulation Profiles	Teacher Reactivity and Regulation Profiles
Low/Average Reactive	Positively Emotionally Reactive, Highly Attuned to Subtlety, and Well-Regulated (31%) Under Attuned to Subtlety and Dysregulated (13%) -	- - Low to Average Reactive and Regulated (37%)
Exuberant	Exuberant and Regulated (2%) Exuberant and Dysregulated (29%) -	Exuberant and Regulated (23%) Exuberant and Dysregulated (4%) High Reactive and Dysregulated (2%)
Inhibited	Reserved and Regulated (16%) - Negatively Emotionally Reactive and Dysregulated (10%)	Reserved and Regulated (8%) Negatively Emotionally Reactive but Regulated (17%) Negatively Emotionally Reactive and Dysregulated (9%)

Question 3: To what extent are the best temperament profile solutions congruent across parent and teacher informants? Regarding the reactivity profiles of the present study (see Table 17), consistent with hypothesis 3, the best solutions were found to be similar but not identical regarding profile numbers, temperament patterns, and proportion sizes across informants. The parent solution yielded three profiles, whereas the teacher solution yielded four profiles. The patterns of these profiles were largely consistent across informants, which broadly reflected the traditional low/average, exuberant, and inhibited reactivity profiles for both parents and teachers. However, a single 'inhibited' profile emerged from parent ratings, while an important distinction between 'reserved' and 'negatively emotionally reactive' profiles emerged from teacher ratings. The proportion sizes of the corresponding profiles were also fairly similar. There was a 10-percentage-point difference between the 'low to average reactive' profile by parents (40%) and the 'average reactive' profile by teachers, an 11-percentage-point difference between the 'exuberant' profiles by parents (34%) and teachers (23%), and only a 2-percentage-point difference between the 'inhibited' profile by parents (26%) and the combined 'reserved' (9%) and 'negatively emotionally reactive' (19%) profiles by teachers. Despite some differences in proportion sizes, the corresponding low/average profiles were found to be the largest, the corresponding inhibited profiles were found to be the smallest, and the corresponding exuberant types were found to be in the middle according to both informants. Because there was considerable congruence in profile numbers, temperament patterns, and proportion sizes across informants, it was sensible to assess the extent to which children were assigned to similar profiles based on parent and teacher ratings. There was an exact match in nearly 25% of cases (e.g., assignment to the parent 'low to average reactive' profile and the 'average reactive' teacher profile), a similar match in nearly 8% of cases (e.g., assignment to the parent 'inhibited' profile

but the 'reserved' or 'negatively emotionally reactive' teacher profiles), and no match in nearly 67% of cases (e.g., assignment to the parent 'exuberant' profile but the 'reserved' teacher profile). Therefore, despite the considerable congruence in temperament profiles across informants, children were more often viewed differently than similarly by their parents and teachers.

Regarding the reactivity and regulation profiles of the present study (see Table 18), the best solutions were found to share some similarities across informants, but also have unique qualities that made them difficult to compare. The solutions were found to yield similar numbers of profiles, with the parent solution yielding six profiles and the teacher solution yielding seven profiles. Several profile patterns were largely consistent across informants, including 'exuberant and regulated', 'exuberant and dysregulated', 'reserved and regulated', and 'negatively emotionally reactive and dysregulated' profiles. However, several profiles were unique to the informant, including the 'under attuned to subtlety and dysregulated' and 'positively emotionally reactive, highly attuned to subtlety, and well-regulated' profiles found using parent ratings and the 'low to average reactive and regulated', 'high reactive and dysregulated', and 'negatively emotionally reactive and regulated' profiles found using teacher ratings. Of the parent and teacher profiles for which there was considerable overlap, some were similar in proportion size and some varied greatly. There was only an 8-percentage-point difference between the parent (16%) and teacher (8%) 'reserved and regulated' profiles and a 1-percentage-point difference between the parent (10%) and teacher (9%) 'negatively emotionally reactive and dysregulated' profiles. However, there was a 21-percentage-point difference between the parent (2%) and teacher (23%) 'exuberant and regulated' profiles and a 25-percentage-point difference between the parent (29%) and teacher (4%) 'exuberant and dysregulated' profiles. Due to the differences

in temperament patterns and proportion sizes across informants, the extent to which children were assigned to similar profiles of reactivity and regulation based on parent and teacher ratings could not be meaningfully assessed. Taken together, Hypothesis 3 was found to be partially supported, with much more congruence between the reactivity profiles than the reactivity and regulation profiles across informants.

Question 4: Are child age and/or sex important predictors of profile membership, and if so, in what ways? Contrary to expectations based on the literature, neither child age nor child sex were found to be important predictors of profile membership in any of the best solutions selected. Therefore, Hypothesis 4 was not supported.

Chapter 5: Discussion

Conclusions

Most studies of temperament profiles have focused on reactivity in infants and toddlers, according to either parent perspectives in naturalistic settings or (more often) researcher perspectives in laboratory settings, and using analytic methodologies that have since become outdated (e.g., expert consensus, the extreme group approach, cluster analysis). The present study aimed to fill gaps in the literature by considering both reactive and regulatory tendencies in kindergarteners, according to parent and teacher perspectives in naturalistic settings, and using the modern statistical technique of latent profile analysis. Kindergarten is a unique and critical time in development in which children are suddenly learning new academic, social, and self-regulatory skills as they begin formal education. Parent and teacher ratings of kindergarteners' temperament were analyzed separately using latent profile analysis, and congruence of the profile solutions was examined by comparing the profile numbers, temperament patterns, and proportion sizes across informants. The present study aimed to answer the following exploratory questions: 1) What profiles emerge when only reactive traits are included in the analyses?; 2) What profiles emerge when both reactive and regulatory traits are included in the analyses?; 3) To what extent are the best temperament profile solutions congruent across parent and teacher informants?; and 4) Are child age and/or sex important predictors of profile membership, and if so, in what ways?

When only reactive variables were included in the latent profile analyses, the best solutions were deemed to be the three-profile solution according to parent ratings and the four-profile solution according to teacher ratings. The three profiles that emerged from parent ratings were 'low to average reactive' (40%), 'exuberant' (34%), and 'inhibited' (26%). The four

profiles that emerged from teacher ratings were 'average reactive' (50%), 'exuberant' (23%), 'reserved' (9%), and 'negatively emotionally reactive' (19%). As predicted, the profiles that emerged were found to be mostly consistent with the three to four profiles that have been found in previous studies, including inhibited, exuberant, average, and/or low reactive profiles. However, an important distinction across informants is that parent ratings yielded an 'inhibited' profile consistent with the literature, whereas teacher ratings yielded two distinct profiles in which children were perceived as either 'reserved' or 'negatively emotionally reactive' in place of the traditional inhibited profile. As also predicted, the best solutions of parent- and teacher-rated reactivity were found to yield similar profile numbers, temperament patterns, and proportion sizes across informants. Contrary to predictions, neither child age nor child sex were found to be important predictors of parent- or teacher-rated reactivity profile membership. Overall, similarities in the reactivity profiles found in the present study and the literature suggest that reactive tendencies are rather robust across various perspectives, settings, developmental stages, and methodological approaches.

When both reactive and regulatory variables were included in the latent profile analyses, the best solutions were deemed to be the six-profile solution according to parent ratings and the seven-profile solution according to teacher ratings. While even more nuanced profiles with various combinations of reactivity and regulation emerged the solutions with more profiles, the additional profiles were so nuanced that they did not seem to add much value. So, the simplest model with maximized theoretically plausibility was favored when selecting the best solutions of parent-rated and teacher-rated reactivity and regulation. The six profiles that emerged from parent ratings were 'positively emotionally reactive, highly attuned to subtlety, and well-regulated' (31%), 'under attuned to subtlety and dysregulated' (13%), 'exuberant and regulated'

(2%), 'exuberant and dysregulated' (29%), 'reserved and regulated' (16%), and 'negatively

emotionally reactive and dysregulated' (10%). The seven profiles that emerged from teacher

ratings were 'low to average reactive and regulated' (37%), 'exuberant and regulated' (23%),

'exuberant and dysregulated' (4%), 'high reactive and dysregulated' (2%), 'reserved and

regulated' (8%), 'negatively emotionally reactive but regulated' (17%), 'negatively emotionally

reactive and dysregulated' (9%). As predicted, the profiles that emerged when both reactivity

and regulation variables were taken into consideration were found to generally reflect

subdivisions of the traditional reactivity profiles in the literature (i.e., exuberant, inhibited,

average, and/or low reactive) but with varying levels of regulation (i.e., well-regulated,

regulated, and dysregulated). The best solutions of parent- and teacher-rated reactivity and

regulation were found to yield similar profile numbers and some overlap in temperament patterns

and proportion sizes, although not to the extent predicted. Four profiles were largely consistent in

temperament pattern across informants (i.e., 'exuberant and regulated', 'exuberant and

dysregulated', 'reserved and regulated', and 'negatively emotionally reactive' and

dysregulated'), of which only two had similar proportion sizes (i.e., 'reserved and regulated' and

'negatively emotionally reactive and dysregulated'). Although there were some similarities in the

reactivity and regulation solutions across informants, there were several important distinctions.

Whereas teacher ratings yielded a profile with low to average reactivity and average regulation

(i.e., 'low to average reactive and regulated'), parent ratings yielded two distinct profiles in

which children were perceived as either low to average reactive with poor regulation (i.e., 'under

attuned to subtlety and dysregulated') or generally low to average reactive with strong regulation

(i.e., 'positively emotionally reactive, highly attuned to subtlety, and well-regulated'). Another

distinction is that exuberant children were more likely to be perceived as regulated according to

teachers (23%) but dysregulated according to parents (29%). Also, some profiles were entirely

unique to the informant. Contrary to predictions, neither child age nor child sex were found to be

important predictors of parent- or teacher-rated reactivity and regulation profile membership.

Overall, similarities and differences in the reactive and regulatory profiles across informants

suggest that our understanding of temperament could be much improved by accounting for

regulatory variables in addition to reactive variables, which seem to combine in complex ways

that may present differently depending on the informant and/or setting.

Limitations

The primary limitation of the present study is that its small sample size caused power

issues that ultimately impacted methodological decisions and statistical quality of the latent

profile analyses. Regarding methodological decisions, the power issues informed decision-

making about the level of model restrictiveness, the number of variables included in the analyses,

and the approach used to address nested data. Regarding statistical quality, the statistical

indicators intended to help examine and compare solution quality were not found to be helpful

for decision-making. Entropy values were consistently adequate to high, suggesting generally

good classification certainty. SABIC values consistently descended as the number of profiles

increased, suggesting increasingly better fit even when additional profiles were highly nuanced,

did not make theoretical sense, and/or were very small in size. Likelihood ratio tests were

generally nonsignificant and not helpful for evaluating the fit of two models with k-1 classes

versus k classes. Therefore, theoretical plausibility was ultimately used over statistical indicators

to determine final profile solutions. Power issues caused by the small sample size also

undermined the effectiveness of efforts to account for nested data in the sample, as likelihood

ratio tests were nonsignificant regardless of whether or not standard errors were adjusted for this

purpose. The power issues of the present study ultimately impacted the abilities to draw definitive conclusions about reactive vs reactive and regulatory profile solutions.

Another limitation of the present study is that, while the roles of child age and child sex on profile membership were examined, the roles of child race and family socioeconomic status could not be meaningfully examined due to limitations in the data available. Various racial groups were represented in the sample, but the sizes of such groups were too disproportionate to be fairly compared. Data were collected on parent occupation and education level, which suggested that the sample was largely middle class, but family income was not ascertained. Therefore, there was not enough information available to fairly compare socioeconomic status either. Accounting for such variables may have deepened our understanding of the ways in which children's cultural backgrounds influence parent and teacher perceptions of their temperament patterns.

Implications

Our current understanding of temperament development is likely oversimplified due to previous methodological limitations, such as not including the full sample available, leaving out important variables worth considering, and using nonparametric approaches. To the author's knowledge, this is the first known study of temperament profiles in young children considering both reactive and regulatory tendencies, according to parent and teacher perspectives in naturalistic settings, and using the modern statistical technique of latent profile analysis. Despite its own limitations, it serves as a model for how past methodological limitations may be addressed to deepen our understanding of temperament development.

The present study demonstrated the importance of studying the complex combinations of various aspects of reactivity and regulation simultaneously to further our understanding of the

development of the whole child, as temperament patterns among kindergarteners were shown to be more complex than previously thought. Kindergarten children, who are increasingly expected to demonstrate regulatory skills as they continue through life and school, showed much variation in their abilities to meet such expectations in the present study. Accounting for specific aspects of regulation, including emotion regulation, behavior regulation, and information processing, suggested that each makes unique contributions to the temperament patterns of young children. However, regulation is most often studied as a broad composite variable in the literature, as demonstrated by the wide body of literature on effortful control (Rueda, 2012), so the unique contributions of such specific aspects (i.e. emotion regulation, behavior regulation, information processing) have been understudied. Aspects of information processing, including perceptual sensitivity to changes in one's environment and enjoyment of low intensity activities, have been particularly understudied and warrant further examination.

The present study also demonstrated the importance of considering both parent and teacher perspectives of child temperament patterns, as teacher perspectives of this age group have been understudied but showed both similarities and differences from parent perspectives. Such similarities across informants may point to the robustness of certain temperament patterns across perspectives, settings, developmental stages, and methodological approaches, as the reactivity profiles found in the present study largely replicated those found in previous studies. However, such distinctions may reflect differences in informant values and expectations and/or how children with various temperamental dispositions respond and adapt to the different demands placed on them in various settings (De Los Reyes & Kazdin, 2005; De Los Reyes et al., 2009; Saudino et al., 2005). For example, given that parents were more likely to see exuberant children as dysregulated whereas teachers were more likely to see them as regulated, these

children may function differently across the home and school settings. They may thrive with the high levels of structure, social interaction, and intellectual stimulation provided in school but may struggle to regulate at home if the environment provides less structure and/or stimulation. It could also be the case that exuberant children have depleted their regulatory resources after a long day at school and are subsequently unable to regulate themselves for the remaining hours of the day outside of school. In another example, given that parents were more likely to see low to average reactive children as either well-regulated or dysregulated and teachers were more likely to see them as generally average in reactivity and regulation, parents may observe nuances across various home and community settings that teachers do not observe in the more predictable school setting. The general lack of congruence across informant perspectives of temperament profiles was somewhat expected and likely very meaningful given low congruence in parent and teacher behavior ratings both in the present study and the literature (De Los Reyes & Kazdin, 2005; Dirks et al., 2012; Teglasi et al., 2015). However, such discrepancies in parent and teacher report challenge the notion that temperament is stable across settings and situations, which also warrants further examination.

Lastly, this study demonstrated how the modern statistical technique of latent profile analysis might be applied to the child development field to provide more rigorous examination of temperament patterns in childhood and ultimately portray how children with various temperamental dispositions might function in real-world settings. Latent profile analysis offers several advantages over other analytical approaches commonly used in the field, including but not limited to the use of formal statistical modelling based on probabilities and the inclusion of all available data (even when cases have missing values). While definitive statements about typologies of reactive vs reactive and regulatory profiles cannot be made due to the study's

limitations, several novel and theoretically plausible profiles emerged that warrant follow up. For example, rather than the traditional inhibited profile typically found among infants and toddlers, in which children were perceived as simultaneously reserved and negatively emotionally reactive (Dollar et al., 2017; Fox et al., 2001; Kagan & Snidman, 1991; Putnam & Stifter, 2005), the present study most often found distinct profiles that were either 'reserved'/'reserved and regulated' or 'negatively emotionally reactive'/'negatively emotionally reactive and regulated'/'negatively emotionally reactive and dysregulated' among kindergarteners. This distinction is consistent with the distinct 'high reactive' (characterized by high negative emotional reactivity and average to low regulation) and 'regulated' (characterized by high regulation and low activity and approach) temperament patterns that emerged in a cluster analysis of parent ratings of preschool children (Prokasky et al., 2017). In another example, the present study found a very small but extreme 'high reactive and dysregulated' profile among teachers' ratings, which was characterized by high levels of exuberance, positive emotional reactivity, and negatively emotionally reactivity and poor regulation. Although this profile made up only 2% of the sample, such a pattern is likely to be clinically significant. Therefore, the validity and implications of the profiles that emerged in the present study warrant further examination as well.

Taken together, previous methodological limitations in the field need to be addressed to further our understanding of temperament development. The present study serves as a model for how to do so, but is not without its own limitations. To continue to push the field forward, future temperament studies should examine if the findings of the present study are replicated using similar methodologies but with a larger and more diverse sample. More specifically, future studies should continue to examine the roles of specific aspects of reactivity and regulation in

profile patterns, according to parent and teacher perspectives in naturalistic settings, and using the model-based approach of latent profile analysis. They should also expand upon this study to further explore the implications and trajectories of various reactive and regulatory dispositions towards important developmental outcomes, such as academic motivation, social competence, and mental health, and accounting for important demographic variables, such as socioeconomic status. By enhancing our understanding of the complexity and nuances of temperament development, the field may one day guide parents, educators, and practitioners towards meeting the diverse needs of children with various temperament dispositions.

Example of Coding for LPA for Parent-Rated Reactivity

Title: Parent LPA 3 Reactivity

Data:

   FILE IS \\tsclient\Dissertation\parent.csv;

Variable:

   NAMES ARE ID AC AN AP AT D F HI IM IN LI P SD SH SM SO EXU IP CO G A R S T;

   USEVARIABLES ARE AC AN AP D F SD SM;

   AUXILARY = G (R) A (R);

   CLASSES = c(3);

   MISSING ARE .;

Analysis:

   TYPE = MIXTURE;

   ESTIMATOR = MLR;

   ALGORITHM = EMA;

   STARTS = 150 25;

   STSCALE = 5;

   STITERATIONS = 50;

   ITERATIONS = 1000;

   SDITERATIONS = 250;

   MITERATIONS = 500;

   MCONVERGENCE = 1E-5;

Model:

%OVERALL%

[AC AN AP D F SD SM];

AC AN AP D F SD SM;

%c#1%

[AC AN AP D F SD SM];

AC AN AP D F SD SM(v1-v7);

%c#2%

[AC AN AP D F SD SM];

 AC AN AP D F SD SM(v1-v7);

%c#3%

[AC AN AP D F SD SM];

AC AN AP D F SD SM(v1-v7);

Output: TECH1 TECH8 TECH11;

 Savedata:

FILE IS \\tsclient\Dissertation\ParentLPA3Reactivity.csv;

SAVE = cprobabilities;

Appendix B

Example of Coding for LPA for Teacher-Rated Reactivity

Title: Teacher LPA 3 Reactivity

Data:

  FILE IS \\tsclient\Dissertation\teacher.csv;

Variable:

  NAMES ARE ID AC AN AP AT D F HI IM IN LI P SD SH SM SO EXU IP CO G A R S T;

  USEVARIABLES ARE AC AN AP D F SD SM;

  AUXILARY = G (R) A (R);

  CLUSTER = T;

  CLASSES = c(3);

  MISSING ARE .;

Analysis:

  TYPE = COMPLEX MIXTURE;

  ESTIMATOR = MLR;

  ALGORITHM = EMA;

  STARTS = 150 25;

  STSCALE = 5;

  STITERATIONS = 50;

  ITERATIONS = 1000;

  SDITERATIONS = 250;

  MITERATIONS = 500;

  MCONVERGENCE = 1E-5;

Model:

   %OVERALL%

   [AC AN AP D F SD SM];

   AC AN AP D F SD SM;

   %c#1%

   [AC AN AP D F SD SM];

   AC AN AP D F SD SM(v1-v7);

   %c#2%

   [AC AN AP D F SD SM];

    AC AN AP D F SD SM(v1-v7);

   %c#3%

   [AC AN AP D F SD SM];

   AC AN AP D F SD SM(v1-v7);

Output: TECH1 TECH8 TECH11;

Savedata:

   FILE IS \\tsclient\Dissertation\TeacherLPA3Reactivity.csv;

   SAVE = cprobabilities;

Example of Coding for LPA for Parent-Rated Reactivity and Regulation

Title: Parent LPA 3 Regulation

Data:

    FILE IS \\tsclient\Dissertation\parent.csv;

Variable:

    NAMES ARE ID AC AN AP AT D F HI IM IN LI P SD SH SM SO EXU IP CO G A R S T;

    USEVARIABLES ARE AN LI P SM SO EXU IP CO;

    AUXILARY = G (R) A (R);

    CLASSES = c(3);

    MISSING ARE .;

Analysis:

    TYPE = MIXTURE;

    ESTIMATOR = MLR;

    ALGORITHM = EMA;

    STARTS = 150 25;

    STSCALE = 5;

    STITERATIONS = 50;

    ITERATIONS = 1000;

    SDITERATIONS = 250;

    MITERATIONS = 500;

    MCONVERGENCE = 1E-5;

Model:

    %OVERALL%

    [AN LI P SM SO EXU IP CO];

    AN LI P SM SO EXU IP CO;

    %c#1%

    [AN LI P SM SO EXU IP CO];

    AN LI P SM SO EXU IP CO(v1-v8);

    %c#2%

    [AN LI P SM SO EXU IP CO];

    AN LI P SM SO EXU IP CO(v1-v8);

    %c#3%

    [AN LI P SM SO EXU IP CO];

    AN LI P SM SO EXU IP CO(v1-v8);

Output: TECH1 TECH8 TECH11;

 Savedata:

    FILE IS \\tsclient\Dissertation\ParentLPA3Regulation.csv;

    SAVE = cprobabilities;

Example of Coding for LPA for Teacher-Rated Reactivity and Regulation

Title: Teacher LPA 3 Regulation

Data:

   FILE IS \\tsclient\Dissertation\teacher.csv;

Variable:

   NAMES ARE ID AC AN AP AT D F HI IM IN LI P SD SH SM SO EXU IP CO G A R S T;

   USEVARIABLES ARE AN LI P SM SO EXU IP CO;

   AUXILARY = G (R) A (R);

   CLUSTER = T;

   CLASSES = c(3);

   MISSING ARE .;

Analysis:

   TYPE = COMPLEX MIXTURE;

   ESTIMATOR = MLR;

   ALGORITHM = EMA;

   STARTS = 150 25;

   STSCALE = 5;

   STITERATIONS = 50;

   ITERATIONS = 1000;

   SDITERATIONS = 250;

   MITERATIONS = 500;

   MCONVERGENCE = 1E-5;

Model:

    %OVERALL%

    [AN LI P SM SO EXU IP CO];

    AN LI P SM SO EXU IP CO;

    %c#1%

    [AN LI P SM SO EXU IP CO];

    AN LI P SM SO EXU IP CO(v1-v8);

    %c#2%

    [AN LI P SM SO EXU IP CO];

    AN LI P SM SO EXU IP CO(v1-v8);

    %c#3%

    [AN LI P SM SO EXU IP CO];

    AN LI P SM SO EXU IP CO(v1-v8);

Output: TECH1 TECH8 TECH11;

 Savedata:

    FILE IS \\tsclient\Dissertation\TeacherLPA3Regulation.csv;

    SAVE = cprobabilities;

Appendix E

Descriptions of All Parent-Rated Reactivity Solutions

 Two-profile solution: The extracted profiles of the two-profile solution were both moderate in size and similar in proportion. Profile 1 was comprised of 64 cases (48%) and characterized by moderately low levels of anger and sadness, but otherwise average ratings. Profile 2 was comprised of 69 cases (52%) and characterized by moderately high levels of anger and sadness, but otherwise average ratings. The two profiles were described as 'low to average reactive' and 'negatively emotionally reactive', respectively.

Table E1

Two-Profile Solution of Parent-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (64)	2[b] (69)
Activity	4.68	0.39	4.29 – 5.07	0.79	3.89 – 5.46	4.53	4.81
Approach	5.04	0.32	4.72 – 5.36	0.65	4.39 – 5.68	4.88	5.17
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	5.99	5.99
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	3.34	4.89
Discomfort	4.23	0.71	3.52 – 4.94	1.42	2.81 – 5.65	3.60	4.80
Fear	3.90	0.69	3.21 – 4.59	1.39	2.51 – 5.28	3.42	4.32
Sadness	4.32	0.37	3.95 – 4.69	0.74	3.58 – 5.05	3.80	4.78

[a] Low to Average Reactive
[b] Negatively Emotionally Reactive

 Three-profile solution: The extracted profiles of the three-profile solution were all moderate in size with some variation in proportion. Profile 1 was comprised of 53 cases (40%) and characterized by moderately low levels of anger, discomfort, fear, and sadness. Profile 2 was comprised of 45 cases (34%) and characterized by moderately high levels of activity, approach, anger, and sadness. Profile 3 was comprised of 35 cases (26%) and characterized by moderately low levels of activity, approach, and positive affect and moderately high fear. The three profiles were described as 'low to average reactive', 'exuberant', and 'inhibited', respectively.

Table E2

Three-Profile Solution of Parent-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (53)	2[b] (45)	3[c] (35)
Activity	4.68	0.39	4.29 – 5.07	0.79	3.89 – 5.46	4.69	5.23	3.93
Approach	5.04	0.32	4.72 – 5.36	0.65	4.39 – 5.68	5.04	5.48	4.43
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	6.02	6.17	5.69
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	3.32	5.05	4.17
Discomfort	4.23	0.71	3.52 – 4.94	1.42	2.81 – 5.65	3.48	4.82	4.52
Fear	3.90	0.69	3.21 – 4.59	1.39	2.51 – 5.28	3.16	4.09	4.68
Sadness	4.32	0.37	3.95 – 4.69	0.74	3.58 – 5.05	3.73	4.80	4.52

[a] Low to Average Reactive
[b] Exuberant
[c] Inhibited

Four-profile solution: The extracted profiles of the four-profile solution ranged from small to moderate in size. Profile 1 was comprised of 50 cases (38%) and characterized by moderately low levels of activity, approach, and anger. Profile 2 was comprised of 16 cases (12%) and characterized by high sadness, moderately high levels of anger, discomfort, and fear, and low activity. Profile 3 was comprised of 18 cases (14%) and characterized by moderately high activity, low levels of discomfort and sadness, and moderately low levels of anger and fear. Profile 4 was comprised of 49 cases (37%) and characterized by moderately high levels of activity, approach, and anger. The four profiles were described as 'reserved', 'negatively emotionally reactive', 'energetic reactive', and 'exuberant and prone to anger', respectively.

Table E3

Four-Profile Solution of Parent-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (50)	2[b] (16)	3[c] (18)	4[d] (49)
Activity	4.68	0.39	4.29 – 5.07	0.79	3.89 – 5.46	4.07	3.71	5.32	5.36
Approach	5.04	0.32	4.72 – 5.36	0.65	4.39 – 5.68	4.64	4.74	5.34	5.41
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	5.90	5.90	6.05	6.09
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	3.50	4.83	3.22	4.94
Discomfort	4.23	0.71	3.52 – 4.94	1.42	2.81 – 5.65	4.00	5.09	2.78	4.74
Fear	3.90	0.69	3.21 – 4.59	1.39	2.51 – 5.28	3.79	4.93	3.03	3.99
Sadness	4.32	0.37	3.95 – 4.69	0.74	3.58 – 5.05	3.98	5.15	3.49	4.68

[a] Reserved
[b] Negatively Emotionally Reactive
[c] Energetic Reactive
[d] Exuberant and Prone to Anger

Five-profile solution: The extracted profiles of the five-profile solution ranged from very small to moderate in size. Profile 1 was comprised of 4 cases (3%) and characterized by low levels of positive affect, fear, and sadness and moderately low levels of anger and approach. Profile 2 was comprised of 7 cases (5%) and characterized by high positive affect, low levels of anger, fear, and sadness, and moderately low discomfort. Profile 3 was comprised of 61 cases (46%) and characterized by average ratings across all areas assessed. Profile 4 was comprised of 42 cases (32%) and characterized by moderately high levels of activity, approach, smiling, anger, and sadness. Lastly, profile 5 was comprised of 19 cases (14%) and characterized by moderately high levels of anger and sadness and low positive affect. The five profiles were described as 'low reactive', 'positively emotionally reactive', 'average reactive', 'high reactive', and 'negatively emotionally reactive', respectively.

Table E4

Five-Profile Solution of Parent-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (4)	2[b] (7)	3[c] (61)	4[d] (42)	5[e] (19)
Activity	4.68	0.39	4.29 – 5.07	0.79	3.89 – 5.46	4.40	4.99	4.45	5.16	4.31
Approach	5.04	0.32	4.72 – 5.36	0.65	4.39 – 5.68	4.39	4.99	4.93	5.50	4.57
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	4.35	6.56	6.10	6.35	5.11
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	2.91	2.40	3.55	5.08	4.83
Discomfort	4.23	0.71	3.52 – 4.94	1.42	2.81 – 5.65	3.97	3.07	3.77	4.93	4.56
Fear	3.90	0.69	3.21 – 4.59	1.39	2.51 – 5.28	2.02	2.36	3.77	4.16	4.58
Sadness	4.32	0.37	3.95 – 4.69	0.74	3.58 – 5.05	3.32	2.49	4.04	4.86	4.77

[a] Low Reactive
[b] Positively Emotionally Reactive
[c] Average Reactive
[d] High Reactive
[e] Negatively Emotionally Reactive

Six-profile solution: The extracted profiles of the six-profile solution ranged from very small to moderate in size. Profile 1 was comprised of 4 cases (3%) and characterized by low levels of positive affect, fear, and sadness and moderately low levels of anger and approach. Profile 2 was also comprised of 4 cases (3%) and characterized by high positive affect, moderately high activity, and low levels of anger, discomfort, fear, and sadness. Profile 3 was comprised of 34 cases (26%) and characterized by moderately low levels of activity, approach, and anger. Profile 4 was comprised of 30 cases (23%) and characterized by moderately high activity and moderately low discomfort. Profile 5 was comprised of 21 cases (16%) and characterized by low positive affect, moderately low approach, and moderately high sadness. Lastly, profile 6 was comprised of 40 cases (30%) and characterized by moderately high levels of activity, approach, positive affect, anger, discomfort, and sadness, but average fear. The six profiles were described as 'low reactive', 'positively emotionally reactive', 'reserved', 'energetic reactive', 'prone to sadness', and 'high reactive', respectively.

Table E5

Six-Profile Solution of Parent-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (4)	2[b] (4)	3[c] (34)	4[d] (30)	5[e] (21)	6[f] (40)
Activity	4.68	0.39	4.29 – 5.07	0.79	3.89 – 5.46	4.40	5.22	3.95	5.11	4.30	5.18
Approach	5.04	0.32	4.72 – 5.36	0.65	4.39 – 5.68	4.39	5.21	4.68	5.26	4.57	5.49
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	4.35	6.71	6.21	6.03	5.11	6.35
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	2.90	2.06	3.30	3.86	4.79	5.12
Discomfort	4.23	0.71	3.52 – 4.94	1.42	2.81 – 5.65	3.96	2.77	4.18	3.22	4.56	4.99
Fear	3.90	0.69	3.21 – 4.59	1.39	2.51 – 5.28	2.01	2.28	4.08	3.22	4.58	4.21
Sadness	4.32	0.37	3.95 – 4.69	0.74	3.58 – 5.05	3.31	2.40	4.02	3.98	4.74	4.89

[a] Low Reactive
[b] Positively Emotionally Reactive
[c] Reserved
[d] Energetic Reactive
[e] Prone to Sadness
[f] High Reactive

Seven-profile solution: The extracted profiles of the seven-profile solution ranged from very small to moderate in size. Profile 1 was comprised of 6 cases (5%) and characterized by moderately high levels of positive affect and activity and low levels of anger, discomfort, fear, and sadness. Profile 2 was comprised of 5 cases (4%) and characterized by low levels of positive affect, fear, and sadness and moderately low levels of anger and approach. Profile 3 was comprised of 2 cases (< 2%) and characterized by high levels of discomfort and sadness, low activity, and moderately low levels of approach and positive affect. Profile 4 was comprised of 19 cases (14%) and characterized by low positive affect and moderately high anger. Profile 5 was comprised of 40 cases (30%) and characterized by moderately low levels of activity, approach, and anger. Profile 6 was characterized by 31 cases (23%) and characterized by moderately high levels of positive affect, anger, discomfort, and sadness. Lastly, profile 7 was comprised of 30 cases (23%) and characterized by moderately high levels of activity and approach and moderately low discomfort. The seven profiles were described as 'positively

emotionally reactive', 'low reactive', 'inhibited', 'prone to anger', 'reserved', 'generally

emotionally reactive', and 'exuberant', respectively.

Table E6

Seven-Profile Solution of Parent-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (6)	2[b] (5)	3[c] (2)	4[d] (19)	5[e] (40)	6[f] (31)	7[g] (30)
Activity	4.68	0.39	4.29 – 5.07	0.79	3.89 – 5.46	5.28	4.41	3.22	4.50	4.00	4.99	5.37
Approach	5.04	0.32	4.72 – 5.36	0.65	4.39 – 5.68	5.10	4.42	2.69	4.74	4.65	5.35	5.63
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	6.45	4.42	5.58	5.01	6.17	6.29	6.21
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	2.56	3.09	4.60	4.82	3.39	5.08	4.23
Discomfort	4.23	0.71	3.52 – 4.94	1.42	2.81 – 5.65	2.62	3.97	6.14	4.28	4.05	5.31	3.49
Fear	3.90	0.69	3.21 – 4.59	1.39	2.51 – 5.28	2.25	1.97	4.09	4.59	3.95	4.54	3.31
Sadness	4.32	0.37	3.95 – 4.69	0.74	3.58 – 5.05	2.49	3.38	5.71	4.61	3.97	4.94	4.34

[a] Positively Emotionally Reactive
[b] Low Reactive
[c] Inhibited
[d] Prone to Anger
[e] Reserved
[f] Generally Emotionally Reactive
[g] Exuberant

Eight profile-solution: The extracted profiles of the eight-profile solution ranged from

very small to moderate in size. Profile 1 was comprised of 4 cases (3%) and characterized by low

levels of positive affect, fear, and sadness and moderately low levels of approach and anger.

Profile 2 was comprised of 40 cases (30%) and characterized by moderately low levels of

activity, approach, and anger. Profile 3 was comprised of 6 cases (5%) and characterized by

moderately high levels of positive affect and activity and low levels of anger, discomfort, fear,

and sadness. Profile 4 was comprised of 19 cases (14%) and characterized by moderately high

levels of activity and approach and moderately low discomfort. Profile 5 was comprised of 17

cases (13%) and characterized by moderately high anger and low positive affect. Profile 6 was

comprised of 36 cases (27%) and characterized by moderately high levels of activity, approach, positive affect, anger, and sadness. Profile 7 was comprised of 4 cases (3%) and characterized by high sadness, moderately high levels of anger and discomfort, low levels of activity and approach, and moderately low positive affect. Lastly, profile 8 was comprised of 7 cases (5%) and characterized by high levels of fear and sadness, moderately high levels of anger, discomfort, approach, and positive affect, and low activity. The eight profiles were described as 'low reactive', 'reserved', 'positively emotionally reactive', 'exuberant', 'prone to anger', 'high reactive', 'inhibited', and 'generally emotionally reactive', respectively.

Table E7

Eight-Profile Solution of Parent-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (4)	2[b] (40)	3[c] (6)	4[d] (19)	5[e] (17)	6[f] (36)	7[g] (4)	8[h] (7)
Activity	4.68	0.39	4.29 – 5.07	0.79	3.89 – 5.46	4.40	3.97	5.28	5.30	4.60	5.40	3.37	3.65
Approach	5.04	0.32	4.72 – 5.36	0.65	4.39 – 5.68	4.41	4.66	5.11	5.47	4.78	5.44	3.42	5.58
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	4.39	6.16	6.48	6.07	4.93	6.30	5.56	6.45
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	3.00	3.39	2.52	3.81	4.81	5.10	5.01	4.83
Discomfort	4.23	0.71	3.52 – 4.94	1.42	2.81 – 5.65	3.97	4.07	2.65	3.23	4.24	4.94	5.44	5.35
Fear	3.90	0.69	3.21 – 4.59	1.39	2.51 – 5.28	2.00	3.93	2.27	3.41	4.59	4.02	4.18	5.33
Sadness	4.32	0.37	3.95 – 4.69	0.74	3.58 – 5.05	3.35	3.96	2.48	4.14	4.54	4.79	5.55	5.39

[a] Low Reactive
[b] Reserved
[c] Positively Emotionally Reactive
[d] Exuberant
[e] Prone to Anger
[f] High Reactive
[g] Inhibited
[h] Generally Emotionally Reactive

Appendix F

Descriptions of All Teacher-Rated Reactivity Solutions

   Two-profile solution: The extracted profiles of the two-profile solution were very

different sizes. Profile 1 was comprised of 98 cases (74%) and characterized by average ratings

across all areas assessed. Profile 2 was comprised of 35 cases (26%) and characterized by

moderately high levels of anger, discomfort, fear, and sadness. The two profiles were described

as 'average reactive' versus 'negatively emotionally reactive', respectively.

Table F1

Two-Profile Solution of Teacher-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1 (98)	2 (35)
Activity	4.38	0.74	3.64 – 5.12	1.49	2.89 – 5.87	4.19	4.92
Approach	4.54	0.38	4.16 – 4.92	0.75	3.70 – 5.29	4.42	4.87
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	5.65	5.58
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87 – 4.29	1.98	4.21
Discomfort	3.26	0.55	2.71 – 3.81	1.10	2.16 – 4.36	2.94	4.13
Fear	2.62	0.53	2.09 – 3.15	1.05	1.57 – 3.67	2.38	3.25
Sadness	3.04	0.47	2.57 – 3.51	0.95	2.09 – 3.99	2.70	3.96

[a] Average Reactive
[b] Negatively Emotionally Reactive

   Three-profile solution: The extracted profiles of the three-profile solution ranged from

small to moderate in size. Profile 1 was comprised of 79 cases (59%) and characterized by

average ratings across most areas assessed, except for moderately low approach. Profile 2 was

comprised of 32 cases (24%) and characterized by high approach, moderately high levels of

activity and positive affect, and moderately low levels of fear and sadness. Profile 3 was

comprised of 22 cases (17%) and characterized by high levels of discomfort, fear, and sadness

and moderately high anger. The three profiles were described as 'low to average reactive',

'exuberant', and 'negatively emotionally reactive', respectively.

Table F2

Three-Profile Solution of Teacher-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (79)	2[b] (32)	3[c] (22)
Activity	4.38	0.74	3.64 – 5.12	1.49	2.89 – 5.87	3.66	5.87	4.64
Approach	4.54	0.38	4.16 – 4.92	0.75	3.70 – 5.29	4.10	5.42	4.71
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	5.46	6.19	5.40
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87 – 4.29	2.06	2.81	4.04
Discomfort	3.26	0.55	2.71 – 3.81	1.10	2.16 – 4.36	2.93	3.10	4.59
Fear	2.62	0.53	2.09 – 3.15	1.05	1.57 – 3.67	2.55	1.91	3.95
Sadness	3.04	0.47	2.57 – 3.51	0.95	2.09 – 3.99	2.94	2.53	4.15

[a] Low to Average Reactive
[b] Exuberant
[c] Negatively Emotionally Reactive

Four-profile solution: The extracted profiles of the four-profile solution ranged from small to moderate in size. Profile 1 was comprised of 12 cases (9%) and characterized by low levels of approach and positive affect and moderately low activity. Profile 2 was comprised of 30 cases (23%) and characterized by high levels of activity and approach, moderately high positive affect, and moderately low levels of fear and sadness. Profile 3 was comprised of 66 cases (50%) and characterized by average ratings across all areas assessed. Profile 4 was comprised of 25 cases (19%) and characterized by high levels of fear and sadness and moderately high levels of anger and discomfort. The four profiles were described as 'reserved', 'exuberant', 'average reactive', and 'negatively emotionally reactive', respectively.

Table F3

Four-Profile Solution of Teacher-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (12)	2[b] (30)	3[c] (66)	4[d] (25)
Activity	4.38	0.74	3.64 – 5.12	1.49	2.89 – 5.87	3.45	5.93	3.74	4.56
Approach	4.54	0.38	4.16 – 4.92	0.75	3.70 – 5.29	3.66	5.47	4.19	4.68
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	3.87	6.21	5.78	5.38
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87 – 4.29	2.44	2.86	1.94	3.96
Discomfort	3.26	0.55	2.71 – 3.81	1.10	2.16 – 4.36	3.02	3.12	2.88	4.52
Fear	2.62	0.53	2.09 – 3.15	1.05	1.57 – 3.67	2.47	1.88	2.53	3.88
Sadness	3.04	0.47	2.57 – 3.51	0.95	2.09 – 3.99	3.37	2.54	2.81	4.12

[a] Reserved
[b] Exuberant
[c] Average Reactive
[d] Negatively Emotionally Reactive

Five-profile solution: The extracted profiles of the five-profile solution ranged from very small to moderate in size. Profile 1 was comprised of 13 cases (10%) and characterized by low levels of approach and positive affect and moderately low activity. Profile 2 was comprised of 60 cases (45%) and characterized by average ratings across all areas assessed. Profile 3 was comprised of 24 cases (18%) and characterized by high approach, moderately high levels of activity and positive affect, and moderately low levels of fear and sadness. Profile 4 was comprised of 19 cases (14%) and characterized by high anger and moderately high activity, approach, and sadness. Profile 5 was comprised of 17 cases (13%) and characterized by high levels of discomfort and fear and moderately high sadness. The five profiles were described as 'reserved', 'average reactive', 'exuberant and positively emotionally reactive', 'exuberant and negatively emotionally reactive', and 'negatively emotionally reactive'.

Table F4

Five-Profile Solution of Teacher-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (13)	2[b] (60)	3[c] (24)	4[d] (19)	5[e] (17)
Activity	4.38	0.74	3.64 – 5.12	1.49	2.89 – 5.87	3.47	3.72	5.78	5.81	3.76
Approach	4.54	0.38	4.16 – 4.92	0.75	3.70 – 5.29	3.69	4.18	5.37	5.15	4.51
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	3.89	5.78	6.23	5.75	5.43
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87 – 4.29	2.48	1.88	2.11	4.91	3.20
Discomfort	3.26	0.55	2.71 – 3.81	1.10	2.16 – 4.36	3.03	2.79	3.08	3.71	4.72
Fear	2.62	0.53	2.09 – 3.15	1.05	1.57 – 3.67	2.46	2.50	1.78	2.74	4.08
Sadness	3.04	0.47	2.57 – 3.51	0.95	2.09 – 3.99	3.45	2.79	2.45	3.83	3.97

[a] Reserved
[b] Average Reactive
[c] Exuberant and Positively Emotionally Reactive
[d] Exuberant and Negatively Emotionally Reactive
[e] Negatively Emotionally Reactive

Six-profile solution: The extracted profiles of the six-profile solution ranged from very small to moderate in size. Profile 1 was comprised of 26 cases (20%) and characterized by high approach, moderately high levels of activity and positive affect, and moderately low levels of fear and sadness. Profile 2 was comprised of 13 cases (10%) and characterized by low positive affect and moderately low levels of activity and approach. Profile 3 was comprised of 60 cases (45%) and characterized by average ratings across all areas assessed. Profile 4 was comprised of 14 cases (11%) and characterized by high levels of discomfort and fear, moderately high sadness, and moderately low activity. Profile 5 was also comprised of 14 cases (11%) and characterized by high levels of anger and sadness and moderately high levels of discomfort and fear. Profile 6 was comprised of 6 cases (5%) and characterized by high levels of activity, approach, and anger and moderately high levels of positive affect and sadness. The six profiles were described as 'exuberant', 'reserved', 'average reactive', 'negatively emotionally reactive – prone to discomfort and fear', 'negatively emotionally reactive – prone to anger and sadness', and 'generally high reactive' respectively.

Table F5

Six-Profile Solution of Teacher-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (26)	2[b] (13)	3[c] (60)	4[d] (14)	5[e] (14)	6[f] (6)
Activity	4.38	0.74	3.64 – 5.12	1.49	2.89 – 5.87	5.80	3.48	3.74	3.59	5.02	6.52
Approach	4.54	0.38	4.16 – 4.92	0.75	3.70 – 5.29	5.39	3.71	4.17	4.63	4.57	5.73
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	6.20	3.91	5.79	5.56	5.35	6.18
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87 – 4.29	2.25	2.50	1.87	2.65	4.82	5.60
Discomfort	3.26	0.55	2.71 – 3.81	1.10	2.16 – 4.36	3.14	3.04	2.77	4.76	4.24	3.06
Fear	2.62	0.53	2.09 – 3.15	1.05	1.57 – 3.67	1.83	2.46	2.48	4.20	3.39	2.26
Sadness	3.04	0.47	2.57 – 3.51	0.95	2.09 – 3.99	2.37	3.48	2.77	3.71	4.20	3.63

[a] Exuberant
[b] Reserved
[c] Average Reactive
[d] Negatively Emotionally Reactive – Prone to Discomfort and Fear
[e] Negatively Emotionally Reactive – Prone to Anger and Sadness
[f] Generally High Reactive

Seven-profile solution: The extracted profiles of the seven-profile solution ranged from very small to moderate in size. Profile 1 was comprised of 17 cases (13%) and characterized by moderately high levels of positive affect, activity, and approach, low sadness, and moderately low levels of anger and fear. Profile 2 was comprised of 13 cases (10%) and characterized by low positive affect and moderately low levels of activity and approach. Profile 3 was comprised of 58 cases (44%) and characterized by average ratings across all areas assessed. Profile 4 was comprised of 14 cases (11%) and characterized by high levels of discomfort and fear, moderately high sadness, and moderately low activity. Profile 5 was also comprised of 14 cases (11%) and characterized by high approach and moderately high levels of activity and positive affect. Profile 6 was comprised of 12 cases (9%) and characterized by high levels of anger and sadness and moderately high levels of discomfort and fear. Lastly, profile 7 was comprised of 5 cases (4%) and characterized by high levels of activity, approach, and anger and moderately high levels of positive affect and sadness. The seven profiles were described as 'exuberant – prone to low negative emotionally reactivity', 'reserved', 'average reactive', 'negatively emotionally reactive

– prone to discomfort and fear', 'exuberant – prone to average negative emotional reactivity',

'negatively emotionally reactive – prone to anger and sadness', and 'exuberant – prone to high

negative emotional reactivity', respectively.

Table F6

Seven-Profile Solution of Teacher-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (17)	2[b] (13)	3[c] (58)	4[d] (14)	5[e] (14)	6[f] (12)	7[g] (5)
Activity	4.38	0.74	3.64 – 5.12	1.49	2.89 – 5.87	5.62	3.50	3.71	3.58	5.82	4.99	6.58
Approach	4.54	0.38	4.16 – 4.92	0.75	3.70 – 5.29	5.10	3.73	4.16	4.62	5.56	4.49	5.84
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	6.27	3.90	5.78	5.56	5.97	5.34	6.27
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87 – 4.29	1.71	2.53	1.88	2.67	2.98	5.01	5.75
Discomfort	3.26	0.55	2.71 – 3.81	1.10	2.16 – 4.36	2.75	3.05	2.78	4.77	3.53	4.36	3.05
Fear	2.62	0.53	2.09 – 3.15	1.05	1.57 – 3.67	1.57	2.46	2.51	4.18	2.20	3.51	2.27
Sadness	3.04	0.47	2.57 – 3.51	0.95	2.09 – 3.99	1.75	3.51	2.81	3.72	3.06	4.34	3.82

[a] Exuberant – Prone to Low Negative Emotional Reactivity
[b] Reserved
[c] Average Reactive
[d] Negative Emotional Reactive – Prone to Discomfort and Fear
[e] Exuberant – Prone to Average Negative Emotional Reactivity
[f] Negatively Emotionally Reactive – Prone to Anger and Sadness
[g] Exuberant – Prone to High Negative Emotional Reactivity

Eight profile-solution: The extracted profiles of the eight-profile solution ranged from

very small to moderate in size. Profile 1 was comprised of 12 cases (9%) and characterized by

low levels of approach and positive affect and moderately low levels of activity. Profile 2 was

comprised of 6 cases (5%) and characterized by moderately high positive affect, low levels of

approach, discomfort, and sadness, and moderately low levels of anger, fear, and activity. Profile

3 was comprised of 13 cases (10%) and characterized by high levels anger and sadness and

moderately high levels of discomfort and fear. Profile 4 was comprised of 12 cases (9%) and

characterized by high levels of discomfort and fear, moderately high sadness, and moderately

low activity. Profile 5 was comprised of 53 cases (40%) and characterized by average ratings across all areas assessed. Profile 6 was comprised of 17 cases (13%) and characterized by moderately high positive affect, activity, and approach, low sadness, and moderately low anger and fear. Profile 7 was comprised of 5 cases (4%) and characterized by high levels of activity, approach, and anger and moderately high levels of positive affect and sadness. Lastly, profile 8 was comprised of 15 cases (11%) and characterized by high approach and moderately high levels of activity and positive affect. The eight profiles were described as 'reserved', 'positively emotionally reactive', 'negatively emotionally reactive – prone to anger and sadness', 'negatively emotionally reactive – prone to discomfort and fear', 'average reactive', 'exuberant – prone to low negative emotional reactivity', 'exuberant – prone to high negative emotional reactivity', and 'exuberant – prone to average negative emotional reactivity'.

Table F7

Eight-Profile Solution of Teacher-Rated Reactivity

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (12)	2[b] (6)	3[c] (13)	4[d] (12)	5[e] (53)	6[f] (17)	7[g] (5)	8[h] (15)
Activity	4.38	0.74	3.64 – 5.12	1.49	2.89 – 5.87	3.45	3.08	4.90	3.57	3.77	5.50	6.59	5.85
Approach	4.54	0.38	4.16 – 4.92	0.75	3.70 – 5.29	3.65	3.11	4.47	4.62	4.30	5.03	5.87	5.58
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	3.85	6.16	5.31	5.59	5.70	6.25	6.27	5.98
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87 – 4.29	2.45	1.22	4.89	2.70	1.99	1.67	5.77	2.97
Discomfort	3.26	0.55	2.71 – 3.81	1.10	2.16 – 4.36	3.00	2.00	4.33	4.88	2.91	2.72	3.07	3.51
Fear	2.62	0.53	2.09 – 3.15	1.05	1.57 – 3.67	2.48	1.81	3.40	4.24	2.64	1.65	2.29	2.17
Sadness	3.04	0.47	2.57 – 3.51	0.95	2.09 – 3.99	3.33	1.60	4.42	3.74	3.01	1.73	3.87	3.04

[a] Reserved
[b] Positively Emotionally Reactive
[c] Negatively Emotionally Reactive – Prone to Anger and Sadness
[d] Negatively Emotionally Reactive – Prone to Discomfort and Fear
[e] Average Reactive
[f] Exuberant – Prone to Low Negative Emotional Reactivity
[g] Exuberant – Prone to High Negative Emotional Reactivity
[h] Exuberant – Prone to Average Negative Emotional Reactivity

Appendix G

Descriptions of All Parent-Rated Reactivity and Regulation Solutions

     Two-profile solution: The extracted profiles of the two-profile solution were both moderate in size, but showed some differences in proportion. Profile 1 was comprised of 79 cases (59%) and characterized by moderately low levels of emotion regulation and behavior regulation but otherwise average ratings. Profile 2 was comprised of 54 cases (41%) and characterized by moderately high levels of emotion regulation, behavior regulation, and low intensity pleasure and moderately low anger. The two profiles were described as 'dysregulated' and 'well-regulated', respectively.

Table G1

Two-Profile Solution of Parent-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (79)	2[b] (54)
Exuberance	4.63	0.27	4.36 – 4.90	0.55	4.08 – 5.18	4.70	4.68
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	5.91	6.10
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	4.78	3.27
Internalizing Emotion	4.11	0.37	3.74 – 4.48	0.74	3.37 – 4.85	4.33	3.79
Emotion Regulation	4.80	0.51	4.29 – 5.31	1.02	3.78 – 5.82	4.21	5.64
Behavior Regulation	5.02	0.33	4.69 – 5.35	0.66	4.36 – 5.68	4.62	5.58
Perceptual Sensitivity	5.34	0.43	4.91 – 5.77	0.86	4.48 – 6.20	5.14	5.63
Low Intensity Pleasure	5.81	0.18	5.63 – 5.99	0.35	5.46 – 6.16	5.65	6.04

[a] Dysregulated
[b] Well-Regulated

     Three-profile solution: The extracted profiles of the three-profile solution ranged from small to moderate in size. There were some statistically significant effects of gender, but not of age. Profile 1 was comprised of 18 cases (14%) and characterized by low levels of perceptual sensitivity and low intensity pleasure and moderately low levels of emotion regulation and behavior regulation. Profile 2 was comprised of 51 cases (38%) and characterized by moderately high levels of emotion regulation, behavior regulation, and low intensity pleasure and moderately

low anger. Profile 3 was comprised of 64 cases (48%) and characterized by moderately low

levels of emotion regulation and behavior regulation and moderately high anger. The three

profiles were described as 'under attuned to subtlety and dysregulated', 'highly attuned to

subtlety and well-regulated', and 'prone to anger and dysregulated', respectively.

Table G2

Three-Profile Solution of Parent-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (18)	2[b] (51)	3[c] (64)
Exuberance	4.63	0.27	4.36 – 4.90	0.55	4.08 – 5.18	4.67	4.68	4.71
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	5.90	6.10	5.92
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	4.46	3.22	4.85
Internalizing Emotion	4.11	0.37	3.74 – 4.48	0.74	3.37 – 4.85	3.90	3.77	4.46
Emotion Regulation	4.80	0.51	4.29 – 5.31	1.02	3.78 – 5.82	4.08	5.68	4.28
Behavior Regulation	5.02	0.33	4.69 – 5.35	0.66	4.36 – 5.68	4.51	5.58	4.69
Perceptual Sensitivity	5.34	0.43	4.91 – 5.77	0.86	4.48 – 6.20	3.66	5.66	5.59
Low Intensity Pleasure	5.81	0.18	5.63 – 5.99	0.35	5.46 – 6.16	5.42	6.04	5.73

[a] Under Attuned to Subtlety and Dysregulated
[b] Highly Attuned to Subtlety and Well-Regulated
[c] Prone to Anger and Dysregulated

Four-profile solution: The extracted profiles of the four-profile solution ranged from

small to moderate in size. Profile 1 was comprised of 19 cases (14%) and characterized by low

levels of perceptual sensitivity and low intensity pleasure and moderately low levels of emotion

regulation and behavior regulation. Profile 2 was also comprised of 19 (14%) cases and

characterized by high behavior regulation, moderately high levels of emotion regulation and

exuberance, and low levels of anger and internalizing emotion. Profile 3 was comprised of 58

cases (44%) and characterized by moderately high anger and moderately low levels of emotion

regulation and behavior regulation. Profile 4 was comprised of 37 cases (28%) and characterized

by moderately high levels of emotion regulation, behavior regulation, perceptual sensitivity, and

low intensity pleasure. The four profiles were described as 'under attuned to subtlety and

dysregulated', 'exuberant and well-regulated', 'prone to anger and dysregulated', and 'highly

attuned to subtlety and well-regulated', respectively.

Table G3

Four-Profile Solution of Parent-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (19)	2[b] (19)	3[c] (58)	4[d] (37)
Exuberance	4.63	0.27	4.36 – 4.90	0.55	4.08 – 5.18	4.65	5.03	4.74	4.46
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	5.90	5.93	5.92	6.18
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	4.46	2.83	4.88	3.57
Internalizing Emotion	4.11	0.37	3.74 – 4.48	0.74	3.37 – 4.85	3.91	3.04	4.45	4.24
Emotion Regulation	4.80	0.51	4.29 – 5.31	1.02	3.78 – 5.82	4.08	5.78	4.23	5.55
Behavior Regulation	5.02	0.33	4.69 – 5.35	0.66	4.36 – 5.68	4.53	5.69	4.64	5.51
Perceptual Sensitivity	5.34	0.43	4.91 – 5.77	0.86	4.48 – 6.20	3.67	5.20	5.58	5.94
Low Intensity Pleasure	5.81	0.18	5.63 – 5.99	0.35	5.46 – 6.16	5.44	5.93	5.71	6.10

[a] Under Attuned to Subtlety and Dysregulated
[b] Exuberant and Well-Regulated
[c] Prone to Anger and Dysregulated
[d] Highly Attuned to Subtlety and Well-Regulated

Five-profile solution: The extracted profiles of the five-profile solution ranged from very

small to moderate in size. Profile 1 was comprised of 14 cases (11%) and characterized by low

perceptual sensitivity and moderately low levels of low intensity pleasure, emotion regulation,

behavior regulation, and internalizing emotion. Profile 2 was comprised of 31 cases (23%) and

characterized by low positive affect, moderately low levels of exuberance, low intensity

pleasure, and emotion regulation, and moderately high internalizing emotion. Profile 3 was

comprised of 4 cases (3%) and characterized by low levels of positive affect, anger, and

internalizing emotion and moderately high emotion regulation. Profile 4 was comprised of 45

cases (34%) and characterized by moderately high levels of positive affect, emotion regulation,

behavior regulation, and low intensity pleasure and moderately low anger. Profile 5 was

comprised of 39 cases (29%) and characterized by moderately high levels of exuberance,

positive affect, and anger and moderately low behavior regulation. The five profiles were

described as 'under attuned to subtlety and dysregulated', 'inhibited and dysregulated', 'low to average reactive and regulated', 'positively emotionally reactive, highly attuned to subtlety, and well-regulated', and 'exuberant and dysregulated', respectively.

Table G4

Five-Profile Solution of Parent-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (14)	2[b] (31)	3[c] (4)	4[d] (45)	5[e] (39)
Exuberance	4.63	0.27	4.36 – 4.90	0.55	4.08 – 5.18	4.88	4.10	4.69	4.71	5.08
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	6.18	5.25	4.33	6.30	6.33
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	4.29	4.69	2.84	3.24	4.88
Internalizing Emotion	4.11	0.37	3.74 – 4.48	0.74	3.37 – 4.85	3.62	4.53	2.65	3.83	4.44
Emotion Regulation	4.80	0.51	4.29 – 5.31	1.02	3.78 – 5.82	4.17	4.16	5.58	5.75	4.36
Behavior Regulation	5.02	0.33	4.69 – 5.35	0.66	4.36 – 5.68	4.63	4.75	5.21	5.64	4.63
Perceptual Sensitivity	5.34	0.43	4.91 – 5.77	0.86	4.48 – 6.20	3.67	5.21	5.52	5.69	5.67
Low Intensity Pleasure	5.81	0.18	5.63 – 5.99	0.35	5.46 – 6.16	5.51	5.49	5.63	6.11	5.85

[a] Under Attuned to Subtlety and Dysregulated
[b] Inhibited and Dysregulated
[c] Low to Average Reactive and Regulated
[d] Positively Emotionally Reactive, Highly Attuned to Subtlety, and Well-Regulated
[e] Exuberant and Dysregulated

Six-profile solution: The extracted profiles of the six-profile solution ranged from very small to moderate in size. Profile 1 was comprised of 17 cases (13%) and characterized by low perceptual sensitivity and moderately low levels of internalizing emotion, emotion regulation, and low intensity pleasure. Profile 2 was comprised of 13 cases (10%) and characterized by moderately high internalizing emotion, low levels of positive affect, emotion regulation, behavior regulation, and low intensity pleasure, and moderately low perceptual sensitivity. Profile 3 was comprised of 3 cases (2%) and characterized by moderately high levels of exuberance and emotion regulation and low levels of positive affect, anger, and internalizing emotion. Profile 4 was comprised of 21 cases (16%) and characterized by low levels of exuberance and positive affect, but otherwise average ratings. Profile 5 was comprised of 38

cases (29%) and characterized by moderately high levels of exuberance, positive affect, and anger and moderately low levels of behavior regulation. Lastly, profile 6 was comprised of 41 cases (31%) and characterized by moderately high levels of emotion regulation, behavior regulation, positive affect, and low intensity pleasure and moderately low anger. The six profiles were described as 'under attuned to subtlety and dysregulated', 'negatively emotionally reactive and dysregulated', 'exuberant and regulated', 'reserved and regulated', 'exuberant and dysregulated', and 'positively emotionally reactive, highly attuned to subtlety, and well-regulated', respectively.

Table G5

Six-Profile Solution of Parent-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (17)	2[b] (13)	3[c] (3)	4[d] (21)	5[e] (38)	6[f] (41)
Exuberance	4.63	0.27	4.36 – 4.90	0.55	4.08 – 5.18	4.90	4.36	5.14	3.89	5.10	4.74
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	6.21	5.02	4.29	5.41	6.32	6.33
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	4.24	5.16	2.84	4.20	4.90	3.21
Internalizing Emotion	4.11	0.37	3.74 – 4.48	0.74	3.37 – 4.85	3.62	4.76	2.42	4.31	4.44	3.81
Emotion Regulation	4.80	0.51	4.29 – 5.31	1.02	3.78 – 5.82	4.25	3.76	5.77	4.52	4.35	5.81
Behavior Regulation	5.02	0.33	4.69 – 5.35	0.66	4.36 – 5.68	4.72	4.19	5.25	5.17	4.60	5.66
Perceptual Sensitivity	5.34	0.43	4.91 – 5.77	0.86	4.48 – 6.20	3.70	4.62	5.11	5.66	5.68	5.73
Low Intensity Pleasure	5.81	0.18	5.63 – 5.99	0.35	5.46 – 6.16	5.55	5.19	5.63	5.68	5.85	6.14

[a] Under Attuned to Subtlety and Dysregulated
[b] Negatively Emotionally Reactive and Dysregulated
[c] Exuberant and Regulated
[d] Reserved and Regulated
[e] Exuberant and Dysregulated
[f] Positively Emotionally Reactive, Highly Attuned to Subtlety, and Well-Regulated

Seven-profile solution: The extracted profiles of the seven-profile solution ranged from very small to moderate in size. Profile 1 was comprised of 13 cases (10%) and characterized by moderately high internalizing emotion and anger, low levels of positive affect, emotion

regulation, behavior regulation, and low intensity pleasure, and moderately low perceptual sensitivity. Profile 2 was comprised of 3 cases (2%) and characterized by moderately high levels of exuberance and emotion regulation, low levels of positive affect and anger, and moderately low internalizing emotion. Profile 3 was comprised of 20 cases (15%) and characterized by low levels of exuberance and positive affect, but otherwise average ratings. Profile 4 was comprised of 17 cases (13%) and characterized by low perceptual sensitivity and moderately low levels of low intensity pleasure and internalizing emotion. Profile 5 was comprised of 35 cases (26%) and characterized by moderately high levels of exuberance, positive affect, and anger and moderately low levels of emotion regulation and behavior regulation. Profile 6 was comprised of 38 cases (29%) and characterized by moderately high levels of emotion regulation, behavior regulation, perceptual sensitivity, low intensity pleasure, and positive affect and moderately low anger. Lastly, profile 7 was comprised of 7 cases (5%) and characterized by high levels of emotion regulation, behavior regulation, low intensity pleasure, and positive affect, moderately high exuberance, and low levels of anger and internalizing emotion. The seven profiles were described as 'negatively emotionally reactive and dysregulated', 'exuberant and regulated', 'reserved and regulated', 'under attuned to subtlety and regulated', 'exuberant and dysregulated', 'positively emotionally reactive, highly attuned to subtlety, and well-regulated', and 'exuberant and well-regulated', respectively.

Table G6

Seven-Profile Solution of Parent-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (13)	2[b] (3)	3[c] (20)	4[d] (17)	5[e] (35)	6[f] (38)	7[g] (7)
Exuberance	4.63	0.27	4.36 – 4.90	0.55	4.08 – 5.18	4.37	5.14	3.89	4.84	5.14	4.70	4.97
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	5.03	4.29	5.39	6.12	6.36	6.28	6.60
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	5.19	2.84	4.21	4.16	4.97	3.48	2.19
Internalizing Emotion	4.11	0.37	3.74 – 4.48	0.74	3.37 – 4.85	4.81	4.41	4.31	3.41	4.49	4.08	2.63
Emotion Regulation	4.80	0.51	4.29 – 5.31	1.02	3.78 – 5.82	3.69	5.77	4.53	4.41	4.24	5.69	6.12
Behavior Regulation	5.02	0.33	4.69 – 5.35	0.66	4.36 – 5.68	4.17	5.25	5.17	4.77	4.53	5.53	6.21
Perceptual Sensitivity	5.34	0.43	4.91 – 5.77	0.86	4.48 – 6.20	4.67	5.12	5.63	3.83	5.59	5.80	5.28
Low Intensity Pleasure	5.81	0.18	5.63 – 5.99	0.35	5.46 – 6.16	5.23	5.63	5.66	5.53	5.85	6.09	6.26

[a] Negatively Emotionally Reactive and Dysregulated
[b] Exuberant and Regulated
[c] Reserved and Regulated
[d] Under Attuned to Subtlety and Regulated
[e] Exuberant and Dysregulated
[f] Positively Emotionally Reactive, Highly Attuned to Subtlety, and Well-Regulated
[g] Exuberant and Well-Regulated

Eight-profile solution: The extracted profiles of the eight-profile solution ranged from small to very small in size. Profile 1 was comprised of 11 cases (8%) and characterized by high internalizing emotion, moderately high anger, low levels of positive affect, emotion regulation, behavior regulation, and low intensity pleasure, and moderately low perceptual sensitivity. Profile 2 was comprised of 13 cases (10%) and characterized by low perceptual sensitivity and moderately low levels of low intensity pleasure and internalizing emotion. Profile 3 was comprised of 22 cases (17%) and characterized by low levels of exuberance and positive affect, but otherwise average ratings. Profile 4 was comprised of 3 cases (2%) and characterized by moderately high levels of exuberance and emotion regulation and low levels of positive affect, anger, and internalizing emotion. Profile 5 was comprised of 13 cases (10%) and characterized

by moderately high levels of exuberance and anger, low behavior regulation, and moderately low in low intensity pleasure. Profile 6 was comprised of 29 cases (22%) and characterized by moderately high levels of perceptual sensitivity, low intensity pleasure, positive affect, emotion regulation, and behavior regulation and moderately low anger. Profile 7 was comprised of 8 cases (6%) and characterized by high levels of emotion regulation, behavior regulation, low intensity pleasure, and positive affect, moderately high exuberance, and low levels of anger and internalizing emotion. Lastly, profile 8 was comprised of 24 cases (18%) and characterized by moderately high levels of exuberance, positive affect, anger, and internalizing emotion, and moderately low emotion regulation. The eight profiles were described as 'negatively emotionally reactive and dysregulated', 'under attuned to subtlety and regulated', 'reserved and regulated', 'exuberant and regulated', 'exuberant and dysregulated', 'positively emotionally reactive, highly attuned to subtlety, and well-regulated', 'exuberant and well-regulated', and 'high reactive and dysregulated', respectively.

Table G7

Eight-Profile Solution of Parent-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (11)	2[b] (13)	3[c] (22)	4[d] (3)	5[e] (13)	6[f] (29)	7[g] (8)	8[h] (24)
Exuberance	4.63	0.27	4.36 – 4.90	0.55	4.08 – 5.18	4.45	4.80	3.92	5.14	5.16	4.70	4.96	5.07
Positive Affect	5.99	0.25	5.74 – 6.24	0.49	5.50 – 6.48	5.27	6.05	5.33	4.30	6.27	6.28	6.55	6.34
Anger	4.16	0.64	3.52 – 4.80	1.27	2.89 – 5.43	5.24	4.16	4.25	2.84	4.58	3.50	2.23	5.08
Internalizing Emotion	4.11	0.37	3.74 – 4.48	0.74	3.37 – 4.85	4.89	3.43	4.33	2.41	3.77	4.09	2.72	4.70
Emotion Regulation	4.80	0.51	4.29 – 5.31	1.02	3.78 – 5.82	3.61	4.40	4.51	5.77	4.61	5.68	6.07	4.06
Behavior Regulation	5.02	0.33	4.69 – 5.35	0.66	4.36 – 5.68	3.95	4.91	5.21	5.25	3.63	5.51	6.26	4.92
Perceptual Sensitivity	5.34	0.43	4.91 – 5.77	0.86	4.48 – 6.20	4.49	3.65	5.60	5.12	5.45	5.80	5.18	5.68
Low Intensity Pleasure	5.81	0.18	5.63 – 5.99	0.35	5.46 – 6.16	5.21	5.52	5.63	5.63	5.62	6.09	6.22	5.95

[a] Negatively Emotionally Reactive and Dysregulated
[b] Under Attuned to Subtlety and Regulated
[c] Reserved and Regulated
[d] Exuberant and Regulated
[e] Exuberant and Dysregulated
[f] Positively Emotionally Reactive, Highly Attuned to Subtlety, and Well-Regulated
[g] Exuberant and Well-Regulated
[h] High Reactive and Dysregulated

Descriptions of All Teacher-Rated Reactivity and Regulation Solutions

Two-profile solution: The extracted profiles of the two-profile solution were very

different sizes. Profile 1 was comprised of 114 cases (86%) and average across all areas

assessed. Profile 2 was comprised of 19 cases (14%) and characterized by high anger,

moderately high levels of internalizing emotion and exuberance, low emotion regulation, and

moderately low behavior regulation. The two profiles were described as 'average reactive and

regulated' versus 'high reactive and dysregulated', respectively.

Table H1

Two-Profile Solution of Teacher-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (114)	2[b] (19)
Exuberance	4.58	0.37	4.21 – 4.95	0.74	3.84 – 5.32	4.48	5.15
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	5.63	5.62
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87- 4.29	2.16	4.94
Internalizing Emotion	2.81	0.39	2.42 – 3.20	0.78	2.03 – 3.59	2.69	3.50
Emotion Regulation	4.97	0.47	4.50 – 5.44	0.94	4.03 – 5.91	5.26	3.29
Behavior Regulation	4.91	0.57	4.34 – 5.48	1.13	3.78 – 6.04	5.09	3.88
Perceptual Sensitivity	4.56	0.61	3.95 – 5.17	1.21	3.35 – 5.77	4.59	4.37
Low Intensity Pleasure	4.93	0.30	4.63 – 5.23	0.60	4.33 – 5.53	4.95	4.82

[a] Average Reactive and Regulated
[b] High Reactive and Dysregulated

Three-profile solution: The extracted profiles of the three-profile solution ranged from

small to moderate in size. Profile 1 was comprised of 19 cases (14%) and characterized by high

anger, moderately high levels of internalizing emotion and exuberance, low emotion regulation,

and moderately low behavior regulation. Profile 2 was comprised of 88 cases (66%) and

characterized by average ratings across most areas assessed, with the exception of moderately

low exuberance. Profile 3 was comprised of 26 cases (20%) and characterized by high

exuberance, moderately high positive affect, and moderately low perceptual sensitivity, low

intensity pleasure, and internalizing emotion. The three profiles were described as 'high reactive and dysregulated', 'reserved and regulated', and 'exuberant and regulated', respectively.

Table H2

Three-Profile Solution of Teacher-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (19)	2[b] (88)	3[c] (26)
Exuberance	4.58	0.37	4.21 – 4.95	0.74	3.84 – 5.32	5.17	4.19	5.32
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	5.62	5.46	6.15
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87- 4.29	4.96	2.25	1.88
Internalizing Emotion	2.81	0.39	2.42 – 3.20	0.78	2.03 – 3.59	3.50	2.98	1.88
Emotion Regulation	4.97	0.47	4.50 – 5.44	0.94	4.03 – 5.91	3.92	5.20	5.43
Behavior Regulation	4.91	0.57	4.34 – 5.48	1.13	3.78 – 6.04	3.87	5.32	4.39
Perceptual Sensitivity	4.56	0.61	3.95 – 5.17	1.21	3.35 – 5.77	4.35	4.83	3.87
Low Intensity Pleasure	4.93	0.30	4.63 – 5.23	0.60	4.33 – 5.53	4.82	5.12	4.40

[a] High Reactive and Dysregulated
[b] Reserved and Regulated
[c] Exuberant and Regulated

Four-profile solution: The extracted profiles of the four-profile solution ranged from small to moderate in size. Profile 1 was comprised of 63 cases (47%) and characterized by moderately low levels of exuberance and anger, but otherwise average ratings. Profile 2 was comprised of 31 cases (23%) and characterized by moderately high levels of internalizing emotion, moderately low levels of positive affect, and otherwise average ratings. Profile 3 was comprised of 22 cases (17%) and characterized by high exuberance, moderately high positive affect, low internalizing emotion, and moderately low levels of behavior regulation, perceptual sensitivity, and low intensity pleasure. Profile 4 was comprised of 17 cases (13%) and characterized by high anger, moderately high levels of internalizing emotion and exuberance, low emotion regulation, and moderately low behavior regulation. The four profiles were described as 'reserved and regulated', 'prone to internalizing emotion but regulated', 'exuberant and behaviorally dysregulated', and 'high reactive and dysregulated'.

Table H3

Four-Profile Solution of Teacher-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (63)	2[b] (31)	3[c] (22)	4[d] (17)
Exuberance	4.58	0.37	4.21 – 4.95	0.74	3.84 – 5.32	4.18	4.37	5.53	5.15
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	5.63	5.26	6.19	5.58
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87- 4.29	1.71	3.17	2.15	5.26
Internalizing Emotion	2.81	0.39	2.42 – 3.20	0.78	2.03 – 3.59	2.63	3.40	1.98	3.58
Emotion Regulation	4.97	0.47	4.50 – 5.44	0.94	4.03 – 5.91	5.43	4.82	5.20	3.24
Behavior Regulation	4.91	0.57	4.34 – 5.48	1.13	3.78 – 6.04	5.48	4.92	4.06	3.93
Perceptual Sensitivity	4.56	0.61	3.95 – 5.17	1.21	3.35 – 5.77	4.80	4.80	3.61	4.42
Low Intensity Pleasure	4.93	0.30	4.63 – 5.23	0.60	4.33 – 5.53	5.05	5.09	4.42	4.87

[a] Reserved and Regulated
[b] Prone to Internalizing Emotion but Regulated
[c] Exuberant and Dysregulated
[d] High Reactive and Dysregulated

Five-profile solution: The extracted profiles of the five-profile solution ranged from very small to moderate in size. Profile 1 was comprised of 17 cases (13%) and characterized by high anger, moderately high levels of internalizing emotion and exuberance, low emotion regulation, and moderately low behavior regulation. Profile 2 was comprised of 46 cases (35%) and characterized by moderately low exuberance, moderately high behavior regulation, and otherwise average ratings. Profile 3 was comprised of 32 cases (24%) and characterized by moderately high levels of internalizing emotion, moderately low levels of positive affect, and otherwise average ratings. Profile 4 was comprised of 33 cases (25%) and characterized by moderately high levels of exuberance, positive affect, and emotion regulation and moderately low levels of internalizing and low intensity pleasure. Profile 5 was comprised of 5 cases (4%) and characterized by high exuberance, moderately high positive affect, low levels of behavior regulation and low intensity pleasure, and moderately low levels of emotion regulation, internalizing emotion, and perceptual sensitivity. The five profiles were described as 'high

reactive and dysregulated', 'reserved and regulated', 'prone to internalizing emotion but regulated', 'exuberant and regulated', and 'exuberant and dysregulated'.

Table H4

Five-Profile Solution of Teacher-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (17)	2[b] (46)	3[c] (32)	4[d] (33)	5[e] (5)
Exuberance	4.58	0.37	4.21 – 4.95	0.74	3.84 – 5.32	5.15	4.03	4.37	5.21	5.61
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	5.58	5.52	5.27	6.15	6.10
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87- 4.29	5.27	1.77	3.14	1.84	2.43
Internalizing Emotion	2.81	0.39	2.42 – 3.20	0.78	2.03 – 3.59	3.58	2.75	3.40	2.03	2.08
Emotion Regulation	4.97	0.47	4.50 – 5.44	0.94	4.03 – 5.91	3.23	5.41	4.83	5.51	4.23
Behavior Regulation	4.91	0.57	4.34 – 5.48	1.13	3.78 – 6.04	3.93	5.65	4.88	4.76	2.12
Perceptual Sensitivity	4.56	0.61	3.95 – 5.17	1.21	3.35 – 5.77	4.41	4.86	4.79	3.97	3.92
Low Intensity Pleasure	4.93	0.30	4.63 – 5.23	0.60	4.33 – 5.53	4.87	5.15	5.09	4.53	4.11

[a] High Reactive and Dysregulated
[b] Reserved and Regulated
[c] Prone to Internalizing Emotion but Regulated
[d] Exuberant and Regulated
[e] Exuberant and Dysregulated

Six-profile solution: The extracted profiles of the six-profile solution ranged from very small to moderate in size. There were some statistically significant effects of age, but not of gender. Profile 1 was comprised of 11 cases (8%) and characterized by low levels of exuberance and positive affect, but otherwise average ratings. Profile 2 was comprised of 31 cases (23%) and characterized by moderately high levels of exuberance, positive affect, and emotion regulation, low internalizing emotion, and moderately low levels of perceptual sensitivity and low intensity pleasure. Profile 3 was comprised of 5 cases (4%) and characterized by high exuberance, moderately high positive affect, low levels of behavior regulation and low intensity pleasure, and moderately low levels of emotion regulation, internalizing emotion, and perceptual sensitivity. Profile 4 was comprised of 50 cases (38%) and characterized by moderately low exuberance, moderately high behavior regulation, and otherwise average ratings. Profile 5 was comprised of

21 cases (16%) and characterized by moderately high levels of anger and internalizing emotion,

but otherwise average ratings. Lastly, profile 6 was comprised of 15 cases (11%) and

characterized by high anger, moderately high levels of internalizing emotion and exuberance,

low emotion regulation, and moderately low behavior regulation. The six profiles were described

as 'reserved and regulated', 'exuberant and regulated', 'very exuberant and dysregulated', 'low

to average reactive and regulated', 'negatively emotionally reactive and regulated', and

'negatively emotionally reactive and dysregulated'.

Table H5

Six-Profile Solution of Teacher-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (11)	2[b] (31)	3[c] (5)	4[d] (50)	5[e] (21)	6[f] (15)
Exuberance	4.58	0.37	4.21 – 4.95	0.74	3.84 – 5.32	3.62	5.23	5.59	4.12	4.67	5.09
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	3.81	6.16	6.10	5.69	5.70	5.47
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87- 4.29	2.42	1.84	2.40	1.85	3.46	5.30
Internalizing Emotion	2.81	0.39	2.42 – 3.20	0.78	2.03 – 3.59	2.84	2.01	2.07	2.84	3.51	3.54
Emotion Regulation	4.97	0.47	4.50 – 5.44	0.94	4.03 – 5.91	5.30	5.52	4.18	5.38	4.68	2.97
Behavior Regulation	4.91	0.57	4.34 – 5.48	1.13	3.78 – 6.04	5.23	4.76	2.07	5.60	4.74	3.90
Perceptual Sensitivity	4.56	0.61	3.95 – 5.17	1.21	3.35 – 5.77	4.84	3.96	3.94	4.86	4.78	4.31
Low Intensity Pleasure	4.93	0.30	4.63 – 5.23	0.60	4.33 – 5.53	4.71	4.52	4.08	5.18	5.20	4.83

[a] Reserved and Regulated
[b] Exuberant and Regulated
[c] Exuberant and Dysregulated
[d] Low to Average Reactive and Regulated
[e] Negatively Emotionally Reactive but Regulated
[f] High Reactive and Dysregulated

Seven-profile solution: The extracted profiles of the seven-profile solution ranged from

very small to moderate in size. Profile 1 was comprised of 5 cases (4%) and characterized by

high exuberance, moderately high positive affect, low levels of behavior regulation and low

intensity pleasure, and moderately low levels of emotion regulation, internalizing emotion, and

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perceptual sensitivity. Profile 2 was comprised of 11 cases (8%) and characterized by low levels of exuberance and positive affect, but otherwise average ratings. Profile 3 was comprised of 49 cases (37%) and characterized by moderately low exuberance, moderately high behavior regulation, and otherwise average ratings. Profile 4 was comprised of 31 cases (23%) and characterized by moderately high levels of exuberance, positive affect, and emotion regulation, low internalizing emotion, and moderately low levels of perceptual sensitivity and low intensity pleasure. Profile 5 was comprised of 22 cases (17%) and characterized by moderately high levels of anger and internalizing emotion, but otherwise average ratings. Profile 6 was comprised of 12 cases (9%) and characterized by high levels of anger and internalizing emotion, low emotion regulation, and moderately low levels of behavior regulation and positive affect. Lastly, profile 7 was comprised of 3 cases (2%) and characterized by high levels of exuberance, positive affect, and anger, low levels of emotion regulation and behavior regulation, and moderately low levels of perceptual sensitivity and low intensity pleasure. The seven profiles were described as 'exuberant and dysregulated', 'reserved and regulated', 'low to average reactive and regulated', 'exuberant and regulated', 'negatively emotionally reactive but regulated', 'negatively emotionally reactive and dysregulated', and 'high reactive and dysregulated'.

Table H6

Seven-Profile Solution of Teacher-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (5)	2[b] (11)	3[c] (49)	4[d] (31)	5[e] (22)	6[f] (12)	7[g] (3)
Exuberance	4.58	0.37	4.21 – 4.95	0.74	3.84 – 5.32	5.59	3.63	4.11	5.23	4.67	4.85	5.96
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	6.10	3.82	5.69	6.17	5.71	5.22	6.44
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87- 4.29	2.41	2.42	1.85	1.83	3.45	5.10	6.02
Internalizing Emotion	2.81	0.39	2.42 – 3.20	0.78	2.03 – 3.59	2.07	2.85	2.84	2.00	3.51	3.85	2.44
Emotion Regulation	4.97	0.47	4.50 – 5.44	0.94	4.03 – 5.91	4.18	5.30	5.38	5.52	4.70	3.16	2.26
Behavior Regulation	4.91	0.57	4.34 – 5.48	1.13	3.78 – 6.04	2.07	5.22	5.60	4.76	4.74	4.02	3.48
Perceptual Sensitivity	4.56	0.61	3.95 – 5.17	1.21	3.35 – 5.77	3.94	4.84	4.85	3.99	4.77	4.45	3.53
Low Intensity Pleasure	4.93	0.30	4.63 – 5.23	0.60	4.33 – 5.53	4.08	4.71	5.18	4.53	5.21	4.91	4.58

[a] Exuberant and Dysregulated
[b] Reserved and Regulated
[c] Low to Average Reactive and Regulated
[d] Exuberant and Regulated
[e] Negatively Emotionally Reactive but Regulated
[f] Negatively Emotionally Reactive and Dysregulated
[g] High Reactive and Dysregulated

Eight-profile solution: The extracted profiles of the eight-profile solution ranged from very small to moderate in size. Profile 1 was comprised of 31 cases (23%) and characterized by moderately high levels of exuberance, positive affect, and emotion regulation, low internalizing emotion, and moderately low in low intensity pleasure. Profile 2 was comprised of 44 cases (33%) and characterized by moderately low exuberance and moderately high behavior regulation and low intensity pleasure. Profile 3 was comprised of 7 cases (5%) and characterized by low levels of exuberance and positive affect, moderately low in low intensity pleasure, and moderately high behavior regulation. Profile 4 was comprised of 21 cases (16%) and characterized by moderately high internalizing emotion and moderately low positive affect, but otherwise average ratings. Profile 5 was comprised of 5 cases (4%) and characterized by high

exuberance, moderately high positive affect, low levels of behavior regulation and low intensity pleasure, and moderately low levels of emotion regulation, internalizing emotion, and perceptual sensitivity. Profile 6 was comprised of 12 cases (9%) and characterized by high levels of anger and internalizing emotion, low emotion regulation, and moderately low levels of behavior regulation and positive affect. Profile 7 was comprised of 10 cases (8%) and characterized by high low intensity pleasure, moderately high levels of anger, internalizing emotion, and positive affect, and moderately low perceptual sensitivity. Lastly, profile 8 was comprised of 3 cases (2%) and characterized by high levels of exuberance, positive affect, and anger, low levels of emotion regulation and behavior regulation, and moderately low levels of perceptual sensitivity and low intensity pleasure. The eight profiles were described as exuberant and regulated, generally average reactive and regulated, reserved and regulated, prone to internalizing but regulated, very exuberant and dysregulated, negatively emotionally reactive and dysregulated, negatively emotionally reactive and regulated, and high reactive and dysregulated.

Table H7

Eight-Profile Solution of Teacher-Rated Reactivity and Regulation

	Mean	0.5 SD	0.5 SD Range	1 SD	1 SD Range	1[a] (31)	2[b] (44)	3[c] (7)	4[d] (21)	5[e] (5)	6[f] (12)	7[g] (10)	8[h] (3)
Exuberance	4.58	0.37	4.21 – 4.95	0.74	3.84 – 5.32	5.22	4.12	3.38	4.24	5.60	4.85	4.93	5.96
Positive Affect	5.63	0.32	5.31 – 5.95	0.64	4.99 – 6.27	6.16	5.77	3.56	5.12	6.10	5.22	6.08	6.44
Anger	2.58	0.86	1.72 – 3.44	1.71	0.87- 4.29	1.83	1.78	2.01	2.81	2.42	5.10	3.95	6.02
Internalizing Emotion	2.81	0.39	2.42 – 3.20	0.78	2.03 – 3.59	2.01	2.74	2.55	3.48	2.08	3.85	3.44	2.44
Emotion Regulation	4.97	0.47	4.50 – 5.44	0.94	4.03 – 5.91	5.51	5.41	5.30	4.92	4.20	3.15	4.81	2.26
Behavior Regulation	4.91	0.57	4.34 – 5.48	1.13	3.78 – 6.04	4.76	5.66	5.50	4.89	2.10	4.02	4.80	3.48
Perceptual Sensitivity	4.56	0.61	3.95 – 5.17	1.21	3.35 – 5.77	3.96	4.94	4.56	4.47	3.93	4.45	3.40	3.52
Low Intensity Pleasure	4.93	0.30	4.63 – 5.23	0.60	4.33 – 5.53	4.50	5.27	4.48	4.83	4.09	4.92	5.75	4.57

[a] Exuberant and Regulated
[b] Generally Average Reactive and Regulated
[c] Reserved and Regulated
[d] Prone to Internalizing but Regulated
[e] Exuberant and Dysregulated
[f] Negatively Emotionally Reactive and Dysregulated
[g] Negatively Emotionally Reactive but Regulated
[h] High Reactive and Dysregulated

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