

# Sleep Problems in Young Children with Autism Spectrum Disorders: A Study of Parenting Stress, Mothers' Sleep-Related Cognitions, and Bedtime Behaviors

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## Keywords

Autism; Behavioral sleep problems; Parenting stress; Sleep.

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## SUMMARY

**Introduction:** Disrupted sleep is common among children with autism spectrum disorder (ASD). **Aims:** Our goal was to (1) examine the contribution of sleep problems to parenting stress in children with ASD as compared to typically developing (TD) and (2) to address maternal sleep-related cognitions and behaviors in both groups. **Methods:** Mothers of 34 ASD (mean age = 39.29 months, SD = 5.22) and 31 TD children (mean age = 36.23 months, SD = 5.75) completed questionnaires measuring maternal stress, sleep-related cognitions and settling to sleep interactions, and the child's sleep problems; mothers in the ASD group completed a symptom severity questionnaire. **Results:** In accord with previous research, children with ASD had more sleep problems compared to the TD group, and their mothers reported higher levels of stress. In the ASD group, sleep problems contributed to the experience of maternal stress, over and above symptom severity. Across groups, maternal cognitions and bedtime interactions were significantly associated with children's sleep problems. **Conclusion:** The results highlight the interplay between sleep-related cognitions, bedtime interactions, and sleep problems and underscore the contribution of disrupted sleep to mothers' experience of parenting stress. As sleep problems in ASD children are common, clinicians are advised to include sleep in consultations with parents.

## Introduction

Raising a child with an autism spectrum disorder (ASD) presents parents with unique challenges. Children with ASD exhibit core symptoms of deficits in social communication and interaction as well as restricted, repetitive patterns of behavior, interests, or activities [1]. In addition, these children may exhibit a wide range of behavioral symptoms such as abnormal reactions to sensory stimuli, hyperactivity, temper tantrums, self-injurious behaviors, abnormal eating patterns, and sleep abnormalities [2]. Consequently, parenting children with ASD is extremely demanding and stressful [3], which has made this an area of focused research [4].

Parents of children with ASD report higher levels of parenting stress when compared to parents of typically developing children [5] and to parents of children with other disabilities [6]. Sources of stress experienced by parents of children with autism may include social isolation, financial worries, and care-taking demands [7]. Studies have consistently found that the stresses of caring for a child with ASD are strongly related to the severity of the child's autism symptoms and the associated behavior problems [8].

One of the most common noncore symptoms among children with ASD is disturbed sleep [9], occurring in 50–80% of these children, compared with 9–50% in age-matched, typically developing

children [10–12]. Reported sleep problems include difficulties with sleep initiation and maintenance, bedtime resistance, parasomnias, and early morning awakenings [9,13]. The severity of the sleep problems is higher compared to typically developing children with sleep difficulties [14]. For parents of children with ASD, sleep-related problems are the most frequently reported area of difficulty [15].

Children's sleep problems can be a significant concern for many parents, and their association with parenting stress is well documented in typically developing children [16] and in children with intellectual disability [17]. In a large-scale epidemiological study of 16,000 families in Sweden which examined psychosocial correlates of parenting stress [18], it was found that children's sleep problems were more important than a series of child health problems, such as ear infections and allergies, in predicting parenting stress. Wiggs and Stores [19] found that the treatment of sleep problems among children with intellectual disability resulted in significant reductions in maternal stress.

Despite the high occurrence of sleep problems among children diagnosed with ASD, only a few studies have investigated the associations between sleep problems and parental stress [20]. For example, Honomichl and colleagues [13] found that parents of children with pervasive developmental disorders (PDD) who also reported sleep problems, indicated more parental stress than did

parents of children with PDD without sleep problems. Chu and Richdale [21] reported that sleep problems among children with developmental disabilities were related to greater behavior problems and increased stress levels in mothers. Other studies indicate that sleep problems in children with ASD are related to symptom severity [22,23]. Hoffman and colleagues [20] have found a relationship between mothers' reports of the severity of the ASD symptoms and the child's sleep problem, which in turn predicted maternal stress. Whereas most of the above studies included in their samples a wide age range of children with ASD and developmental disabilities, in the present research, we aimed to restrict the age span and study parenting stress among mothers to children with ASD ages 2–4 years.

It has been underscored that the relationship between children's sleep problems and parents' behavior and experiences is bidirectional [24]. The transactional model of sleep–wake regulation [24] highlights the dynamic and bidirectional links between child variables, parental factors, and child–parent interactions, which in turn shape the child's sleep patterns [25]. Among the parenting variables that have been linked to child sleep, a construct of sleep-related cognitions has been postulated [26,27], encompassing the beliefs, attitudes, interpretations, and expectations parents attribute and assign to sleep-related behavior and issues. Problematic sleep-related cognitions, especially those reflecting difficulty in limit setting, anger at the infant's demands, and increased doubts about parenting competence [26], as well as parental use of active physical comforting at bedtime [27], have been linked to children's sleep problems. Caregivers of children with medical issues may have difficulty setting limits, due to feelings of guilt or a perception of the child as vulnerable [28], and therefore may find it difficult to limit their bedtime interactions.

Considering the high prevalence of sleep problems among children with ASD, their potential adverse effect on parents' well-being and the little empirical attention these links have received, the first objective of this study was to examine the contribution of sleep problems to maternal parenting stress in the ASD group. A second aim was to focus on parental cognitions and behaviors related to these sleep problems among children with ASD as compared to TD children. Mothers were the focus of this study as they are often the primary caregivers and may be at greater risk of the negative effects of their children's disabilities [29] and sleep problems [30].

We hypothesized that (1) in the ASD group, sleep problems will make a unique contribution to the experience of maternal parenting stress over and above symptom severity; and (2) mothers of children in the ASD group will report more problematic sleep-related cognitions and more bedtime involvement compared to mothers of TD children. In both groups, problematic cognitions and intensive bedtime involvement will be associated with poor sleep.

## Materials and Methods

### Participants

The sample consisted of 66 mother–child dyads: 35 children (25 boys), aged 29–48 months ( $M = 39.29$ ,  $SD = 5.22$ ), with autism spectrum disorder (ASD) and 31 typically developed (TD) children

(15 boys), aged 25–48 months ( $M = 36.23$ ,  $SD = 5.75$ ). The ASD sample was drawn from rehabilitation day care centers ("Alutafs") designated for young children with autism that operate throughout Israel. These "Alutafs" were established by ALUT—The Israeli Society for Autistic Children, to fulfill the children's needs for early and intensive intervention and offer their parents support. The ASD diagnosis for each child in the "Alutafs" was provided by developmental psychologist and child neurologist based on DSM-IV [2] criteria in order for the child to be eligible for Alutaf assigning. The comparison group (TD) was a convenience sample recruited in childcare centers. The only exclusion criteria for both groups were child health problem existence.

Table 1 provides a description of the demographic characteristics of the children and mothers included in the sample. The two groups were not different with respect to family size, parents' age, marital status, mothers' level of education, and child's birth order. The groups did differ significantly with respect to child's age ( $t = 2.25$ ,  $P = 0.028$ ) and gender ( $\chi^2 = 4.33$ ,  $P = 0.026$ ). The ASD children were, on average, older than the comparison group. The higher prevalence of boys in the ASD is in accord with the known gender ratio [2]. MANOVA analysis revealed no significant gender differences in regard to parental stress [ $F(1,29) = 0.17$ ,  $P = 0.917$ ], children's sleep problems [ $F(1,29) = 0.56$ ,  $P = 0.796$ ], maternal sleep-related cognitions [ $F(1,29) = 0.67$ ,  $P = 0.652$ ], and behaviors [ $F(1,29) = 1.12$ ,  $P = 0.377$ ].

### Procedure

The study was approved by the Institutional Review Board and by the Ministry of Social Affairs and Social Services. In the ASD group, parents were invited by the childcare social worker to participate in a study on sleep and parenting and pointing out the location of the questionnaire packages. One hundred and forty questionnaire packets were delivered to "Alutaf" centers and 35 were returned, yielding a 25% participation rate (one questionnaire was removed from analysis due to child's asthma). The TD participants were recruited from three childcare centers. In each, the head teacher invited parents to take part in a study on sleep and parenting. Of the 48 questionnaire packets delivered, 31 were completed and returned, yielding a 65% return rate. Across groups, recruitment spanned over a period of 5 months.

### Instruments and Measures

- 1 *Demographic form* which included information pertaining to age, marital status, and education level of both parents, number of children in the family and the participating child's birth date, gender, birth order, health, and whether or not the child has been diagnosed with a developmental disorder.
- 2 *Gilliam Autism Rating Scale-Second Edition (GARS-2)* [31]. The GARS-2 is a 42-item professional and parent report instrument that assesses the severity of autism within three domains: stereotyped behavior, communication, and social interaction, yielding an Autism Index ( $M = 100$ ,  $SD = 15$ ). The GARS-2 manual [31] provides normative data from an American nationwide sample of 1107 children and young adults (ages 3–22 years) diagnosed with autism. According to Gilliam [31], age does not influence the characteristics of

**Table 1** Child and mother: demographic characteristics

Variable	ASD (n = 34)					TD (n = 31)				
	Range	M	SD	n	%	Range	M	SD	n	%
Child										
Boys				25	73.5				15	48.4
Girls				9	26.5				16	51.6
Age (in months)	29.0–48.0	39.3	5.2			25.0–48.0	36.2	5.7		
Birth Order										
First				14	41.2				14	45.2
Second				15	44.1				11	35.5
Third/Forth				5	14.7				6	19.3
Mother										
Age (in years)	22.0–43.0	32.0	5.0			26.0–42.0	33.6	4.1		
Years of Education	12.0–18.0	13.9	3.0			12.0–18.0	15.0	2.2		
No. of Children	1.0–4.0	2.1	0.7			1.0–4.0	2.1	0.8		
Marital Status										
Married				31	91.2				29	93.5
Divorced				3	8.8				2	6.5

autism, as they measured through GARS-2. Internal reliability coefficients in this study ranged from 0.90 to 0.97.

- 3 *Parenting Stress Index-Short Form (PSI-SF)* [32]. The PSI-SF is a 36-item parent report measure of parenting stress, which is based on the full-length version [32]. The PSI-SF comprises three subscales (12 items each), including parental distress (distress directly related to parenting), parent–child dysfunctional interaction (parental perception of the child and the interactions with the child that are not reinforcing to the parent), and difficult child (report of the child's behavioral characteristics that make them easy or difficult to manage). Items are rated on a 5-point Likert scale, yielding total parenting stress score, which ranges between 36 and 180. A score of  $\geq 90$  indicates clinically significant levels of stress. Internal reliability coefficients in this study ranged from 0.88 (parent–child interaction subscale) to 0.95 (for the entire scale).
- 4 *Children's Sleep Habits Questionnaire (CSHQ)* [33]. The CSHQ is a parent report instrument used to examine sleep habits and identify sleep problems. Parents rate the frequency of their child's specific sleep behaviors during the preceding week on a 3-point Likert scale (*rarely* = 0–1 night per week; *sometimes* = 2–4 nights per week; *usually* = 5–7 nights per week). The CSHQ contains eight subscales: bedtime resistance, sleep onset delay, sleep duration, sleep anxiety, night wakings, parasomnias, sleep-disordered breathing, and daytime sleepiness. These subscales yield a total score with higher scores indicating more disturbed sleep; the cutoff for sleep problems is 41 [34]. Although the CSHQ was normed with children age 4–10 years, it has been used to assess sleep in preschoolers with and without ASD [35]. An internal consistency coefficient of 0.88 was obtained in this study.
- 5 *Maternal Cognitions about Infant Sleep Questionnaire (MCISQ)* [36]. The MCISQ is a 20-item self-report questionnaire designed to assess cognitions that mothers have about their infant's sleep. Mothers rate their agreement with assertions about difficulties or concerns with the following five domains: limit setting (difficulties in setting limits or resisting the

infant's demands,  $\alpha = 0.84$ ), anger (negative feelings toward the infant,  $\alpha = 0.63$ ), doubt (doubts about parental competency,  $\alpha = 0.70$ ), feeding (concerns about nighttime feeding,  $\alpha = 0.81$ ), safety (concerns about the child's safety during the night,  $\alpha = 0.39$ ). Internal consistency coefficient for the entire scale was 0.89. Overall scores range from 0 to 75, with higher scores indicating problematic cognitions.

- 6 *Parental Interaction Bedtime Behavior Scale (PIBBS)* [37]. A 17-item parent report measure evaluating the types and frequency of behaviors parents use to settle their children to sleep. Items are grouped into five subscales: active physical comforting, encourage autonomy, settle by movement, passive physical comforting, and social comforting. For this study, we focused on the distinction between active parental involvement versus encouraging child autonomy in settling to sleep [38].

## Results

### Descriptive Statistics and Preliminary Analysis

Means, standard deviations, and group comparisons of PSI and children's sleep are presented in Table 2. MANOVA with maternal stress (PSI) as dependent variable indicated significantly higher stress levels in ASD compared to TD group (Wilk's  $\Lambda = 0.52$ , MF (3,61) = 18.41,  $P = 0.000$ ). MANOVA with the CSHQ total score as dependent variable indicated significantly higher sleep problems in ASD compared to TD group (Wilk's  $\Lambda = 0.71$ , MF (9,55) = 2.46,  $P = 0.020$ ).

Across groups, maternal stress (PSI score) was significantly positively correlated with the CSHQ total score ( $r = 0.62$ ,  $P = 0.000$ ). Sleep-disordered breathing was the only scale which was not correlated with PSI ( $r = 0.10$ ,  $P = 0.429$ ); all other scales were significantly correlated with maternal stress: bedtime resistance ( $r = 0.39$ ,  $P = 0.001$ ), sleep onset delay ( $r = 0.48$ ,  $P = 0.000$ ), sleep duration ( $r = 0.36$ ,  $P = 0.003$ ), sleep anxiety ( $r = 0.25$ ,

**Table 2** Means, standard deviations, and *F* values comparing maternal stress (PSI) and sleep variables (CSHQ) in ASD and TD groups

Scale	ASD (n = 34)			TD (n = 31)			MANOVA F (1,63)
	Range	M	SD	Range	M	SD	
PSI-SF	42.0–135.0	89.9	22.9	36.0–86.0	58.8	16.6	38.7***
PD	12.0–51.0	30.1	10.2	12.0–33.0	22.7	7.1	11.5**
P-CDI	14.0–46.0	26.3	8.4	12.0–25.0	15.0	3.7	46.8***
DC	13.0–48.0	33.5	8.5	12.0–38.0	21.0	8.5	35.0***
CSHQ	33.0–70.0	48.1	9.9	33.0–63.0	42.7	8.5	5.3*
Bedtime resistance	6.0–16.0	9.5	3.2	6.0–15.0	8.8	3.0	0.9
Sleep onset delay	1.0–3.0	2.1	0.9	1.0–3.0	1.6	0.8	7.1*
Sleep duration	3.0–9.0	4.2	1.8	3.0–8.0	3.5	1.2	3.1
Sleep anxiety	4.0–12.0	6.4	2.2	4.0–11.0	6.2	2.2	0.0
Night-waking	3.0–8.0	4.4	1.6	3.0–7.0	4.2	1.3	0.3
Parasomnias	7.0–11.0	8.2	1.3	7.0–9.0	7.5	0.7	6.7*
Disordered breathing	3.0–5.0	3.2	0.5	3.0–4.0	3.0	0.2	2.9
Daytime sleepiness	8.0–23.0	13.3	3.9	8.0–22.0	11.2	3.6	5.2*

PSI-SF, parenting stress index-short form; PD, parental distress; P-CDI, parent-child dysfunctional interaction; DC, difficult child; CSHQ, children's sleep habits questionnaire. \* $P < 0.05$  \*\* $P < 0.01$  \*\*\* $P < 0.001$ .

$P = 0.041$ ), night wakings ( $r = 0.41$ ,  $P = 0.001$ ), parasomnias ( $r = 0.45$ ,  $P = 0.000$ ), and daytime sleepiness ( $r = 0.60$ ,  $P = 0.000$ ).

### ASD Severity, Parenting Stress, and Sleep Problems

ASD severity was strongly correlated with maternal stress ( $r = 0.65$ ,  $P = 0.000$ ). Total PSI score was positively correlated with all GARS-2 subscales total scores:  $r = 0.56$ ,  $P = 0.000$ ,  $r = 0.51$ ,  $P = 0.000$ , and  $r = 0.60$ ,  $P = 0.000$ , respectively, for stereotypic behavior, communication, and social interaction scales.

To test the first hypothesis concerning the contribution of ASD severity and child's sleep problems to the experience of maternal stress, hierarchical regression analysis was applied. The results supported the prediction: Sleep problems made a unique contribution to the experience of parenting stress, over and above symptom severity (Step 1:  $R^2 = 0.11$ ,  $\beta = 0.33$ ; Step 2:  $R^2 = 0.50$ ,  $\beta = 0.18$ ). CSHQ scores accounted for 39% of 50% explained variance in maternal stress [ $F(2, 31) = 15.22$ ,  $P = 0.000$ ].

### Maternal Cognitions, Bedtime Settling Behaviors, and Sleep Problems

To test the hypothesis that, compared to TD, mothers in the ASD group will express more problematic sleep-related cognitions and behaviors, the two groups were compared with respect to the MCISQ PIBBS subscales. The MANOVA revealed more similarities than differences. The only significant difference between the groups was the safety subscale of MCISQ [ $F(1, 63) = 7.96$ ,  $P = 0.006$ ]: Mothers of children diagnosed with ASD reported more worries about child's safety during the night than mothers of TD children ( $M = 3.62$ ,  $SD = 1.95$  and  $M = 2.52$ ,  $SD = 0.99$ , respectively). No significant differences were found between groups on neither MCISQ other subscales nor PIBBS subscales.

Finally, for examining the prediction pertaining to the interrelations between cognitions (MCISQ), bedtime behaviors (PIBBS), and poor sleep (CSHQ), Pearson's correlation coefficients were calculated (Table 3). Across groups, cognitions about sleep were significantly associated with parenting bedtime behavior. It was further found that problematic cognitions, as represented by the total MCISQ score, were strongly correlated with active physical comforting ( $r = 0.71$ ,  $P = 0.000$ ) and moderately negatively correlated with encourage autonomy subscale ( $r = -0.30$ ,  $P = 0.016$ ). As shown in Table 3, poor sleep, as indexed by the total CSHQ score, was strongly correlated with problematic cognitions as represented by the MCISQ score ( $r = 0.65$ ,  $P = 0.000$ ), with subscale correlations ranging from  $r = 0.25$  ( $P < 0.05$ ) to  $r = 0.61$  ( $P < 0.001$ ), respectively, to anger and setting limits. Bedtime parenting settling behaviors were also associated with sleep problems, such that poor sleep was associated with the bedtime strategies mothers applied to settle their child to sleep (PIBBS). Specifically, poor sleep was strongly associated with active physical comforting ( $r = 0.75$ ,  $P < 0.001$ ) and with settling the child using movement ( $r = 0.37$ ,  $P < 0.01$ ).

To further examine the role of mothers' cognitions and behaviors in predicting sleep problems, hierarchical regression analysis was carried out. As shown in Table 4, together, maternal sleep-related cognitions and bedtime behaviors accounted for 69% of the sleep problem variance; 48% of the variance in poor sleep (CSHQ score) was explained by maternal cognitions [ $F(10, 54) = 11.84$ ,  $P = 0.000$ ].

### Discussion

The present study examined the relationship between children's sleep problems, maternal stress, and sleep-related parenting factors. Similar to previous findings, raising a child diagnosed with autism spectrum disorder entails higher levels of parenting stress [3,6,39] and greater children's sleep problems [11,14], compared to typically developing children. Children with ASD differed

**Table 3** Pearson correlations between sleep problems, maternal cognitions, and bedtime interaction measures

	Setting limits	Anger	Doubt	Feeding	Safety	Total MCISQ score	Active physical	Autonomy	Movement	Passive physical	Social
Bedtime resistance	0.39***	0.21*	0.41**	0.34**	0.24	0.44***	0.68***	−0.07	0.28*	0.24	0.14
Sleep onset delay	0.44***	0.24	0.38**	0.35**	0.31*	0.47***	0.42***	−0.03	0.16	0.07	0.05
Sleep duration	0.30*	0.11	0.23	0.42**	−0.06	0.31*	0.46***	−0.10	0.29*	0.05	0.06
Sleep anxiety	0.25*	0.05	0.39**	0.13	0.05	0.27*	0.46***	0.08	0.32**	0.16	0.09*
Night-waking	0.57***	0.32**	0.56***	0.48***	0.34**	0.63***	0.67***	0.02	0.37**	0.11	0.27*
Parasomnias	0.31*	0.22	0.24	0.13	0.51***	0.34**	0.32**	0.12	0.10	0.21	0.20
Disordered breathing	0.03	−0.01	0.00	0.23	−0.17	0.06	−0.03	0.05	0.00	0.04	−0.04
Daytime sleepiness	0.58***	0.19	0.57***	0.37**	0.55***	0.60***	0.59***	−0.02	0.30*	0.15	0.17
Total CSHQ score	0.61***	0.25*	0.60***	0.49***	0.45***	0.65***	0.75***	−0.02	0.37**	0.19	0.20

\* $P < 0.05$  \*\* $P < 0.01$  \*\*\* $P < 0.001$ .

significantly from TD children in that mothers reported more sleep disturbance, particularly longer sleep onset delay, more parasomnias, and greater daytime sleepiness. These findings are in accord with the possibility that behavioral deficits associated with ASD interfere or delay the establishment of adequate sleep habits [40]. Previous research underlined that children with ASD appear to have difficulty transitioning from stimulating activities to sleep [41], or they may have sensitivities to the level of light or sound in their bedroom [40], resulting in difficulty falling asleep at night and sleepiness during the following day. Adjusting the child's daily schedule and sleep environment to promote good sleep habits may be particularly challenging for parents dealing with the multiple stressors involved in raising a child with ASD [40]. The results of the present study indicated that in very young children with ASD, sleep problems made a unique contribution to the experience of maternal stress, over and above symptom severity. From a clinical perspective, this finding is important as the extra maternal burden experienced when the child has sleeping problems may be partially alleviated in intervention.

The second aim of the study was to examine the interplay between the child's sleep problems and aspects of parenting that relate to the child's sleep. More specifically, we focused on mother's cognitions about sleep-related issues and on their bedtime behavior when settling the child to sleep. The link between sleep-related cognition and children sleep was studied in normative samples of infants [27] and toddlers [36]; this is the first study to examine this topic in young children with ASD. Our results showed that, as a group, mothers in the ASD group did not report more problematic cognitions or more active bedtime involvement compared to mothers of typically developing children matched for age. This finding should be emphasized for a number of reasons. First, it confirms, albeit indirectly, that the high prevalence of sleep-related problems in children with ASD [9] is part of the syndrome [2] rather than reflects problematic parental cognitions and/or interactions. Second, it suggests that the ideas and beliefs parents have about children's sleep cut across different developmental trajectories. Moreover, the nighttime parenting strategies that mothers use to settle their child to sleep [37] reflect parenting

**Table 4** Hierarchical regression analysis: predicting children's sleep problems

		B	SE B	$\beta$	R <sup>2</sup>
Step 1					
Maternal cognitions	Setting limits	0.44	0.20	0.32*	0.48
	Anger	−0.22	0.29	−0.08	
	Doubt	0.49	0.25	0.27	
	Feeding	0.34	0.31	0.13	
	Safety	1.09	0.62	0.19	
Step 2					
Maternal cognitions	Setting limits	0.54	0.18	0.40**	0.69
	Anger	−0.22	0.24	−0.09	
	Doubt	0.18	0.23	0.10	
	Feeding	−0.23	0.30	−0.09	
	Safety	0.65	0.53	0.11	
Bedtime interactions	Active physical	0.99	0.23	0.53***	
	Encourage autonomy	0.56	0.25	0.20*	
	Movement	−0.14	0.68	−0.02	
	Passive physical	0.87	0.37	0.19*	
	Social	−0.28	0.20	−0.12	

\* $P < 0.05$  \*\* $P < 0.01$  \*\*\* $P < 0.001$ .

variables [26,42] and individual differences in the child's regulation capacities [43], more than whether or not the child has a developmental disorder. In the context of developmental psychopathology, identifying similarities between parent-child dyads with and without diagnostic labels is just as important as highlighting differences [44].

Whether or not the child was typically developing or not, more problematic sleep-related cognitions expressed by the mothers, especially those reflecting doubts about parenting competence and difficulties with limit setting, were related to more disrupted sleep. Similarly, at the reported behavioral level, active settling

involvement such as physically regulating transitions from awake to asleep states was associated with overall poor sleep. Similar results were previously found in convenience sample of infants [27], as well as in community sample of preschoolers [45]. It appears that in the early years, more active parental involvement, as opposed to parenting behaviors that encourage independence and self-soothing, is associated with shorter and more fragmented sleep [45]. The contribution of the present research is in highlighting that a similar interplay between cognitions, parenting behaviors, and sleep disruption is also characteristic of mothers and their young children diagnosed with ASD. A number of methodological limitations should be considered. First, the correlational design precludes causality inferences. According to the transactional model of sleep–wake regulation [24], children's sleep may influence as well as be influenced by parents' behavior. For example, parents of a poor sleepers who wake up often during the night are more likely to get actively involved in settling their child back to sleep than parents of calmer sleepers [46]. Hastings [47] formulated a model on the links between parental stress and behavioral problems of children with developmental delay, arguing that problematic child behavior lead to parental stress and parents under stress employ certain behaviors which tend to reinforce the child's behavior problems. Future longitudinal investigations could explore causal pathways between parental sleep-related cognitions and behaviors, children's sleep problems, and parental stress. Clarifying the extent to which parenting stress compromises parents' ability to effectively manage their children's sleep problems could be of considerable clinical importance.

A second limitation of this study is its reliance on mothers' self-reports. Clearly, self-report is crucial when evaluating internalized

states such as cognitions and the experience of parenting stress. Including objective measures of sleep and observations of actual parent–child bedtime interactions, across time, will allow to examine how parents' ideas and beliefs shape their own sleep-related behavior. A future study should also include a measure of fathers' parenting stress and could also examine the prediction that greater involvement of fathers in caretaking reduces sleep problems [48].

From an applied perspective, as sleep problems in children with ASD are very common [9], children undergoing evaluation for autism spectrum disorder should be routinely screened for sleep disturbances [49]. Unlike parents of typically developing children, parents raising a child with ASD may perceive their child's sleep problems as an integral part of the child's disability and believe that it is untreatable [50,51]. Hence, parents of young children with ASD might benefit from the inclusion of sleep education to help reduce parental stress, which in turn may make it easier for parents of children with ASD to cope better with the everyday challenges related to the child's disability, including sleep-related problems.

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## Conflict of Interest

The authors declare no conflict of interest.

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