THE MODERATING EFFECTS OF COMORBID ANXIETY DISORDER AND PROBLEM BEHAVIORS IN INFANTS WITH ASD

by

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The Moderating Effects of Comorbid Anxiety Disorder and Problem Behaviors in Infants with ASD

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List of Abbreviations/Symbols

Attention Deficit Hyperactivity Disorder	ADHD
Autism Spectrum Disorder	ASD
Baby and Infant Screen for Children with autism Traits	BISCUIT
Cumulative Internalizing Score	IS
Pervasive Developmental Disorder	PDD
Pervasive Developmental Disorder- Not Otherwise Specified	PDD-NOS
Self-Injurious Behavior	SIB
Variance Inflation Factor	VIF

Abstract

THE MODERATING EFFECTS OF COMORBID ANXIETY DISORDER AND PROBLEM BEHAVIORS IN INFANTS WITH ASD

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Autism Spectrum Disorders (ASDs) are often accompanied by an array of behavior problems such as self-injurious behavior (SIB), aggression, and stereotypic behavior (Matson et al., 2011). Recent estimates of prevalence rates of comorbid psychiatric disorders in ASD have ranged between approximately 70% to 84% (Gjevik, Eldevik, Fjæran-Granum, & Sponheim, 2011; Simonoff et al., 2008). Many studies have shown associations between the presence of comorbid psychopathology and challenging behaviors in children with ASD (Matson et al., 2011). Of the psychiatric disorders, anxiety disorder is the most commonly found among children (Simonoff et al., 2008). Research suggests comorbid psychiatric disorders may be contributing factors in the wide variability of behaviors seen in individuals with ASD. The majority of studies that examined comorbid psychopathology and problem behavior have focused on adults, adolescents, and older children with ASD. Regression analyses were run on six models to test the moderation effect of anxiety on the relationship between Autism diagnosis severity and challenging behavior (SIB and aggression). Model fit statistics were significant for all six models. The model 3 accounted for the most variance in SIB (7%) and model 6 accounted for the most variance in aggression (38%). While none of the interaction terms in the model were found to be significant, anxiety and avoidance were consistently significant predictors of both SIB and aggression in all 6 models. Cronbach's alpha was also used to test the internal reliability of the BISCUIT and each subscale as well as the whole measure had high levels of internal reliability (alpha values between .724 and .967).

Chapter 1: Introduction

1.1 Background of the study

Every year, the prevalence estimates of Autism Spectrum Disorders (ASD) are rising. Currently the Center for Disease control statistics show prevalence rates of 1 in 88 children meet a diagnosis for an ASD and it's onset is anywhere between birth and three years ("CDC - Data and Statistics, Autism Spectrum Disorders -NCBDDD," n.d.). Research has also shown that children and adults with autism are more likely to be diagnosed with a comorbid psychiatric condition than the typically developing population. Of these psychiatric disorders, anxiety disorder is the most commonly found among children and studies have found prevalence rates of psychiatric disorders between 70%-84.1% among individuals with an ASD (Gjevik, Eldevik, Fjæran-Granum, & Sponheim, 2011; MacNeil, Lopes, & Minnes, 2009; Simonoff et al., 2008).

ASD's are typically accompanied by an array of challenging behaviors such as self-injurious behavior (SIB), aggression, and stereotypic behavior (Matson et al., 2011). Since there is commonly a co-occurrence of both challenging behaviors and anxiety disorders in children with ASD (Fodstad, Rojahn, & Matson, 2010), it seems essential to investigate the relationship that anxiety disorders have on problem behaviors. Some researchers have suggested that these comorbid psychiatric disorders are contributing

factors in the wide variability of behaviors and severity that is seen in individuals with ASD (Gjevik et al., 2011).

The majority of studies regarding comorbid psychiatric disorders and challenging behaviors in ASD has been focused on adults, adolescents, and older children and there is a shortage of research in infants and toddlers. This is particularly important because research has shown that early detection and intervention of comorbid psychiatric disorders is essential in prognosis and overall functioning of children with ASD. Typically, the earlier the intervention is put in place, the better the prognosis and quality of life for the child and their family (Matson et al., 2011). Despite the large body of literature that supports high prevalence rates of comorbid psychopathology in individuals with ASD the concern remains that they are under-diagnosed in individuals with developmental disabilities in general and in ASD in specific (Gjevik et al., 2011; MacNeil et al., 2009; Rojahn & Matson, 2010; Simonoff et al., 2008; Spence, 1998).

As mentioned earlier, Simonoff et al. (2008) estimated the prevalence of comorbid psychiatric disorders in children with autism and other pervasive Developmental Disorders (PDD) to be 70.8%. Social anxiety was the most commonly found disorder (29.2%). There was an overall prevalence rate of 41.9% of anxiety disorders in the ASD population. Gjevik et al. (2011) found that among the 72% of children with ASD with at least one comorbid disorder, 42% had some form of anxiety disorders; 31% of them were specific phobias, and 7% presented with social phobia.

Both of these studies as well as others showed prevalence rates of comorbidity in children with ASD that are much higher than the typically developing child population

(Davis, Hess, Matthews, et al., 2011; Gjevik et al., 2011; MacNeil et al., 2009; Matson et al., 2011; Simonoff et al., 2008). Gjevik et al. (2011) and Simonoff et al. (2008) identified the two most common psychiatric disorders, anxiety and Attention Deficit Hyperactivity Disorder (ADHD), which are also the two most common childhood disorders in the typically developing population (Davis, Hess, Matthews, et al., 2011). These results indicate that while specific childhood psychiatric disorders are distributed the same way in both ASD and non-ASD populations (The two most common disorders are ADHD and anxiety), having an ASD increases vulnerability of developing a psychiatric disorder. (Gjevik et al., 2011; Simonoff et al., 2008).

Davis, Hess, Moree, et al. (2011) investigated trends in anxiety symptoms across the lifespan. Anxiety symptoms and severity seem to increase in toddlerhood and then peak in childhood in children with ASD. After this peak the development of anxiety symptoms follows a more typical, although slower, developmental trajectory as seen in typical children with anxiety disorders, creating a cubic trend. This means that anxiety symptoms develop alongside cognitive development and abstract thought. They found that symptoms of anxiety were the most pronounced in toddlerhood and early childhood compared to the adult and young adult groups. The authors speculate that this is due to developmental delays in inhibition and emotional regulation, which can affect how children with ASD control anxiety. They also found higher rates of "sudden, rapid, repetitive movements not associated with a physical disability" (Davis, Hess, Moree, et al., 2011, p. 115) in children with ASD, which may be a coping strategy used to soothe the internal effects of anxiety in the absence of more appropriate coping skills (Davis,

Hess, Moree, et al., 2011). The significance of this potential pattern is that it indicates a temporal importance in identifying toddlers with symptoms before the peak in childhood, emphasizing the need for early identification.

Kim et al. (2000) found that children with Asperger 's Syndrome and high functioning autism had significantly higher scores of generalized anxiety, separation anxiety, and what they referred to as a cumulative internalizing score (IS) than the typically developing community sample. The IS represented all of the anxiety related measures in the battery that was used for assessment (Kim et al., 2000). They also found a strong correlation between behavioral problems and anxiety. Children with high scores on the measures of anxiety also displayed higher levels of aggression and oppositional disorder. Anxiety was also associated with poor social relationships among teachers, peers, and parents, as well as limitations on parental adaptation (Kim et al., 2000).

Many studies have also shown a link between the presence of comorbid psychopathology and challenging behaviors in children with ASD and Pervasive Developmental Disorder- Not Otherwise Specified (PDD-NOS) (Groden, 2006; Kim et al., 2000; Matson et al., 2011). Research suggests that SIB in children with an ASD may be a manifestation of anxiety, which they engage in possibly as a coping mechanism for internal stress. There is also the assumption that one of the characteristics of ASD is an increased sensitivity to anxiety provoking events, which in turn increases rates of SIB and Stereotypic behavior (Groden, 2006; Matson et al., 2011). Studies looking at infants with ASD have also found that the level and severity of comorbidity is correlated to the severity of many challenging behaviors (Matson et al., 2011). In particular, Matson et al.

(2011) found that when controlling for age, levels of Anxiety/repetitive Behavior had a significant effect on challenging behaviors. They also found significant differences in levels of stereotypic behavior between groups of infants with no or minimal impairment and moderate to severe impairment.

1.2 Need for Study

Anxiety has been associated with many problem behaviors, lack of adaptation, and lower functioning for both children with ASD and their parents. If challenging behaviors are indeed maintained by being negatively reinforced by reduction of emotional distress, treating the comorbid psychopathology first would be the rational first step in reducing both the problem behaviors and the comorbid psychopathology.

More research is needed to examine the effects of anxiety disorders on challenging behaviors in infants with an ASD. Specifically, the current study will look at anxiety as a moderating variable between Autism and challenging behaviors (i.e., SIB and aggression). The current literature on challenging behavior presents the presence of Anxiety symptomology as a theoretical explanation for the wide variability of severity and frequency of problem behaviors in children with ASD. My aim is to discover if anxiety interacts in some systematic way with ASD symptoms to predict levels and severity of challenging behaviors (Davis et al., 2011). If the presence of anxiety symptoms is in fact an underlying moderator of problem behaviors, then it is reasonable to say that a focus on specific interventions for anxiety symptoms would be beneficial in potentially reducing problem behaviors and increasing quality of life in children who have ASD.

1.3 Research Questions/Objectives

The purpose of this study is to examine the relationship between anxiety and the severity of SIB and Aggression, specifically addressing the following research questions:

- Do symptoms of anxiety (as represented by the Anxiety/Repetitive Behavior subscale of the BISCUIT 2) moderate the predicted relationship between autism diagnosis severity and the severity of aggression?
- 2. Do symptoms of anxiety (as represented by the BISCUIT 2Avoidance behavior subscale) moderate the predicted relationship between autism diagnosis severity and the severity of aggression?
- 3. Do symptoms of anxiety (as represented by the Anxiety/Repetitive Behavior subscale of the BISCUIT 2) moderate the predicted relationship between autism diagnosis severity and the severity of SIB?
- 4. Do symptoms of anxiety (as represented by the BISCUIT 2Avoidance behavior in the form of avoidance subscale) moderate the predicted relationship between autism diagnosis severity and the severity of aggression?
- 5. Does a full model including both avoidance and repetitive behavior serve as a better predictor of SIB?
- 6. Does a full model including both avoidance and repetitive behavior serve as a better predictor of aggression?
- 7. A secondary aim of the study is to further establish the reliability of the the Baby and Infant Screen for Children with aUtIsm Traits (BISCUIT; (Matson, Wilkins,

& Fodstad, 2011), the measure used in this study, by looking at the internal consistency of our sample.

Chapter 2: Method

2.1 Participants and Procedures

The participants were from a sample of children who are currently enrolled in Louisiana's Early Steps Program (Matson et al., 2011). This is a state funded program that provides services for children who have been identified with a developmental delay or a medical condition that is likely to cause a delay. The toddlers in the sample are between 17 and 37 months and the mean age was 27 months (SD =4.89). other demographic information can be found in Table 1.

Participants for the analysis were selected for the study if they met two requirements: (1) a score on the BISCUIT part 1 measuring between 35 and 124 which is consistent with the measures definition of Probable ASD/Autistic disorder and (2) a clinical diagnosis of an ASD/Autistic disorder based on the clinical observation conducted during the data collection. Cases were selected from the larger sample size to be included for the analysis. In order to be included in the analysis, the participant had to have received a diagnosis from a licensed clinical psychologist. Based on their diagnosis, participants were classified into one of four groups: Autism, PDD-NOS, No diagnosis with atypical development, or true control (*see Table 2*). Only those participants with a clinical diagnosis of Autism were included in the sample. The Autism sample was then further subdivided by diagnostic category (*see Table 3*). The BISCUIT part 1 gives participants a total diagnostic score between 0 and 124. Scores from 0-17 are classified as "No ASD/Atypical development", 18-34 are labeled as "possible ASD/PDD-NOS", and scores of 35-124 are Probable ASD/Autistic disorder. There were 406 children with score of 35-121 on Part 1 of the BISCUIT. Of these, 294 children were given a clinical diagnosis of autism from a licensed psychologist (Dr. Matson). Of these 294, 25 were also given a clinical diagnosis of autism from a second clinician involved in the study (Dr. Davis). 235 of the 294 individuals have scores for all the subscales of interest (*see Table 2*)

2.2 Instrument

2.2.1 Baby and Infant Screen for Children with aUtIsm Traits (BISCUIT The BISCUIT is a 3-part Child and parent questionnaire comprehensive assessment that is designed to measure comorbid psychiatric symptoms, behavior problems, and ASD symptoms in infants and babies (ages 17-37 months). BISCUIT Part-1 is a 62-item, 3-point Likert scale measure that identifies autism symptoms by comparing the child's development to that of a typical child's. The BISCUIT part 1 has established strong construct and divergent validity through a series of correlational analysis as well as high sensitivity and specificity, 93.4 and 86.6 respectively (Matson et al., 2011, 2011; Matson, Wilkins, Sharp, et al., 2009). BISCUIT Part-2 is a 65-item measure that assess psychiatric symptomology characteristic of the following disorders: Conduct Disorder, Attention Deficit/hyperactivity Disorder, Tic Disorder, Obsessive Compulsive Disorder, Specific Phobia, and eating difficulties. The BISCUIT Part-2 items are divided into five factors (Tantrum/Conduct Behavior, Inattention/Impulsivity,

Avoidance Behavior, Anxiety/Repetitive Behavior, and Eating/Sleep Problem) based on factor analysis. The two that will be examined in this study are the Anxiety/Repetitive Behavior and the Avoidance Behavior factors. BISCUIT Part-3 is a 17-item measure that rates the severity of aggressive, disruptive, self-injurious, and stereotypic behaviors. All three parts of the BISCUIT have internal reliability coefficients of 0.91 or higher (Matsonet al., 2009). The Anxiety/repetitive behavior symptom subscale is made up mostly of questions pertaining to repetitive behavior so from the purposes of this study, it will be referred to as repetitive behavior. The construct of Anxiety in the context of the thesis will be the combination of the avoidance and repetitive behavior subscales.

Chapter 3: Results

3.1 Data Characteristics

The data were analyzed using the SPSS software PASW Statistics v. 18.0 unless otherwise stated.

3.1.1. Mean Centering. To account for potential multicollinearity between the avoidance and anxiety subscales, the subscale values were grand mean centered in order to standardize the values. This was done by computing the mean for the subscale scores and then subtracting it from the individual subscale scores in each case. A total of 5 subscales were mean centered for the purposes of analysis: SIB, aggression, Diagnosis, anxiety, and avoidance. The means and standard deviations that were used to calculate the mean centered variables can be found in Table 4.

3.1.2. Interaction terms. Interaction terms were created manually in SPSS by multiplying the mean centered diagnosis variable and the moderating variable. The first interaction term was created by multiplying the diagnosis variable and the anxiety subscale score. The second interaction term included the diagnosis score and the avoidance subscale score. A third interaction term was created between the avoidance and anxiety predictors that was used only in the full models (Models 3 and 6).

3.1.3. BISCUIT Subscale Scores. Subscale scores were computed by adding the item level scores in accordance with the BISCUIT factor structure. The anxiety subscale

is made up of items #4, 9, 18, 27, 39, 36, 41, 45, 46, 51, and 54 of Part 2. The avoidance subscale is made up of items #3, 8, 13, 15, 24, 29, 33, 36, and 40 in Part 2. The SIB subscale consists of items # 1 and 2 in Part 3. The aggressive/destructive behavior subscale includes Part 3 items #3, 4, and 6-13. For each participant, all of the item scores were added up to create a subscale score, which was then used in the analysis. Descriptive statistics of each subscale can be found in table 4 and correlations between these subscales scores can be found in Table 5.

3.1.4. Missing Values. The data was checked for missing cases to make sure all the measures are complete. A total of 59 cases with missing data were be excluded casewise and the final sample wise was n = 235.

3.2 Multiple Regression Analysis – Moderation analysis

A total of six regression analyses were conducted. In each regression I conducted a multiple regression analysis where anxiety symptoms were a moderating variable in the model, and the severity of behavior was the outcome. Two predictors of anxiety were included in the analyses (1) the Anxiety/repetitive behavior symptom subscale items of the BISCUIT part 2 and (2) Avoidance symptom subscale of the BISCUIT part 2. In each model the main effect was autism diagnosis as a predictor of SIB or aggression and the interaction was Anxiety and Autism. This analysis was conducted to see if the additive effect of Autism and Anxiety is more influential on SIB than either of the main effects alone. The BISCUIT 2 subscales Avoidance Behavior and Repetitive Behavior, and the diagnostic score from BISCUIT 1 were used as the dependent variables in a linear regression with moderation to predict Aggressive

Behavior and SIB. Three models were proposed for each outcome variable (*see Tables 7 and 8*). All six Models had significant Fit statistics with *p* values between .000 and .024 (*see Table 6*). No interaction terms were found to be significant predictors of either Aggressive Behavior or SIB (*see Tables 7 and 8*).

3.2.1. Partial Models.

Models 1, 2, and 3 predicted my SIB outcome (*see Table 7*). Model 1 had two main effects of anxiety symptoms and level of diagnosis, and one interaction between diagnosis and anxiety predicting SIB. In Model 1 the only significant predictor of SIB was the main effect of anxiety (t=3.8, p<.001). Model 2 had two main effects of avoidance and level of diagnosis, and one interaction between diagnosis and avoidance predicting SIB. The only significant predictor in model 2 was the main effect of avoidance (t=2.36, p<.05).

An additional three models (*see Table 8*) predicted aggressive behavior (Models 4, 5, and 6). Model 4 had two main effects of anxiety symptoms and level of diagnosis, and one interaction between diagnosis and anxiety predicting aggression. The only significant predictor of SIB in model 4 was the main effect of anxiety (t=9.66, p<.001). Model 5 had two main effects of avoidance and level of diagnosis, and one interaction between diagnosis and avoidance predicting aggression. Both of the main effects of avoidance (t=4.25, p<.001) and diagnosis (t=2.69, p<.01) were found to be significant in model 5, however the interaction term was not. The main effect of the avoidance subscale was a significant predictor in Models 2 and 5. The diagnostic criteria were a significant predictor of aggressive behavior in Model 5.

3.2.2. Full Model. Model 3 predicted SIB and had three main effects: Anxiety, avoidance, and diagnosis as well as 3 three interaction terms: diagnosis*anxiety, diagnosis*avoidance, and avoidance*anxiety. The only significant predictor of model 3 was the main effect of anxiety (t=.29, p<.01). Model 6 predicted aggressive behavior and had three main effects: Anxiety, avoidance, and diagnosis as well as 3 three interaction terms: diagnosis*anxiety. The only significant predictor of model 3 significant predictor of model 3 was the main effects of anxiety.

The full models (3 and 6) including diagnosis, avoidance behavior, and repetitive behavior explained the most variance in both Aggressive Behavior ($R^2 = .385$) and SIB ($R^2 = .077$) compared to any of the partial models. However, model 1 explained a similar amount of variance in SIB ($R^2 = .076$) as did the full model. The main effect of the avoidance subscale was a significant predictor in Models 2 and 5. The diagnostic criteria were a significant predictor of aggressive behavior in Model 5.

3.2.3. Variance Inflation Factor (VIF). In model 3 there are four terms with higher VIFs; the Main effect of anxiety (VIF = 2.5), the main effect of the Avoidance subscale (VIF = 2.3), the interaction between diagnosis and anxiety (VIF = 2.2), and the interaction between diagnosis and avoidance (VIF = 2). Similarly, model 6 contains two instances of high VIFs: the main effect anxiety (VIF = 2.5), and the main effect of avoidance (VIF = 2.4). The complete list of VIFs for all variables can be found in Tables 6 and 7.

3.3 Reliability

3.3.1 Internal Consistency. Cronbach's alpha coefficients (Cronbach, 1951) were found for each subscale of the BISCUIT as well as for the whole measure (*see Table 9*). A total of 6 reliability analyses were run. The whole measure had a Cronbach's alpha of 0.98, indicating high internal consistency for the BPI as a whole. Subsequent analyses were conducted to assess the internal consistency of the diagnostic Part 1 (α = .967), comorbidty part 2 (α = .956), and problem behavior part 3 (α = .895) of the BISCUIT again indicating high internal consistency. Additional analyses were run to assess the reliability of the avoidance and anxiety subscale in part 2 of the BISCUIT. The avoidance subscale and the anxiety subscale had Cronbach's alpha's of 0.746 and .724, respectively. These amounts of internal consistency could be considered low but they are acceptable because of the low number of items within each subscale.

Chapter 4: Discussion

4.1 Multiple Regression Analysis – Moderation Analysis

4.1.1. Partial and Full models. Model 6 accounted for the most variance (39%) in the aggression outcome. However, this model provides an insufficient representation of my data because the only significant predictor of SIB was the main effect for anxiety. In contrast, model 5 only explained 14% of the variance aggression, but we did find a main effect for both of the anxiety constructs (avoidance and anxiety). A future direction would be to compare these models using chi-square fit statistics. The hypotheses of this study were not supported because none of the interaction terms in any of the models were found to be significant. Based on this analysis we can suggest that symptoms of anxiety do not moderate the relationship between the severity of diagnosis and aggression in an autism population.

Model 3 accounted for the most variance (7%) in the SIB outcome. In general, this model also provides an insufficient representation of the data because the only significant predictor of aggression was the main effect for anxiety. However, none of the three models used to predict SIB had more than one significant predictor so relatively; model 3 is the most representative in this study. My hypothesis was not supported because none of the interaction terms in any of the three models were found to be significant and very little variance was explained by the predictors. Based on the current study we find that

symptoms of anxiety do not moderate the relationship between the severity of diagnosis and SIB in an autism population. The findings probably are most likely influenced by the structure of the measure. The BISCUIT SIB subscale only contains 2 items, which could significantly under power the analysis. In the future, a more representative assessment of SIB should be used in a similar model. In this case, we found little to no evidence that the models are predictive of SIB.

4.1.2. Variance Inflation Figures. The VIF describes how much variance of an estimated regression coefficient is increased because of multicollinearity and the square root of the VIF tells us what the standard error would be if that predictor were not correlated to any other predictors in the model. In the cases in models 3 and 6 we found no significant results and then also higher VIF statistics, which could mean that multicolinearity was a factor in the lack of significance. In model 3 the main effect of the Avoidance subscale, the interaction between diagnosis and anxiety, and the interaction between diagnosis and avoidance could be compromised by the levels of multicolinearity. The same could be true for the main effect of avoidance in model 6 that was found to be insignificant.

4.1.3. Limitations and future directions. The main limitation of my findings is that only cases with a diagnostic total above 35 were included in the analysis. Participants in the diagnostic range of 35-124 were considered to have Probable ASD/Autistic disorder. Limiting the sample restricted the range of variance in the sample and a clear future direction would be to widen the sample to include all three diagnostic categories (No ASD/Atypical development, possible ASD/PDD-NOS, and Probable ASD/Autistic disorder).

Another major limitation is the ability to truly assess the levels of anxiety and other comorbid symptomology in such a young age range. While there was clinical observation of all the infants, the parents or caretakers completed the rating scale and we must also be cautious about the inferences we make from these secondary data collection methods. In the future trained raters should be used to complete the BISCUIT.

In addition, work needs to be done concerning the construct validity involved in the BISCUIT. It would be beneficial to know how well the items that are included in the measure are actually measuring the construct of anxiety in an infant population potentially using Latent variable analysis and longitudinal methods.

While multicolinearity was addressed by mean centering the variables, the correlations between the mean centered subscales (*table 5*) and the high VIF scores in the full models (*tables 7 and 8*) suggest that there is still a component of multicolinearity that may have affected the results. In conclusion, we found no support for my hypothesis that symptoms of anxiety moderate the relationship between ASD severity and the severity of aggression.

4.2 Reliability

4.2.1 Internal Consistency. The internal consistency of the whole measure, each Part, and the 2 subscales of interest (anxiety and avoidance) were all found to have internal validity. While Cronbach's alpha for the anxiety and the avoidance subscales could be considered low, they are in fact relatively high considering the fact that both subscales had fewer items, which under powers the test. The avoidance scale has only 9 items and the anxiety scale has 11. The fact that these subscales have Cronbach's alphas

over .70 adds further evidence to the reliability of the BISCUIT, which was the secondary aim of the study.

		frequency (<i>n</i>)	Mean	SD
Gende	er			
	Male	172		
	Female	63		
Race				
	Black	86		
	White	123		
	Hispanic	4		
	other	10		
Age (1	nonths)	235	27.07	4.89

Descriptive Statistics – ASD Sample N = 235

				Valid	Cumulative
		Frequency	Percent	Percent	Percent
Valid	Autism	349	15.8	15.8	15.8
	PDD-NOS	300	13.6	13.6	29.4
	Atypical				
	development	1539	69.5	69.8	99.2
	True Control	18	0.8	0.8	100
	Total	2206	99.6	100	
Missing	System	8	0.4		
Total		2214	100		

Diagnostic Descriptive Statistics of the Sample

Table 3

Descriptive Statistics – BISCUIT 1 Diagnostic scores

Diagnostic score	Category
0-17	No ASD/Atypical development
18-34	Possible ASD/PDD-NOS
35-124	Probable ASD/Autistic disorder

Subscale	Mean	Std. Deviation
SIB	0.78	1.12
Aggression	5.3	4.9
anxiety	4.8	3.7
avoidance	3.4	3.6
diagnostic		
total	62.3	18.6

Descriptive Statistics - BISCUIT subscales in Autism Sample N = 235

Table 5

Correlations among Subscales (mean centered)

			ASD		
Subscale	SIB	Aggression	Score	Anxiety	Avoidance
SIB	1.00	.44***	.12*	.26	.18*
Aggression	-	1.00	.27***	.61***	.34***
Diagnosis	-	-	1.00	.49	.34***
Anxiety	-	-	-	1.00	.66***
Avoidance	-	-	-	-	1.00

significance at the *p<.05, **p<.01, ***p<.001

			Std.		
Model	F	р	R^2	Error	df
1	6.3***	.000	.08	1.1	3
2	3.2*	.024	.04	1.1	3
3	3.2**	.005	.08	1.1	6
4	45.1***	.000	.37	3.8	3
5	12.6***	.000	.14	4.5	3
6	23.8***	.000	.39	3.8	6

Model fit statistics

significance at the *p<.05, **p<.01, ***p<.001

Parameter Estimates	: Predi	icting	SIB (unstand	ara	lized	b	's)
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Model	Subscale	b	SE	t	р	VIF
1	Main effects					
	Anxiety	.09***	0.02	3.8	.000	1.4
	diagnosis	.00	0.00	0.3	.768	1.4
	Interaction					
	diagnosis/anxiety	00	0.00	-1.6	.106	1.3
2	Main effects					
	Avoidance	.051*	.02	2.4	.019	1.2
	diagnosis	.01	0.00	1.2	.231	1.2
	Interaction					
	diagnosis/avoidance	00	0.00	-1	.317	1.1
3	Main effects					
	Anxiety	.09**	0.03	2.9	.003	2.5
	Avoidance	.00	0.03	0.1	.926	2.3
	diagnosis	.00	0.00	0.3	.793	1.4
	Interactions					
	diagnosis/anxiety	00	0.00	-1.2	.234	2.2
	anxiety/avoidance	00	0.00	-0.4	.663	1.8

significance at the *p<.05, **p<.01, ***p<.001

Model	Subscale	b	SE	t	р	VIF
4	Main effects					
	Anxiety	0.8***	0.08	9.7	0	1.5
	diagnosis	-0.0	0.2	-0.7	0.498	1.4
	Interaction					
	diagnosis/anxiety	0.00	0.0	0.7	0.495	1.3
5	Main effects					
	Avoidance	0.4***	0.09	4.3	0	1.2
	diagnosis	0.05**	0.02	2.7	0.008	1.2
	Interaction					
	diagnosis/avoidance	-0.0	0.0	-0.3	0.749	1.1
6	Main effects					
	Anxiety	0.9***	0.11	8.1	0	2.5
	Avoidance	-0.1	0.11	-0.6	0.583	2.4
	diagnosis	-0.0	0.02	-0.7	0.5	1.4
	Interactions					
	diagnosis/anxiety	0.01	0.0	1	0.297	1.2
	diagnosis/avoidance	-0.00	0.01	-0.1	0.9	1
	anxiety/avoidance	-0.04	0.02	-1.7	0.096	1.8

Parameter Estimates Predicting Aggression (unstandardized b's)

Reliability – Cronbach's alpha

	Cronbach's				
Scale	Alpha				
					N of
		Mean	s^2	sd	Items
Diagnostic items	.97	20.1	437.3	20.9	61
Comorbidity items	.96	12	255.2	15.9	65
Problem behavior items	.90	3.3	28.4	5.3	17
Avoidance	.75	0.96	4.2	2.0	9
Anxiety	.72	1.5	5.9	2.4	11
All Items	.98	34.3	1310.6	36.2	134

Appendix A



Demogra	phic Form		
Date of Assessment:	Name of Assessor:		
Child Information			
Child's Name:	Gender:	Male	Female
Date of Birth:	Age: month	s	Birth weight
Ethnicity:	Height:	Weigh	ıt:
Parental Concers Regarding Development or Behavior:	No Yes	If yes,	at which age noted:
Specify Concerns:		(conti	nue on back if necessary)
<u>Milestones</u> (Specify age in months) Began crawling:	Began walking:	8	
Said first word:	Said first sentence	or phras	se:
Toilet Trained (daytime): Yes (atmonths) No	Toilet Trained (nig	httime)	: Yes (atmonths) No
Medical History Current Diagnoses:			
Medication(s)/Dosage:			
Has the child been previously assessed for autism/ASD?	(if yes please compl	lete the	following page)
		Yes	No
Informant/Family Information			
Informants' Name: Re	lationship to child:		
Number of siblings: Birth order:			
Does the child have a sibling diagnosed with autism/AS	D or suspected of ha	ving au	tism/ASD?
		Yes	No

BISCUIT



BISCUIT Part 1 - Diagnostic

	Rate each item for the extent that it is/was <u>ever</u> a problem. Compare the person to other people his/her age (who live in the community) based on the following:
	0 = Not different; no impairment
	1 = Different; mild impairment
	2 = Very different; severe impairment
	Communication skills.
	2 Intellectual abilities (i.e., as smart as others his/her age).
	3 Age appropriate self-help and adaptive skills (i.e., able to take care of self).
,	4 Engages in repetitive motor movements for no reason (e.g., hand waving, body rocking, head banging, hand flapping).
	5 Verbal communication.
	5 Prefers foods of a certain texture or smell.
	7 Ability to recognize the emotions of others.
;	8 Maintains eye contact.
	Use of language to communicate.
	10 Social interactions with others his/her age.
	11 Reactions to normal, everyday sounds (e.g., vacuum, coffee grinder).
	2 Response to others' social cues.
	13 Reaction to normal, everyday lights (e.g., streetlights, etc.).
	14 Peer relationships.
	15 Rhythm of speaking (e.g., sing-song; If nonverbal, rate "0").
	16 Use of language in conversations with others.
	17 Shares enjoyment, interests, or achievement with others (e.g., parents, friends, caregivers).
	18 Ability to make and keep friends.
	19 Interest in participating in social games, sports, and activities.
	20 Interest in another person's side of the conversation (e.g., talks to people with intention of hearing what others have to say).
	21 Able to understand the subtle cues or gestures of others (e.g., sarcasm, crossing arms to show anger)
	22 Use of too few or too many social gestures.
	23 Body posture and/or gestures.
	24 Communicates effectively (e.g., using words, gestures or sign language).
	25 Likes affection (e.g., praise, hugs).
	26 Displays a range of socially appropriate facial expressions.
;	27 Restricted interests and activities.
;	20 Monvaleu to picase others (e.g., peers, caregivers, parents).
;	22 Eye-to-eye gaze.
<u> </u>	by Reaction to sounds and signis.
;	Awareness of the unwritten or unspoken rules of social play (e.g., turn taking, sharing).
	32 Facial expression corresponds to environmental events.
	35 Sticking to odd routines or rituals that don't have purpose or make a difference.
	34 Plays appropriatly with others.
	35 Plays appropriately with others

TOTAL

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BISCUIT Part 1 - Diagnostic Page 1 of 2

	Rate each item for the extent that it is/was <u>ever</u> a problem. Compare the person to other people his/her age (who live in the community) based on the following: 0 = Not different: no impairment
	1 = Different: mild impairment
	2 = Very different; severe impairment
36	Reads nonverbal cues (body language) of other people (If blind rate "0")
37	Speaks in monotone (e.g. voice is glat does not change in sound: If nonverbal rate "0")
38	Expects others to know their thoughts, experiences, and opinions iwthout communicating them (e.g. expects others to "read his/her mind").
39	Interest in a highly restricted set of activities
40	Talking to others in a social context (If nonverbal, rate "0").
41	Use of facial expression
42	Abnormal fascination with the movement of spinning objects (e.g., closing dorrs, electric fan blades
43	Curiosity with surroundings
44	Saying words and phrases repetitvely (If nonverbal, rate "0").
45	Make-believe or pretend play.
46	Understanding of age appropriate jokes, figures of speech, or sayings.
47	gives subtle cues or gestures when communicating with others (e.g., hinting).
48	Becomes upset if there is a change in routine
49	Needs reassureance, especially if events don't go as planned
50	Language development.
51	Responds to others' distress.
52	Socializes with other children.
53	Use of nonverbal communication.
54	Clumsiness.
55	Limited number of interests.
56	Imitation of an adult or child model (e.g., caregiver waves "bye", then the child waves "bye").
57	Abnormal, repetitive hand or arm movements.
58	Abnormal, repetitive motor movements involving entire body.
59	Development of social relationships.
60	Respect for others' personal space (e.g., stands too close to others).
61	Needs reassureance, especially if events don't go as planned
62	Participation in games or other social activities.
	TOTAL
	Total from page 1
	TOTAL BISCUIT-Part 1 Score (A score of 18 or higher is in the "at risk" range)

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BISCUIT-Part 1

Baby and Infant Screen for Children with aUtIsm Traits -Part 1

Name:

119-121 116-118 113-115 110-112 107-109 104-106 101-103 98-100 95-97 92-94 89-91 86-88 83-85 80-82 77-79 74-76 71-73 68-70 65-67 62-64 59-61 56-58 53-55 50-52 47-49 44-46 41-43 39-41 35-38	Probable ASD/Autistic Disorder
33-34 30-32 27-29 24-26 21-23 18-20	Possible ASD/PDD-NOS
15-17 12-14 9-11 6-8 3-5 0-2	No ASD/Atypical Development

Date:
ID #:
Age: Gender:
Ethicity:
Informant:
Additional Notes:
Total:
FOR ADDITIONAL TEST KITS/INFORMATION:

FOR ADDITIONAL TEST KITS/INFORMATION: JOHNNY MATSON, Ph.D. 3333 WOODLAND RIDGE BLVD. BATON ROUGE, LA 70816 (225) 752-5924 ; EMAIL: JOHNMATSON@AOL.COM

	B	aby and
	Ι	nfant
	S	creen for
	C	hildren with
a	U	t-
	Ι	sm
	Τ	raits
		Part 2
		Johnny L. Matson, Ph.D., Jessica Boisjoli, M.A., & Jonathan Wilkins, M.A. © Disability Consultants, LLC www.disabilityconsultants.org

BISCUIT Part 2 - Comorbidity Page 1 of 2

BISCUIT Part 2 - Comorbidity

	Rate each item for the extent that it is a <u>recent</u> problem:
	0 = Not a problem or impairment; not at all
	1 = Mild problem or impairment
	2 = Severe problem or impairment
	X = Does not apply or don't know
1	Easily becomes upset.
2	Concentration problems.
3	Unreasonable fear of approaching or touching specific objects, people, or animals.
4	Repetition of actions or words to reduce stress.
5	Restless.
6	Interrupts the activities of others.
7	Has difficulty making decisions.
8	Fear of being around others in school, at home, or in social situations.
9	Sudden, rapid, repetitive movements or vocalizations that are not associated with a physical disability (such as cerebral palsy).
10	Crying.
11	Runs and climbs more than others his/her age.
12	Will eat only certain foods (If due to allergies or special diet, rate "X").
13	Persistent fear that is not age appropriate.
_14	Destroys others' property.
15	Presentation of a specific object or situation results in loss of control, panic, or fainting.
16	Always "on-the-go."
17	Intrudes upon the activities of others.
18	Engages in repetitive behaviors (e.g., ordering objects, handwringing, handwashing, etc.) for no apparent
	reason or to reduce stress.
19	Compliance with demands.
20	Has a poor appetite.
21	Distracted by objects or people in the environment.
22	Spiteful, vindictive, revengeful, or wanting to get back at others.
_23	Eats too little.
_24	Withdraws or removes him/her self from social situations.
_25	Has trouble sleeping.
_26	Damages property.
27	Groups of sudden, rapid, repetitive movements or vocalizations occurring together in a chain or cluster
- 20	(i.e., tics).
-28	Loses belongings (e.g., books, toys).
-29	Avoids specific situations, people, or events.
-30	Ordering of objects for no apparent reason or to reduce stress.
_31	Sustaining attention in tasks or play activities.
32	Tearful or weepy.
33	Avoids specific objects, persons, or situations causing interference with his/her normal routine.
34	Avoids activities that require sutained mental effort.
35	Finished assigned tasks (e.g., schoolwork, chores, or duties).
36	Trembles or shakes in the presence of specific objects of situations.

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BISCUIT Part 2 - Comorbidity Page 2 of 2

Rate each item for the extent that it is a recent problem:

- 0 = Not a problem or impairment; not at all
- 1 = Mild problem or impairment
- 2 = Severe problem or impairment
- X = Does not apply or don't know
- 37 Delibrately annoys others.
 - 38 Engages in behaviors the impair daily routine or activities.
- 39 Easily becomes angry.
- 40 Exposure to specific boject/situations provokes immediate distress that is not age appropriate.
- 41 Checking on play objects excessively.
 - 42 Physically cruel to people or animals.
- 43 Tantrums.
 - 44 Fidgets or squirms.
 - 45 Perisitent or recurring impusles the interfere with activities (e.g., impusle to shout).
 - 46 Engages in repetitive mental acts (e.g., praying, coutning) for no apparent reason.
- 47 Listens when spoken to directly.
 - 48 Eats things that are not meant to be eaten (e.g., pain chips, dirt, hair, cloth, etc.).
 - 49 Bullies, threatens, or intimidates others.
- 50 Irritable mood.
 - 51 Has difficulty organizing tasks, activities, and belongings.
 - 52 Noisy while playing.
- 53 Waits for his/her turn.
 - 54 Sudden, rapid, repetitive movement or vocalization that occurs for no apparent reason.
- 55 Has poor concentration.
- 56 Initiates fights.
 - 57 Talks excessively.

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BISCUIT-Part 2				Name:			_ Today's Date:	
Babv and Infant Screen for Children with aUtIsm Traits -Part 2			Age:	Gen		Ethnicity:		
38	34	18	22	Vieres)	8		A delitioned Materia	
36	32		20				Additional Notes.	
34	32	16	18	1026533				
32	30		16					
30	28	14	14	103532				
28	26			12.202	6		44	
26	24	12	12	0.5358				
24	22							
22	20	10	10	Constant)				
20	18				1.0			
18	16	8	8	12-12-22	4			
16								
14	14							
12	12	6	6		1			
10	10			141111	20			
8	8	4	4	201010	2			
6	6				1			
4	4	2	2	Manager Street				
2	2							
0	0	0	0		0			
Tantrum/ Conduct Behavior	Inattention/ Impulsivity	Avoidance Behavior	Anxiety/ Repetitive Behavior		Eating/ Sleep Problem			
1	2.	3	4		12			
6	5	8	9		20			
10	7	13	18		23	2	20 X	
14	11	15	27		25	-		
17	16	24	30.	- 0				
22	19	29	36.					
26	21	33	41			40		
28	31	36	45			Item	s are listed on the back of this form	
32	33	40	46			item	are nated on the block of this form	
37	34		51			1		
39	35		54					
42	38							
43	44					FOR ADE JOHNNY 3333 WO BATON F	DITIONAL TEST KITS/INFORMATION: MATSON, Ph.D. IODLAND RIDGE BLVD. ROUGE, LA 70816	

BISCUIT-Part 2

TANTRUM/CONDUCT BEHAVIOR

- _ Easily becomes upset _ Interrupts the activities of others _ Crying 6. 10.
- 14. 17.
- Crying Destroys others' property Intrudes upon the activities of others Spiteful, inciditive, revengeful, or wanting to get back at others Damages property Loses belongings (e.g., books, toys) Tearful or weepy Deliberately annoys others Easily becomes angry Physically cruel to people or animals Tantrums Builles, threatens, or intimidates others Irritable mood
- 22. 26. 28. 32. 37. 39. 42. 43.

- 49. 50. Irritable mood
- Noisy while playing Waits for his/her turn Initiates fights Talks excessively 52. 53. 56. 57.

INATTENTION/IMPLII SIVITY

INAT	TENTION/IMPOLSIVITY
2.	Concentration problems
5.	Restless
7.	Has difficulty making decisions
11.	Runs and climbs more than others his/her age
16.	Always "on-the-go"
19.	Compliance with demands
21.	Distracted by objects or people in the environment
31.	Sustaining attention in tasks or play activities
33.	Avoids specific objects, persons, or situations causing interference
	with his/her normal routine
34.	Avoids activities that require sustained mental effort
35.	Finishes assigned tasks (e.g., schoolwork, chores, or duties)
38.	Engages in behaviors that impair daily routine or activities
44.	Fidgets or squirms
45.	Persistent or recurring impulses that interfere with activities (e.g., impulse to shout)
47.	Listens when snoken to directly

48. Eats things that are not meant to be eaten (e.g., paint chips, dirt, hair, cloth, etc.)

AVOIDANCE REHAVIOR

AVOID	ANCE BERAVIOR	
3	 Unreasonable fear of approaching or touching specific objects, people, or animals 	
8.	Fear of being being around others in school, at home, or in social situations	
13.	Persistent fear that is not age appropriate	
15.	Presentation of a specific object or situations results in loss of control, panic, or fainting	
24.	Withdraws or removes him/her self from social situations	
29.	Avoids specific situations, people, or events	
33	 Avoids specific objects, persons or situations causing intereference with her normal routine 	
36.	Trembles or shakes in the presence of specific object or situations	

Exposure to specific object/situation provokes immediate distress that is
 not age appropriate

ANXIETY/REPETITIVE BEHAVIOR

- ANALEL TREPE INVERSENT VION
 A._____Repetition of actions or words to reduce stress
 S.______Sudden, rapid, repetitive movements or vocalizations that are not associated with a physical
 disability (such as cerebral pais)
 as cerebral pais()
 control of the stress
 apages in repetitive behaviors (e.g., ordening objects handwriing, handwashing, etc) for no
 apparent reason or to reduce stress
- apparent reason or to reduce stress Groups of sudden, rapid, repetitive movements or vocalizations occuring together in a chain or cluster Ordering of objects for no apparent reason or to reduce stress Trembies or shakes in the presence of specific objects or situations Checking on play objects excessively Persistent or recuring impulses that interfere with activities (e.g., impulse to shout) Engages in repetitive mental acts (e.g., praying, counting) for no apparent reason Has difficulty organizing tasks, activities, and belongings Sudden, rapid, repetitive movemnt or vocalization that occurs for no apparent reason 27. _ _____

- 30.

 36.

 41.

 45.

 46.

 51.

 54.

EATING/SLEEP PROBLEMS

- Will eat only certain foods (If due to allergies or special diet, rate "X")

 Has a poor appetite

 East so thitp:

 Has trouble sleeping
- 12. 20. 23. 25.



BISCUIT Part 3 - Behavior Problems Page 1 of 1

BISCUIT Part 3 - Behavior Problems

- Rate each problem for the extent that it is a <u>recent</u> problem:
- 0 = Not a problem or impairment; not at all
- 1 = Mild problem or impairment
- 2 = Severe problem or impairment
- 1 Poking him/her self in the eye.
 - 2 Harming self by hitting, pinching, scratching, etc.
 - 3 Kicking objects (e.g., doors, walls).
 - 4 Removal of clothing at inappropriate times.
- 5 Unusual play with objects (e.g., twirling string, staring at a toy, etc.).
- 6 Playing with own saliva.
 - 7 Throwing objects at others.
 - 8 Banging on objects (e.g., doors, walls, windows) with hand.
 - 9 Leaving the supervision of caregiver without permission (i.e., elopement).
 - 10 Aggression towards others.
- 11 Pulling others' hair.
 - 12 Yelling or shouting at others.
 - 13 Property destruction (e.g., ripping, breaking, tearing, crushing, etc.).
 - 14 Repeated and unusual vocalizations (e.g., yelling, humming, etc.).
 - 15 Repeated and unusual body movements (e.g., handflapping, waving arms, etc.).

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13.

lumber:	Informant:
:	Gender:
nicity:	
	Additional Notes:
8	

____ Today's Date: _____

Items are listed on the back of this form FOR ADDITIONAL TEST KITS/INFORMATION: JOHNNY MATSON. Ph.D.

FOR ADDITIONAL TEST KITS/INFORMATION: JOHNNY MATSON, Ph.D. 3333 WOODLAND RIDGE BLVD. BATON ROUGE, LA 70816

BISCUIT-Part 2

AGGRESSIVE/DESTRUCTIVE BEHAVIOR

- 3.
- Kicking objects (e.g., doors, walls) Removal of clothing at inappropriate times 4. _
- 6. Playing with own saliva
- Throwing objects at others 7. _
- 8.
- Banging on objects (e.g., dorrs, walls, windows) with hand Leaving the supervision of caregiver without permission (e.g., elopement) 9.
- Aggression towards others 10.
- 11.
 Pulling others' hair

 12.
 Yelling or shouting at others
- Property destruction (e.g., ripping, breaking, tearing, crushing, etc.) 13.

STEREOTYPIES

- Unusual play with objects (e.g., twirling string, staring at toy, etc.)
 Repeated and unusual vocalizations (e.g., yelling, humming, etc.)
 Repeated and unusual body movements (e.g., handflapping, waving arms, etc.)

SELF INJURIOUS BEHAVIOR

- 1. . Poking him/her self in the eye
- 2. Harming self by hitting, pinching, scratching, etc

BISCUIT Part 1- Appendix

1 Communication skills. Typical: The child is able to get you to Atypical: The child has basically one response that know what he/she wants or needs is used for everything, and even at this age (18 through speaking sounds, gestures, months or older) you are still not easily able to tell signs, etc. The child is able to what he/she is communicating (e.g., diaper communicate in any form. If the child is change; experiencing pain or distress; hungry; not yet speaking he/she can still get you wants a toy; etc.) to know what he she/wants 2 Intellectual abilities (i.e., as smart as others his/her age). Cross-reference this item with the cognitive section Typical: The child learns as quickly as other children his/her age, understands of the BDI. ideas, and solves problems. By 18 months old the child may identify objects in books and follow 1-step directions (e.g., "Give me the doll"). By 24 months the child may point to 5 body parts on self and others. At 24 months the child may also be able to find objects when they are hidden. By 36 months the child may be able to follow 2-step directions. 3 Age appropriate self-help and adaptive skills (i.e., able to take care of self). Typical: The child is able to dress, feed Cross-reference this item with the self-care section self, wash self appropriately for his/her of the BDI. age. By 18 months, the child may hold arms up to help with dressing, hold his/her cup, know how to use a spoon or fork. By 24 months the child may be able to undress self and by 36 months the child may be able to put on loose clothing. Cross-reference this item with the selfcare section of the BDI. 4 Engages in repetitive motor movements for no reason (e.g., hand waving, The child moves his/her body or parts of body in the same way, over and over. Typical: It is not uncommon for children Atypical: Some children engage in repetitive

from the first year until 36 months to head bang, roll their necks, body rock, or make other repetitive movements. The repetitive movements can also be developmentally appropriate. For example, in toddlers, these behaviors tend to occur mostly when they are trying to comfort themselves, falling asleep, or bored

behaviors more often than you would expect in that the child may spend most of his/her time engaging in repetitive movements.

5 Verbal communication.

Typical: The child uses sounds or words to get someone else to understand something; there is a meaning and purpose to the verbalizations. By 18-24 months the child may ask for common food by name, for example. Toddlers may also say "mama" to get their mother's attention. The child makes sounds that have meaning to familiar people.

6 Prefers foods of a certain texture or smell.

Typical: Being a picky eater is not uncommon for toddlers. For example, many toddlers will not eat broccoli. Atypical: Some children are much more selective about the food they will eat. For example, the child will only eat foods that are crunchy or pureed. Or the child will only eat foods that smell a certain way or are white in color.

7 Ability to recognize the emotions of others.

Typical: The child is able to tell if another person is happy, sad, scared, mad, etc. Between 24 and 36 months the child may be able to tell when a parent is not happy with his/her actions. For example, when a parent is happy the child is aware of this and will approach him/her. But, if the parent is visibly angry, the child may hesitate, observe for a few seconds before approaching, or step back from him/her. Atypical: The child does not act any differently (eg., does not stop an activity to notice an obvious change in emotions; still approaches and asks for somthing).

8 Maintains eye contact.

Typical: The child looks others in the eye and will hold the gaze without quickly looking away. Starting in infancy, children may learn to maintain eye contact.

9 Use of language to communicate.

Typical: The child uses sounds/words, gestures, signs, etc. to get another person to understand what he/she means. The child is using these sounds/words, gestures, signs, etc. with a purpose; not just repeating something they have previously heard that doesn't have meaning. Atypical: Some children will not look other people in the eye at all, and seem to actively avoid eye contact. The avoidance of eye contact does not seem to be because the child is shy.

Atypical: Some children may only use words when repeating something they heard in a movie but never when they want something.

10 Social interactions with others his/her age.

Typical: The child is aware of other children his/her age and responds to the other child's behavior. By 24 months the child may be excited about other children's company, and may play alongside that child. By 36 months, the child may play with other children and take turns. Also around 36 months the child may show affection for other children. Atypical: Some toddlers do not notice or react to other children his/her age.

11	Reaction	to	sounds	and	sights.

Atypical: The child has an unusual reaction to things he/she hears or sees. For example, he/she stares at straight lines or things that spin or for long periods of time. The child may also overreact to certain sounds and doesn't seem to notice other sounds.

12 Response to others' social cues. Typical: The child is able to "read" the body language of another person and change his/her behavior accordingly. For example, the child can tell that mom is mad by looking at her face and her body posture so the child decides not to ask for something he/she wants at that moment. The child may be able to look at facial expressions or hear a tone of voice and know that someone is happy, mad, etc. The child may change his/her own facial expression, or decide to approach or not approach another person depending on social cues.

Atypical: Some children don't notice these cues (e.g. child doesn't change behavior in response to social cues)

13 Reaction to normal, everyday lights (e.g., streetlights, etc.).

Atypical: The child has an unusual reaction to lights. The child may stare at lights more than usual or may be overly sensitive to lights. For example, the child may move his/her fingers in front of his/her eyes while looking at lights or have more of a fascination with certain types of (e.g., holiday lights, flashlights) than is expected.

14 Peer relationships.

Typical: The child has relationships with other children appropriate for his/her age. When very young, just being interested in other children is appropriate, not necessarily having friends. By 24 months, children may become excited about the presence of other children. **Atypical:** Some children do not seem interested in interacting with children their age.

15 Rhythm of speaking (e.g., sing-songy; If nonverbal, rate "0").

Typical: The child stresses certain words when speaking and the rhythm of his/her speech sounds like other children his/her age. For example, you can tell when the child is asking a question because his/her pitch goes up at the end of the sentence. Toddlers' intonation and rhythm of speech may sound similar to adults even if the words are not understood.

Atypical: Some children may always sound like they are singing or like a robot when they speak.

16 Use of language in conversations with others.

Typical: The child uses sounds, words, gestures, etc. to have a back-and-forth communication with another person. For children who are just learning words or have not begun talking yet, these conversations may be as simple as mimicking each other's sounds.

17 Shares enjoyment, interests, or achievement with others (e.g., parents,

Typical: The child shows other people things he/she is excited about. The child wants other people to know about his/her enjoyment, interests, achievements, etc. The child may bring something to show you or point to something he/she likes. By 18 months, toddlers may show people things they enjoy or are interested in. For example, a child may show a parent a picture he/she made, blocks he/she stacked, or a new toy.

18 Ability to make and keep friends.

Typical: The child approaches other children and plays with (or beside) children, and familiar children approach the child. By 24 months children may become excited about the presence of other children. By 36 months, children may have a preference for certain playmates. The child may become excited when a favorite cousin or classmate visits. The child may ask about preferred playmates when they aren't around and make attempts to please the other child during play. Atypical: Some children don't appear to notice familiar children.

19 Interest in participating in social games, sports, and activities. Typical: The child likes to play games

with others such as ball, peek-a-boo, pata-cake, ring-around-the rosie, follow-theleader, etc. Many toddlers have difficulty with rules, sharing, and taking turns but they may enjoy short interactive games with an adult.

20 Interest in another person's side of the conversation (e.g., talks to people

Typical: The child is interested in what you have to say. Toddlers may ask a question and look at the parent to wait for a response. Interactions may be brief for toddlers but they may pay attention, even for just a few seconds, when another person is speaking.

21 Able to understand the subtle cues or gestures of others (e.g., sarcasm,

Typical: The child understands facial expressions, gestures, body posture, and tone of voice, etc. For example, the child can tell when mom is mad or excited without her saying "I am mad" or "I am excited." The child can tell this by looking at mom's facial expression, gestures, or tone of voice. When mom is mad, the child may hesitate before getting close to her and/or may look nervous, for example. Atypical: Some children don't notice these cues (e.g. child doesn't change behavior in response to social cues). Some children may continue engaging in a behavior that is bothersome to others because they don't notice the cues.

22 Use of too few or too many social gestures.

Typical: The child uses the typical amount of social gestures for his/her age. Some examples of social gestures that may occur with toddlers are waving to people, clapping for someone, patting on the back. The child uses these gestures at appropriate times but doesn't "go over board." For example, the child may wave to a stranger at the store and stops waving when the stranger looks away.

Atypical: Some children may use these gestures excessively - more often than is appropriate. Other children may not use these gestures at all.

23 Body posture and/or gestures.

Typical: The child uses gestures and positions his/her body to face a person during social interaction. A toddler may point or clap and position his/her body towards a person when interacting. The posturing may not last long with toddlers. The child is animated when he/she speaks. He/she may shrug shoulders, put hands on hips.

narios or i

24 Communicates effectively (e.g., using words, gestures or sign language).

Typical: The child is able to get his/her wants and needs across to another person by using sounds/words, gestures, signs, etc. The child may point to what he/she wants if his/her speech is difficult to understand or may take someone by the hand to show what he/she wants. The parent may be able to tell the difference between sounds the child makes and what the sounds mean. The child uses different sounds/gestures/words for different things.

Atypical: Some children may only make one sound when they want something making it difficult for parent to figure out what the child wants. The child is not able to let a parent know when they are hungry, sick, dirty, etc. The child may only scream when they need something and the screaming sounds the same for all needs. The parent may have to keep trying different things (e.g. give food, change diaper) to get the child to calm down.

25 Likes affection (e.g., praise, hugs).

Typical: The child likes to be cuddled, hugged, praised, etc by familiar people. By 36 months the child may show affection toward a playmate without being told to do so. Atypical: Some children may stiffen or pull away when hugged by a caregiver.

26 Displays a range of socially appropriate facial expressions.

Typical: The child's shows many different facial expressions (happy, sad, scared, etc.) and displays these expressions at the appropriate time. For example, the child looks happy when he/she receives a gift and sad when a favorite toy is broken.

Atypical: Some children do not show a lot of facial expression making it difficult to tell how they are reacting to something.

27 Restricted interests and activities.

Typical: It may be common for toddlers to have preferred activities, for example reading a specific book or playing with trucks; however, the toddler may still be interested in other activities and novel tovs. **Atypical:** The child is not interested in many different kinds of activities. The child prefers to do or talk about the same thing over and over.

28 Motivated to please others (e.g., peers, caregivers, parents).

Typical: The child does things to make you (or other people) happy. The child enjoys when he/she is given praise or attention for doing something. The child may show you or bring you something and then wait for praise. The child may pick up toys or "sweep" the kitchen and show his/her mom.

29 Eye-to-eye gaze.

Typical: The child may make eye contact with others and you will be able to "catch their eye." Toddlers may learn to make eye-to-eye gaze in infancy. Ask the parents if they think the amount of eye-to-eye gaze is too little, too much, or about right.

30 Reactions to normal, everyday sounds (e.g., vacuum, coffee grinder).

Typical: A child may have a very short startle response and return to what he/she was doing or momentarily glance toward the source of the everyday sound.

Atypical: The child may have an unusual, exaggerated reaction to certain sounds or not seem to notice a sound that he/she should hear. For example, the child may hear a train whistle in the distance that no one else can hear but does not react when a large pot is dropped in the kitchen. The child may also do or say something every time he/she hears a certain sound. Additionally, the parents may have thought the child had a hearing impairment as an infant but he/she passed hearing tests.

31 Awareness of the unwritten or unspoken rules of social play (e.g., turn

Typical: The child has been taught and understands taking turns and sharing without being told to do it. At 18 months the child may seem selfish and compete for toys with other children. By 24 -36 months the child may be learning to take turns but it is not always easy. Children may start learning to share around 36 months. Atypical: Some children never know when it is their turn, even when they've been taught. For example, the child needs to be prompted to get up every time it is his/her turn for duck, duck, goose.

32 Facial expression corresponds to environmental events.

Typical: The child's facial expressions are related to what's going on around him/her. For example, the child smiles when playing with his/her parents and frowns when not able to do a favorite activity. Toddlers may have different facial expressions for when they are happy, sad, mad, scared. The toddler appears happy when people around them are happy, scared when other people are scared, etc. Atypical: The child's facial expressions are not related to what is going on around him/her. For example, the parents may be upset because the family pet just died, but the child is smiling and laughing.

33 Sticking to odd routines or rituals that don't have a purpose or make a

Typical: Having particular routines during the 1st and 2nd years may be common for many children. For example, a certain bedtime routine that a child insists on is common. Even at 3 years a child may become upset with major changes in routine. Atypical: The child needs to do the same thing in a certain way each time it is done. For example, he/she insists on getting dressed in a particular order, or insists on others saying things in a particular way each time. This item should be rated if the child's need to stick to a routine, or is so upset by changes in routine, is more than you would expect. Some children may insist that the same route always be taken to the store, always walk through the same door of the house, or always get out of the car the same way.

34 Abnormal preoccupation with the parts of an object or objects.

Atypical: The child is very interested in certain objects; more interested in particular objects than other children his/her age. For example the child spends a lot of time looking at and playing with only the wheels of a toy car. The interest may be so intense that it takes up a lot of the child's time.

35 Plays appropriately with others. Typical: The child plays well with others, appropriate for his/her age. At 18 months the child may seem selfish and competes for toys with children. At this age the child may play near other children. By 24-36 months the child may be learning to take turns but it is still be difficult for him/her. The child may need only occasional adult interaction to settle differences.

Atypical: Some children have a very difficult time interacting with other children. All interactions may end in tantrums and require a lot of adult supervision/interaction while playing.

36 Reads nonverbal cues (body language) of other people. (If blind, rate "0")

Typical: The child is able to tell how someone is feeling without the person verbally saying it (by facial expression, posture). By 24 months children may be able to tell when his/her parents are upset with his/her actions and either stops doing something or does it more. The child may be able to notice other people's actions and cues and change his/her own behavior. Atypical: Some children don't notice when other people are upset or bothered by them and continue enaging in the behavior.

37 Speaks in monotone (e.g., voice is flat, does not change in sound; If

Atypical: The child speaks without stressing certain words in a statement or question. His/her speech is flat and may sound robot-like.

he/she is thinking and that everyone thinks as

he/she does. Some children may not understand

that people have thoughts and ideas of their own.

38 Expects others to know his/her thoughts, experiences, and opinions Typical: Between 24 and 36 months Atypical: The child expects you to know what

Typical: Between 24 and 36 months toddlers are just beginning to learn that other people have different thoughts and intentions. For example, an older toddler may understand that when a another child walks up to him/her at a playground and takes him/her by the hand to the sandbox, that this child wants to play (the child is not being a bully or trying to control the other child).

39 Interest in a highly restricted set of activities.

Typical: It may be common for a 24 month old, for example, to insist the same book is read over and over; however, the child may still be interested in a number of other activities.

Atypical: The child only likes to do the same activities over and over. For example, some children may only be interested in watching the same cartoon over and over again and will not watch other cartoons or play other games.

40 Talking to others in a social context (*If nonverbal, rate "0"*). Typical: The child talks with people to

socialize; talks for more than just to get needs/wants met. A toddler may tell a parent about a trip he/she took to the park or talk about a toy. The child tries to gain attention by talking to other people.

41 Use of facial expressions.

Typical: The child shows a range of facial expressions (happy, sad, scared, etc.) and displays these expressions at the appropriate time. For example, the child looks happy when he/she receives a gift and sad when a favorite toy is broken.

Atypical: Some children do not show a lot of facial expression making it difficult to tell how they are reacting to something. For example, the child may look sad but is happy. Some children may have only one facial expression all the time.

42 Abnormal fascination with the mov Atypical: The child is very interested in things that spin. The child seems to be drawn to objects that spin and will continue to look at them for long periods of time if uninterrupted. Some children may also make their own things to spin. For example, spinning string on the end of a stick.	<i>v</i> ement of spinning objects (e.g., closing
 43 Curiosity with surroundings. Typical: The child asks about what is happening around him/her. Toddlers may explore new places or take notice of something new in the home. 	Atypical: Some children will not notice things in their environment like new furniture or a swing set.
44 Saying words and phrases repetiti Typical: Eighteen month old children through 36 months may repeat words or sayings that they hear. The child seems to understand the meaning of the words or sayings and these children may also have spontaneous language.	vely (If nonverbal, rate "0"). Atypical: The child repeats the same words, phrases, or sayings over and over. Some children may repeat words and sayings but do not seem to understand the meaning of what they are saying and/or they don't develop new words to say. For example, the child may repeat lines from movies or conversations his/her parents have had.
45 Make-believe or pretend play. Typical: The child is able to pretend. At 18 months the child may act out an activity, such as bathing, while playing. By 24 months the child may pretend to feed a doll or stuffed animal. By 36 months the pretending may be more elaborate, such as shopping or cooking.	
46 Understanding of age appropriate Typical: The child finds age appropriate jokes funny. Age appropriate for toddlers may be having something out of place, or where it doesn't belong. For example, wearing pants on your head or a stuffed animal in the cabinet with dishes may be funny to an 18-month old. Calling your foot a hand may be funny to a 24 month old.	jokes, figures of speech, or sayings.
47 Gives subtle cues or gestures whe Typical: The child may hint at what	en communicating with others (e.g.,

Typical: The child may hint at what he/she wants or use gestures to get something he/she wants without using words. For example, a child may want to go outside but his/her mother is taking too long so the child stands near the door with his/her arms crossed, or hands on hips. When upset, the child may stop his/her feet.

48 Becomes upset if there is a change in routine.

Typical: Having particular routines during the 1st and 2nd years may be common for many children. For example, a certain bedtime routine that a child insists on is common. Even at 36 months a child may become upset with major changes in routine. Atypical: Some children become more upset than would be expected if their routine is changed. The child may insist in the same route always be taken to the store and will tantrum if the route changes, for example. This item should be rated if the child's need to stick to a routine, or becomes so upset by changes in routine, is more than you would expect and/or causes a lot of disruption.

49 Needs reassurance, especially if events don't go as planned.

Atypical: The child becomes quite upset if plans change. He/she may repeatedly ask questions about the change in plans and need to be comforted. The child may try to go outside repeatedly for a picnic even though the picnic was canceled due to rain, for example.

50 Language development.

Typical: The child learned/is learning to speak, gesture, etc at the same rate as other children of the same age. By 24 months the child may recognize names of other people and objects. Also by 24 months the child may be saying 40 words and using 2 word sentences. By 36 months the child may be using pronouns and correctly using personal pronouns (i.e. using "me" or "I" when referred to self instead of incorrect pronoun such as "you").

51 Responds to others' distress. Typical: The child notices and reacts when other people are upset. The child may try to comfort the person. By 24 months most children will comfort friends or parents when distressed. This comforting can be with a hug or kissing a "boo-boo." Older toddlers may lead the distressed child by the hand to an adult.

52 Socializes with other children. Typical: The child is aware of other children. The child chooses to play near/with other children at times. At 18 months children may prefer to play with his/her parents or older children but around 24 months, children may start to enjoy playing with and the company of children close in age. Cross-reference this item with the communication section of the BDI.

Atypical: Some children don't even notice when another child is crying because of sand in the eye or a bee sting, for example.

Atypical: Some children don't notce other children or seem interested in interacting with them.

53 Use of nonverbal communication.

Typical: The child uses gestures, eye contact, body posture to communicate with other people. By 18 months children may be making good eye contact when communicating, pointing to objects, and positioning his/her body near others during interactions. Younger toddlers may lift their arms when being picked up, and older toddlers may stomp their feet or cross their arms when upset.

54 Clumsiness.

Typical: By 24 months children may be able to walk up and down four steps with support. By about 36 months children may be able to easily run and kick balls without falling. Atypical: The child seems to fall more, bump into things, or is less coordinated than others his/her age. Some children seem to need to be watched more carefully than others due to falling and bumping into things. Some children seem to have more buildren seem to have more buildren seem to have more buildren seem to have the children of

55 Limited number of interests.

the same age. Atypical: The child is interested in few things and those things only to the point where he/she will not engage in any other activity. For example, some children are only interested in presidents or animals and will not talk about or be involved in activities that don't involve these topics.

56 Imitation of an adult or child model (e.g., caregiver waves "bye" then the

Typical: The child copies/imitates other children or adults. By 24 months children may be able to imitate parents or other children. The child may be able to clap when other people clap, put blocks in a bucket after someone else, jump after someone else jumps.

57 Abnormal, repetitive hand or arm movements.

The child engages in hand flapping, finger flicking, hand wringing. **Typical:** Toddlers may engage in hand flapping at times, especially when they are excited. **Atypical:** It may be periods of time an when the child is e

Atypical: It may be abnormal if it occurs for long periods of time and/or frequently or more than just when the child is excited. Some children may have calluses or skin damage from the repeated hand movements.

58 Abnormal, repetitive motor movements involving entire body.

The child moves his/her entire body in a repetitive manner. For example, body rocking.

Typical: Infants and young toddlers may engage in body rocking when relaxing.

Ittive manner. For example, body rocking. Atypical: It may be abnormal if it occurs for long periods of time and/or often. For example, the body rocking occurs more than just when they are relaxing or watching television. The body rocking may be forceful.

59 Development of social relationships.

Typical: The child has relationships with other people for social reasons; not to just get immediate needs met. For example, there are particular people (child or adult) that the child enjoys being around or playing with. The child may enjoy spending time with a number of people such as aunts, teachers, neighbors.

60 Respect for others' personal space (e.g., stands too close to others).

Atypical: The child tends to get too close to people he/she does not know well. Some children may keep moving closer to other people, as the other person continues to back up. Some children may climb on or hang on people they do not know or join in on private activities of other people such as picnics.

61 Isolates self (i.e., wants to be by him/her self).

Typical: Toddlers may enjoy being near familiar people and playing with them. Children around the ages of 24-36 months show an interest in other children. He/she may not play with the other child but still enjoy being near them.

62 Participation in games or other social activities.

Typical: The child likes to play games with others such as ball, peek-a-boo, pata-cake, ring-around-the rosie, follow-theleader, etc. Many toddlers have difficulty with rules, sharing, and taking turns but they may enjoy short interactive games with others. Children may play on the playground near other children or go down the slide together. Atypical: Some children prefer to be alone all the time. These children regularly try to get away from where people are, such as go under tables, in corners, or go in different rooms.

Atypical: Some children never approach others to play or initiate play with others.

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Curriculum Vitae

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