

Compliance and School Liking in Children with High Functioning Autism and
Typically-Developing Peers: Relations with Temperament and Parent Behaviors

by

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ABSTRACT

The constructs of compliance and temperament play an important role in children's school liking and engagement, and these constructs may differ between typically-developing children and children with autism because of the deficits associated with autism. The present study examined group differences among temperament, parent and child behaviors in a compliance context, and school liking and how these processes related to each other. This was the first study to examine school liking in children with high functioning autism and to explore the associations among school liking, temperament, and compliance in this population. Participants included children with high functioning autism ($n = 20$) and typically-developing children ($n = 20$) matched on language and mental age, and their parents. Compliance to a parent was observed in a laboratory setting, and temperament and school liking data were collected using parent-report measures.

The findings revealed that children with autism had significantly lower Effortful Control (EC) and school liking scores than typically-developing children. However, there were no group differences in compliance, and no significant relation was found between temperament and compliance. Additionally, school liking scores were related to compliance and EC. These findings are discussed with respect to implications for potential future research and use of interventions for children with high functioning autism.

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INTRODUCTION

In the United States, 1 in 110 children are diagnosed with autism (Rice, 2009). Overall, children who receive an autism diagnosis exhibit deficits in communication, social development, and emotion development, and the extent of these deficits vary by individual (Graziano, 2002). Of those who are diagnosed, approximately 30 to 50 % are not cognitively impaired, and a quarter of children who are diagnosed between two and three years of age develop age appropriate communication skills (Miles & McCathren, 2005). Such “high functioning” children who have average cognitive ability and verbal skills are often able to be placed in a general education school environment by six to seven years of age (Miles & McCathren, 2005), but continue to have social skills deficits (Bartak & Rutter, 1976; Eaves, Ho, & Eaves, 1994). These social impairments may have a negative impact on the child’s overall school engagement, both behaviorally and emotionally.

School engagement, which refers to attending to and interacting with both social and nonsocial aspects of the school environment, is a term used to describe different types of experiences a child may have within a classroom setting, including behavioral, emotional, and cognitive (Iovannone, Dunlab, Huber, & Kincaid, 2003; Fredricks, Blumenfeld, & Paris, 2004). An important indicator of school engagement and school liking is compliance within the classroom (Ladd, Buhs, & Seid, 2000). In general, children who are compliant are able to control

desires and resist temptations consistent with others' expectations (Kochanska, 1993), and these are important traits in the classroom. Overall, children with autism demonstrate less compliance to parents in a prohibition task compared to children with other disabilities and typical peers (Arbelle, Sigman, Kasari, 1994; Lemanek, Stone, & Fishel, 1993). Compliance can be first seen in early childhood, often in the context of parent-child interactions.

Because compliance is often examined during parent-child tasks, investigators have noted clear relations between parenting behaviors during compliance tasks and children's compliance and noncompliance. Parental strategies, such as the type of command used and the degree of control have been examined (Kochanska & Aksan, 1995; Kuczynski & Kochanska, 1990; Kuczynski & Kochanska, 1995). Overall, in studies of typically-developing youth, parents who use indirect commands (Kuczynski & Kochanska, 1990) or gentle control (e.g., suggestions; Wachs, Gurkas, & Kontos, 2004) tend to have more compliant children. However, little research has focused on parental behavior and child compliance in children with autism. Previous research has shown that overall, parents use similar strategies to direct attention and engage children such as pointing, modeling, and prompting with both children with autism and typically-developing children. Parents of children with autism, however, used physical prompting as much as or more often than parents of typically-developing children (Kasari, Sigman, Mundy, & Yirmiya, 1988;

Lemanek et al., 1993). Following parental commands is an experience that may be important, prior to a formal school setting, which promotes compliance to different types of demands. Positive experiences following parental commands early in life may facilitate a child's transition to a formal school environment by better preparing a child to act in accordance with demands in the classroom.

Compliance to a parent begins early in life and may be related to later compliance in different settings, such as the classroom. It is important to note that compliance to a parent may be influenced by motivation and desire to please the parent and may be different from compliance in a school setting. Although compliance to a parent is different than in a classroom setting, compliance with a parent may be a precursor to compliance in the classroom. Following directions or instruction and agreeing to teachers' demands are aspects of compliance in the classroom that have been linked to many positive school outcomes such as successful adjustment, classroom engagement, and academic achievement in typically-developing children (Foulks & Morrow, 1989; Ladd et al., 2000; Matheson & Shriver, 2005). Child characteristics may influence the amount of compliance a child exhibits.

Children's temperament likely predicts their ability to act in compliance with adult requests. One perspective on temperament focuses on biologically-based individual differences in emotional reactivity and self-regulation (Rothbart & Derryberry, 1981). Self regulation is an acquired skill that is necessary to

ensure control and plan one's own emotions, thoughts, and behavior (Shunk & Zimmerman, 1997) , and develops through social experiences early in life (Kopp, 1982). Increased self-regulatory abilities allow for a child to control any unwanted behaviors and act according to demands that may be set forth by a parent or teacher. Conversely, if a child is unable to regulate behavior, he or she may not be able to overcome negativity (e.g., frustration), or to focus on or act appropriately to complete a task.

Specifically, there are three main components of temperament, including Effortful Control (EC), Negative Affectivity, and Surgency. EC is defined as “the ability to inhibit a dominant response in order to perform a subdominant response” (Rothbart & Bates, 1998, p. 137) and reflects attentional and behavioral control. EC contributes to compliance such that children who can regulate their behavior and attention well are more likely to follow instructions and demonstrate compliance (Kochanska, Coy, & Murray, 2001; McClelland et al., 2007). Over time, children develop greater ability to control their actions, which may affect their later school adjustment (Posner & Rothbart, 2007). EC has been shown to be lower in cognitively impaired children with autism than in typically-developing children (Konstantareas & Stewart, 2005), indicative of problems with self-regulation. However it is unclear how EC appears in children with high functioning autism.

The second component of temperament, Negative Affectivity, encompasses the negative emotional reactivity and behavioral inhibitions of an individual, including distress to limitations through temper tantrums and displays of anger, frustration, or irritability (Rothbart, Ahdai, Hershey, & Fisher, 2001). Children who rate high in Negative Affectivity often demonstrate internalizing and externalizing problems (De Pauw, Mervielde, Leeuwen, & De Clercq, 2011). Little research has examined Negative Affectivity in children with autism, and no significant differences have been found between these children and typically-developing children (Konstantareas & Stewart, 2006). However, previous research has not focused on children with high functioning autism, thus further examination of Negative Affectivity in this subpopulation is of interest. If a child does not have any cognitive impairment and demonstrates a higher level of functioning, parents may have higher expectations of the child's behavior. With increased demands and expectations, the child may demonstrate more Negative Affectivity through anger and frustration than children who are lower-functioning and typical children.

The third component of temperament, Surgency, reflects high extraversion and is characterized by low inhibition, high intensity pleasure, and impulsivity (Rothbart et al., 2001). Children who rate high on Surgency often have externalizing problems (De Pauw et al., 2001) and participate in reward seeking and risk taking behavior (Garon & Moore, 2007), such as rushing into novel

situations, and participating in fast-paced activities (e.g. reckless bicycle riding). Previous research on Surgency has not shown significant group differences between children with autism and typically-developing children (Konstantareas & Stewart, 2006). However, examining group differences is still of interest in the present study as previous research has focused on temperament in children with severe cognitive delays, and the children in the present study are high functioning. Because children with autism often demonstrate externalizing behavior and impulsivity, children with high functioning autism may have higher levels of Surgency than typically-developing peers. If children are high functioning and do not have a cognitive delay, they may possess the cognitive ability necessary to attend to demands and process information. There is evidence that children with high functioning autism still have social behavior deficits (Bartak & Rutter, 1976). Specifically, these children have been shown to exhibit impulsive behaviors, externalizing problems, hyperactivity and difficulty regulating emotions (Ashburner et al., 2010). Because these children still demonstrate social deficits, further investigation of Surgency among children with high functioning autism is important to gain a better understanding of difference among them and typically-developing children. Additionally, impulsivity will be examined separately, as children with autism are often reported as being disruptive, which may be related to impulsivity (Ashburner et al., 2010). Further investigation of all three temperament constructs in children with high functioning autism is

important to understand differences in temperament at varying severities of the autism spectrum. Additionally, measuring both the child's compliance and temperament may allow for a more thorough understanding of the relation between these constructs and school behavior.

School engagement refers to attending and interacting with both social and nonsocial aspects of the school environment, and is important for all children and related to positive school outcomes (Iovannone et al., 2003). Recent research suggests the importance of considering how much children enjoy school in explaining their school success, as school liking scores have been linked to positive academic outcomes in typically-developing children (Ladd et al., 2000). Children who reported greater school liking also demonstrated more compliance and participation in the classroom, whereas children who did not accept the student role generally had lower school liking scores (Ladd et al., 2000). School liking also has been linked to peer acceptance, and typically-developing children who are accepted by peers report higher levels of school liking (Ladd & Burgess, 2001). To date, school liking has not been examined in children with autism. Children with autism, and average cognitive abilities, who are in typical classrooms often perform below average academically compared to typically-developing peers., have difficulty paying attention and regulating emotion in the classroom (Eaves & Ho, 1997), and often exhibit hyperactive and disruptive behavior in the classroom (Ashburner, Ziviani, & Rodger, 2010). Additionally,

children with autism are different from typically-developing children and children with other developmental disabilities with overall weaknesses in learning (Mayes & Calhoun, 2007). Moreover, children with autism often have relatively poor peer relationships and are frequently rejected by peers. (Baumringer & Kasari, 2000; Chamberlain, Kasari, & Rotheram-Fuller, 2007). Given the difficulties that children with autism face in the classroom and with peers, understanding the factors related to their school engagement may allow for a better understanding of how to help these children successfully transition into a classroom environment.

There is limited research to date regarding the association between compliance, temperament, and school liking in typically-developing children. The current literature on school liking and compliance focuses on the relation between school liking and classroom participation, and the effect of school liking on later kindergarten achievement (Ladd et al., 2000). Previous research has shown that, within the classroom, children who are more compliant to a teacher report more positive school attitudes (Ladd et al., 2000). However, no research to date had examined the relation between children's compliance to a parent and school liking. Although previous research has shown that EC contributed to children's attention in the classroom and development of social relations, leading to increased school liking and better academic performance. Because EC is a key component of compliance, it is possible that the relation between EC and school liking is mediated by compliance

In terms of the relation between temperament and compliance, previous research has shown that EC contributes to a child's attention within the classroom leading to increased school liking (Valiente, Lemery-Chalfany, & Castro, 2007). As EC is a key component of compliance, and a relation between EC and school liking exists, it is possible the relation between EC and school liking is mediated by compliance. Although the present study examines compliance to a parent, there may be valuable information about the transference of compliance in early childhood to a classroom setting as measured by school liking, and the relation among this type of compliance, and temperament and school liking.

Overall, a child's school engagement can be influenced by many factors, including parent-child interactions and compliance, child temperament, and developmental status. The present is guided by a number of theoretical perspectives that examine the aforementioned factors. The exploration of differences in temperament and compliance between high functioning children with autism and typical peers is guided by an executive function deficit perspective on autism (Ozonoff, Pennington, & Rogers, 1991). In addition, a theoretical perspective that focuses on parent-child experiences as precursors to children's later development is applied to explain how this relationship can influence later school adjustment (Waters & Stroufe, 1983). Finally, to explain how a child's organismic characteristics interact with a parenting environment to

explain developmental abilities, an ecological framework is examined (Bronfenbrenner & Ceci, 1994).

The present study focuses on compliance, parent behaviors, temperament and school liking in children with autism and typically-developing peers. Of particular interest is whether compliance to a parent's request predicts later school liking and how this relation may differ in children with high functioning autism and typically-developing children. Additionally, because there is little research to date focusing on temperament and compliance in children with autism, differences along these constructs between typically-developing children and children with autism are of interest, as well as differences in parents' use of strategies to facilitate their children's compliance and whether parent behaviors are associated with children's behaviors in the compliance setting. The results of the proposed study will significantly contribute to our knowledge of important developmental processes influencing school performance in children with autism and may highlight behaviors that could be targeted in interventions in order to facilitate a more positive adjustment to a formal school setting for these children.

LITERATURE REVIEW

Autism is a neurological, pervasive developmental disorder (PDD) that includes impairments in multiple developmental contexts, including language, social development, stereotypic behaviors, and emotional development, that usually has an early onset and is relatively permanent (Graziano, 2002; Miles &

McCathren, 2005). There is a large variability in the manifestation of autism, as can be seen from the different ages of onset, and the diagnosis lies on a spectrum. Cognitively, children with autism may vary from exhibiting mental retardation to average intellectual functioning. Previous research has shown that autism severity is related to cognitive functioning (Eaves et al., 1994). Children with lower cognitive functioning are often detached from their environment with more severe language delays, whereas those children with average cognitive abilities appear to have good verbal skills but maintain deficits in social skills (Bartak & Rutter, 1976; Eaves et al., 1994). Additionally, children with autism, both with and without mental retardation, demonstrate disruptive behavior in public and deficits with social behavior (Bartak & Rutter, 1976). Often, children with autism are not diagnosed until language delays are evident, around two years of age.

Autism is marked by significant heterogeneity, with deficits ranging from mild to severe. Social impairments can range from an inability to understand other's emotions, avoidance of eye contact, little peer engagement, and little to few friendships. Other children with autism may understand social situations but fail to take initiative in these situations, and still others might seek social interactions but are unsure of how to have a "normal" friendship (Miles & McCathren, 2005). Communication impairments can be seen at varying levels that may change over time. Many children with autism have language delays,

impaired receptive language, and difficulty sustaining conversations (Miles & McCathren, 2005); however, this deficit may not be evident in all children with autism. Lastly, deficits in repetitive and stereotypic behaviors are seen in children with autism. Children with autism may use idiosyncratic behavior as a form of self-soothing, resulting in the development of rituals that must be followed or the child may have outbursts if there is an upset in routine (Miles & McCathren, 2005). As autism is a developmental disorder, it is amenable to change over time, through developmental cycles, early intervention, and experiences; however IQ and cognitive delays remain stable (Baird, Cass, & Slonims, 2003). Previous research has examined characteristics that are indicative of successful development as children age and enter a school setting. Those children who entered school with an IQ in the average range demonstrated abnormal social skills similar to those children who were lower functioning; however, as the children in the high functioning group aged, their adaptive skills reached the low normal range, indicative of mild social delays (Stevens et al., 2000).

School-age children face many new experiences and obstacles in the classroom. Those with autism not only face the same obstacles as typically-developing children but may also have increased difficulty with cooperation and academic achievement in addition to other autism specific deficits (Valente, 2004). Children with high functioning autism may be placed in typical classrooms to promote academic achievement and social interactions at an age-

appropriate level. Inevitably, some of these children have difficulty within their classroom environment, particularly with respect to transitions that occur across the typical school day, resulting in increased stress. Difficulty in the classroom may occur because of the underlying symptoms of the developmental disorder (Ashburner et al., 2010). Teacher's ratings show a high proportion of students with autism have behavioral difficulties that cause disruptions in the classroom, including behavior problems, distractions, frustration, stubbornness, difficulty regulating emotion, and hyperactivity (Ashburner et al., 2010). These difficulties may be related to school success, specifically school engagement which includes social-emotional aspects of school success, including school liking. Given the behavioral difficulties that children with autism experience in the classroom, they may not be enjoying school, which may worsen problem behaviors and decrease school engagement.

Although children with autism may be placed in mainstream classrooms, they do not always perform academically similar to their typically-developing peers. In a study of 76 children with autism, teachers reported that only about 25% of students with autism were academically average compared to typically-developing children; of those children, only 10% had average behavioral classroom performance by working independently, paying attention, and completing tasks (Eaves & Ho, 1997). Thus, although some children with autism perform academically similar to peers, decreased performance in attention and

task completion may have an adverse impact on a child's overall classroom behaviors. More specifically, teachers rated children with autism as having difficulties with following instructions overall and on subject-specific problems (Eaves & Ho, 1997). Previous research on children's performance on the Wechsler Intelligence Scale, Third Edition (WISC-III) also suggests that these children have weaknesses in attention, writing, and processing speed (Calhoun & Mayes, 2005). Weaknesses in processing speed and attention may be negatively related to a child's performance on a number of tasks throughout the school day. Together, these findings suggest that children with autism may have academic disadvantages compared to their typical peers, which may be a function of their attentional issues. These attentional issues may be related to the child's temperament, as attention is important for EC, and compliance, as a child must pay attention to demands in order to be compliant. Understanding the factors related to school engagement, such as compliance and temperament, for these children would therefore allow for behavioral strategies to take place prior to school entry.

Compliance

Compliance is characterized by an individual's ability to resist tempting impulses, control frustration, delay gratification, and complete a requested action to set standards (Kochanska, 1993). Overall, compliance to a caregiver is a complex concept that includes many different aspects including motivation,

language, and regulation. Motivation to accept a caregiver's agenda may influence the amount of compliance a child demonstrates. If a child is motivated and eager to follow the caregiver's agenda and feels a sense of obligation towards the caregiver, the child may be more inclined to be compliant (Kochanska & Aksan, 1995). This internalization may appear as a child develops and may be related to increased regulatory ability that occurs with development.

Additionally, a child's language ability may influence compliance, as a child who is able to understand demands may demonstrate more compliance because he or she understands what is being asked.

Kochanska and Aksan (1995) have identified two types of compliance: situational and committed. Situational compliance occurs when a child follows through with a request but does not appear committed to the request; whereas committed compliance occurs when a child complies wholeheartedly with a request without prompts (Kochanska & Aksan, 1995). In the present study, compliance is measured in a parent-child setting. Compliance to a parent may differ from compliance to a teacher in a classroom setting. When a child is compliant to a parent's demands, the child may be complying in order to please the parent. Although this setting is different than a classroom setting, the need to act according to demands is still necessary. Compliance in a school setting requires paying attention, following instructions, participating within the classroom, and demonstrating appropriate behaviors in a context with many

students (Foulks & Morrow, 1989; Matheson & Shriver, 2005). Demands within a classroom context are often given to the entire classroom without addressing a specific child, which may be a new experience for many children. However, before a child experiences a school setting where compliance to demands is required, the child will have experiences in a home environment that act as a precursor to how to act appropriately. This setting allows for the child to receive direct instruction and feedback that may be helpful in shaping behavior and can be transferred to other contexts. Previous research has shown that both parents' and teachers' use of effective commands resulted in increased child compliance, and use of these commands increased the child's compliance within the classroom (Matheson & Shriver, 2005).

Characteristically, non-compliance appears as uncooperative behavior on the individual's part (Kochanska et al., 2001). Styles of non-compliance include defiance, self-assertion, and passive noncompliance. Defiance is characterized by a child whining or acting aggressively when asked to do something, whereas self-assertion is characterized by a simple "no" response, or something similar, without any negative affect, and passive noncompliance is evident when the child ignores a parent's request deliberately (Kochanska & Aksan, 1995). Non-compliance commonly occurs in children with developmental delays (Hiebert, Martin, Yu, Thorsteinsson, & Martin, 2009). In scenarios where children were asked to complete a task by parents, children with autism demonstrated less

compliant and more noncompliant behaviors than children with other disabilities (Lemanek et al., 1993). Furthermore, children with autism were significantly less compliant in a parental prohibition task than typically-developing children and children with mental retardation (Arbelle et al., 1994). Interestingly, age emerged as a significant factor in this study, with older children with autism demonstrating more compliant behavior, indicating children's potential to learn these skills with increased maturity. If children with autism are less compliant to parental requests than other children with developmental delays and typically-developing peers, these children may also have trouble complying in a school setting. Non-compliance in a school setting could result in inattention to direction, incomplete class work, classroom disturbances, and reduced social interactions, which could culminate in an overall decrease in school engagement and school liking and subsequent academic performance.

Parent Behaviors in the Context of Child Compliance. Although a child's compliance reflects the child's actions and ability to regulate, the parent's behavior can play a role in the development of this behavior. Previous research on children at 5 years of age, suggests that maternal demands in a "do" (clean-up) context requiring the child to perform a behavior, are associated with increased compliance and decreased behavior problems (Kuczynski & Kochanska, 1995). However, "do" requests may be more challenging for younger children (toddlers), as these requests require the child to embrace the parent's demand and requires

more maintenance of compliance through verbalizations from the parent (Kochanska & Aksan, 1995). In a previous study of toddlers involving a clean-up task, children demonstrated lower levels of committed compliance, but higher levels of situational compliance than in a prohibition (“don’t”) task (Kochanska & Aksan, 1995).

Parental behavior and verbalizations are important determinants of child compliance. In order for a child to comply, the parent must allow the child time to comply, in addition to rewarding or punishing compliance or non-compliance accordingly (Forehand, Gardner, & Roberts, 1978). Parent verbalizations can range from commands to negotiation. Previous research on compliance to a parent has also shown that mothers who use control over guidance had children who demonstrated non-compliance and less committed compliance (Braungart-Rieker, Garwood, & Stifter, 1997). In clean-up tasks, specific parental behaviors have been linked to compliance and non-compliance. For example, Kuczynski and Kochanska (1990) investigated parental behaviors and child compliance in a cleanup task when children were five years of age. Mothers who used indirect commands as a way of requesting compliance and verbally reprimanded inappropriate behavior had children that demonstrated more compliance and gave fewer excuses.

Additionally, children whose parents use gentle control (suggestions) over controlling commands demonstrated more compliance (Wachs et al., 2004).

Overall, these findings suggest that parents play an important role in children's development of compliance and increased compliance is seen in children whose parents use indirect commands and verbally reprimand inappropriate behavior. However, less is known about the associations between parent behaviors and child compliance in children with disabilities, such as autism.

Little research has focused on parental behaviors that facilitate compliance in children with autism. Previous research has shown that children with autism demonstrated less compliance when parent's used suggestions than children who were mentally retarded or typically-developing (Sigman, Mundy, Sherman, & Ungerer, 1986). In one study of parent-child interactions during a cleanup task, Kasari et al., (1988) found that the interactions between caregivers and children with autism were relatively similar to typically-developing children. The caregivers of the children with autism were as responsive and used similar strategies to direct the child's attention compared to caregivers of typically-developing children. However, the caregivers of children with autism modeled actions, physically prompted the children more often than typically-developing children's caregivers, (Kasari et al., 1988) and used structured and cue behaviors more often (i.e. non-verbal prompts, verbal attention getting; Lemanek et al., 1993).

In order to better understand compliance in children with high functioning autism, one goal of the present study is to examine the relation between parent

behaviors and children's compliance within this population, and whether these relations are different than those for typical parent-child dyads. As language deficits are evident in children with autism, it is hypothesized that a negative relation between parental indirect commands and child compliance may exist for this population. Specifically, children with autism will demonstrate less compliant behavior as parents use more indirect commands, as previous research has shown less compliance to suggestions and indirect commands (Sigman et al., 1986).

Temperament

An important component of children's compliance behaviors, in addition to parent strategies, is the child's temperament. There are many approaches to studying temperament, however they all generally include constructs that integrate biological and emotional processes with psychological and brain functions, and consider temperament to be relatively stable and have a biological basis (Rothbart & Derryberry, 2002). Rothbart and Derryberry (1981) focus on temperament as "constitutional differences in reactivity and self-regulation" (p. 37) influenced by genes, experience, and development. Reactivity refers to an individual's response, including motor, affective, and sensory systems, to environmental changes or stimuli. Self-regulation refers to the ability to modulate reactivity using both attention and behavior approaches and control. Both positive and negative reactivity as a response to an experience can be seen very

early in life; however some higher-order forms of self-regulation, such as executive attention mature during preschool and development continues as children complete their early school years (Posner & Rothbart, 2007; Rothbart & Jones, 1998). Individual differences in such behaviors may play a role in the different behaviors that are seen in classrooms. Children who have low attentional control may also have less control over emotions and actions, ultimately affecting the child's adjustment to a school setting (Posner & Rothbart, 2007).

The Children's Behavior Questionnaire (CBQ) is one measure of temperament for children (Rothbart et al., 2001). The scores for each question on the CBQ are compiled and load onto subscales that further load onto the three superfactors of EC, Negative Affectivity, and Surgency. EC encompasses the self-regulatory aspect of temperament and begins to emerge in children between 6 and 12 months of age (Kochanska & Knaack, 2003). Rothbart and Bates (1998) defined EC as "the ability to inhibit a dominant response to perform a subdominant response" (p. 137); EC involves effort to control reactivity, attention and behavior voluntarily in situations (Valiente et al., 2007). EC can be seen in scenarios when children have to control their behavior to comply to parents or teachers, resist temptations, and act according to social rules. A negative relation exists between EC and the other two factors of temperament, Negative Affectivity

and Surgency; the attentional skills that are evident in EC may help regulate negative affect and impulsive tendencies (Posner & Rothbart, 2007).

Negative Affectivity refers to how a child responds to negative events, measuring fear, sadness, and anger/frustration (Garon & Moore, 2007). This factor includes positive loadings on shyness, fear, sadness, and discomfort (Rothbart & Derryberry, 2002). Negative Affectivity encompasses negative emotional reactivity and includes distress, displays of anger and frustration, irritability, sadness, and fear. Children who rate high in Negative Affectivity demonstrate both internalizing and externalizing problems, and have difficulty regulating negative emotions (De Pauw et al., 2011). The final aspect of temperament is Surgency, which measures sensation seeking (high intensity pleasure), low inhibition, and impulsivity, with a negative loading on shyness (Rothbart & Derryberry, 2002). Surgency includes positive affect and low inhibition for approach to novel situations, similar to extraversion (Rothbart & Derryberry, 2002). Children who rate high in Surgency generally rate lower in EC, and demonstrate less self-regulation, often participating in reward seeking and risk taking activities (Garon & Moore, 2007). Additionally, Surgency is also related to greater externalizing problems.

Previous research has shown that children with autism demonstrate externalizing, disruptive behaviors to gain or maintain access to items or to avoid unpleasant stimuli, where as those without autism use disruptive behavior to avoid

caregiver demands or attract caregiver attention (Reese, Richman, Belmont, & Morse, 2005). Other research has shown that children with autism have a higher risk of externalizing and internalizing problems, such as anxiety, depression and social withdrawal (De Pauw et al., 2011). Differences in internalizing and externalizing behaviors between typically-developing children and children with autism may be associated with differing levels of Surgency and Negative Affectivity. It may also be possible that the development of EC, Negative Affectivity and Surgency differs in children with autism compared to typically-developing children.

Previous research has shown differences along temperament dimensions in children with autism and typically-developing children. Konstantareas and Stewart (2006) studied temperament in children with autism 3 to 10 years old. Using the CBQ, group differences were observed in EC between children with autism and typically-developing peers, with an inverse relationship existing between symptoms and ratings of EC, and no significant differences between groups on Negative Affectivity and Surgency. Although no significant differences were seen between groups on Surgency, further exploration of the subscales that comprise this superfactor, specifically Impulsivity, would be of interest. Given that children with autism differ significantly from typically-developing children on EC, which suggests a regulation problem, it is possible that these children differ on Impulsivity as well, given that this construct is the

opposite of regulation. Additionally, Negative Affectivity predicted academic functioning; children with higher ratings of Negative Affectivity demonstrated higher functioning. It may be possible that children who are higher functioning are more likely to be less delayed academically, and may demonstrate negative or inappropriate behaviors that are easier to identify and rate given their level of functioning. As a possible explanation for the lack of group differences in Negative Affectivity, the authors proposed that the CBQ may not be suitable for children with autism, as the questions address feelings and other complex themes that children with autism may not be able to verbally convey to their parents because of underlying deficits. However, the sample in the aforementioned study consisted of children with autism who were very delayed and ranged in age from 3 to 10 years. If it is the case that language plays a role in explaining children's negativity ratings, it may be that a higher functioning and more homogeneous sample of children will demonstrate differences along this dimension.

Research using the Infant Behavior Questionnaire (Garstein & Rothbart, 2003), an infant temperament scale related to the CBQ, has been conducted longitudinally on infants, some of which were later diagnosed with autism (Zwaigenbaum et al., 2005). Children who received an autism diagnosis at 24 months were rated as exhibiting decreased activity levels and less orienting at 6 months and extreme intense distress to various stimuli and increased fixation on objects at 12 months (Zwaigenbaum et al., 2005). These findings suggest there

are early temperamental differences between typically-developing children and children who eventually are diagnosed with autism that can be seen around the critical developmental period (6 to 12 months) when regulatory development occurs in typically-developing children.

Additional researchers using measures other than the CBQ have also reported significant differences in temperament in children with autism. In one study using the Temperament and Atypical Behavior Scale (TABS), 80 % of children with autism, at 1 year of age, were reported as having “self-regulatory difficulties” (Gomez & Baird, 2005). Difficulty with self-regulation relates to the EC factor on the CBQ, and lower levels of EC are consistent with previous research. Kasari and Sigman (1997) used the Behavior Style Questionnaire (BSQ) to measure child difficultness and found that children with autism were rated as more difficult by their parents. Difficult temperament is marked by slow adaptability and irregular and intense negativity to new situations (Chess & Thomas, 1986). Other studies using the BSQ, found that children with autism were also rated as less adaptable, less persistent (Bailey et al., 2000), and required more environmental stimuli to exhibit a response (Hepburn & Stone, 2006). These behaviors may be seen in children who are high in Negative Affectivity on the CBQ.

To date, previous research has shown inconsistent findings regarding temperamental differences in children with autism. Some studies suggest that

children with autism demonstrate difficult temperament (Bailey et al., 2000; Hepburn & Stone, 2006; Kasari & Sigman, 1997), which is marked by similar behaviors as Negative Affectivity. However, other research has not shown any differences on Negative Affectivity between typical children and children with autism (Konstantareas & Stewart, 2006). Additionally, Surgency has not been thoroughly examined in the literature within this population. The aforementioned studies included samples that varied by child's age, level of functioning, and developmental level. The present study aims to further explore this topic and is unique because it includes children who are high functioning and matched to peers on language age. Specifically, the present study will provide a novel perspective of temperament factors, as the sample is more homogenous than previous research. Given previous research, EC differences are hypothesized as previous research has shown differences between typical children and children with autism on this construct. Although previous research has not shown differences on the CBQ factors of Negative Affectivity and Surgency between typical children and children with autism, it is hypothesized that differences may exist due to the underlying deficits of the disorder. Children with autism may have higher levels of Negative Affectivity, as they often demonstrate externalizing behavior manifested through anger and frustration. Similarly, it is hypothesized that children with autism will have higher levels of Surgency, as impulsivity is common among these children, in addition to demonstrating

externalizing behaviors. Understanding temperamental differences that may exist in children with autism is important as these differences may affect the child's behavior and the social aspects of school engagement, specifically school liking.

School Liking

Alexander and Entwisle (1988) have argued that primary school years are “powerful determinants of subsequent development” (p.1) and a critical period in a child's development. As children enter school, they are faced with new environments, peers, academic requirements, and experiences that may result in varying amounts of school engagement, which is important for attending to and interacting within the school environment and receiving the best learning opportunities possible (Iovannone et al., 2003). One dimension of school engagement is school liking, which is the extent that a child admits to liking or disliking school (Ladd et al., 2000), and is considered to be an important predictor of children's academic and social competence in the classroom. Measures used to determine school liking, which can be completed by the child, parent, or teacher, include both negative (avoidance) and positive (liking) questions about school, such as “do you like school?” and “does school make you feel like crying?” (Ladd et al., 2000).

School liking can be measured reliably beginning as early in children's school careers as kindergarten and is thought to be relatively stable over time (Ladd et al., 2000). Parent and child reports of school liking have been found to

be correlated and to accurately portray the child's sentiments towards school (Ladd et al., 2000). In general, data on school liking for normative populations indicates that the majority of students have positive sentiments when they are beginning school, and there is a considerable minority of students who report sentiments that are either mixed or negative (Ladd et al., 2000). However, school liking has been shown to decline during kindergarten over the school year, with 10% of children having negative sentiments in the fall, and 19% of children reporting negative feelings in the spring (Ladd et al., 2000). Thus, the experiences that transpire in the classroom over the course of the school year can have an impact on children's perceptions of school and can ultimately affect their academic performance.

Previous research on the outcomes associated with school liking has shown that this construct predicts positive academic outcomes (Ladd et al., 2000). It may be that children's classroom behaviors, particularly cooperation, play a role in this prediction as these behaviors are precursors of early achievement (Ladd et al., 1999). That is, those children who like school are generally more compliant in the classroom, participate more in the classroom, adhere to classroom rules, and are more receptive to the role of the student, while children who are less compliant to requests and resist classroom roles are more likely to dislike school (Ladd et al., 2000), all of which also relates to more positive academic outcomes. Research in the United Kingdom has also shown that middle

school children (United States equivalent) who demonstrate positive academic self-concept also expressed higher levels of school liking (Ireson & Hallam, 2005).

Another important outcome associate with school liking is peer social competence. Children who act in accordance with classroom rules and are less of a distraction to other students tend to be liked and included by peers (Ladd et al., 1999). In a study with typically-developing children, an inverse relation existed between attention problems, peer acceptance, and school liking; students who had less attention problems reported higher school liking scores with greater peer acceptance (Ladd & Burgess, 2001). It may be that temperament, in particular, self-regulation plays a role in this association as research on typically-developing children indicates that children with high negative emotionality and low regulation of negative emotions are also often avoided by peers, and are low in social functioning (Fabes, Hanish, Martin, & Eisenberg, 2002). Furthermore, typically-developing children's emotionality was negatively correlated with popularity; these children demonstrated more problematic behaviors and were less popular with peers (Stocker & Dunn, 1990).

Exclusion can occur when a child does not act appropriately in the classroom, a common occurrence for children with autism. High functioning children with autism are often rejected by peers, have few meaningful and poor quality friendships (Baumringer & Kasari, 2000; Chamberlain et al., 2007), and

are excluded by peers because of maladaptive behaviors, including disruption, aggression, and inappropriate behavior directed towards peers and teachers (Ashburner et al., 2010). These maladaptive behaviors may result in exclusion, and consequently, more negative feelings towards school. Prior research also suggests that children with autism demonstrate more behavioral and emotional problems in a school setting than typical peers, including both internalizing and externalizing behavior (Ashburner et al., 2010). Together, the research on children with autism has shown that self-regulatory difficulties may affect their school liking and subsequent academic achievement. Given that previous research suggests school liking is important to better understand children's behaviors within the classroom, peer relationships, and academic performance, one goal of the present study is to examine school liking. Little is known about children with autism and their feelings about a formal school environment, and the present study will be the first study to examine school liking in this population. In addition to understanding school liking in children with autism, the relation among temperament and compliance with school liking will be examined to create a better understanding of factors that may be related to school liking.

Relation among Temperament, Compliance, and School Liking

Temperament as a Predictor of Compliance. Compliance is a valuable skill for young children. Children who are compliant are able to act in accordance with demands, control desires, and resist temptation, and these types of skills are

necessary for appropriate behavior in a classroom context. Understanding predictors of compliance in children is important because compliance may predict school engagement later in life. Research exists for typically developing children suggesting that aspects of children's temperament including self-regulation and behavior regulation are predictive of compliance. Accordingly, children's regulation as it relates to children's compliance will be discussed for typically developing children and children with autism.

Self regulation is necessary to ensure control over one's planned emotions and behavior (Shunk & Zimmerman, 1997). Children's self-regulation abilities are important as children are faced with the need to inhibit desires to perform an action that may contradict a requested action. Behavioral regulation, which is a component of self-regulation, refers to the process and execution of overt behavior and inhibition of behavior purposefully (Baumeister & Vohs, 2004; Morrison, Ponitz, & McClelland, 2010). High levels of behavioral regulation are evident in compliant children when they inhibit impulses and execute requested behaviors. Increased regulation abilities not only allow individuals to act appropriately and control unwanted or inappropriate behaviors, but children who are well regulated are better able to process information related to tasks and remain focused on activities (Sektan et al., 2010). For young children, these abilities are particularly important in the school environment.

Academically, regulation can play a key role in a child's compliance and performance in the classroom. Paying attention and following instructions are examples of behavior regulation and are important in maintaining appropriate behavior in the classroom (McClelland et al., 2007). Related to behavior regulation, children who have a greater attention span, lower activity level, and less negative emotionality are well regulated, and these skills are important for classroom compliance and performed better on academic tasks (Coplan, Barber, & Lagace-Seguin, 1999). However not all children are able to act in accordance with classroom demands. Children who have trouble regulating their behavior are often non-compliant when faced with demands or requests (Kochanska, 1993). Previous research on typically-developing preschool children during a clean-up task found that children with difficult temperaments demonstrated less compliance (Wachs et al., 2004). Additionally, typically-developing children who demonstrated low levels of regulation demonstrated more noncompliant behavior during a clean-up task (Stifter et al., 1999). Unfortunately, the majority of previous research has focused on these constructs in typically-developing children.

Research has shown that typically-developing children are better regulated than atypical children (Laurent & Rubin, 2004; Loveland, 2005). Yet little research has focused on regulation and compliance in children with autism. In general children with autism have decreased self-regulation, likely a function of

difficulty perceiving information in their environment and other's behaviors (Laurent & Rubin, 2004; Loveland, 2005). These deficits can result in tantrums that are a product of difficulties these children face and their inability to regulate appropriately when faced with a challenge (Laurent & Rubin, 2004). Children who have tantrums and who are not well regulated may be described as "highly-reactive." If a child is "highly-reactive," he or she is easily aroused by the environment and demonstrates strong reactions to stimuli which are related to decreased self regulation (Loveland, 2005).

In a study by Ashburner et al., (2010), children with autism whose demands were not met demonstrated low levels of emotion regulation through behaviors including outbursts, crying, mood changes, and frustration. This may result in negative classroom performance, including incomplete assignments and difficulty understanding directions. For example, in mainstream classrooms, children with autism demonstrated decreased performance relative to ability, with attention, emotion, and behavior regulation problems, all of which may be related to compliance (Ashburner et al., 2010). Although children with autism are represented in public schools, these children have been described as having a disability that has affected learning and, compared to peers, had significantly lower school performance (Montes & Halterman, 2006). Given the findings from previous research on regulation and compliance in typically-developing children, which shows that children who have decreased regulation are less compliant

(McClelland et al., 2007; Stifter et al., 1999; Wachs et al., 2004), the same relation is hypothesized for children with autism. The present study will examine how temperament and compliance are related in both children with autism and typically-developing children.

Compliance as a Predictor of School Liking. Although little research has focused on the relation between compliance to parental requests and school liking, Ladd et al. (2000) investigated the association between school liking and cooperative participation in the classroom, and how this association influenced later achievement in kindergarteners. Cooperative participation is “the extent to which children act in a cooperative and responsible manner in response to teacher and classroom demands” (Ladd et al., 2000, p. 258). Children who comply within the classroom are more likely to have positive attitudes regarding school, whereas children who are less likely to comply with teacher’s requests report negative school attitudes (Ladd et al., 2000).

Other research has focused on school liking and the construct of EC. Emotion regulation is a key component of EC and is necessary for compliance. Because one of the key components associated with compliance is self-regulation, understanding the relation between EC and school liking can be helpful in better understanding to the role of compliance. Valiente et al. (2007) determined that school liking acted as a mediator between EC and academic competencies in 7- to 12-year-old children. EC contributed to children’s attention in the classroom and

development of social relations, leading to increased school liking and better academic performance. Because EC is a key component of compliance, it is possible that the relation between EC and school liking is mediated by compliance. A bidirectional relation between behavior and school liking may also exist; children's behavior in the classroom could influence feelings towards school, and feelings towards school could influence classroom behavior (Ladd & Dinella, 2009). However, the present study will focus only on a unidirectional relation that behaviors influence feelings towards school. Children who like school are more cooperative and participatory. Similarly, children who participate in class have positive attitudes towards school (Ladd & Dinella, 2009). The present study will offer an important contribution to our knowledge of factors related to school success for children with high functioning autism by measuring school liking in this population and by exploring the mechanism by which school liking is associated with children's compliance and temperament. Specifically, the present will examine if the relation between EC and school liking is mediated by compliance.

Theoretical Framework

The present study is guided by a number of theoretical perspectives. An executive functioning deficit perspective was considered to understand the underlying processes that may drive differences between high functioning children with autism and their typical peers in temperament and compliance

(Ozonoff, Pennington, & Rogers, 1991). Furthermore, a theoretical perspective that focuses on early parent-child experiences as influencing children's later development was taken into account when examining how parent-child experiences influence later school adjustment (Waters & Sroufe, 1983). Finally, an ecological framework was used to explain how children's organismic characteristics may interact with the parenting environment to explain children's developmental abilities (Bronfenbrenner & Ceci, 1994).

One theory that explains the underlying processes driving differences between children with autism and typically developing children focuses on executive functioning deficits (Ozonoff et al., 1991). Executive functioning is best defined by Ozonoff et al. (1991) as “ the ability to maintain an appropriate problem-solving set for attainment of a future goal; it includes behaviors such as planning, impulse control, inhibition of a prepotent but irrelevant responses, set maintenance, organized search, and flexibility of thought and action” (p. 1083). Additionally, Ozonoff and colleagues give examples of these deficits in children with autism, noting that these children are easily distressed over occurrences in the environment, exhibit rigid behavior, demonstrate perseveration, lack understanding of consequences for behavior, appear impulsive, and exhibit difficulty with self-monitoring (Ozonoff et al., 1991).

Applying the executive function deficit model for autism in the present study may provide a theoretical background to understanding the behavioral

differences hypothesized to be exhibited by children with autism. If children with autism have deficits in executive functioning, they are less able to control both positive and negative emotional arousal, and it is hypothesized, that these children will have more Negative Affectivity. Executive functioning and EC are highly related, and consistent with an executive functioning deficit model, it is hypothesized that children with autism will have lower EC. Finally, children with autism lack an understanding of consequences for behaviors and are impulsive, and it is hypothesized that they will have higher levels of Surgency based on an executive functioning deficits model. With regard to compliance, children with autism may demonstrate less compliance because they lack an understanding of consequences for behavior, and have difficulty with self-monitoring, which may result in less compliance.

The present study is also guided by a theoretical perspective emphasizing the importance of a child's experiences in the caregiver-child context to that child's behaviors in different contexts; more specifically, beginning at an early age, the caregiver-child relationship influences later social adaptation to environments other than the home (Sroufe, 1989). These environments can include the school environment and reflects later school adjustment. The patterns in which a child interacts with a caregiver, including feelings, behaviors, and attitudes early in childhood later impacts new experiences and the formation of new relationships (Sroufe, 1989).

In the present study, the development of school engagement, more specifically school liking, is hypothesized to be influenced by interactions children have had within the parent-child environment occurring prior to a formal school setting. For example, by developing compliance skills in a clean-up situation with a parent, the child may gain increased motivation to act in accordance with an adult's expectations. Later in life, the child may then apply these experiences to a classroom setting with a teacher, thereby increasing his or her engagement in a classroom setting. In this manner, the child uses knowledge of situations that have previously occurred in the parent-child interaction to structure responses and adaptation to new experiences (Sroufe, 1989). Within the present study, the use of inherent resources (previously experienced parent-child context) is imperative to the development of competencies that can be used in school environments that will promote positive school adjustment and school liking. Specifically, the relation between a child's EC and school liking may be mediated by compliance. The child must first learn and understand how to be compliant within a parent-child context before he or she can fully engage in and enjoy school.

Children experience many environments that influence later development, and the bioecological model emphasizes the processes that take place within these environments (Bronfenbrenner, 1979). Bronfenbrenner's approach allows an exploration of the multiple influences of environmental systems and the

developmental interactions of these on a child's characteristics. Within the child, there are many inherent or organismic characteristics that may influence his or her response to any environment (Ladd, 1996). Children's developmental disability status (typical or autism), which is believed to be largely biological, may be attributed to the differences among these children, and children with autism may have unique developmental trajectories. These characteristics then influence the child's response to the environment. In the present study, parental use of commands is the environmental influence, and the child developmental disability status is the inherent characteristic. An example of interaction between environmental systems and child characteristics hypothesized in the present study is the moderation of parental indirect commands and compliance by group status. The moderation by disability status is hypothesized based on previous research that has shown that typical children demonstrated more compliance when suggestions or indirect commands were used (Braungart-Rieker, et al., 1997; Kuczynski & Kochanska, 1990), but children with autism demonstrated less compliance (Sigman et al., 1986).

CURRENT STUDY

The present study will examine the relations of temperament, compliance, parent behaviors, and school liking in children with high functioning autism and typically-developing children. Compliance will be measured in a laboratory setting, and both the child's and parent's behaviors will be examined.

Temperament will be measured using the Children's Behavior Questionnaire (CBQ), and school liking will be measured using the School Liking and Avoidance Questionnaire (SLAQ).

The present study has three overarching aims: to examine group differences in the processes of school liking, temperament, and compliance between children with high functioning autism and typical development; to examine the associations between these processes, and whether they are similar or different for children with high functioning autism; and to examine the mechanism by which these processes are related, specifically, whether compliance mediates the relations between temperament and school liking. The following hypotheses will be tested in the present study:

Hypothesis 1

Children with autism will demonstrate less compliant behavior than typically-developing children. In previous research, lower functioning, cognitively impaired children with autism were shown to be less compliant than typically-developing children and children with other disabilities (Hiebert et al., 2009; Lemanek et al., 1993). Additionally, children with autism have been rated as becoming more distracted and having difficulty with following instructions, paying attention, and regulating behavior (Ashburner et al., 2010; Eaves & Ho, 1997; Valente, 2004). The present study will contribute to the current state of the literature by focus on group differences between typically-developing children

and children with high functioning autism. Additionally, the present study will control for developmental level, and the children in the sample will be matched on language age. By matching on language age, all the children in the sample will have the same language ability and should understand the directives given by parents, eliminating a lack of understanding as a possible reason for less compliance.

Hypothesis 2

Children who demonstrate more compliance will have parents who use more indirect commands. Previous research has shown that children displayed increased levels of compliance when parents use indirect commands (Kuczynski & Kochanska, 1990) and gentle control, such as suggestions (Wachs et al., 2004).

Hypothesis 2a. The relation between commands and compliance will be moderated by group status. The relation between compliance and specific parental commands will be reversed for children with autism because they need clearer commands than typically-developing children. Previous research on children with autism has not focused on parent behavior and compliance but does suggest that caregivers of children with autism use similar strategies to direct their children's attention (Kasari et al., 1988). Children with autism may not fully understand indirect commands as part of the communication impairment that is evident in the developmental disability. Because the use of indirect commands (Kuczynski & Kochanska, 1990) and gentle control suggestions (Wachs et al.,

2004) are related to compliance behavior in typically-developing children, I hypothesize a reverse relation will be evident for children with autism as they have been rated as easily distracted and having difficulty with following instructions and paying attention,(Ashburner et al., 2010; Eaves & Ho, 1997; Valente, 2004).

Hypothesis 3

Overall, there will be group differences between children with autism and typically-developing children on the three factors of the CBQ. Previous research has shown that reactivity and self-regulation in typically-developing children are important aspects of temperament (Rothbart & Derryberry, 1981). Children with autism may have difficulty with self-regulation, which will be reflected in their temperament ratings (Gomez & Baird, 2005).

Hypothesis 3a. Children with autism will have significantly lower scores than typically-developing children on EC. Previous research has shown that EC best differentiated children with autism from typically-developing peers (Konstantareas & Stewart, 2006). Additionally, children with autism have difficulty with self-regulation and demonstrate significant emotion regulation problems (Ashburner et al., 2010). The present study will be the first to examine EC in children with high functioning autism.

Hypothesis 3b. Children with autism will have significantly higher scores than typically- developing children on Negative Affectivity. Although the limited

previous research using the CBQ has not found any significant differences between typically-developing children and children with autism (Konstantareas & Stewart, 2006), children with autism have been found to be rated as significantly more “difficult” in temperament compared to typical children (Kasari & Sigman, 1997), which may be related to Negative Affectivity. Furthermore, as the present study reports on a sample of higher-functioning, verbal children, and matches children based on language skills, it overcomes the potential methodological issue of undermining children’s negative expressions due to lower language skills overall in children with autism. The present study will be the first to examine Negative Affectivity in children with high functioning autism.

Hypothesis 3c. Children with autism will have higher scores than typically-developing children on Surgency. As very little previous research has focused on this scale, particularly for children with autism, this hypothesis is largely exploratory. Although previous research has not found any significant differences between typically-developing children and children with autism on this superfactor (Konstantareas & Stewart, 2006), previous research has shown a negative relation between EC and Surgency (Posner & Rothbart, 2007). This dimension also includes positive loadings on Impulsivity, which has been reported as a concern for children with autism (Ashburner et al., 2010), and will be examined as well. It is hypothesized that children with autism will have higher

scores than typically-developing children on Impulsivity. The present study will be the first to examine Surgency in children with high functioning autism.

Hypothesis 4

Overall, there will be a positive relation between individual dimensions of temperament and children's compliance behaviors. Previous research has shown that regulation is related positively to compliance, and children who demonstrate low levels of regulation have more non-compliant behavior (Stifter et al., 1999). However, previous research has not focused on the relation between compliance and temperament in children with autism

Hypothesis 4a. Children who have lower scores on EC will demonstrate less compliance. Compliant children act in accordance with demands and control desires, aspects of behavior regulation related to self regulation (Morrison et al., 2010). If children are unable to regulate emotions and behavior, they will have low EC scores and decreased compliance.

Hypothesis 4b. Children who have higher scores on Negative Affectivity will demonstrate less compliance. Previous research has shown that children who have higher negative reactivity demonstrate less committed compliance (Braungart-Rieker et al., 1997). Children who have high Negative Affectivity often have low EC scores because a negative relation between the two exists (Posner & Rothbart, 2007), which suggests that children who have higher Negative Affectivity will have lower levels of compliance.

Hypothesis 5

Children with autism will have lower school liking scores than typically-developing children, as reported by parents. Previous research has shown that school liking is linked to school performance in typical children; children who like school participate in the classroom and behave appropriately (Ladd et al., 2000). Although no research has specifically focused on school liking in children with autism, children with autism demonstrate difficulties in class and a small percentage have average performance in the classroom (Ashburner et al., 2010; Eaves & Ho, 1997; Valente, 2004).

Hypothesis 6

There will be a positive relation between compliance and school liking scores; as compliance increases, school liking scores will increase as well. Previous research has shown that children who are more compliant and participatory in the classroom have positive school attitudes, whereas students who are less compliant and resist classroom roles dislike school (Ladd et al., 2000). If compliance in the classroom is reflective of compliance to parent, it is possible that compliance to a parent may be related to later school liking.

Hypothesis 7

The relation between temperament and school liking will be mediated by compliance. Previous research has shown that children with greater temperamental effortful control generally have higher compliance in a parent-

child context (McClelland et al., 2007; Stifter et al., 1999; Wachs et al., 2004), and children who are more compliant within the classroom tend to have greater school liking (Ladd et al., 2000). I believe that compliance to a parent will mediate the relation between EC and school liking because compliance to a parent is an early-forming skill in toddlerhood that may serve as a precursor to healthy school engagement, including school liking.

METHOD

Participants

The study consisted of 20 children with autism diagnosed using the Autism Diagnostic Interview-Revised (ADI-R) and 20 typically-developing children. The children with autism were all high functioning, with respect to language measured using the Preschool Language Scale, Fourth Edition (PLS-4) and matched with typically-developing peers according to language age. There were no significant differences between groups in mental age, expressive language age, and receptive language age (see Table 1). Children with autism had a mean mental age of 57.79 months, whereas children in the typical development cohort had a mean mental age of 52.95 months. As expected, because of the deficits of autism, the typically-developing children were chronologically younger, on average, than the children with autism.

Educational data was collected during a follow-up questionnaire. In the typically-developing cohort, 19 parents returned the questionnaire. Of the

children in this cohort, 37% were in preschool, 32 % were in kindergarten, 26% were in first grade, and 5% were homeschooled with no report of grade level. Additionally, 95% of the students did not have an Individualize Education Plan (IEP), and 5% did not report IEP status. Only 5% of this cohort received services within school for speech and occupational therapy. Of this group, 79% of the students were in a general education classroom, 5% of the students were home schooled, and 16% of students did not report classroom setting.

Within the cohort of children with autism, 18 parents completed and returned the questionnaire. Grade level ranged from preschool to third grade with 17% of students in preschool, 17% in kindergarten, 33% in first grade, 28% in second grade, and 5% in third grade. Overall, 78% of the children in this cohort had an IEP. In terms of services, 72% of this cohort received speech and/or occupational therapy within a school setting, and 5% received physical therapy services. Of the children in this cohort, 83% were in a general education classroom, 11% were in a special education classroom, and 6% spent time in both settings.

Demographic information was gathered on ethnicity, parent age, parent education level, and parent income. In the entire sample, 77.5% of participants were White, 10% were Hispanic/Latino, 7.5% were of Asian origin, and 2.5% were biracial or other. Regarding parental age, the mean age of mothers was 36.3 years ($SD = 4.92$), and the mean age of fathers was 37.6 years ($SD = 6.08$). The

majority of the parents were married (97.5%) while a minority had never been married (2.5%). Parental self-report of income indicated that 25% of families made less than \$60,000 a year, 35% made between \$60,000 and \$100,000 a year, 30% made over \$100,000 a year, and 10% chose not to report income. In terms of maternal education, 5% of mothers had a high school diploma, 8% completed a 2-year degree, 45% completed a 4-year degree, 29% obtained a master's degree, and 13% obtained a doctoral degree. Regarding paternal education, 5% of fathers had a high school diploma, 11% completed a 2-year degree, 37% completed a 4-year degree, 37% obtained a master's degree, and 10% obtained a doctoral degree.

Procedure

The children with autism were primarily recruited through a local resource center for families of children with autism, Southwest Autism Research and Resource Center (SARRC). Typical children were recruited from preschools at Arizona State University. Recruitment flyers were distributed at each setting and parents who were interested in participating in the study provided their contact information to study personnel.

Visits were held in two locations: a lab on the Arizona State University campus or at SARRC, depending on what was convenient for the parents. In both locations, the testing room consisted of a relatively empty space with a table and chairs. The visits on campus were videotaped through a two-way mirror, with

participant consent, while the visits at SARRC were videotaped via a camera in the ceiling of the testing room.

Participants attended two research visits. During the first visit, the child participated in developmental assessments (Differential Ability Scale-II; PLS-4) while the parent completed the ADI-R. The parent was also given multiple questionnaires to complete at home and instructed to bring them back at the child's second visit. The second visit occurred a few weeks after the initial visit. During this visit, the parents returned the questionnaires they had completed at home. The children participated in many activities, including a clean-up task.

A follow-up measure was conducted when the children were, on average, six-years old ($SD = 1.21$ years). Parents were contacted by phone or email to determine if they were interested in participating. Those who agreed were either sent an electronic link to complete the survey online or a hard copy of the questionnaire. The questionnaire included questions on demographics, child friendship, school liking, social competence, and the child's services (if any).

Measures

Autism Diagnostic Interview-Revised (ADI-R). This interview is conducted by a trained professional to learn about a child's behavior from the parent in order to receive an autism diagnosis for the child (Lord, Rutter, & Couteur, 1994). Overall, there are 93 items on the ADI-R that focus on language and communication, social interactions, and repetitive, stereotyped behaviors.

Each item is scored on a scale from 0 (not present) to 3 (extreme severity) by the interviewer. The ADI-R can be used with both children and adults, with the only necessary criteria being the individual has a mental age above 2 years. Advanced training is required for all individuals prior to administering the ADI-R as the interviewer must make judgments on parent's feedback. The training includes a two and a half day workshop consisting of instruction on the psychometric properties of the instrument, practice administering and scoring the instrument, and discussion of administration and coding issues. Following this workshop, the interviewer must videotape an administration and submit it to be scored for reliability purposes. In the present study, the ADI-R was administered by testers who had passed the formal training and reliability requirements for this measure.

Children's Behavior Questionnaire (CBQ) Short Form. This questionnaire consists of a 94-item parent report of child temperament and takes approximately half an hour to complete (Putnam & Rothbart, 2006). It is an abbreviated form of the full length Children's Behavior Questionnaire, and designed to assess temperament in children 3 to 8 years of age (Rothbart et al., 2001). Parents were asked to rate their child using a 7-point Likert scale ranging from 1 (extremely untrue) to 7 (extremely true) or not applicable on each question. The CBQ contains 13 subscales that are derived from the 94 questions. The subscales are then grouped even further into the three broad dimensions of Surgency, Negative Affectivity, and Effortful Control. Surgency includes

positive loadings on Activity Level, High Intensity Pleasure, Impulsivity, and negative loadings on Shyness scales. Negative affectivity includes positive loadings on Anger/Frustration, Discomfort, Fear, Sadness, and negative loadings on Falling Reactivity/Soothability scales. Lastly, Effortful Control includes positive loadings Attentional Focusing, Inhibitory, Low Intensity Pleasure, and Perceptual Sensitivity scales. The authors of the scale report internal consistency between the full length CBQ and short form CBQ; 11 scales had an alpha coefficient greater than .70, 3 scales yielded an alpha coefficient between .65 and .70, and 1 scale yielded an alpha coefficient lower than .65 (= .61) (Putnam & Rothbart, 2006). In the present study, internal consistency was examined for both groups. For the autism group, there were 2 scales that yielded an alpha coefficient higher than .90 (Falling Reactivity/Soothability, .90; Shyness, .90), 6 scales with an alpha coefficient between .70 and .88 (Activity Level, .88; Anger/Frustration, .87; Impulsivity, .76; Inhibitory Control, .73; Discomfort, .78; Fear, .82), 2 scale between .60 and .70 (Sadness, .70; Attentional Focusing, .61), and 3 scales that yielded an alpha coefficient below .60 (High Intensity Pleasure, .50; Low Intensity Pleasure, .50, Perceptual Sensitivity, .48). For the typical group, 1 scale yielded an alpha coefficient over .9 (Falling Reactivity/Soothability, .93), 7 scales had an alpha coefficient between .70 and .88 (Shyness, .88; Activity Level, .70; Anger/Frustration, .84; Sadness, .76; Discomfort, .72; Fear, .81; Perceptual Sensitivity, .82), 3 scales yielded an alpha coefficient between .60 and .70

(Attentional Focusing, .61; Impulsivity, .66; Inhibitory Control, .63) , and 2 scales yielded an alpha below .60 (High Intensity Pleasure, .22; Low Intensity Pleasure, .27). The variables used in the present study are Effortful Control, Negative Affectivity, Surgency, and Impulsivity.

School Liking and Avoidance Questionnaire (SLAQ). One of the child's parents completed the Parent Report of SLAQ consisting of 10 questions (Ladd et al., 2000). The parent rated the child on school liking (e.g. "looks forward to going to school," "tells me about good things that have happened at school,") and avoidance indicators (e.g. "seems to dread going to school," "asks to stay home from school") on a 5- point scale (1-almost never, 2-not much, 3-sometimes, 4-a lot, 5-almost always). The child's score was derived by averaging the parent's ratings across all indicators. The internal consistency of this measure was determined by its authors using 200 kindergarten students, calculating the average parent report scores twice during the school year yielding $\alpha = .87$ (fall) and $\alpha = .91$ (spring) (Ladd et al., 2000). In the present study, the alpha coefficient was .85 for children with autism and .73 for typically-developing children.

School liking and school avoidance are the two scores derived from the SLAQ. In the present study, a composite score is created that represents more school liking and less avoidance. Children who were homeschooled were not included in analyses involving school liking.

Child Compliance Behaviors. During the visit, the experimenter left the room and instructed the parent to play with the child as he or she normally would at home. The experimenter re-entered the room and handed the parent an instruction sheet that said “Please ask your child to clean up the toys once I have left the room.” The child’s behavior was coded in 10-second intervals by two independent observers with two types of compliance (committed and situational) and five types of non-compliance behaviors, passive noncompliance, self assertion, defiance, negotiation, and unengaged (see Table 2 for description of coding definitions). This coding paradigm has been successfully used before with children with autism spectrum disorders (Jahromi et al., 2009). The variable in the present study included a composite proportion variable that represented more committed compliance and less situational compliance.

Inter-rater reliability. Two observers were trained to code child compliance. The raters were blind to the research question and participant’s group affiliation (autism or typical). The inter-rater reliability was high for coding of the child compliance with Cohen’s Kappa’s ranging from .82 to 1.0 (see Table 2 for coding definitions and individual Kappa values).

Parental Strategies for Compliance. The parent’s strategies to maintain the child’s attention to the clean up task were coded in 10-second intervals by two independent observers. There were three types of commands (unclear, direct, and indirect) and six other parental strategies, reprimands, positive incentive,

reasoning, alternative/distraction, bargaining, and other verbalization (see Table 3 for description of coding definitions). The variable included in the present study is indirect commands.

Inter-rater reliability. Two observers were trained to code parent behaviors. The raters were blind to the question and participant's group affiliation (autism or typical). The inter-rater reliability was high for coding of parental strategies with Cohen's Kappa's ranging from .85 to 1.0 (see Table 3 for coding definitions and individual Kappa values).

RESULTS

Diagnostic and Preliminary Analyses

Initially, the skew and kurtosis of all study variables were examined. The skew was less than three and kurtosis less than eight for all variables, indicating normal distribution (Tabachnick & Fidell, 2006). Preliminary bivariate correlations were conducted to identify any potential covariates related to the child's developmental level using both developmental measures (i.e., expressive language, receptive language, and mental age) and the study variables (i.e., compliance, school liking, and temperament). See Table 4 for correlations. In the present study, a correlation coefficient of .25 to .40 was considered a moderate effect size (Rubin, 2009). Additionally, a correlation coefficient of .20 to .25 can be considered weak to moderate, and given the small sample size, correlation coefficients in this range were carefully examined. Analyses revealed a

significant negative correlation between school liking and mental age, indicating that mental age was negatively related to school liking, $r(36) = -.34$, $p = .04$. That is, in general, children with higher mental age had lower scores on school liking. As a result, further analyses involving school liking controlled for mental age. In addition, although the correlation between expressive language and EC only approached statistical significance within the entire sample, $r(37) = .30$, $p = .07$, the magnitude of the correlation was nevertheless moderate in size indicating that expressive language should be considered a possible covariate in further analyses involving EC. Within the typically-developing group, the correlation between EC and expressive language was not significant, $r(19) = .24$, $p > .05$. However, within the group with autism the correlation between EC and expressive language was significant, $r(20) = .50$, $p < .05$. Finally, no significant associations were found among the temperament superfactors (all p 's $> .05$).

In an effort to guide the interpretation of study analyses given the relatively small sample size, power analyses were conducted to determine what effect size would be necessary for statistically significant results. Given the current sample size, power (.95) and alpha (.05), an effect size of 1.17 would be necessary for statistically significant results with a t -test. In terms of regression, with power set at .95 and alpha set at .05, an effect size of .42 with two predictors and .47 with three predictors would be needed for statistically significant results.

Finally, with power set at .95 and alpha set at .05, a correlation of at least .49 would be statistically significant using a bivariate correlation.

Descriptive Analyses

For descriptive purposes, frequencies, means, and standard deviations on all coded variables were examined. With respect to children's compliance behaviors, committed compliance ($M = .50, SD = .26$), was evident in every child's behavior, and situational compliance ($M = .16, SD = .18$) was displayed by 75 % of children. Children's noncompliance behaviors varied, with defiance ($M = .01, SD = .04$) displayed by one child, and self-assertion ($M = .02, SD = .09$) displayed by 20 % of children. See Table 5 for means and standard deviations of all compliance behaviors. Bivariate correlations were conducted to determine if any compliance and non-compliance variables were correlated. Committed compliance was significantly negatively correlated with situational compliance, passive non-compliance, negotiation, and unengaged behavior (situational compliance $r(39) = -.55, p < .01$; passive non-compliance $r(39) = -.72, p < .01$; negotiation $r(39) = -.39, p < .01$; unengaged $r(39) = -.33, p < .05$). Additionally, passive non-compliance was positively correlated with unengaged behavior ($r(39) = .33, p < .05$), and self-assertion was positively correlated with negotiation ($r(39) = .48, p < .01$).

With respect to parent behaviors, direct commands ($M = .17, SD = .16$) were used by 75% of parents, positive incentives ($M = .13, SD = .13$) were used

by 78 % of parents, and indirect commands ($M = .19$, $SD = .16$) were used by 80% of parents. The only parent behavior that did not occur was the alternative/distraction behavior. See Table 6 for means and standard deviations of all parent behaviors. The remaining parent behaviors were less predominant, as they occurred for between 20 and 70 % of parents. Bivariate correlations between parent behaviors were computed to determine if any parent behaviors were associated. Reprimands and reasoning were positively correlated, $r(39) = .40$, $p < .05$), while no verbalizations was negatively correlated with other verbalizations, reasoning, indirect commands, positive incentives and unclear commands (other verbalizations $r(39) = -.58$, $p < .01$; reasoning $r(39) = -.38$, $p < .05$; indirect commands $r(39) = -.38$, $p < .05$; positive incentives $r(39) = -.48$, $p < .01$; unclear commands $r(39) = -.40$, $p < .05$).

Group Differences in Compliance

To test the first hypothesis, that children with autism would be less compliant than typically-developing children, an independent samples t -test was conducted on the compliance composite (i.e., a proportion variable that represented more committed compliance and less situational compliance). The hypothesis was not supported, as there was no significant group difference in compliance between typically-developing children ($M = .19$, $SD = .18$) and children with autism ($M = .15$, $SD = .18$), $t(37) = -.61$, $p > .05$; $d = 0.19$.

Compliance and Parent Behaviors

The next hypothesis stated that children who demonstrated more compliance would have parents who used more indirect commands. To test this hypothesis, a partial correlation was conducted with expressive language as the covariate. Although the correlation between compliance and indirect commands controlling for expressive language was not significant, $r(34) = .23, p = .16$, the magnitude of this correlations was moderate in size. The partial correlations were then examined within groups. The partial correlation between compliance and indirect commands was not significant in the autism group, $r(16) = .17, p > .05$, or the typically-developing group, $r(17) = .30, p = .20$. However, the magnitude of the correlation in the typically-developing group was moderate in size. The small sample size should be taken into account when examining these correlations.

To test the next hypothesis, which stated that the relation between commands and compliance would be moderated by group status, a regression analysis was conducted. First, an interaction term was created reflecting the product of group (0, 1) and the centered indirect commands variable. Contrary to the expected result, the interaction term was not a significant predictor of compliance $\beta = -.64, t(36) = -.64, p > .05$, indicating that group status did not moderate the relation between parent indirect commands and child compliance. As such, no follow-up analyses were necessary to evaluate individual group slopes.

Temperament Group Differences

Next, the hypotheses concerning group differences in temperament were tested to assess whether children with autism had lower levels of EC, and higher levels of Negative Affectivity, Surgency, and Impulsivity than typically-developing children. To assess group differences in temperament, a one-way Multivariate Analysis of Variance (MANOVA) was conducted with group (typically-developing and children with autism) as the between-subjects factor and temperament superfactors (Negative Affectivity, Effortful Control, and Surgency) and the Impulsivity subscale as the dependent variables (see Table 7). A one-way MANOVA revealed a significant main effect for group, $\Lambda = .447$, $F(4, 34) = 10.52$, $p < .01$. Given that the overall test was significant, the univariate main effects were analyzed. Consistent with the hypothesis, a significant group difference was evident on EC, $F(1, 38) = 41.55$, $p < .01$, with a large effect size, partial eta squared = .529. On average, typically-developing children scored .94 points higher than children with autism. However, support was not found for the hypotheses concerning Surgency, Negative Affective, or the Impulsivity scale, as there were no significant group differences in these measures (Surgency, $F(1, 38) = .89$, $p > .05$; Negative Affectivity, $F(1, 38) = .27$, $p > .05$; Impulsivity subscale, $F(1, 38) = 3.35$, $p > .05$).

Temperament and Compliance

Initially, a regression analysis was run with all three superfactors predicting compliance, holding expressive language constant. The three superfactors were not significant predictors of compliance, $\beta = .29$, $t(33) = 1.17$, $p > .05$. Next, partial correlations were conducted to examine the relation between temperament, specifically EC and Negative Affectivity, and compliance, controlling for expressive language. It was hypothesized that children who had lower scores on EC and Negative Affectivity would demonstrate less compliance. When the sample was examined as a whole, no significant correlations were found, although the partial correlation between EC and compliance approached significance, $r(38) = .16$, $p = .07$.

Bivariate correlations between temperament and compliance were next examined by group. In the autism group, when controlling for expressive language, the partial correlation between Negative Affectivity and compliance was low in magnitude and non-significant $r(16) = .06$, $p > .05$. Additionally, the partial correlation between EC and compliance was not significant, $r(16) = .23$, $p = .36$, but had a moderate magnitude.

When the typically-developing group was examined using bivariate correlations, there were no significant correlations. Although not significant, the correlation between EC and compliance was moderate, $r(19) = .33$, $p = .33$. To follow the same analyses that were conducted on the autism group, a partial

correlation among temperament superfactors and compliance, controlling for expressive language were completed. When expressive language was controlled, there were no significant partial correlations between compliance and Negative Affectivity, $r(16) = .10, p > .05$, or compliance and EC, $r(16) = .29, p = .24$.

Group Differences in School Liking

Next, to test the hypothesis that children with autism had lower school liking scores than typically-developing children an Analysis of Covariance (ANCOVA) was conducted with group as the between-subjects factor, school liking as the dependent variable, and mental age as the covariate. Consistent with the hypothesis, a significant difference was found in school liking when mental age was controlled, $F(1, 35) = 4.42, p < .05$. On average, typically-developing children had significantly higher school liking scores ($M = 4.53, SD = 0.46$) than children with autism ($M = 4.14, SD = 0.59$), even after controlling for children's mental age.

Compliance and School Liking

To determine if there was a positive relation between compliance and school liking, a bivariate correlation was conducted. Given that school liking was found to be correlated with mental age, a partial correlation was conducted between compliance and school liking, controlling for mental age. Consistent with the hypothesized direction of results, compliance and school liking were significantly positively correlated, $r(32) = .37, p < .05$. However, when examined

by group, partial correlations between compliance and school liking were not significant (typically-developing $r(15) = .19, p > .05$; children with autism $r(15) = .35, p > .05$).

Mediation Model

Because the relation between EC and compliance approached statistical significance in the autism group ($r(38) = .16, p = .07$), a mediation analysis was conducted to determine if the relation between EC and school liking was mediated by compliance. This analysis was conducted using the approach outlined by Mackinnon, Lockwood, Hoffman, West, and Sheets (2002) which uses two regressions to test mediation. In the first regression, the independent variable (temperament) was included as a predictor of the mediator (compliance). In the second regression, both the independent variable and the mediator were included as predictors of the dependent variable (school liking). In order to have a mediation model, the independent variable in the first regression must be significant, and the mediator in the second regression must be significant. Expressive language was first included in each regression model as a covariate. EC did not significantly predict compliance, $\beta = .25, t(35) = 1.45, p > .05$, in the first regression model, when holding expressive language constant. In the second regression model, EC and compliance did not significantly predict school liking $\beta = .22, t(32) = 1.29, p > .05$, holding expressive language constant. However, EC did significantly predict school liking, holding expressive language and

compliance constant, $\beta = .40$, $t(35) = 2.22$, $p < .05$. Thus, the hypothesis that compliance mediates the relation between EC and school liking was not supported. However, findings indicate that EC was a significant predictor of children's school liking, even when controlling for expressive language and compliance.

DISCUSSION

The aims of the present study were threefold: (1) to examine group differences in school liking, temperament, and compliance in children with high functioning autism and their typical peers; (2) to examine relations among these processes, and whether relations were similar or different for children with high functioning autism and their typical peers and; (3) to better understand the mechanism by which these processes were related, specifically whether compliance mediated the relationship between temperament and school liking. This was the first study to examine school liking in children with high functioning autism, and to explore the associations among school liking, temperament and compliance in this population.

In the present study, the examination of temperament group differences yielded the most interesting findings. Consistent with previous research on children with autism of lower developmental functioning (Konstantareas & Stewart, 2006), there were significant group differences on EC, even in this sample of children with relatively high cognitive and language functioning.

Children with autism had significantly lower ratings of EC than typically-developing children by almost one point. These findings lend some support for the theoretical perspective that children with autism have underlying executive functioning deficits. As executive functioning includes focusing and sustaining attention, self-monitoring, and inhibiting impulsive responses (Liss et al., 2001), children's low EC may negatively impact the development of executive functioning. The finding in the present study was consistent with previous empirical studies that have found group differences in the inhibitory control dimensions of executive functioning. Children with high functioning autism have been shown to score lower than children with other developmental disabilities on tasks that required inhibiting a prepotent response and lower than typically-developing children on all executive functioning tasks (Verte, Geurts, Roeyers, Oosterlaan, & Sergeant, 2005). Additionally, children with autism have demonstrated difficulty shifting attention compared to children with Asperger's disorder (Rinehart, Bradshaw, Moss, Brereton, & Tonge, 2001). The finding of the present study may provide future implications for interventions that focus on the key components of EC, including regulation.

Currently, some interventions are aimed at promoting adaptation to a school environment and learning the necessary social skills for a positive transition. The Promoting Alternative Thinking Strategies curriculum (PATHS) has been used with children in preschool and kindergarten. This program focuses

on development of emotional awareness, self-control techniques, and self-regulatory problem solving skills and has been helpful in improving social-emotional competence and emotion regulation skills in children (Domitrovich, Cortes, & Greenberg, 2007). Although studies using this curriculum have focused on typically-developing children, children with high functioning autism may benefit from inclusion in this program. Starting early in a child's life may allow for him or her to learn skills early, apply them, and act accordingly in a school environment.

Another intervention that has targeted self-regulation, specifically in children with autism, is the Social Communication, Emotional Regulation and Transactional Support (SCERTS) program (Prizant, Wetherby, Rubin, Laurent, & Rydell, 2006). The emotion regulation component of SCERTS works on such skills as expression of emotions, development of emotion regulation techniques, and strategies for coping with stress. Although the emotion regulation component of the SCERTS program has not undergone vigorous testing for effectiveness, given the finding in the present study that children with autism have lower EC, further investigation of the effectiveness of the this program in children with high functioning autism is imperative.

Negative Affectivity was hypothesized to be higher in children with autism based on previous research that has shown these children demonstrate more "difficult" temperaments (Kasari & Sigman 1997). Somewhat surprisingly,

no group differences in Negative Affectivity were found. These findings were consistent with that of Konstantareas and Stewart (2006) who also found no group differences. They suggested the lack of group differences may have been attributed to inappropriate questions on the CBQ for children with autism, as these children may not be able to verbally convey feelings that fall under this superfactor. However, the present study overcame that limitation by matching children on language to ensure equivalent groups based on language ability. Thus, a factor other than the child's language may have influenced the child's level of Negative Affectivity. One possibility is that the children with autism were high functioning and were better able to regulate their negative affect, thereby minimizing any differences between themselves and their typical peers on this dimension of temperament. Indeed, although the typically-developing group scored higher in EC, both groups had relatively high EC overall. Children who score higher on EC may be able to use strategies that decrease Negative Affectivity, such as shifting attention away from negative cues (Posner & Rothbart, 2000), thus, the differences in Negative Affectivity may not have been detected.

Also somewhat surprisingly, the Surgency scores, which were hypothesized to be higher for children with autism, (Ashburner et al., 2010), were not significantly different between groups, and there were no group differences on the Impulsivity scale as predicted in the present study. Although consistent with

previous research on lower functioning children (Konstantareas & Stewart, 2006), results in the present study may be attributed to the level of functioning in this sample. Because the children with autism in the present study were high functioning, they may have had better regulation skills, which resulted in less impulsivity overall. Previous research has shown that children who rated lower in EC tended to rate higher in Surgency (Garon & Moore, 2007), and although the children with autism rated significantly differently from the typically-developing group on EC in the present study, their EC scores were not low. Moreover, Surgency reflects activity level and positive anticipation, which may be similar across groups given the age of the sample. Children who have new experiences in school may have similar activity levels and anticipation as they experience similar novel environments and situations at a young age. Previous research has shown that experiences and maturation influenced temperament through adolescence (Posner & Rothbart, 1998). This is a possible explanation as to why there were no group differences, given that the typical children were younger than the children with autism, and thus not fully matured. Another explanation for no group differences may lie within the services the children with autism may have been receiving. In the present study, the children with autism all received services for their developmental disability. These services included physical therapy, occupational therapy, and speech therapy. Occupational therapy can be used to help teach children necessary skills to promote appropriate behaviors that

are essential in activities of daily living, including play and leisure with friends, and productivity at school (Filipek et al., 2000). It may be possible that these children learned skills to inhibit actions associated with Surgency such as rushing into situations, making decisions without thinking about the outcomes, and thinking before speaking or acting, therefore diminishing any differences that may have existed between these children and the typically-developing children.

Overall, little research has focused on temperamental differences in children with autism and typically-developing children using the CBQ. Konstantareas and Stewart (2006) examined these constructs in children with autism who were cognitively delayed and spanned a large age range. Given the variability in age and cognitive delays, their results may not be generalizable to all children with autism. Because aspects of temperament, such as executive attention, continue to develop throughout childhood (Posner & Rothbart, 2007; Rothbart & Jones, 1998) the children in the aforementioned study may have been at varying levels in development, some just beginning to develop self-regulation skills. Children in the present study had high functioning autism and were matched to typically-developing peers on language. This allowed for language to be ruled out as a possible confound in the group differences finding. Additionally, the children were all between 3 and 6 years of age, whereas the children in the aforementioned study ranged between 3 and 10 years of age. The children in the present study may still have been at differing levels of

development; however the age range was smaller than previous research. Because of these factors, the results of the present study may be generalizable to other children with autism who are high functioning

Given that previous research has shown that children who demonstrated less regulation were less compliant (Stifter et al., 1999), those who were more compliant were able to act according to demands and resist impulses (Morrison et al., 2010), and children with autism demonstrated less compliance than typically-developing peers (Hiebert et al., 2009; Lemanek et al., 1993), several key hypotheses were tested concerning compliance. It was hypothesized that there would be a positive relation between compliance and EC, a negative relation between Negative Affectivity and compliance, and group differences on compliance. Unexpectedly, however, these hypotheses were not supported by findings.

No significant relation was found between EC and compliance or Negative Affectivity and compliance in either group, although the correlation between EC and compliance was positive and moderate in size in both groups. Finding no significant relation between EC and compliance was surprising given that the typical children scored higher on EC than the children with autism. Because the children with autism had lower EC scores, it was expected they would demonstrate less compliance than typical children. Further investigation using a larger sample size may yield more conclusive, significant findings. It is possible

that other child specific variables may have influenced the relation between EC and compliance that were not taken into account. Child motivation and feelings of obligation towards a caregiver may result in increased compliance (Kochanska & Aksan, 1995). Both motivation and regulation may have contributed to children's compliance and were not accounted for in the present study. Although the association between EC and compliance was not significant in the present study, a relation between regulation and compliance has been reported in previous research (McClelland et al., 2007; Stifter et al., 1999; Wachs et al., 2004). The positive relation between the two constructs in the present study was congruent with previous research, and as EC, or the ability to regulate, increased compliance increased as well.

In the present study, one possible explanation for no negative relation between Negative Affectivity and compliance may have been the children's levels of EC. Previous research has shown an inverse relation between EC and Negative Affectivity, and children with high Negative Affectivity levels often become frustrated easily and irritable in situations (Berdan, Keane, & Calkins, 2008). The children in this study had high levels of EC, and may have been able to better regulate feelings of anger or frustration and comply with parent's request more easily. Overall, only one child demonstrated defiance, indicating that the task did not induce high negative reactions. The clean-up task did not appear to elicit frustration, which may be a possible explanation why no relation was evident

between compliance and Negative Affectivity. In addition to the investigation of the relation between temperament and compliance, group differences in compliance were examined.

The findings of the present study did not support the hypothesis concerning group differences in compliance. Specifically, no significant group differences in committed compliance were found between typically-developing children and children with high functioning autism. There are several possible explanations for these findings. The results in the present study may differ from previous research on children with autism because the groups were matched on language, and the children with autism had the necessary language required to comply with a caregiver's request and understand what was being asked of them. Additionally, because the children with autism were high functioning, they may have been able to follow instructions better, contrary to previous research on children with autism who were lower functioning and had cognitive impairments (Eaves & Ho, 1997; Lemanek et al., 1993). Another possible explanation for these results was the chronological age of the typically developing children. These children were younger than the children with autism because groups were matched on mental age. Previous research has shown that children who are older demonstrate more committed compliance in both typical children and children with autism (Kochanska et al., 2001; Kochanska & Aksan, 1995). It is possible that group differences did not exist because the typical group was chronologically

younger than the group with autism. Additionally, the present study did not take into account the parent's physical actions during the clean-up task. If the parents of children with autism tried to compensate for their children's disability, they may have helped put toys away or made the task easier by organizing the toys in a way that facilitated cleaning. Physical help from parents was not measured and may have attributed to the compliance levels seen in the children with autism.

Previous research has shown that typically-developing children whose parents used more indirect commands or suggestions demonstrated more compliance (Kuczynski & Kochanska, 1990; Wachs et al., 2004) and that language-delayed toddlers are less compliant than typically-developing children (Irwin, Carter, & Briggs-Gowan, 2002). To further understand parent's behaviors and child compliance, specifically if language and group status were related to understanding caregiver's requests, the relation between parents' indirect commands and children's compliance was examined. Although there was not a significant relation between compliance and indirect commands in the present study, the strength of the correlation was moderately positive in size. This suggests that as indirect commands increased, the amount of compliance demonstrated by the child increased as well, consistent with previous literature (Kuczynski & Kochanska, 1990; Wachs et al., 2004). When examined by group, a moderately positive correlation was also found in the typically-developing group. However, the correlation in the group with autism was low and non-

significant. Previous research has shown that children with autism are less compliant to parental suggestions than typically-developing children (Sigman et al., 1986). In the present study, the correlation between indirect commands and compliance in children with autism was smaller than in typically-developing children, consistent with the notion that children with autism are less compliant when indirect commands are used. Given that previous research has shown these two constructs to be related, further research using a similar, but larger sample, may yield a more interpretable result.

Whereas previous research suggests that typically-developing children are more compliant when indirect commands are used (Kuczynski & Kochanska, 1990), the inverse relation was hypothesized for children with autism in the present study, because previous research has shown that children with autism demonstrated less compliance to parental suggestions than typically-developing children (Sigman et al., 1986). Therefore, it was hypothesized that the relation between commands and compliance would be moderated by group. However, the hypothesized relation was not moderated by group. These results were surprising, because children with autism often have communication and language deficits; however given that the children with autism in the present study were matched to peers on language and were high functioning, explanations may exist as to why no moderation between commands and compliance by group was evident. Both groups had comparable expressive and receptive language, and the group with

autism may have better understood parental requests than children with autism in previous research. Because there were no deficits in receptive language, it appears the children with autism in the current study did not have difficulty understanding the commands compared to the typically-developing group.

Another possible explanation for no moderation may be the types of parent behaviors that were unaccounted for in the present analyses. In the present study, only indirect commands appeared to differ from the mean of the entire sample between the two groups. Parents of children with autism used indirect commands less often, on average, than parents of typically-developing children. A lack of moderation by group status may be due to varying types of unexamined parent behaviors, time accounted for by each behavior, and similar durations of parent behavior in both groups. It is possible that combinations of parent behaviors, in the same ten second interval, may have resulted in differing levels of compliance by group, which was not accounted for in the present study. Previous research with typically-developing children has shown that a combination of control and guidance types of parent behavior, in a home setting, resulted in more child compliance (Crockenberg & Litman, 1990). If these types of parental behaviors were employed, they were not analyzed in the present study, as only indirect commands were examined. Also of interest was that parents of children with autism used less indirect commands, on average, yet no significant group differences were evident. One possible explanation as to why parents in the

present study used more indirect commands may be because they were more aware of their child's language ability and used language they deemed appropriate for their child. Additionally, comprehension of commands may be one behavior that is focused on by services the child receives, and therefore the child has had experience following commands through practice or developed a routine for when the child is given directions. Further examination of different types of parent behavior and subsequent child compliance may result in a better understanding of possible moderation by group status. Additionally, the experiences that children have in the parent-child context may inform their later school engagement. Understanding differences in school engagement between typically-developing children and children with autism is important to ensure that children have the best school experience possible.

Although no research has focused on school liking in children with autism, it was hypothesized that children with autism would have lower school liking scores than typically-developing children, because previous research has shown that school liking was associated with appropriate classroom behavior in typically-developing children (Ladd et al., 2000), and children with autism demonstrated difficulty behaving appropriately in the classroom (Ashburner et al., 2010; Eaves & Ho, 1997; Valente, 2004). The findings in the present study supported the hypothesis that group differences in school liking existed. Typically-developing children had significantly higher school liking scores than

children with autism. Again, it is important to note that the typically-developing children were younger than the children with autism. The majority of the children with autism were in first and second grade where as the majority of typical children were in preschool and kindergarten. Preschool and kindergarten have different goals and demands than first and second grade, with an emphasis in formalized instruction possibly occurring in kindergarten but likely not in preschool (Rimm-Kaufman, Pianta, & Cox, 2000). If the younger children were not spending as much time in a structured, curriculum based classroom, they may have reported higher school liking as the demands were less than those of older children. Additionally, these children may not have been in school for a full day, as some preschools and kindergarten classrooms are only half day.

Many of the children with autism in the present study were in mainstream classrooms. Understanding group differences in school liking can lead to further implications regarding what can be done to minimize negative reactions to school. The reasons why children with autism liked school less are speculative, as the current study did not measure the following constructs. Although these children may be in a mainstream classroom, it is possible they liked school less because of aspects of the classroom. Difficulty in school may result in decreased school engagement. Children with autism may not be prepared for a typical classroom and consequently, struggle with transitions within the classroom or have difficulty accepting the student role. Previous research has shown that students who had

less attention problems reported higher school liking scores and greater peer acceptance (Ladd & Burgess, 2001). In the present study, children with autism's lower school liking scores may have been a function of difficulties with attention, which is common in children with autism (Ashburner et al., 2010; Calhoun & Mayes, 2005; Eaves & Ho, 1997), or decreased peer acceptance. One possible explanation for group differences in school liking may be that children with autism have trouble paying attention in the classroom. Children who have high EC are able to attend in the classroom better than children with low EC (Valiente et al., 2007). By focusing on the aforementioned interventions for EC, children may learn self-regulation strategies that promote school engagement and ultimately school liking. Not only will children benefit by learning attention strategies, they may learn social skills as well.

Another possibility is that the children with autism in the present study had difficulties with friendships, poorer quality friendships (Baumringer & Kasari, 2000; Chamberlain et al., 2007), and were excluded by peers (Ashburner et al., 2010), which may have led to decreased school liking. Given the group differences that existed between typically-developing children and children with autism in school liking, it may be helpful to implement programs that would target factors associated with school liking, such as classroom behavior skills and social skills, to help strengthen skills and increase the child's desire to attend school.

Peer-mediated interventions may be an opportunity for children with autism to learn social skills in a peer setting. Morrison, Kamps, Garcia, and Parker (2001) investigated peer mediation between typically-developing children and children with autism and showed that teaching social skills using peer mediation increased social bids for play among children with autism. Another peer-mediated intervention focused on communication between typical children and children with disabilities to increase social interactions and was effective in improving social interactions in preschoolers (Goldstein, Kaczmarek, Pennington, & Shafer, 1992). Finally, a peer-mediated intervention focusing on social skills training with children with autism and typically-developing children showed an increase in frequency and duration of social interactions in group play among these children (Kamps, Leonard, Vernon, Dugan, & Delquadri, 1992). The aforementioned studies provide useful information about the importance of peer-mediated interventions on improving social interactions with children with autism. By using peer-mediated social skills interventions with children with high functioning autism, relationships with peers may increase in both quality and duration, which would help children with autism form more meaningful peer relationships. A combination of interventions that focus on self-regulatory behavior, such as EC interventions, and peer-mediated social skills training may help children with high functioning autism learn how to form relationships with

peers and decrease exclusion by peers due to externalizing behavior, which may result in increased school engagement and school liking.

Interestingly, the present study found that mental age and school liking were significantly negatively correlated; as children aged, their school liking scores decreased. Previous research has shown that school liking decreases throughout the year (Ladd et al., 2000), and the negative relation between the two variables may be related to school curriculum. As children progress through school, the curriculum becomes more formal. Children who are in preschool and kindergarten may like school more because the curriculum may not emphasize academics to the same extent as first and second grade curriculum, and may focus on group time and play activities.

The final aim of the present study was to examine school engagement, as measured by school liking, in children with autism and to explore relations among temperament, compliance, and school liking. As one behavior important for school engagement is compliance to an adult's request (Ladd et al., 2000), a positive relation between compliance to a parent and school liking was hypothesized. This hypothesis was supported by the finding that children's committed compliance and school liking were significantly positively related. It is important to note that compliance in the present study was in a clean-up situation with a parent, prior to formal schooling. One possible explanation for the relation between compliance and school liking is that children who were

compliant to a caregiver were able to apply the learned skills to a school setting. These skills may include paying attention, following direction, participating in the classroom, and behaving appropriately, all of which have been related to academic performance (Foulks & Morrow, 1989; Matheson & Shriver, 2005), which has been related to school liking (Ladd et al., 1999; Ladd et al., 2000). When examining compliance and school liking, a bidirectional relation may exist. Children who are compliant may like school more, or children who like school may be more compliant. One possibility is that children in the present study who had higher levels of school liking were more compliant because they liked school more. School engagement has been related to positive school outcomes (Iovannone et al., 2003) and the level of a child's engagement in school may influence compliance, as those who attend to both the social and nonsocial aspects of school may demonstrate more compliance in the classroom.

Another possible explanation is that a motivational aspect of compliance to a parent exists. A child may remain motivated to act appropriately in school for his or her parents and subsequently report higher school liking scores. Additionally, the child may transfer that motivation to a school setting to please his or her teacher, culminating in a child who is motivated to follow directions given by both parents and teachers. Because the present study did not examine compliance in a school setting, it would be interesting to see if compliance to caregivers is related to compliance in a school setting. Understanding if these two

types of compliance are associated would allow parents and caregivers to help children develop key skills for compliance early in life, which would help prepare them for a formal school setting and result in better school engagement. Because children have many different characteristics, it is important to focus on differences that are evident across groups in school engagement and how to increase school engagement and school liking for children who may not be similar to their peers.

Previous research has shown that children who were more compliant reported higher school liking scores (Ladd et al., 2000) and children who had higher levels of EC demonstrated more compliance (McClelland et al., 2007; Stifter et al., 1999; Wachs et al., 2004). Skills such as compliance are theorized to be a function of children's inherent characteristics that develop in the context of parent-child interactions and are applied to novel contexts such as a school setting where they may influence school engagement. Thus, in the present study, compliance was hypothesized to mediate the relation between the child's temperament and school liking. This hypothesis was not, however, supported by findings. There are a number of explanations for this outcome. One explanation is that parental compliance, the type of compliance in the present study, consisted of constructs different from school compliance, and compliance to a parent may not be closely related to school compliance. Compliance to a parent includes motivation and a sense of obligation, while compliance in school requires that a

child pay attention, follow directions, and participate in the classroom with appropriate behavior (Foulks & Morrow, 1989; Matheson & Shriver, 2005). In a classroom setting, a child may be required to attend to a task while there are competing stimuli that may distract the child which may be very different from a parent context. Future research that examines compliance in school settings may yield more interpretable and applicable results regarding compliance mediating the relation between EC and school liking. Additionally, compliance to parent and compliance to teacher, as possible mediators between EC and school liking could be examined. It is possible that the relation between EC and school liking is mediated through both parent and teacher compliance. Research examining the relation between compliance to a parent and compliance to a teacher may allow a better understanding of the mechanisms by which important skills can be learned in a parent-child context and later transferred to a classroom context.

Given that the correlation between EC and compliance was moderate in size, and the relation between compliance and school liking was significant in the present study, further investigation of this mediation model using a larger sample size may yield a significant mediation model. Interestingly, although the mediation model was not significant, EC did significantly predict school liking, controlling for expressive language. This finding is consistent with previous research that has shown a relation between EC and school liking, specifically as it pertains to children's attention in the classroom and development of social

relations (Valiente et al., 2007). Children who demonstrated high levels of EC were able regulate behaviors better and demonstrated appropriate attention skills, important factors for adaptation to a classroom setting and school engagement (Rothbart & Jones, 1998). These self-regulatory skills have been associated with behaviors that are important for successful school adjustment (Blair, 2002). Additionally, children who had higher levels of EC had better social relationships within a school setting with peers (Valiente, Lemery-Chalfant, Swanson, & Reiser, 2008), were able to regulate emotions appropriately within social situations, communicate thoughts, sustain attention, and engage with peers in turn taking behavior (Blair, 2003), which may lead to higher levels of overall school liking. If children have high levels of EC, they are less likely to be disruptive in the classroom, succumb to distractions during class, and receive negative attention for inappropriate behaviors, all of which could result in school avoidance, as these experiences may result in feelings of negativity towards school. Given the relation between EC and school liking, further research on interventions that can help children learn regulatory skills may be effective in helping children learn how to act appropriately in the classroom and may increase school liking and engagement.

Limitations and Future Direction

There were some limitations within the present study that may affect the study's generalizability. The sample size was relatively small, with 20

participants in each group. Because of the small sample size, the power of the analyses was likely affected and may have attributed to correlations that were moderate in magnitude but not significant. Further investigation of constructs in the present study using a larger sample would allow for more power and a better interpretation of the results.

The sample was somewhat homogeneous in functioning as the children with autism were all high functioning and match on language skills to typical peers, which does not allow for findings to be generalized to all children with autism. Because autism is a spectrum disorder, individuals can range from cognitively impaired to high functioning, with language, social, and behavioral deficits that fall on a continuum as well. While, on the one hand, it is important to focus research attention on a homogeneous group of children along this spectrum in order to control for numerous potential covariates (i.e., diagnostic severity, language ability, cognitive functioning), investigation of the constructs in the present study with individuals who range in severity may also provide a better understanding of how individuals differ, and allow for an understanding of how the constructs appear at various levels of the spectrum. In order to test the variability along the spectrum, however, it would be important to have a sufficiently large sample size to account for the varying levels of diagnosis. It may also be helpful to choose cut off points, and create subgroups that encompass individuals that fit a range, i.e. low functioning, moderate functioning, and high

functioning, using scores from the ADI-R or another autism diagnostic tool. This would allow for a better understanding of how the constructs look among different subgroups of autism and in what areas deficits may be more, or less, evident.

It should be noted that the SLAQ has not been used before with children with autism. In the present study, the scale was found to be reliable; however, given the heterogeneity of this disorder, this measure may not be appropriate for all children with autism. Future research using this scale for children with autism should consider potential confounds that may exist in parent-reported child school liking. For example, on the one hand, it is possible that parents of children with autism are more involved in the classroom and may have greater first-hand knowledge of children's school engagement (both positive and negative) than parents of typically-developing children. Another possibility, however, is that because children with autism have social deficits, they may not be interested in sharing information about things that happen at school (either negative or positive) affecting the validity of relying on their spontaneous reports of school liking and avoidance. Further investigation using this measure is important to ensure the measure is appropriate for children with autism and to specify the level of functioning necessary for reliable results. Additionally, it would be interesting for future research to use the SLAQ to supplement classroom observations and academic performance data. Having a researcher in the classroom to observe and

code the behavior of every child, in addition to having a completed SLAQ for each child, would allow for analyses of the relation between children's observed behavior, academic performance, and school liking. Such a multi-method approach may allow for a better understanding of what may be occurring in the classroom, which can inform the creation of future classroom interventions.

Autism affects males four times more than females (Barclay, 2002).

Understanding gender differences in autism is difficult given that females are diagnosed with autism less often than males, and females with autism often have lower IQs and more severe diagnoses (Volkmar, Szatmari, & Sparrow, 1993). Thus, it was difficult to find females for the present study that could be matched to typical peers on expressive and receptive language skills. In addition, matching on gender is important because of gender differences in the classroom. Previous research on typically-developing children has shown that girls differ from boys in classroom behavior, which has been associated with peer acceptance (Ladd et al., 1999), and during the late elementary school years, girls rated themselves higher in school liking and EC than boys (Valiente et al., 2007). Additionally, gender differences have been found in compliance, with girls demonstrating more compliant behavior than boys (Kuczynski, Kochanska, Radke-Yarrow, & Girnius-Brown, 1987). In terms of temperament, results of a meta-analysis revealed gender differences have been shown with girls having higher levels of EC than boys and gender differences on Surgency favoring boys (Else-quest, Hyde,

Goldsmith, & Van Hulle, 2006). However, no significant gender differences were evident for Negative Affectivity. Future research that included a proportionate amount of girls would allow for investigation of gender differences, which was not possible in the present study given the small sample size. Additionally, the level of functioning for both the males and females in the study should be similar, allowing for any differences to be attributed to gender and not IQ or severity. Given that girls with autism are more cognitively delayed, it would be necessary to have all children be high functioning as children who are low-functioning most likely have difficulties with daily living skills and investigating compliance and school liking would not be developmentally appropriate. Ideally, the study would include an appropriate ratio of 4:1 for males to females and to have a moderate effect size (.5) would include 218 males and 54 females.

The sample in the present study included only four fathers. Although previous research has shown that mothers and fathers often demonstrate similar behaviors, differences between their styles have been reported, and these differences may be a function of their child's developmental functioning (Giralonetto & Tannock, 1994; Konstantareas, Mandel, & Homatidis, 1988). For example, mothers and fathers were equally responsive during interactions to children with developmental disabilities; however fathers used more topic control than mothers (Giralonetto & Tannock, 1994). Another study found that fathers used similar sentence lengths with children, regardless of level of functioning, and

used more direct commands, more prompts, and fewer suggestions than mothers (Konstantareas et al., 1988). In the present study, differences in parent verbalizations between mothers and fathers could not be examined because of the small number of fathers in the study. Future research should include observations of both parents, during the same task, allowing for examination of differences in parent verbalizations and child compliance, for children at varying levels of the autism spectrum.

In order to have a better understanding of the relations among compliance, temperament, and school liking in a school context, examination of compliance within a school setting is necessary. Children may demonstrate different levels of compliance to teachers than parents, and these differences were not addressed in the present study, as only compliance to a parent was examined. The types of relationship a child and teacher have may be different than between a parent and a child, which may result in different interactions (Howes & Olenick, 1986). Additionally, a school setting requires that children follow instructions not directed towards them, or a child may be singled out to comply in a large group, both of which may be very different from situations and compliance techniques the child has previously experienced with parents. There are also other children in classrooms that may influence the target child's behavior. The child may choose to comply or not comply with a request because of how peers may perceive the compliance or comments made by the peers. Additionally, children

with autism have social deficits that may impede their ability to understand sarcasm or jokes, and they may misconstrue these comments as genuine and viable suggestions. Future research that investigates compliance directly in the classroom through teacher report and child observation may provide more information about school engagement in the classroom.

Although not a specific limitation, little research has used the CBQ to measure temperament in children with autism (Konstantareas & Stewart, 2006). Additional research on this measure of temperament in children with autism may provide more information about variability in temperament across the autism spectrum. Future research that incorporates the above suggestions may allow for a better understanding of the differences between typically-developing children and children with autism, and how to apply this knowledge to the types of interventions and development of skills necessary for children with autism to flourish in different environments.

Conclusion

The primary goals of the present study were to examine the processes of compliance, temperament and school liking in children with autism and typically-developing peers. In terms of compliance, an interesting finding that may guide future research was that children who demonstrated more compliance had higher school liking scores. Future research that focuses on not only parental compliance but school compliance may help to further explain factors related to

children's feelings about school and may help in the development of interventions that target school engagement. Children with autism were rated as having significantly lower EC than their typical peers, and those children who had higher levels of EC reported higher school liking scores. Given these findings, future research that focuses on the development of regulation and attention skills may help children learn how to use these skills in the classroom and increase school engagement. To help these children with skills related to EC, interventions that focus on self-regulation, such as SCERTS, or on self-control techniques and problem solving skills, such as PATHS, should be implemented with high functioning children with autism who are transitioning to a general education setting.

Finally, the present study was the first to examine school liking in children with high functioning autism. Children with autism were reported to have significantly lower school liking scores than their typical peers. To promote school liking among high functioning children with autism, it may be necessary to help children with autism learn strategies that help with transition to a new environment and skills that can promote attention and appropriate behavior in the classroom. In addition, peer interventions could be utilized to help these children learn social skills in a peer setting, which may result in less exclusion based on inappropriate behavior in the classroom.

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Table 1

Developmental characteristics

<i>Developmental Characteristics (Months)</i>	Children with autism			Typically-developing children		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
Chronological Age	58.95	11.50	40 – 77	50.20	11.12	33 – 78
Mental Age	57.79	16.80	32 – 94	52.95	13.66	29 – 86
Receptive Language Age	60.20	13.53	39 – 81	58.05	11.63	45 – 81
Expressive Language Age	56.70	12.36	32 – 83	58.05	12.01	37 – 81

Table 2

Child compliance coded in clean-up task

Child behavior	Description of behavior	Kappa
Committed compliance	Internalized, wholehearted behavioral compliance to clean-up	.82
Situational compliance	Receptive to clean-up task but not fully internalized	.85
Passive noncompliance	Non-receptive to maternal agenda, continues to play with toys	.93
Self assertion	Overtly refuses maternal agenda without negative affect	.96
Defiance	Defying or rejecting maternal agenda accompanied by anger	1.0
Negotiation	Attempt to reach a new agreement, compromise, or explanation	.82
Unengaged	Child is completely unengaged from the clean-up task	.98

Table 3

Parent behavior coded in clean-up task

Parent behavior	Description of behavior	Kappa
No verbal component	No verbalization during interval	.99
Unclear command	Unclearly states command without overt specification of action	.91
Direct command	Explicit statement specifying desired action	.92
Indirect command	Polite request or suggestion	.85
Reprimand	Verbalization that implies the child is not following directions	1.0
Positive incentive	Verbal, positive evaluation of child's behavior	1.0
Reasoning	Explanation justifying maternal agenda	.94
Alternative/distraction	Verbal redirect of child's attention	1.0
Bargaining	Attempt to make a deal, negotiation	1.0
Other verbalization	Anything that is not related to the clean-up task	.89

Table 4

Correlations among measures

	Expressive language	Receptive language	Mental age	Surgency	Negative Affectivity	Effortful Control	School liking	Compliance
Expressive language								
Receptive language	.89**							
Mental age	.68**	.76**						
Surgency	.09	.02	-.11					
Negative Affectivity	.23	.19	.17	.29				
Effortful Control	.30	.15	-.04	-.15	-.01			
School liking	-.18	-.24	-.34*	.13	-.31	.41*		
Compliance	.22	.15	.14	.25	.13	.30	.28	

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

Table 5

Descriptive analyses for children's compliance

	Entire Sample		Typical		Autism	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Committed compliance	0.50	0.26	0.49	0.27	0.5	0.25
Situational compliance	0.16	0.15	0.12	0.12	0.2	0.16
Passive noncompliance	0.26	0.19	0.25	0.25	0.26	0.17
Self assertion	0.03	0.09	0.04	0.04	0.01	0.04
Defiance	0.01	0.04	0.01	0.01	0	0
Negotiation	0.08	0.08	0.09	0.09	0.07	0.09
Unengaged	0.01	0.02	0.01	0.01	0.01	0.03

Table 6

Descriptive analyses for parent behaviors

	Entire Sample		Typical		Autism	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
No verbal component	0.30	0.25	0.22	0.24	0.39	0.23
Unclear command	0.15	0.17	0.14	0.18	0.16	0.16
Direct command	0.17	0.19	0.17	0.19	0.16	0.18
Indirect command	0.19	0.16	0.22	0.13	0.15	0.18
Reprimand	0.01	0.03	0.02	0.04	0.01	0.01
Positive incentive	0.13	0.13	0.14	0.14	0.11	0.12
Reasoning	0.06	0.07	0.07	0.08	0.05	0.06
Alternative/distraction	0	0	0	0	0	0
Bargaining	0.01	0.02	0.02	0.03	0.01	0.01
Other verbalization	0.28	0.21	0.33	0.21	0.23	0.20

Table 7

Temperament group differences

Temperament Scales	Autism		Typical		<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Negative Affectivity	2.42	0.79	2.57	0.96	0.89	0.61
Surgency	2.40	1.00	2.13	0.8	0.27	0.35
Effortful Control	4.29	0.65	5.23	0.39	41.55	0.01
Impulsivity	4.46	0.24	3.84	0.24	3.74	0.08

Figure 1.

Mediation Model: Temperament, Compliance, School Liking

