

Infant Sleep and Parental Sleep-Related Cognitions

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Infant sleep is a major source of distress in many families. The purpose of this study was to assess infant sleep and parental sleep-related cognitions about infant sleep in clinical and control samples. The clinical sample consisted of 48 infants referred to a sleep clinic because of night-wakings problems. The control sample included 48 infants with no parental complaints about sleep difficulties. Sleep of all participating infants was monitored for 1 week with actigraphs and parental daily logs. Parents completed 2 questionnaires testing their cognitions about infant sleep. As expected, significant group differences were found with regard to the sleep-quality measures and parental cognitions. Parental cognitions about difficulties in limit setting were associated with poorer sleep quality. Significant differences were found between fathers and mothers on the cognitions scales. The results highlight the links between parental cognitions and infant sleep and the unique perspective of each parent in this area.

Keywords: sleep, infant, parent, cognitions, actigraphy

The evolution of infant sleep–wake patterns is one of the most striking developmental processes in early childhood. During the first years of life, many parents are preoccupied with concerns and difficulties pertaining to their infant’s sleep. Many of them seek professional help or use information available in the media to address their infant’s sleep problems (Johnson, 1991). Infant sleep problems may pose a serious challenge to parental and family well-being (Durand & Mindell, 1990; Eckerberg, 2004; Hiscock & Wake, 2002; Sadeh & Anders, 1993). Most intervention methods for infant sleep problems rely on changing parental attitudes and behaviors to facilitate better infant sleep habits. However, parental cognitions (i.e., beliefs, expectations, attributions, and interpretation) vis-à-vis infant sleep have rarely been explored. In the present study, we aimed to explore the relationships between infant sleep and parental cognitions about sleep in a clinical group of sleep-disturbed infants and their parents and in a matched control group.

Sleep in Early Development

The maturation and consolidation of sleep–wake patterns are major developmental tasks in infancy. This course of development involves a complex matrix of biological–

physiological processes as well as developmental–psychosocial ones (Mirmiran, Maas, & Ariagno, 2003; Sadeh & Anders, 1993; Thoman, 1990). The early evolution process of infant sleep includes two main features: (a) Sleep duration is gradually reduced, and (b) sleep consolidates and concentrates in a main nocturnal sleep episode (Anders & Keener, 1985).

The goal of consolidated sleep during the night, also referred to as “*sleeping through the night*,” is achieved by most infants during the 1st year of life (Anders, Halpern, & Hua, 1992; Bernal, 1973). Nevertheless, surveys show that as many as 20% to 30% of all infants do not succeed in achieving this goal, and their sleep continues to be fragmented as manifested by multiple and/or prolonged night wakings. These phenomena are considered the most prevalent sleep problems during infancy and early childhood (e.g., Johnson, 1991; Thunstrom, 1999). It has been demonstrated that sleep difficulties in early childhood constitute not only a prevalent problem but also a persistent one that could develop into a chronic disorder lasting well into late childhood and even adulthood (Kataria, Swanson, & Trevathan, 1987; Zuckerman, Stevenson, & Bailey, 1987).

This pessimistic picture of early sleep problems is counterbalanced by the optimistic findings from the research focused on behavioral interventions for prevalent infant sleep problems. Many studies have demonstrated the efficacy of behavioral interventions in treating sleep problems, particularly during infancy and early childhood. Generally, the reported success rate ranged between 73% and 90% (Kuhn & Weidinger, 2000; Mindell, 1999; Owens, France, & Wiggs, 1999; Ramchandani, Wiggs, Webb, & Stores, 2000; Sadeh, 1994; Stores, 1996). These data highlight the importance of early intervention and prevention of infant sleep problems. The key players in clinical interventions are the parents, who need to modify their behavior vis-à-vis

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their infant's sleep. Understanding the underlying psychological mechanisms that determine parental behavior is thus crucial for clinical interventions tailored to prevent or treat sleep problems in early childhood.

Infant sleep is influenced by a variety of physiological and psychosocial factors (Mindell, 1993; Mindell, Owens, & Carskadon, 1999; Sadeh & Anders, 1993). From the psychosocial perspective, it has been established that infant sleep is very sensitive to—or highly correlated with—psychosocial factors including parental personality, psychopathology, and stress (Benoit, Zeanah, Boucher, & Minde, 1992; Guedeney & Kreisler, 1987; Keener, Zeanah, & Anders, 1988; Morrell, 1999; Sadeh, 1996b; Seifer, Sameroff, Dickstein, & Hayden, 1996; Van Tassel, 1985; Zuckerman et al., 1987). Furthermore, a strong relationship exists between sleep problems in infancy and parent–infant interactions (Paret, 1983; Sander, Stechler, Burns, & Julia, 1970), particularly bedtime interactions (Adair, Bauchner, Philipp, Levenson, & Zuckerman, 1991; Johnson, 1991; Van Tassel, 1985). It appears that infants who require or receive a high level of parental involvement at bedtime are more likely to have night-waking problems and vice versa (Adair et al., 1991).

The present study addressed the links between parental cognitions and infant sleep. This study was based on the hypothesis that parental cognitions about infant sleep underlie parental sleep-related behaviors and parents' interactions with their infants and are therefore related to a child's evolving sleep patterns (Morrell, 1999; Sadeh & Anders, 1993). The following sections introduce the broader topic of parental cognitions and their relevance to infant sleep.

Parental Cognitions: Expectations, Attributions, and Interpretation

Parental cognitions, in the form of developmental and temperamental expectations or in the form of attributions to the child's behavior, play a major role in child–parent relationships and child development (Bugental, 2000; Bugental & Johnston, 2000; Dix, 1993; Gottman, Katz, & Hooven, 1996; Joiner & Wagner, 1996; Miller, 1995). Studies have shown that parental cognitions relate to the way parents interpret child behavior and to how they feel and behave in response to it (Brody, Arias, & Fincham, 1996; Bugental, Brown, & Reiss, 1996; Donovan, Leavitt, & Walsh, 1997; Hastings & Grusec, 1998; Slep & O'Leary, 1998). For instance, in an experimental manipulation of maternal attributions, it was demonstrated that compared with mothers who were told that their children were not responsible for their behavior, mothers who were told that their children would intentionally behave with negative intent were significantly more overreactive in their discipline, they felt angrier, and their children exhibited higher rates of negative effects (Slep & O'Leary, 1998).

In addition, it has been demonstrated that parents of children with diagnosed psychopathology differ from parents of control children in their cognitive attribution concerning their child's behavior (Baden & Howe, 1992; Bickert, Milich, & Brown, 1996; Geller & Johnston, 1995;

Johnston & Freeman, 1997; Johnston, Reynolds, Freeman, & Geller, 1998; Nix et al., 1999; Strassberg, 1995, 1997). For instance, parents of children with attention-deficit/hyperactivity disorder (ADHD) tended to view inattentive–overactive and oppositional–defiant behaviors as more internally caused, less controllable by the child, and more stable, and they had more negative reactions to such behaviors, compared to control parents. For prosocial child behaviors, parents of children with ADHD viewed the causes as less internal and less stable than control parents (Johnston & Freeman, 1997).

Parents tend to have stable internal representations of their infants even prior to their birth (Benoit, Parker, & Zeanah, 1997; Zeanah, Keener, & Anders, 1986a, 1986b; Zeanah, Keener, Stewart, & Anders, 1985; Zeanah, Zeanah, & Stewart, 1990). On the basis of Bowlby's concept of "working models" that represent cognitive schemas of significant others, relationships, and related emotions, researchers have demonstrated that when parents are asked to describe future characteristics of their infants prior to birth, they produce descriptions that predict the actual characteristics of their real infants (Benoit et al., 1997; Zeanah et al., 1985, 1986a, 1986b, 1990). These results, and the fact that they exist even prior to real-life experiences with the infant, highlight the stability of these cognitive–emotional schemas. These early representations of the infant may shape or color, to a certain degree, the actual experience of the baby and his or her development (Benoit et al., 1997; Zeanah et al., 1985, 1986a, 1986b, 1990). For example, Benoit et al. (1997) examined the stability and predictive validity of classifications of mothers' representations of their infants using a structured interview. They found concordance between the prenatal mothers' representations of their infants and the infant Strange Situation attachment classifications at 12 months of age. This study demonstrates strong links between early maternal cognitions and expectations and actual objective measures of infant behavior in structured situations.

Although these predictive relationships cannot directly indicate what the causal links are, and how certain parental cognitions lead to specific developmental outcomes, the theories on working models suggest that these cognitions guide parental behaviors and responses to their infants and shape their development. The present study focuses on parental cognitions related to infant sleep.

Maternal Versus Paternal Cognitions

The research on parental cognitions has mostly relied on maternal cognitions (Bugental & Johnston, 2000; Morrell, 1999). However, differences between mothers' and fathers' cognitions have been found in various studies (Miller, 1995). Studies that have focused on parental perceptions of children's attachment behavior have found only modest associations between mother–infant and father–infant attachment or between maternal attachment representation and paternal attachment representation (van Ijzendoorn & DeWolff, 1997). This means that parents hold different perceptions regarding the attachment relationship with their

child. Differences between fathers and mothers have also been found in the way they rate their child's temperament. In one study, for example, mothers rated their children as having a more favorable temperament than fathers did (Zeanah et al., 1986b).

In another study that focused on the relationship between infant temperament, infant sleep, and nighttime parental interventions, significant differences were found between paternal and maternal perceptions. Although these findings indicated that both fathers' and mothers' perceptions of temperament at 6 months were related to objective measures of infant sleep-wake state organization, fathers' ratings were correlated with more sleep-wake variables than mothers' were. Specifically, it was found that infants who required frequent caregiving during the night were rated as significantly more difficult and arrhythmic by their fathers. These findings show that parents may interpret certain infant behaviors differently. It seems that infant sleep habits are a more potent determinant of fathers' than mothers' perceptions of their infant's temperament. This may be related to the fact that most of the fathers' interactions with infants occurred in the evenings and at night, whereas the mothers were the infants' primary caregivers during the day and therefore had more opportunities to interact with their infants in a variety of settings (Keener et al., 1988).

A significant limitation of the few studies on sleep-related parental cognitions and infant sleep is the fact that only maternal cognitions were explored, neglecting the significant role of the father in child development and psychopathology in general (Bonney, Kelley, & Levant, 1999; Connell & Goodman, 2002; Guzell & Vernon-Feagans, 2004; Lamb, 1997; Liebman & Abell, 2000; Montague & Walker-Andrews, 2002; Paquette, Bolte, Turcotte, Dubeau, & Bouchard, 2000; Winsler, Madigan, & Aquilino, 2005) and in infant sleep problems in particular. It has been suggested, on the basis of clinical experience, that fathers may play a special role in the development of infant sleep (Minde, Faucon, & Falkner, 1994; Sadeh, 2001, 2005). This suggestion is based on the clinical impression that mother-infant relationships are often very complex and enmeshed, and the father, who is often perceived as more neutral, may be in a better position to offer or adopt different perspectives, approaches, and behaviors that could lead to a resolution of the infant sleep problem. One of the main aims of the present study was to compare mothers' and fathers' cognitions about infant sleep and to assess how they distinctly correlate with their infants' sleep.

Parental Cognitions and Infant Sleep

The study of infant sleep and its relationships with parental psychopathology and parental behaviors has been quite extensive. For instance, sleep problems in early childhood have been repeatedly associated with maternal depression, stress level, ambivalent feelings toward the child, and a sense of incompetence (e.g., Gelman & King, 2001; Hiscock & Wake, 2001; Lam, Hiscock, & Wake, 2003; Lozoff, Wolf, & Davis, 1985; Zuckerman et al., 1987). However, the underlying cognitive sets that drive parents of

sleep-disturbed infants to respond in a different way from parents of control infants have not yet been thoroughly researched. As mentioned earlier, it is well documented that parents of sleep-disturbed infants tend to be much more involved in bedtime interactions with their infants, compared with parents of children without sleep disturbance (Adair et al., 1991; Anders et al., 1992; Burnham, Goodlin-Jones, Gaylor, & Anders, 2002; Morrell & Cortina-Borja, 2002). Many clinical interventions are based on the assumption that weaning the infant from excessive parental involvement would facilitate development of self-soothing skills and would lead to better sleep (Ferber, 1985; Owens et al., 1999; Sadeh, 1994; Sadeh & Anders, 1993; Wolfson, Lacks, & Futterman, 1992). Most of these interventions rely heavily on the parents as the change agents and on altering parental cognitions and behaviors to facilitate better infant sleep (Kerr, Jowett, & Smith, 1996; Mindell, 1999; Owens et al., 1999; Sadeh, 2005; Stores, 1996; Wolfson et al., 1992). Prevention studies have demonstrated that changing parental knowledge concerning infant sleep prior to the child's birth can prevent infant sleep problems (Kerr et al., 1996; Wolfson et al., 1992).

However, clinical practice suggests that for many parents, adopting behavioral strategies that imply not responding to every demand of the infant with full capacity involves great emotional distress. This is particularly true when parents interpret their infant's "signals" or crying at bedtime and/or at night as a sign of anxiety or distress. Under such circumstances, many parents interpret a suggestion to limit their interventions as insensitive, neglectful, or abusive to the child (Daws, 1989; Sadeh, 2005). These issues involve major psychological parental concerns related to separation anxiety and limit setting and highlight the importance of studying the role of these concerns and cognitions in parents of sleep-disturbed infants.

Research focusing on parental cognitions vis-à-vis infant sleep has been very sparse (Morrell, 1999; Toselli, Farneti, & Salzarulo, 1995). Toselli et al. provided a detailed account of expectant mothers' cognitions about infant sleep, including their expectations and interpretation of possible sleep problems. The authors reported contradictory beliefs among the expectant mothers as to who is responsible for sleep initiation (baby vs. parent). Morrell made the first attempt to correlate maternal cognitions and infant sleep using questionnaires to assess these domains. Reported infant sleep problems were significantly correlated with maternal cognition subscales that describe difficulty with limit setting, increased doubts about parenting competence, and increased anger toward the infant. Morrell suggested that in a stressful situation associated with infant night waking, it is possible that problematic cognitions regarding setting limits, anger, and doubt lead to overintrusive or rejecting parental interactions, which maintain the sleep problems. It is assumed that it would be easier for the infant to develop self-regulating and self-soothing skills if their parents manage to adopt balanced and more appropriate cognitions.

The aims of the present study were (a) to expand the exploration of parental cognitions by studying both parents, (b) to compare sleep and parental cognitions in a clinical

sample of sleep-disturbed infants and controls, and (c) to assess infant sleep using both objective and reported sleep measures.

On the basis of the existing literature and clinical experience (Minde et al., 1994; Sadeh, 2005), we hypothesized that (a) fathers would have higher tendency to emphasize the infant's demandingness struggles and the role of parental limit setting, whereas mothers would have higher tendency to emphasize the distress of the infant and need to take an active role in soothing the infant, and (b) there would be significant group differences on parental cognitions with parents in the clinical group experiencing more difficulties with limit setting.

Method

Participants

Ninety-six infants and their parents participated in this study. The clinical sample consisted of 48 infants and toddlers whose parents sought professional help for sleep problems at a children's sleep laboratory. The control sample consisted of 48 children, with no reported sleep problems, whose parents volunteered to participate in the study. They were recruited by approaching parents in a few large companies. Only two-parent families, with both parents willing to participate, were included in this study. Infants with suspected medical problems, including breathing-related sleep problems, were excluded from the study. Both samples were composed of upper middle-class socioeconomic class families. An attempt was made to recruit parents from similar socioeconomic backgrounds and with similar characteristics to those in the clinical group. The characteristics of the sample are described in Table 1. No significant group differences were found on any of the demographic variables. Parents received a graphic report on their infant's sleep-wake patterns. No other compensation was offered for participation.

Procedure

The study was approved by the Institutional Ethical Committee. Parents signed informed consent. Each family was monitored for 1 week. During the monitoring period, each pair of parents completed the questionnaires. Infant sleep

was monitored with an actigraph attached to the left ankle during the nocturnal sleep period only. The parents completed daily logs to document their knowledge about their infant's sleep. In the clinical sample, the monitoring period was the baseline assessment week before any intervention was discussed or offered. All the questionnaires were completed at home during the sleep assessment week. Parents were instructed to complete the questionnaires independently.

Instruments

Parental Cognitions about Infant Sleep Questionnaire (PCISQ). This questionnaire is a translated version of Morrell's (1999) Maternal Cognitions about Infant Sleep Questionnaire. Morrell's questionnaire was designed to assess direct cognitions that mothers have about their own infant's sleep. Morrell has demonstrated good psychometric properties of the questionnaire and its sensitivity in detecting distinct cognitions of mothers of sleep-disturbed and nondisturbed infants. Morrell reported internal consistency (based on Cronbach's alpha) ranging between .80 and .84. The test-retest Pearson product-moment correlation for the total score was .81. In the present study, we administered the Hebrew version of the questionnaire to both mothers and fathers. The internal reliability obtained in our study ranged between .65 and .72. The questionnaire is a Likert-type scale with 20 items. The derived scales are (a) Limit Setting—which reflects endorsement of items associated with difficulties in setting limits or resisting the infant's demands; (b) Anger—negative feelings toward the infant; (c) Doubt—doubts about parental competency; (d) Feeding—concerns about feeding issues during the night; and (e) Safety—concerns about the child's safety during the night. High scores represent negative concerns and doubts on all the scales.

Infant Sleep Vignettes Interpretation Scale (ISVIS). The ISVIS was developed in Hebrew for the present study (see the Appendix for an English version). The scale presents the parent with 14 hypothetical case descriptions of infants who display sleep problems and asks the parent to rate (on a 6-point Likert-type scale) his or her agreement with different assertions about possible interpretations and approaches for addressing the problem (see the Appendix). These in-

Table 1
Demographic Variables of the Children in the Clinical and Control Groups

Variable	Range	Clinical (<i>n</i> = 48)			Control (<i>n</i> = 48)		
		<i>M</i>	<i>SD</i>	%	<i>M</i>	<i>SD</i>	%
Child's age (in months)	5–29	13.08	5.52		15.05	5.46	
Sex (% boys)				64.58			54.17
Mother's age (in years)	24–46	31.35	4.26		31.64	3.95	
Father's age (in years)	26–53	34.69	5.60		35.06	6.09	
Mother's education (in years)	12–23	15.45	2.63		16.58	2.27	
Father's education (in years)	10–22	15.45	2.38		15.55	2.58	
No. of children in family	1–3	1.35	0.60		1.60	0.73	
Birth order of child (% firstborns)				71.13			56.72

Note. No significant group differences were found.

interpretations represent three categories: (a) Distress—the child is very anxious or distressed and the parent should directly help or soothe; (b) Limits—the situation is interpreted as an excessive infant demandingness and limit setting is the suggested approach, emphasizing that the child should learn self-soothing with minimal parental help; and (c) Temperament—this interpretation emphasizes the role of the child's character or temperament in explaining the sleep problem, regardless of what parents do. Good internal reliability based on a Cronbach's alpha above .90 was found for these three scales. It is important to emphasize that this questionnaire is aimed at sampling parental cognitions vis-à-vis hypothetical infants and hypothetical situations, whereas on the PCISQ participants respond with regard to their own child and their real-life situation.

Sleep Assessment

One of the major limitations in the field of infant sleep research is the reliance on subjective reports. Parental reports on infant sleep have serious limitations and distortions (Minde et al., 1993; Sadeh, 1994, 1996a; Sadeh, Lavie, Scher, Tirosh, & Epstein, 1991) because parents are mostly aware of their infant's sleep behavior when they observe their child or when the child "signals" them to intervene by crying or fussing (Anders et al., 1992; Minde et al., 1993; Sadeh, 1994, 1996a; Sadeh et al., 1991). The present study addresses this limitation by assessing infant sleep using objective and reported measures.

Actigraphy. Activity-based sleep monitoring (actigraphy) was used for infant sleep assessment. Actigraphy has been established during the last decade as a reliable method for naturalistic studies of sleep-wake patterns in infants, children, and adults (Sadeh, 1994, 1996a; Sadeh & Acebo, 2002; Sadeh, Acebo, Seifer, Aytur, & Carskadon, 1995; Sadeh, Hauri, Kripke, & Lavie, 1995; Sadeh et al., 1991; Sadeh, Sharkey, & Carskadon, 1994). Actigraphy is based on a miniature wristwatch-like device attached to the infant's ankle during the recording period. The device enables continuous recording for extended periods (more than a week) with no interference with the child's natural sleep environment. In the present study we used the miniature actigraph (Ambulatory Monitoring Inc., Ardsley, NY), with amplifier setting 18 and 1-min epoch interval according to the standard working mode for sleep-wake scoring.

Actigraphic sleep measures included (a) sleep onset time—the 1st min of the first consecutive 15 min of sleep after bedtime; (b) total sleep period—from sleep onset time to morning awakening time; (c) sleep percentage—percentage of true sleep time (excluding wakefulness during the night) from total sleep period (Measure b); (d) number of night wakings (that lasted 5 min or longer); and (e) nocturnal wakefulness—time spent in wakefulness between sleep onset and morning rise time. The Actigraphic Sleep Analysis program was used to score the data based on a validated sleep-wake scoring algorithm for children (Sadeh et al., 1994).

Sleep diary. Daily parental reports on their infant's sleep patterns were used to assess infant sleep from a

parental perspective. The sleep diary has been developed for clinical and developmental research on infant sleep (Sadeh, 1994, 1996a). Parents were instructed to report any night waking of which they are aware and its length. The derived measures include (a) night wakings—reported number of wakings (of any length) during nocturnal sleep and (b) nocturnal wakefulness—total duration of reported night wakings.

Results

Data analysis included three major components: (a) group comparisons of the objective and reported sleep measures, (b) group comparisons of parental cognitions that also included comparisons between fathers and mothers, and (c) tests of multivariate associations between sleep measures and parental cognitions. All sleep measures were averaged across the period of monitoring.

Group Comparison of Sleep Measures

Multivariate analysis of covariance (MANCOVA) with group and sex as independent measures and age as a covariate was performed on actigraphic and reported sleep measures. Preliminary MANCOVA results revealed a significant group effect, $F(7, 88) = 8.06, p < .0001$. No significant sex or Sex \times Group interaction effects were found. Therefore, the results are reported for the group differences only (see Table 2).

Significant effects were found on the actigraphic measures that reflect sleep quality. As expected, in comparison with the control infants, infants in the clinical group had an increased number of night wakings, lower sleep percentage, and longer time spent in wakefulness during the night. The infant sleep measures reported by the parents reflected much larger group differences on the number of night wakings and the time spent in wakefulness. Many infants in the control group had frequent night wakings that were not reported by their parents, as opposed to most of the infants in the clinical group, who woke up as frequently as reported by their parents.

Group and Parent-Related Differences on Parental Cognitions

General MANCOVAs were conducted to assess the group differences on maternal and paternal cognitions. The MANCOVA on maternal cognitions revealed a significant overall group difference, $F(8, 87) = 2.18, p < .05$. The MANCOVA on paternal cognitions did not reach statistical significance, $F(8, 87) = 1.10$. The more detailed analysis is based on MANCOVA with group as the first independent variable and parent (mother or father) as the second within-subject independent variable. The specific cognitions served as dependent variables. Age was used as a covariate. The analysis included a comparison of fathers' and mothers' rating on the scales derived from the two instruments used to assess parental cognitions about infant sleep (see Table

Table 2
Sleep Measures in the Clinical and Control Groups

Measure	Clinical		Control		<i>F</i> (1, 95)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Actigraphic sleep measures					
Sleep onset time (hour)	2105	0.64	2116	0.75	0.70
Sleep period (in hours)	9.67	0.76	9.36	0.90	3.27
Nocturnal wakefulness (in hours)	1.96	0.60	1.60	0.72	7.41**
Sleep percentage (%)	80.44	5.69	82.89	6.76	4.02*
Night wakings (no.)	4.87	1.27	4.21	1.75	4.47*
Nocturnal wakefulness (in hours)	1.91	0.60	1.63	0.72	4.54*
Reported sleep measures					
Night wakings (no.)	3.97	1.68	1.57	1.58	52.92***
Nocturnal wakefulness (in hours)	1.12	0.78	0.39	0.36	29.61***

Note. Values are group weekly means (averaged across the nights) and standard deviation.

* $p < .05$. ** $p < .01$. *** $p < .001$.

3). The table also includes correlations between mother–father pairs.

Significant correlations between fathers and mothers were found on four of the parent cognition scales. Fathers' and mothers' ratings on the ISVIS scales Distress and Limits and on the PCISQ scales Doubt and Feeding were associated.

No significant Parent \times Group interaction was found. Distinct differences were also found between the parents. On the ISVIS, mothers rated significantly higher than fathers did on the Distress interpretation, whereas fathers rated significantly higher on the Limits interpretation. On

the PCISQ, mothers rated higher than fathers did on difficulties associated with anger and concerns about safety.

Significant group differences were found on two related scales. On the ISVIS–Limits scale parents in the clinical group rated higher than those in the control group. On the PCISQ–Limit Setting scale parents in the clinical group rated higher than the control parents, indicating that they might have more difficulties setting limits for their infant. There were no significant Parent \times Group interaction effects. When the Bonferroni correction was applied to control for multiple comparisons, group differences on the ISVIS–Limits became insignificant, and so did all the dif-

Table 3
Mothers' and Fathers' Cognitions About Infant Sleep

Scale	Clinical		Control		<i>F</i> _{group} , <i>df</i>	<i>F</i> _{parent} , <i>df</i>	<i>r</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
ISVIS-Distress					3.26, (1, 84)	4.70*, (1, 84)	.29**
Mother	4.00	0.76	4.20	0.88			
Father	3.68	0.87	3.98	0.65			
ISVIS-Limits					4.46*, (1, 84)	8.83***, (1, 84)	.37***
Mother	3.54	0.69	3.17	0.92			
Father	3.82	0.72	3.58	0.83			
ISVIS-Temperament					0.98, (1, 90)	0.07, (1, 90)	.13
Mother	3.18	0.92	3.02	0.86			
Father	3.14	0.87	3.00	0.93			
PCISQ-Anger					1.16, (1, 90)	6.32*, (1, 90)	.19
Mother	2.51	0.78	2.27	0.68			
Father	2.25	0.55	2.25	0.64			
PCISQ-Limit Setting					11.88***, (1, 90)	3.44, (1, 90)	.15
Mother	3.60	0.57	3.26	0.50			
Father	3.50	0.54	3.23	0.57			
PCISQ-Doubt					0.27, (1, 90)	1.41, (1, 90)	.33***
Mother	2.60	0.83	2.54	0.73			
Father	2.45	0.59	2.39	0.55			
PCISQ-Safety					0.29, (1, 90)	6.06*, (1, 90)	.20
Mother	2.43	1.22	2.26	1.31			
Father	2.05	1.96	1.94	1.06			
PCISQ-Feeding					0.50, (1, 90)	3.18, (1, 90)	.46***
Mother	2.91	1.22	2.89	1.29			
Father	2.35	0.86	2.66	1.14			

Note. Comparison of mean scale scoring and Pearson correlations between parents. ISVIS = Infant Sleep Vignettes Interpretation Scale; PCISQ = Parental Cognitions about Infant Sleep Questionnaire. No significant Group \times Parent interaction was found.

* $p < .05$. ** $p < .01$. *** $p < .001$.

ferences between the parents except for the difference on PCISQ–Limit Setting, which remained statistically significant.

For further multivariable comparison between the cognitions of the parents of the clinical and control groups, we conducted a stepwise discriminant analysis using STEPDISC (SAS Institute, 1990), with group (clinic vs. control) as the classifying variable and parental cognitions as the discriminating variables. Stepwise discriminant analysis is based on linear regression models and is similar to stepwise regression but with a classificatory criterion (group) rather than a numerical variable. Three variables were found to be significant in discriminating between the groups. The first variable was the mother's PCISQ–Limit Setting scale, which explained 8.22% of the grouping variance (variance associated with group affiliation), $F(1, 94) = 7.52, p < .01$. The second variable was the father's ISVIS–Distress scale, which explained an additional 4.98% of the variance, $F(1, 93) = 4.35, p < .05$. The last significant variable was the father's PCISQ–Limit Setting scale, which explained 5.93% of the variance, $F(1, 92) = 5.17, p < .05$. Altogether, these three variables explained 16.88% of the variance. Group predictions based on this discriminant function resulted in 76.67% correct assignments. Independently, higher mothers' and fathers' ratings on the PCISQ–Limit Setting scale were associated with affiliation with the clinical group rather than with the control group,

whereas lower paternal scores on the ISVIS–Distress scale were associated with affiliation with the clinical group.

Correlations Between Infant Sleep Measures and Parental Cognitions

Table 4 presents Pearson correlations between sleep measures and parental cognition scales. As can be seen in the table, the only robust correlations found between sleep measures and parental cognitions are those between reported nocturnal wakefulness and maternal and paternal reported difficulty in limit setting. Increased difficulty in limit setting was associated with increased wakefulness during the night.

Discussion

The results of the present study revealed interesting and complex relationships between infant sleep and parental cognitions. Before addressing the specific results of our study, we should emphasize its limitations. Our insistence on participation of both parents in this study may have led to a somewhat skewed sample of couples in which the father is more involved in child care and therefore more willing to participate in the study. This bias could have affected the results in ways that could not be estimated. In addition, the correlational nature of the study precludes causal interpre-

Table 4
Correlations Between Sleep Measures and Parental Cognition Scales

Parental cognitions scale	Actigraphic sleep measures				Reported measures	
	Onset	Period	Wakings	WASO	Wakings	WASO
ISVIS-Distress						
Mother	.20	.00	.16	.05	.17	.12
Father	.04	-.09	-.04	-.06	-.11	.01
ISVIS-Limits						
Mother	-.07	.03	.02	-.01	-.12	-.04
Father	.05	.02	-.13	-.03	-.08	-.18
ISVIS-Temperament						
Mother	-.12	.18	.03	.05	.12	.23*
Father	.04	-.11	.07	.03	.11	.21
PCISQ-Limit Setting						
Mother	-.04	.4	.03	.03	.20	.43***
Father	-.03	.07	.15	.15	.28**	.40***
PCISQ-Anger						
Mother	-.01	.17	.04	.05	.24*	.28*
Father	.21*	-.12	-.09	-.05	-.02	-.04
PCISQ-Doubt						
Mother	.30***	-.21*	-.22*	-.33***	-.12	.12
Father	.16	-.07	-.08	-.11	-.07	.00
PCISQ-Feeding						
Mother	.00	.08	.06	-.03	.20	.20
Father	.10	.00	.06	.00	.12	.07
PCISQ-Safety						
Mother	.12	-.08	-.09	-.13	-.05	.00
Father	-.01	.05	.07	.04	-.03	.05

Note. Onset = sleep onset time; Period = sleep period duration; Wakings = number of night wakings; WASO = duration of wakefulness after sleep onset; ISVIS = Infant Sleep Vignettes Interpretation Scale; PCISQ = Parental Cognitions about Infant Sleep Questionnaire. No significant Group \times Parent interaction was found. Only correlations in boldface were significant after Bonferroni corrections.

* $p < .05$. ** $p < .01$. *** $p < .001$.

tation of the links between these two domains. Another limitation is related to the fact that infant factors such as temperament or other biomedical characteristics were not assessed. Finally, because of the exploratory nature of this study, in this relatively new area of research, a large number of measures addressing sleep and parental cognitions have been used. We reported our findings with and without statistical corrections for multiple tests (Bonferroni and general MANCOVA) to cover and describe the full spectrum of potential measures for future research. However, findings not meeting the stringent statistical tests should be considered with caution. Notwithstanding these limitations, the results of the present study suggest that infant sleep is closely linked to parental cognitions about sleep.

The results of our study highlight the differences in sleep patterns between clinically referred and control infants. When objective measures are used, the sleep quality of the sleep-disturbed infants is indeed poorer than the sleep of control infants as manifested in their increased number of night wakings, increased wakefulness time during the night, and reduced sleep percentage. These results are consistent with similar findings of an earlier study (Sadeh et al., 1991). However, the most striking difference between these groups lies in the reported measures of night wakings and duration of nocturnal wakefulness. These findings suggest that the control infants are better able to resume sleep without signaling to their parents and requiring help whereas the sleep-disturbed infants signal and require help almost every time they wake up during the night (Anders et al., 1992; Burnham et al., 2002; Gaylor, Goodlin-Jones, & Anders, 2001; Goodlin-Jones, Burnham, Gaylor, & Anders, 2001; Sadeh, 1994, 1996a; Sadeh et al., 1991).

The comparison between parents on sleep-related cognitions revealed interesting differences. As expected, in comparison with mothers, fathers tended to have higher ISVIS–Limits interpretations. Given hypothetical examples of infants with sleep problems, fathers were more likely than mothers to interpret the situations as an excessive infant demandingness and to endorse a limit-setting approach. Of interest, when it comes to the parents' cognitions about their own difficulties in applying a limit-setting approach (PCISQ), there was no significant difference between fathers and mothers. In comparison to fathers, mothers tended to endorse the distress interpretation of hypothetical situations more frequently, suggesting that they might be more attuned to the infant's signs of distress (Lundy, 2003).

An additional significant difference between mothers and fathers was related to the experience of anger. In the clinical group, mothers rated higher than fathers on anger experiences. This could be related to the fact that mothers are generally more likely to be involved in nighttime interactions with their awakening infant (Beltramini & Hertzog, 1983). Another possible explanation could be related to the fact that mothers tend to attribute more influence on child development to themselves than fathers do (Miller, 1995). This may lead to a more pronounced sense of anger in mothers of the sleep-disturbed infants because of their perceived failure to help their child sleep more peacefully.

Significant correlations were found between the scoring of the parents on a number of scales. On both the ISVIS–Distress and the ISVIS–Limits scales, the parental ratings were modestly associated. Similarly, parental scores on the PCISQ–Doubt and PCISQ–Feedings scales were significantly correlated showing, that fathers and mothers tend to share these specific concerns.

Group comparisons revealed interesting differences. On the ISVIS–Limits scale, the ratings of parents in the clinical group were higher than those of parents in the control group. This means that when faced with hypothetical examples of infants with sleep problems, both fathers and mothers in the clinical group were more likely than control parents to interpret the situation as an excessive infant demandingness and endorse limit setting as the appropriate approach. However, when asked directly about their cognitions regarding their own child, these parents of the sleep-disturbed infants reported more difficulties with limit setting (PCISQ–Limit Setting) than the control parents. The latter result is consistent with earlier findings that mothers of children with sleep problems tend to have more difficulties with limit setting measured using the same questionnaire (Morrell, 1999). Our study suggests that both mothers and fathers of sleep-disturbed infants endorse cognitions related to difficulties with limit setting. An additional result from the discriminant analysis, which indicated that a lower paternal ISVIS–Distress rating was associated with the clinical group, could be considered as part of the discrepancy between the PCISQ and ISVIS findings.

The correlations between sleep measures and parental cognitions revealed only robust correlations between parental difficulties with limit setting and increased wakefulness during the night. These correlations are in line with the previous findings associating difficulties in limit setting with affiliation to the clinical group.

These results represent a complex picture that should be further explored to understand the underlying processes. The tendency of parents in the clinical group to endorse limit-setting approaches when challenged with hypothetical cases may represent the outcome of these parents' internal process of preparation for behavioral interventions that strongly emphasize limit-setting strategies. Another possible explanation is that parents in the clinical group experience a larger internal discrepancy between the knowledge of what is the "right" interpretation or action and their inability to follow this line of action with their own child. It is possible that "clinical" parents have opposing cognitions and emotions that deter them from applying what they think should be done according to their basic "cold" (*vis-à-vis* hypothetical cases) cognitions. This discrepancy may be manifested in ambivalent and inconsistent behavior that does not help the child to calm down and develop self-soothing capacity.

Finally, the results of the multivariate discriminant analysis revealed that difficulty in limit setting on the part of both parents independently contributed to the group differences. These results suggest that the combination of two parents with self-reported difficulty in limit setting is associated with greater risk for having a sleep-disturbed infant.

These findings could be interpreted in two directions: (a) Infants of parents who have difficulties in limit setting during the night are more likely to become demanding and fail to develop self-soothing capacities, and (b) parents of infants who are very irritable and demanding during the night are more likely to “break” and develop difficulties in setting limits or at least develop a strong sense of having such difficulties. The present study does not allow causal interpretation, but either or both of these processes could underlie the close association found between these parental limit-setting scales and group affiliation.

Overall, the findings of this study demonstrate significant links between infant sleep and parental sleep-related cognitions. The different lines of data analysis led to a relatively consistent conclusion that supports our main hypothesis: Poor sleep is associated with parental difficulties in limit setting. However, contrary to our expectation, we found that when given hypothetical cases, parents of poor sleepers tend to interpret night wakings and infants’ calls during the night as excessive infant demandingness that requires limit setting. Most clinical interventions for sleep-disturbed infants with night-waking problems are based on training the parents in behavioral interventions aimed at extinction of parental involvement during the night and limit-setting approaches (Kuhn & Elliott, 2003; Mindell, 1999; Ramchandani et al., 2000; Sadeh, 2005). However, most of these behavioral approaches appear to ignore (at least in the literature) the cognitive component underlying parental attitudes and difficulty in adopting and applying these methods that sometimes require a dramatic change in these cognitive sets (Sadeh, 2005). Early prevention programs for sleep problems work more directly on modifying parental perceptions and cognitions in addition to behavioral guidelines (Kerr et al., 1996; Wolfson et al., 1992). Our findings suggest that developmental and clinical sleep research should include an evaluation of parental cognitions as an integral component that should also be addressed in clinical interventions. More specifically, the parental difficulties and ambivalence about limit setting should be explored to overcome what appears to be a significant obstacle for the implementation of the common behavioral interventions. Furthermore, it would be interesting to test how parental cognitions interact with specific infant characteristics such as temperament.

Another important conclusion from our study is related to the role of the father. As suggested in the clinical literature (Keener et al., 1988; Minde et al., 1994; Sadeh, 2005), paternal cognitions were closely linked to the infant sleep patterns in addition to and independent of maternal cognitions. These results highlight the need to continue the inclusion of fathers in developmental and clinical sleep research. Social changes in family structure, parenting styles, and paternal involvement (Bonney et al., 1999; Corwyn & Bradley, 1999; Paquette et al., 2000), the growing literature on the unique role of the father in child development (Lamb, 1997; Raiha, Lehtonen, Huhtala, Saleva, & Korvenranta, 2002; Winsler et al., 2005), and differences in parental perspectives on child development and psychopathology

(De Los Reyes & Kazdin, 2005; Keener et al., 1988) should serve as additional impetus for such research.

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Appendix

Infant Sleep Vignettes Interpretation Scale

In the following questionnaire, you will find several descriptions of babies at different ages. After each description several statements will appear. Please indicate your degree of agreement with each statement according to the scale below. There is no right or wrong answer. Please answer according to your own beliefs. Thank you for your cooperation!

1	2	3	4	5	6
Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
1. Mary is a 6-month-old girl. She is described as an anxious baby during the day. She finds it hard to separate from her parents and cries when her mother leaves the room. She reacts to every change or a new face. Every night she wakes up crying 4–5 times and finds it difficult to fall back to sleep.					
● It is necessary to check on Mary when she wakes up and to calm her down and help her to fall asleep again. 1 2 3 4 5 6					
● It is Mary's nature to wake up at night and it will be difficult to change this behavior. 1 2 3 4 5 6					
● One should resist Mary's demands when she wakes up at night. This will help her learn to fall asleep on her own. 1 2 3 4 5 6					
2. Susan is an 18-month-old girl. She is described as a restless child. She is very active at her daycare center and finds it hard to fall asleep there. At home, she does not want to sleep and behaves nervously. At night, she has difficulty falling asleep. Susan's older brother resembles her in his restlessness and his sleep problems.					
● There are children who find it hard to fall asleep and it is difficult to change this tendency. 1 2 3 4 5 6					
● Susan's demands should be resisted and her parents should avoid going to her during the night, so that she learns to fall asleep on her own. 1 2 3 4 5 6					
● Susan's parents should stay with her and calm her down until she falls asleep. 1 2 3 4 5 6					
3. Tom is a 9-month-old boy. When he wants something or feels uncomfortable he cries and screams loudly. He usually calms down quickly when he gets what he wanted. During the night, Tom wakes up many times and has difficulties falling asleep.					
● It is better not to react each time Tom wakes up so that he can learn to calm down and fall asleep. 1 2 3 4 5 6					
● There are children who habitually wake up at night and it is hard to find a way to change this behavior. 1 2 3 4 5 6					
● One should go to Tom when he wakes up, so that he knows that there is always someone to soothe him. 1 2 3 4 5 6					
4. Dan is a 2-year-old boy. He is a curious child who is interested in every object at home. His motor development was fast and he started walking at an early age. Dan finds it difficult to fall asleep at bedtime.					
● Dan's difficulty falling asleep is in his nature, which is difficult to influence. 1 2 3 4 5 6					
● Dan is probably frightened and therefore one should go to him and help him to fall asleep. 1 2 3 4 5 6					
● Dan's parents should resist his demands and avoid going to him at night so that he can learn to fall asleep alone. 1 2 3 4 5 6					
5. Sue is a 20-month-old girl and attends a daycare center. Every morning when entering the center, she has difficulty separating from her mother. Her mother calms her down and helps her take part in the activities. At night Sue wakes up 4–5 times, finding it hard to calm down and resume sleep.					
● It is okay to let Sue cry when she wakes up. She should learn to fall asleep on her own. 1 2 3 4 5 6					
● Sue's parents should go to her and help her to calm down. 1 2 3 4 5 6					
● It is Sue's nature to wake up and it is difficult to find a way to help her. 1 2 3 4 5 6					

(Appendix continues)

6. Kevin is an 8-month-old boy. He is described as a very active and alert child. He is restless, cries a lot, and his parents have a hard time calming him down. Kevin's father reported that he himself was an active and restless child. During the night, Kevin wakes up a number of times and has difficulty falling asleep.
- One should allow Kevin to cry at night. This will teach him to fall asleep by himself. 1 2 3 4 5 6
 - Kevin's parents should react immediately to his crying; otherwise he will feel abandoned. 1 2 3 4 5 6
 - It is probably Kevin's nature to wake up often at night. 1 2 3 4 5 6
7. Judi is a 21-month-old girl. She is described as a stubborn child in certain situations, but after a talk and explanation, she usually cooperates. Judi finds it hard to fall asleep at night.
- Judi's parents should react every time she has difficulty falling asleep, so that she will not feel abandoned. 1 2 3 4 5 6
 - Judi's difficulty falling asleep is part of her nature, and it is hard to change this problem. 1 2 3 4 5 6
 - Judi's parents should insist on her falling asleep alone, so that she won't learn to manipulate them. 1 2 3 4 5 6
8. Ron is a 9-month-old boy. He is a cheerful child who smiles a lot. Ron is very attached to his parents. When Ron is restless or cries, he calms down when his parents are near him. At bedtime, it takes him a long time to fall asleep.
- Ron's difficulty falling asleep is related to his temperament and therefore it would be hard to change it. 1 2 3 4 5 6
 - Ron's parents should let him fall asleep on his own, so that he can learn to be independent. 1 2 3 4 5 6
 - Ron's parents should soothe him and help him to fall asleep. 1 2 3 4 5 6
9. Rachel is a 19-month-old girl. She is described as an alert and nervous child. She is restless in any situation whether she is alone or with her parents. Rachel wakes up a number of times at night, and finds it hard to return to sleep.
- It is Rachel's nature to wake up at night and it is hard to find a way to help her. 1 2 3 4 5 6
 - Rachel wakes up because she is scared, and her parents should go to her and soothe her. 1 2 3 4 5 6
 - Rachel's parents should avoid going to her or she will be even more nervous. 1 2 3 4 5 6
10. Jewel is a 6-month-old girl. Her motor development has been fast. A babysitter has been caring for her since she was 3 months old and Jewel likes to go outside with her. Jewel wakes up crying several times at night and it is hard to comfort her.
- Jewel's parents should let her fall asleep on her own; otherwise she will be dependent on her parents. 1 2 3 4 5 6
 - There are children who have a tendency to wake up at night, and who have difficulty falling asleep. It is hard to change this pattern. 1 2 3 4 5 6
 - Jewel is probably frightened; therefore, someone should go to her when she wakes up and comfort her. 1 2 3 4 5 6
11. Ruth is a 9-month-old girl. When she does not want to stay in her crib, she cries inconsolably. When she wants something, she yells and cries until she gets what she wants. Ruth finds it very difficult to fall asleep at night.
- There are children who naturally find it hard to fall asleep, and it is difficult to change this. 1 2 3 4 5 6
 - Ruth is probably scared; therefore, someone should be with her until she falls asleep. 1 2 3 4 5 6
 - Ruth's parents should resist her demands, and avoid going to her, so that she can learn to fall asleep on her own. 1 2 3 4 5 6

12. James is a 2-year-old boy. He is described as an anxious child who becomes scared easily. He resists separating from his parents or from his caregiver at his daycare center. He finds it very difficult to fall asleep at night.
- James' difficulty falling asleep is part of his character and therefore it will be hard to change. 1 2 3 4 5 6
 - James is probably frightened; therefore, one should go to him and help him fall asleep. 1 2 3 4 5 6
 - James should be given the opportunity to fall asleep on his own; otherwise he will become dependent on his parents. 1 2 3 4 5 6
13. John is an 8-month-old boy. He is described as an active and restless child since he was born. His older brothers are both described as very active. When John is put into bed, it takes him a lot of time to fall asleep.
- It is better to stay with John and soothe him until he falls asleep. 1 2 3 4 5 6
 - It is okay to let John fall asleep on his own, even if it takes him a lot of time. 1 2 3 4 5 6
 - John's difficulty falling asleep is related to his temperament; therefore, it would be difficult to change. 1 2 3 4 5 6
14. Steve is a 21-month-old boy. He is described as a very obstinate child. At home, there are many power struggles around eating, playing, and different activities. Steve wakes up several times at night and it is hard to soothe him. On the other hand, Steve sleeps well in his daycare center.
- It is important to resist Steve's demands at night, so that he will learn to fall asleep on his own. 1 2 3 4 5 6
 - One of Steve's basic traits causes him to wake up at night. 1 2 3 4 5 6
 - Steve's parents should soothe him; otherwise he might feel frightened and lonely. 1 2 3 4 5 6

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