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Mind-Mindedness in Mothers of Children with Autism Spectrum Disorder

Abstract

Background: Little is currently understood about the ways in which caregivers represent the internal mental states of their child with autism. Previous research has shown that being mind-minded can limit the experience of parenting stress in typically developing samples. The current study explored mind-mindedness in mothers of children with autism spectrum disorder (ASD) and examined whether this related to the experience of parenting stress.

Method: Mind-mindedness was coded from mothers' descriptions of their child obtained from an online survey ($N = 55$). A subsample of these mothers also provided data on a non-ASD sibling ($n = 27$). We compared mothers' mind-mindedness when describing their child with ASD and a non-ASD sibling.

Results: Mothers predominantly described their child with ASD using mental and behavioral attributes. There were no overall differences in mothers' use of mental state descriptors when referring to their child with ASD or a sibling, however, when considering the valence of descriptors, a significantly higher proportion of the mental attributes used to describe the child with ASD were negative. Associations between mind-mindedness and overall parenting stress failed to reach significance.

Conclusions: Parenting a child with ASD does not appear to limit the parent's ability to tune-in to their child's mind. Maternal mind-mindedness scores were similar for the ASD and non-ASD sibling, although there were differences in the valence of representations. Being mind-minded did not protect against parenting stress, however we suggest that the high levels of stress experienced by our sample were beyond the protective reach of mind-mindedness.

Keywords: autism, maternal mind-mindedness, parenting stress, parenting

Mind-Mindedness in Mothers of Children with Autism Spectrum Disorder

Impairments in social relatedness are central to autism spectrum disorders (ASD) and present a significant challenge to the caregiver's ability to read their child's behavior, and contribute to the experience of parenting stress (Davis & Carter, 2008; Kasari & Seligman, 1997). Given these difficulties, one might expect the caregiver to be less able to respond sensitively to the child's cues, limiting the quality of dyadic interactions. Alternatively, these difficulties may drive the caregiver to overcome barriers to communication, in order to tune-in to their child to better interpret and anticipate their behavior. Beyond responding to the child's immediate needs, the caregiver may strive to develop a deeper understanding of the mental states underlying behaviors, which may at times be unusual or challenging. Little is currently understood about the ways in which caregivers represent the internal mental states of their child with autism. The aim of this paper is to examine mind-mindedness of caregivers of children with autism.

Mind-mindedness refers to the caregiver's tendency to treat their child as an individual with a mind (Meins, 1997) and is closely related to, but distinct from, maternal sensitivity. Mind-mindedness is indexed in infancy via an observational measure that captures a caregiver's tendency to comment appropriately on their infant's behavior (Meins, Fernyhough, Fradley, & Tuckey, 2001), and in childhood by the extent to which caregivers describe their child with reference to mental characteristics (i.e. thoughts, feelings, desires) in an interview (Meins, Fernyhough, Russell, & Clark-Carter, 1998). Mind-mindedness is suggested to be an important aspect of caregiver behavior and has been associated with various child outcomes, including attachment security (Meins et al., 2001), theory of mind (Kirk, Pine, Wheatley, Howlett, Schulz & Fletcher, 2015; Laranjo, Bernier, Meins, & Carlson, 2010; Meins, Fernyhough, Arnott, Leekam, & Rosnay, 2013; Meins et al., 2002)

and behavioral difficulties (Meins, Centifanti, Fernyhough, & Fishburn, 2013). As a construct, mind-mindedness has yet to be explored amongst mothers of children with autism, although it may present an important source of information about parenting behavior.

There are individual differences in the capacity of caregivers for mind-mindedness, however this variation does not appear to be driven by child or maternal factors. In community samples, mind-mindedness is unrelated to child temperament (Meins, Fernyhough, Arnott, Turner, & Leekam, 2011) and general cognitive ability (Meins et al., 2001). Furthermore, a caregiver's social economic status (SES) has not been found to impact upon mind-mindedness (Meins et al., 2011), neither has depression (Pawlby et al., 2010; Walker, Wheatcroft, & Camic, 2011). Therefore, in non-clinical samples, evidence suggests that characteristics of the parent and child do not appear to impact upon capacity for mind-mindedness.

Research has begun to consider mind-mindedness in clinical samples, including mothers with severe mental illness (Pawlby et al., 2010) and parents of children referred to Child and Adolescent Mental Health Services (CAMHS) (Walker et al., 2011). Pawlby et al. compared mind-mindedness of mothers who were in-patients on a mother and baby unit diagnosed with schizophrenia and mood disorders with a healthy control sample. No significant differences in mind-mindedness were found, however, there was a trend for depressed mothers to comment less frequently on their infant's thoughts and feelings upon admission. These findings suggest that maternal clinical features do not significantly disrupt mind-mindedness, although there is some evidence to indicate that child clinical features can have an impact.

Walker et al. (2011) examined mind-mindedness in a clinical sample of parents whose children had been referred to CAMHS for different emotional and behavioral issues, including aggression, tantrums, anxiety, sleeping, and eating difficulties. Compared to a

community sample, the clinical sample used significantly fewer mental descriptors when describing their child. The authors additionally coded the valence of the mental descriptors as positive, negative, or neutral. The mental descriptors of the mothers in the clinical sample were significantly more likely to be negative. While in community samples child factors do not impact upon the caregiver's capacity for mind-mindedness, these findings indicate that challenging child behaviors in a clinical sample can restrict mind-mindedness. These findings also highlight the value in coding the valence of the descriptions, providing additional insight into the way that parents represent their children.

Research to date has not considered mind-mindedness of caregivers of children with a disability. The major social impairments that characterize autism pose unique challenges to the parent's ability to understand their child's behavior and this may in turn impact the nature of parent-child interaction. For example, Hutman, Siller, and Sigman (2009) found that aspects of mother's narratives about their child with autism were related to observations of synchronicity when engaged in play. Mothers who provided 'insightful' narratives (The Insightfulness Assessment, Koren-Karie & Oppenheim, 1997) of their child's thoughts and behaviors from videotapes of mother-child interaction (for example, by considering multiple explanations for their child's behavior) were more synchronous during play than mothers who gave non-insightful narratives. Additionally, Oppenheim, Koren-Karie, Dolev, and Yirmiya (2009) found that mothers who were insightful and had reached resolution about their child's diagnosis were more likely to have securely attached children. Whilst the researchers did not employ indices of mind-mindedness, their findings suggest the value of exploring this mental representational construct in the context of ASD.

To fully explore mind-mindedness in parents of children with ASD, we compared the descriptions that mothers gave of their child against their description of a sibling without such a diagnosis. Comparing mothers' descriptions of her children has the advantage of a within-

subjects design, providing the opportunity to assess relational quality rather than differences between groups of parents. We were interested to see whether mothers would be equally likely to describe their child with ASD using mental descriptors as they were his or her sibling, and whether there would be any differences in the valence of these descriptions. Previous research has established that an analysis of the valence of descriptors can reveal meaningful differences between clinical and non-clinical groups (Walker et al. 2011). We predicted that the descriptions of ASD children would contain more negative, and fewer positive mental attributes, than descriptions of their non-ASD siblings. This is because we expect that the challenging behaviors typical of children with ASD will impact upon the way that parents mentally represent their child.

To date, only one study has compared mind-mindedness across siblings (Illingworth, Maclean, & Wiggs, 2015). This study assessed mind-mindedness using both representational and observational methods and revealed inconsistency in mind-mindedness between siblings, but only when mind-mindedness was measured via the describe your child interview and not when mind-mindedness was measured through observation of parent-child interactions. These findings support the representation of mind-mindedness as a relational construct, rather than a trait (Meins, Fernyhough, & Harris-Waller, 2014) such that a mother's use of mental terms to describe her children reveals something about the close relationship between the mother and the child she is describing, rather than a general tendency to focus on mental attributes.

We also sought to examine the relationship between maternal mind-mindedness and the experience of parenting stress in relation to both a child with ASD and his or her non-ASD sibling. Recent investigations have expanded the original measurement of mind-mindedness to consider the valence of mother's descriptions of their children and have yielded interesting findings, particularly in relation to parenting stress (Demers, Bernier,

Tarabulsky, & Provost, 2010; McMahon & Meins, 2012). For example, Demers et al. found no association between the overall use of mental descriptors and parenting stress, but greater use of positive mental descriptors of the child was related to lower levels of parenting stress. The researchers argued that lower levels of parenting stress causally contribute to the construction of more positive and more mind-minded representations of the child. McMahon and Meins argue that since there is continuity in mind-mindedness assessed at both pre and postnatal periods (Arnott & Meins, 2008) it is unlikely that parenting stress causally contributes to mind-mindedness. McMahon and Meins also found that greater use of positive mental state descriptors was related to lower levels of parenting stress, less hostility, and increased sensitivity during interactions. However, McMahon and Meins report a mediating effect of parenting stress in the relationship between mind-mindedness and parenting behavior, such that mothers higher in mind-mindedness reported lower parenting stress and therefore exhibited lower levels of hostility when interacting with their child. In the present study we assess the valence of the mental attributes used to describe children in order to test the association between mind-mindedness and parenting stress.

Measurement of parenting stress within the current study is important since it is unclear whether being mind-minded may afford the same benefits for parents of children with ASD, where the experience of stress is much higher compared to parents of typically developing children and children with other disabilities (Hayes & Watson, 2013). It has been highlighted recently by Hayes and Watson that the emphasis in the literature on identifying stress in families parenting a child with ASD has overshadowed positive parental factors that act to reduce the impact of stress. We consider whether mind-mindedness may offer such a protective buffer and test the hypothesis that greater use of positive mental descriptors would be associated with lower parental stress.

In summary, the aim of the present study was to explore mind-mindedness in parents of children with ASD. We assessed mind-mindedness using the describe your child interview since the observational measure is not suitable for children over one year of age, and thus would be difficult to apply in a sample of children holding a diagnosis of ASD. We explored the descriptions that mothers gave of their child with ASD and considered whether mind-mindedness was associated with the severity of their child's autistic symptomology. We compared the descriptions that mothers gave of their child with ASD and a sibling without ASD, and tested the association between mind-mindedness and parental stress. No hypotheses were made regarding any differences in mothers' tendency to describe their child with ASD and a non-ASD sibling using mental attributes. However, we hypothesized a difference in valence such that mothers would use significantly more negative terms overall to describe their child with ASD compared to their descriptions of their non-ASD child. In line with existing research, we predicted a negative relationship between parental stress and the use of positive mental attributes across both children. The Parental Stress Index was used to assess stress and this provides an overall stress score and scores on subscales (Parental Distress, Parent-Child Dysfunctional Interaction, Difficult Child). Given the lack of existing research, no hypotheses were made regarding the relationship between mind-mindedness and these subscales, instead exploratory analyses are reported.

Method

Participants

Fifty-five mothers ($M_{age} = 37.29$; $SD = 5.76$) with children with a diagnosis of ASD were recruited via online adverts on Internet parenting forums. The majority reported being the primary caregiver for the child (94%) and predominately described their ethnic origin as White (English, Irish, Scottish, or Welsh, 83%), with the remainder reporting mixed (4%) or

Black and Asian Minority Ethnic backgrounds (10%). A small minority (3%) did not disclose their ethnicity. Forty-three of the mothers reported having more than one child (eight reported having just one child and four did not respond to the question). The children with ASD were aged on average 5.51 years ($SD = 1.84$, range 3 – 10 years) and were mostly male (80%). The male to female ratio was equal to 4:1. This is inline with commonly reported sex ratios (Werling & Geschwind, 2013). Diagnoses included Autism (68%), Asperger syndrome (25%), and Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS, 7%). All children had been diagnosed by an appropriate health professional, specified as either a psychiatrist, or clinical psychologist, usually accessed through specialist diagnostic services. The mean age of diagnosis was 3.84 years ($SD = 1.70$). Comorbidity was high (71%), with the majority of parents reporting that their child was affected by at least one (40%), or two plus diagnoses (31%). The most prevalent diagnoses reported were ADD/ADHD (64%) and sensory processing disorder (23%). Participant's SES scores (Hollingshead, 1975) ranged from 9 to 66 ($M = 33.28$, $SD = 18.69$), demonstrating a representative range of low to higher SES families.

Within-family subsample. Twenty-seven of the parents provided data on one sibling who was not affected by ASD¹. The mean age of the children with ASD for whom sibling data were available was 5.81 years ($SD = 1.82$, range 3 - 9). The mean age of their siblings was 6.41 ($SD = 3.97$, range 1 - 16) (a non-significant difference, $p > .05$). There was an equal sex distribution amongst the sibling group (13 males and 14 females). Within this subsample, sixteen mothers reported that they had a total of two children, seven had three children, and four had four children. Twelve of the siblings were older than the child with ASD, thirteen were younger and two were the same age. Three siblings were reported to have additional difficulties, including dyslexia, attention deficit hyperactivity disorder and sensory processing

¹ 16 parents reported having another child not affected by ASD but did not provide responses for a sibling.

disorder. Relevant analyses are repeated excluding these children to check whether they impacted upon the results.

Procedure

The (reference removed for blind review) granted ethical approval for the research (reference LMS/PG/UH/00212) and the study was conducted in adherence to the ethical procedures of the British Psychological Society. Mothers provided consent online, prior to accessing the survey. The survey comprised four sections. The first obtained demographic information about the parent and their child with ASD. The second section consisted of the Autism Spectrum Quotient – Child (AQ-Child; Auyeung, Baron-Cohen, Wheelwright, & Allison, 2008). Section three was the Describe your Child Interview (Meins & Fernyhough, 2015), and finally, section four included the Parenting Stress Index-Short Form (PSI-SF; Abidin, 1995).

Additionally, mothers who were able to provide data on a sibling who was not affected by ASD also completed basic demographic information, the Describe your Child Interview, and PSI-SF in relation to that child. Presentation of the Describe your Child Interview and PSI-SF was counterbalanced. This was achieved by online software assigning parents randomly to different versions of the survey.

Materials

Autism Spectrum Quotient – Child (AQ-Child; Auyeung et al., 2008). The AQ-Child is a parent-report measure of traits associated with autism. It is suitable for use with children aged under 11 years and consists of 50 items that tap into five areas: social skills, attention switching, attention to detail, communication, and imagination. Parents rate each item on a 4-point likert scale ranging from 0 (*definitely disagree*) to 3 (*definitely agree*).

Some items are reverse coded to yield a total scale range of scores from 0 to 150. Higher scores indicate more autistic traits and scores above 76 have demonstrated good sensitivity and specificity as an assessment tool (Auyeung et al., 2008). In the current study, the AQ-Child was used to gain more information about the children with ASD. All except one child scored over the AQ-Child raw score threshold of 76. One child had a score of 71 but because their parents had indicated that a diagnosis was received from a suitable health professional this child was not excluded.

Describe your Child Interview (Meins & Fernyhough, 2015). Mothers were given an open-ended instruction to describe their child (“Can you describe your child?”). This measure has been verified to yield reliable results when administered in an online format (Meins, Fernyhough, & Harris-Waller, 2014). As per the mind-mindedness coding manual (Meins & Fernyhough, 2015), two additional questions were included in the survey, however these are not coded in the assessment of mind-mindedness (“What’s the best thing about your child?” and “What do you try to teach your child?”). The mothers’ written responses to the describe your child question were coded according to the Meins and Fernyhough (2015) mind-mindedness coding scheme. The lead coder (the first author) sectioned the descriptions into individual attributes. Each attribute was coded as belonging to one of the following categories: (i) *Mental*, reference to the child’s mental life (including intellect, knowledge, memory) as well as the child’s desires and wishes, likes and dislikes and preferences. For example, “he has an incredible memory”; (ii) *Behavioral*, any reference to the child’s behavior, including activities and interactions with other people, for example “he is very playful”; (iii) *Physical*, any reference to the physical characteristics of the child, for example “He looks like any other child”; (iv) *Self-referential*, comments that are self-focused rather than a description of the child, such as “he can be absolutely maddening in his rigidity” (v) *General*, any other attribute that does not fit the other categories, for example “sweet” or “he

is brilliant”. Each parent was given a score for the use of each type of descriptor as a proportion of the total number of attributes used to describe her child. A second coder, experienced in coding mind-mindedness and blind to the sample, second coded approximately 15% of the descriptions ($n = 16$, comprising 145 individual attributes). Inter-rater reliability for assignment across the five categories was $\kappa = 0.66$ (95% CI = .56, .76) (substantial agreement, Landis and Koch, 1977). The first coder’s scores were retained for analysis.

Each mental attribute was coded additionally for valence (positive, negative, or neutral). Comments such as “he would never intentionally lie”, “he’s a fast learner”, and “he is very loving” were considered positive. Comments such as “he doesn’t understand other people’s feelings” and “she is very anxious” were considered negative, and comments such as “he gets strong fascinations with certain objects” and “likes the alphabet” were neutral. Valence was measured as a proportional score of the total mental attributes. A random subsample of 20% of all mental attributes ($n = 253$) were second-coded for valence. Inter-rater reliability for assignment across the three valence categories was $\kappa = 0.65$ (95% CI = .57, .73) indicating substantial agreement (Landis & Koch, 1977).

Parenting Stress Index-Short Form (PSI-SF; Abidin, 1995). The PSI-SF is a 36-item, self-report measure of stress related to the parenting role. It is suitable for parents of children under the age of 12 years and is composed of three domains: *parental distress* (PD), *parent-child dysfunctional interaction* (P-CDI), and *difficult child* (DC). The PD domain assesses perceptions of competence, responsibility and restrictions due to the parenting role (‘I feel trapped by my responsibilities as a parent’). P-CDI assesses feelings towards interactions with the child (‘My child rarely does things for me that make me feel good’). The DC domain relates to perceptions of how easy or demanding a child is to parent (‘My child generally wakes up in a bad mood.’) Items are rated on a 5-point likert scale ranging from 5

(*strongly agree*) to 1 (*strongly disagree*). Total stress scores range from 36 to 180, with higher scores considered as more problematic. Abidin (1995) suggests that scores above 90 indicate clinically significant levels of stress. Individual subscale scores range from between 12 to 60. The PSI-SF is the most widely used measure of stress across studies with parents of children with ASD (Zaidman-Zait et al., 2010), although it should be acknowledged that psychometric testing of the scale amongst this population has been limited.

Results

Preliminary Analyses

Mean scores for the outcome variables are reported in Table 1. Mind-mindedness scores were not normally distributed and were significantly positively skewed ($p < .05$), thus non-parametric analyses are reported alongside parametric tests. Stress scores were normally distributed in both the ASD and non-ASD groups ($p > .05$). There were no significant associations found between mind-mindedness (including the proportion of total mental attributes, and the proportion of mental comments that were positive and negative) for the ASD children and demographic variables including child age and gender, maternal age, number of children, and AQ-Child scores, thus it was not deemed necessary to control for these variables in subsequent analyses. For children with ASD, there was a significant negative association between the proportion of total mental attributes and SES ($r_s(50) = -.31, p = .029$). There were no associations between mind-mindedness and these demographic variables in the non-ASD children. PSI-SF scores did not correlate with any of the demographic variables, with the exception of the AQ-Child scores ($r(53) = .30, p = .026$), and the age of the non-ASD sibling $r(25) = -.43, p = .024$.

Table 1

Mean scores (SD) on outcomes variables

	ASD sample (<i>n</i> = 55)	Non-ASD sample (<i>n</i> = 27)
AQ-Child	107.73 (17.11)	
PSI-SF (total stress)	110.64 (21.14)	79.89 (19.30)
Parental Distress	38.31 (9.60)	30.67 (7.32)
Parent-Child Dysfunctional Interaction	31.02 (8.18)	20.22 (5.06)
Difficult Child	41.31 (9.39)	29.00 (11.58)
Mind-mindedness	.35 (.26)	.41 (.29)

Note. AQ-Child: Autism Spectrum Quotient- Child; PSI-SF: Parenting Stress Index-Short Form

Mind-mindedness of mothers' of children with ASD

We first looked at how mothers described their child with ASD (Table 2). These analyses are conducted on the full sample ($N = 55$). Additionally, we explored the valence of the descriptions, namely whether the attributes mentioned were positive, neutral or negative (Table 2). Overall, maternal descriptions largely contained mental, behavioral and general attributes, with few parents providing physical or self-referential attributes. Across all attributes, the majority were neutral in valence, followed by positive and then negative attributes.

Table 2

Total proportion of attributes and proportion by valence for ASD sample (n = 55)

Attribute	Frequency	Total		Positive Valence		Neutral Valence		Negative Valence	
		<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>
Mental	48	.35	(.26)	.43	(.40)	.32	(.35)	.24	(.34)
Behavioral	50	.48	(.26)	.21	(.27)	.51	(.36)	.28	(.28)
Physical	4	.01	(.02)	.25	(.50)	.25	(.50)	.50	(.58)
SR	7	.03	(.11)	.32	(.47)	.24	(.37)	.44	(.46)
General	27	.20	(.26)	.32	(.42)	.53	(.45)	.15	(.33)

Note. SR = self-referential

We examined whether the severity of autistic symptomology, as indexed by the AQ-Child, was associated with mind-mindedness. There were no significant associations between AQ score and the proportion of mental attributes overall ($r = .19, p = .170$), or between AQ scores and the proportion of mental attributes that were positive ($r = .10, p = .518$), negative ($r = -.24, p = .106$) or neutral ($r = .12, p = .42$). Thus the severity of a child's symptomology did not impact upon mind-mindedness.

A within-family comparison of mothers' descriptions of their child with ASD and a non-ASD sibling

Data were available for 27 siblings of children with ASD. Mothers' descriptions of their ASD and non-ASD children were compared by attributes (means reported in Table 3).

Table 3

Mean (SD) proportion of attributes for children with ASD and their TD siblings

Attribute	ASD (<i>n</i> = 27)	TD (<i>n</i> = 27)	Paired samples <i>t</i> - test <i>p</i> -value	Correlation <i>r</i> -value
Mental ²	.34 (.20)	.41 (.29)	.298	.05
Behavioral	.52 (.22)	.33 (.26)	.009*	-.04
Physical	.01 (.02)	.00 (.00)	.191	-
Self-referential	.01 (.05)	.02 (.05)	.114	.72**
General	.12 (.21)	.18 (.40)	.407	.32

Note. * significant at $p < .05$, **significant at $p < .01$. Comparisons conducted using paired samples *t*-tests.

Mothers' descriptions of their child with ASD contained significantly more references to behavioral attributes than their description of their non-ASD child (this significant difference held when tested using a non-parametric Wilcoxon signed rank test). Group comparisons revealed that mothers were just as likely to describe their child with ASD in mental terms as they were the child's sibling. However, there was no significant correlation between mental attributes used to describe the ASD and non-ASD child, nor any other type of attribute; thus a mother's proclivity to use mental terms was not consistent between descriptions of siblings. There was a correlation between self-referential comments used to describe the ASD and non-ASD child, however this was no longer significant when tested using a Spearman rank correlation.

² All except one mother referred to at least one mental attribute in their descriptions of either their ASD or non-ASD child (3 descriptions of an ASD child and 5 descriptions of a non-ASD sibling did not include any mental descriptions).

The proportion of mental attributes that were categorized as negative, neutral, and positive are presented in Figure 1³. We hypothesized that mothers would use significantly more negative mental terms to describe their child with ASD compared to their mental descriptions of their non-ASD child, and that mothers would use significantly more positive mental terms to describe their non-ASD child compared to their child with ASD. No predictions were made regarding neutral comments.

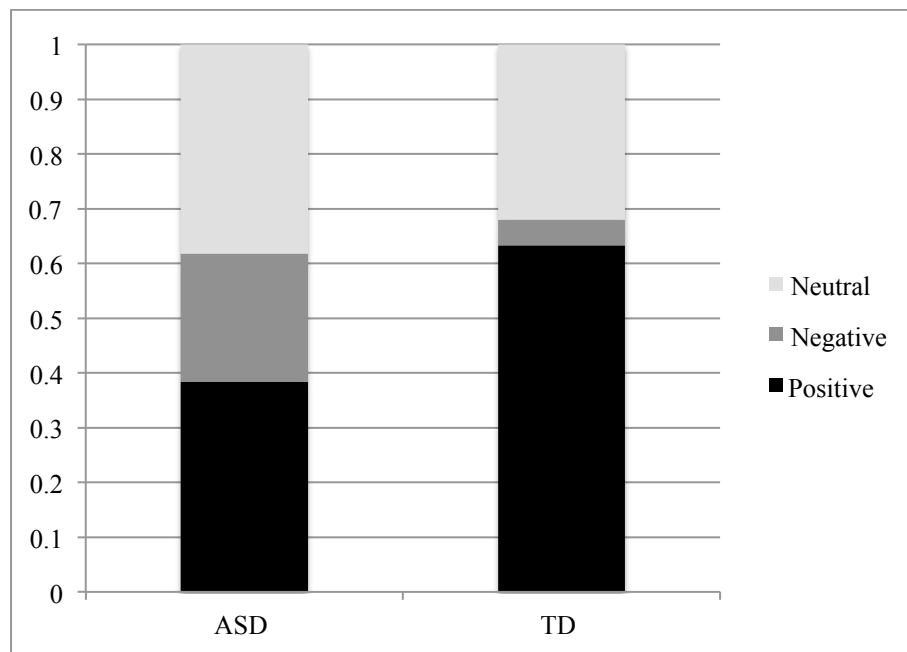


Figure 1. Proportion of mental attributes by valence for ASD ($n = 23$) and TD siblings ($n = 23$).

A significantly higher proportion of the mental attributes used to describe the child with ASD were negative compared to the proportion of negative mental comments used to describe the non-ASD sibling, $t(19) = 2.60, p = .017$. Mothers described their non-ASD child using significantly more positive mental terms than their child with ASD, $t(19) = -2.44, p =$

³ Sample size is 23 because not all of the sample produced mental attributes in their descriptions of their children.

.025. There were no differences in the proportion of neutral mental attributes used to describe their child with ASD and non-ASD sibling, $t(19) = .35, p = .727$. These results held when tested with non-parametric tests.

Comparison of stress related to parenting a child with ASD and a non-ASD sibling

Parenting stress in relation to a child with ASD ($n = 55$) was high. Over 85% of mothers reported total stress above the 90th percentile, indicating clinically significant levels of stress. Furthermore, there was a significant association between autism symptomatology, as measured by the AQ-Child, and the experience of parenting stress $r(53) = .30, p = .026$. When looking at data from mothers who reported stress scores for both a child with ASD and a non-ASD sibling ($n = 27$), significant group differences emerged. Parenting stress related to the child with ASD ($M = 114.70, SD = 17.23$) was significantly higher than the stress related to the non-ASD sibling ($M = 79.89, SD = 19.30, t(26) = 7.95, p < .001$). In the within-family sample ($n = 27$), 30% of mothers had total stress scores pertaining to parenting the non-ASD child above the 90th percentile and 93% had total stress scores pertaining to parenting the ASD child above the 90th percentile.

The association between mind-mindedness and parenting stress

The relationship between mind-mindedness and total parenting stress was explored. Separate analyses were conducted for measures relating to the ASD and the non-ASD child. There were no significant associations between mind-mindedness (proportion of mental descriptors, proportion of positive and negative mental descriptors) and total parenting stress ($ps > .05, r$ -values reported in Table 4). Exploratory analyses were conducted to test associations between mind-mindedness and the PSI-SF subscales (*parental distress, parent-child dysfunctional interaction, difficult child*) for both the ASD and the non-ASD samples.

There was a significant correlation between scores on the difficult child subscale and negative mental comments ($r_s = .31, p = .034$) for the ASD sample. There were no other significant correlations ($ps > .05, r$ range $-.25$ to $.21$).⁴

Table 4

Correlations (r-values) between mind-mindedness and parental stress scores

	Mental attributes		Positive		Negative		Neutral	
	ASD	TD	ASD	TD	ASD	TD	ASD	TD
Total PSI score	.14	-.15	.04	-.04	.14	.14	-.18	-.03

Discussion

The current study explored mind-mindedness amongst a sample of mothers of children with ASD. Additionally, we compared maternal propensity for mind-mindedness with reference to a child with ASD and a sibling without such a diagnosis. The mothers in our study ascribed mental descriptors to their children with ASD, and did so at similar rates to mothers of typically developing children as reported elsewhere in the literature. In our ASD sample, the mean proportion of attributions that were coded as mental was .35, which is consistent with rates reported elsewhere for non-clinical samples, which range from .32 to .47 (Lok & McMahon, 2006; Meins et al., 2003; Meins et al., 2014; Walker et al., 2011). The severity of autism symptomology was unrelated to mother's use of mental descriptors, however there was indication of a non-significant association between autism severity and

⁴ All within-family analyses were repeated with the three TD children with additional difficulties removed from the sample. Results were unchanged.

negative mental descriptors that may reach significance in a larger sample with the power to detect medium effect sizes.

Crucially, we compared mind-mindedness within samples by asking mothers to describe their child with ASD and a non-ASD sibling. Group level comparisons revealed no significant difference in the number of mental attributes that mothers used to describe ASD children and non-ASD siblings. At the individual level, however, there was not a significant correlation between the number of mental attributes mothers used to describe her two children. Thus, while there were no group differences in mind-mindedness, there were individual differences in the consistency of how mind-minded the mothers were with their two children. Only one other study to date has examined mind-mindedness in clinical child samples and in contrast to our results, it reported that mothers of children referred to clinical services made significantly fewer mental comments compared to a community sample (Walker et al., 2011). The authors do not make any claims about what contributed to the lower mind-mindedness in their sample, and do not rule out the possibility of a third underlying variable. What is clear from our data is that parenting a child with ASD does not appear to limit the parent's ability to tune-in to their child's mind.

One possible interpretation of our results is that because group differences between mothers' mind-mindedness of their ASD and non-ASD children were nonsignificant, mind-mindedness may represent an individual trait to take a mentalistic approach in understanding others. However, we did not find a significant correlation between mind-mindedness pertaining to the ASD child and the non-ASD sibling, indicating there were individual differences in how consistently mind-minded mothers were with their ASD and non-ASD children. Our findings concur with the proposal of Meins et al. (2014) that mind-mindedness is a feature of close relationships, rather than an individual trait. Meins et al. (2014) found that an individual's tendency to comment on the mental states of a close romantic partner was

positively correlated with their mind-minded descriptions of a friend, but not their descriptions of famous people or works of art, leading them to conclude that the construct of mind-mindedness represents a quality of close relationships. More recent research provides further support for this view by comparing mind-mindedness in adoptive and biological parents. Fishburn et al. (2017) found adoptive parents were lower in mind-mindedness than biological parents, and that these differences were not explained by differences in parental mental health. Thus in caregiver-child dyads in which the relationship has not spanned the child's life, the caregiver's capacity for being mind-minded about their child is reduced.

In keeping with this view, previous studies have demonstrated that the capacity for mind-mindedness is unrelated to demographic characteristics of the parent and child (Meins et al. 2001; Meins et al. 2011, Pawlby et al. 2010; Walker, Wheatcroft, & Camic, 2011). Our results add to these by demonstrating that mind-mindedness is maintained even in the presence of a developmental disorder.

However, by considering the valence of mind related comments, we revealed interesting differences in the way that mothers described their two children. Mothers more readily applied positive mental state descriptors to a non-ASD sibling, and used more negative mental descriptors of their child with ASD. These findings could have arisen from the fact that parents described their child with ASD first, and so their subsequent description of a non-ASD sibling was always anchored against this first description and this comparison may have exacerbated the valence difference. However, our findings are consistent with Walker et al. who also found a higher proportion of negatively valenced mental comments in the clinical group compared to the community sample. Our findings further highlight the value of coding the valence of mental attributes to reveal additional insight into parents' representations of their children. The extent to which such representations relate to the nature of parent-child interactions was not explored within this study, although research in related

domains indicates that maternal insight into a child with ASD is positively related to sensitivity during interactions (Koren-Karie, Oppenheim, Dolev, Sher, & Etzion-Carasso, 2002). Alternatively, it is possible that while a mother may hold negatively valenced representations of her child's mind, this may not reduce her sensitivity. Future work is required to understand the way that mind-mindedness predicts interactional quality.

It is well established that stress is high in mothers of children with ASD and our data reflect this with the majority of mothers reporting total stress in clinically significant ranges. Because the stress measure that we employed assesses the stress experienced in relation to parenting a particular child, we were able to differentiate between parenting stress across siblings. Parents reported significantly more stress related to parenting their child with ASD than their non-ASD child. In their meta-analysis of parenting stress, Hayes and Watson (2013) suggested that it is not enough to merely understand stress in this way by comparing experiences across different contexts. To this end, we also considered the relationship between parenting stress and the propensity for mind-mindedness, with previous research suggesting that the valence of mind related comments is important. Whilst the frequent use of positive mind-related comments has been shown to afford some protection from high levels of stress (Demers et al., 2010; McMahon & Meins, 2012), our results did not concur. This was true even when considering valence of mind-related comments and across both the ASD and non-ASD siblings. While the stress scores relating to the non-ASD child were similar to those reported by McMahon and Meins (2012) ($M = 79.89$ and $M = 73.17$, respectively) and were significantly lower than the stress scores reported for the ASD-child, it is likely that the cumulative daily experience of stress for parents in our sample was high. We suggest that such extremely high stress parenting is beyond the protective reach of mind-mindedness. Such null findings may also be explained by the diversity of parent experiences, of which parenting stress is only one dimension. Since this is the first study to explore mind-

mindedness when raising a child with ASD, such interpretations are speculative and warrant future exploration.

Mothers who rated their child with ASD as more difficult to parent used a greater proportion of negative mental descriptors. This correlation may indicate that mothers were able to understand their child's challenging behavior with reference to underlying mental states. However, being able to do so was not associated with reduced overall stress, as one might expect. Alternatively, mothers possessing a negative intentional stance of their child may have judged their behavior to be more difficult to manage, or mothers who experienced stress related to difficult child behavior were more likely to represent their child in negative mental terms. Our correlational data preclude the drawing of conclusions, however these findings lend further support to the importance of considering valence when assessing mind-mindedness, and also highlight the need to further support families in understanding and coping with the behavioral profile associated with children with autism.

This study was the first to explore mind-mindedness amongst mothers of children with ASD and also represents one of the few to consider the consistency of mind-mindedness across sibling relationships. In doing so, we have provided preliminary evidence that maternal mind-mindedness appears to be consistent across close relationships, although there are marked qualitative differences in the nature of these representations. The inter-rater agreement for coding mind-mindedness, while substantial, was somewhat lower than that typically reported in the literature. This may have been due to the types of attributes elicited by descriptions of children with ASD, which are harder to assign to the categories of the mind-mindedness coding scheme. Withstanding this and other limitations, such as the sample size and recognizing its self-selecting nature and lack of ethnic diversity, we have demonstrated that the presence of disability does not compromise assessment of mind-mindedness, although further research is needed to understand whether in contexts where

there are high demands on parenting, being mind-minded affords protection from problematic outcomes.

Implications. While we did not find a protective effect of mind-mindedness on parental stress (or vice versa, that experiences of high stress limit parents' capacity for mind-mindedness), being mind-minded may provide other benefits to the dyad. Previous work has found an association between mothers' representations of their child with ASD and interactional style during play (Hutman, Siller, & Sigman, 2009). The extent to which mothers are responsive to their children with ASD during play has been identified to predict the child's subsequent language abilities (Siller and Sigman, 2002; 2008). We have demonstrated that the describe your child interview yields valuable data on mind-mindedness in parents of children with ASD. It may be useful for future research to utilize this measure and explore the relationship between mind-mindedness and interactional style during play, considering factors such as parenting stress and child language outcomes.

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