

Parenting and sleep in early childhood[☆]

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The development of sleep is influenced by complex interactions between biologically driven forces and diverse socio-environmental factors. Among those factors, parents have a critical role. The present review focuses on new studies regarding the links between parenting and the development of sleep in early childhood in the context of a transactional model. Recent findings from longitudinal studies and large cohort studies highlight the contribution of various parenting factors, such as parental bedtime behaviors, parental cognitions, cry tolerance, maternal mood, stress, and the parents' couple relationship, to the development of child sleep. Recent research also demonstrates the effectiveness of behavioral sleep interventions in which parents are the main agents of change in the behavioral aspects of child sleep.

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Introduction

The development of regulated and consolidated sleep–wake patterns is one of the most prominent developmental processes of early childhood [1,2]. Although most infants achieve the ability to ‘sleep through the night’ around the age of 6 months, difficulties in settling to sleep and night-waking problems characterize about 20–30% of

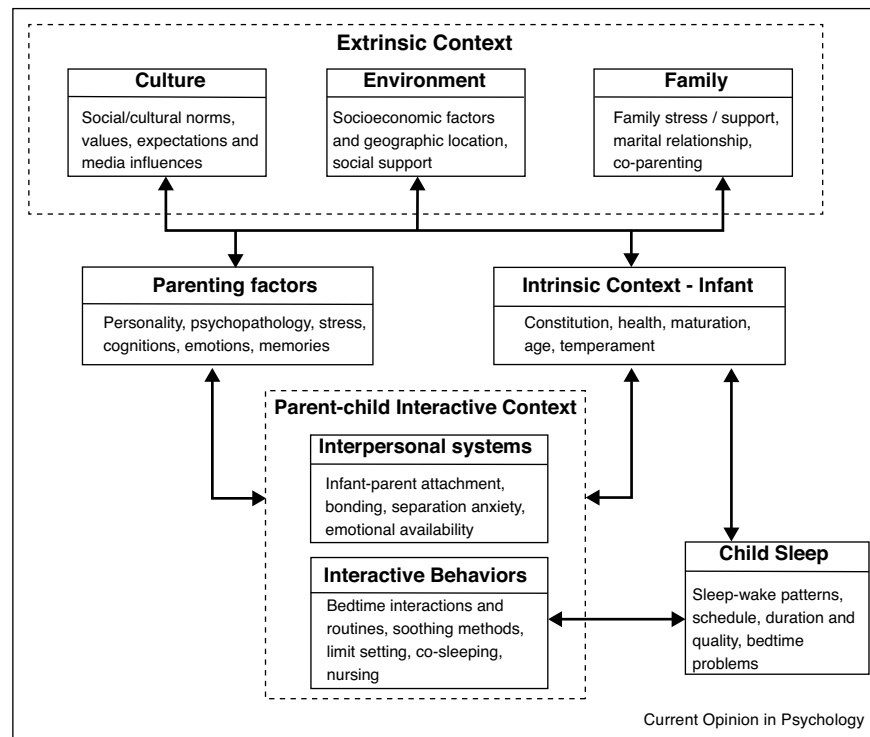
all infants and young children and are among the most prevalent parental reasons for seeking professional help [3–6]. Early identification and treatment of sleep problems is highly important as growing evidence suggests that childhood sleep disturbances may have negative consequences for children's socio-emotional, behavioral and cognitive development and for family functioning [7,8].

Various biological, environmental and psycho-social factors influence the development of sleep in infancy and continue to shape the sleep of children along their development. Among those factors, parents have a critical role in the development of the behavioral aspects of child sleep (*e.g.*, sleep duration, night-wakings/self-soothing, sleeping arrangements) [6].

The current review presents the most recent findings of research on the role of parents in early child sleep development in the context of the transactional model of infant sleep as described in Figure 1 [6,9]. This model is based on the transactional model formulated by Sameroff [10], adapted to sleep, and it stipulates bi-directional, dynamic and complex relations between infant sleep development and the proximal and distal environment, in interaction with infant intrinsic factors (*e.g.*, maturation, temperament) [2,6,11^{*}]. The different sections of this review are organized according to the different levels of influence as suggested in the transactional model. First, the immediate context of parenting behaviors will be explored, followed by the parent–infant relationship, parental mental health factors, cognitions, and the role of the marital relationship. Finally, recent research on the effectiveness of clinical sleep interventions involving parents as the main agents of change will be discussed. The review will not cover the physiological factors nor the cultural aspects that are related to infant sleep development, though it is important to keep in mind that these domains may influence sleep related parenting behaviors. Cultural influences on parental behaviors, cognitions and values are discussed thoroughly in this issue by Bornstein [12] and by Prevoo and Tamis-LeMonda [13].

[☆] *Tribute:* This paper is dedicated to Professor Avi Sadeh, a world leader in the field of pediatric sleep, who died unexpectedly on September 19, 2016. Prof. Sadeh published over 150 scientific papers and book chapters on a wide range of subjects in pediatric sleep and child development. He was a pioneer in the area of objective assessment of sleep with actigraphy, and was known for his extensive contribution to the understanding of sleep disorders in children and how they relate to cognitive and emotional functioning. In 1993, Prof. Sadeh published, together with Prof. Thomas Anders, a theoretical transactional model of bidirectional influences between parenting and infant sleep. This model guided his research about the links between child sleep development and parental (both mothers and fathers) behaviors, cognitions and emotions. His research on behavioral interventions for sleep problems in young children, further demonstrated the crucial role of parents in early sleep development. I am grateful to Prof. Sadeh for the many precious years of mentorship, collaborations and friendship. He was a brilliant and creative researcher, teacher and clinician who will always be remembered as a remarkably caring, generous, respectful, and thoughtful person. He will be deeply missed but his influential work will endure.

Figure 1



A transactional model of child sleep. Adapted from Sadeh and Anders [9] and Sadeh *et al.* [6].

This review focuses on the role of parents in the development of the behavioral aspects of sleep, which broadly includes the sleep quantity dimension (sleep minutes/duration, time in bed) and the sleep quality dimension. Sleep quality refers to both sleep initiation (sleep onset latency) and to sleep maintenance/consolidation (*e.g.*, number and duration of night-awakenings, sleep percent—minutes of sleep divided by minutes in bed, longest period of uninterrupted sleep). Studies vary significantly in their choice of which specific measures they include and how they measure sleep. Research in this field relies still heavily on parental reports (via sleep questionnaire, sleep diaries) of their children's sleep, but there is also a growing number of studies that are based on objective measures such as actigraphy and video recording.

Parental bedtime and nighttime involvement

According to the transactional model, parental bedtime soothing behaviors have a direct influence on infant sleep. It is assumed that infants of parents who are actively involved in settling their infant to sleep (*e.g.*, by rocking, feeding) become reliant on parental help upon awakening and are less likely to develop self-soothing capacities that are necessary for consolidated sleep [6]. Previous research supports this premise, with clinical sleep interventions demonstrating that limiting parental bedtime

involvement leads to improved infant sleep (*e.g.*, reduced infant night-awakenings, increased self-soothing) [14,15]. However, most of the research that has been conducted in non-clinical populations has been cross-sectional, and longitudinal studies revealing the direction of the links between parental nocturnal practices and child sleep are scarce [16–18]. Two recent longitudinal studies found predictive associations between higher levels of parental bedtime involvement and later child sleep problems [11*,19], and similar findings regarding the role of parental bedtime presence in relation to sleep duration have been reported also in preschool children [20].

Two specific and interrelated parental nighttime practices, which have been a topic of recent interest, are breastfeeding and co-sleeping [21]. New studies from diverse countries are consistent with previous findings [6,22,23] of mothers reporting more disturbed infant sleep in co-sleeping arrangements [4,24,25*,26*] and in breastfeeding infants [24,26*,27]. However, in two recent longitudinal studies comparing objective sleep patterns of co-sleeping versus solitary sleeping infants, no significant group differences in actigraphic number and duration of night-awakenings were found [25*,26*]. Notably, the research on co-sleeping and infant sleep problems is mostly correlational and the findings concerning the nature of these links could be influenced by various

factors such as cultural norms and whether co-sleeping was intentional (planned) or reactive (see Ref. [28^{••}] for a recent extensive review on this topic).

Beyond the particular types of bedtime practices that parents use, recent research has focused on the question of whether parental consistency during bedtime and daytime routines would be associated with children's bedtime behaviors and nighttime sleep patterns. Evidence from both cross-sectional [29[•],30,31] and longitudinal studies [32[•],33], mainly conducted on preschool children, suggests that consistent bedtime or daytime routine is associated with shorter sleep latency, reduced night-awakenings, less bedtime resistance, and longer nighttime sleep duration.

Attachment and infant sleep

The transactional model assumes bidirectional associations between the parent–infant emotional relationship and infant sleep. Apparently, a secure parent–infant relationship is vital for the child's feeling of safety at night and his/her capacity to separate from the caregiver when going to sleep [6,34]. In view of that, the links between infant sleep and attachment have been studied quite extensively, with the underlying hypothesis that insecure attachment would be associated with more sleep problems. However, past research on this topic have yielded mixed findings [17,35–37]. Recent studies have moved the field forward by examining the longitudinal associations between infant sleep and attachment [38,39^{••},40,41[•],42[•],43]. For example, in a longitudinal study by Penesstri *et al.* [39^{••}], children with a disorganized attachment at 36 months had more problematic sleep patterns as reported by their mothers at 6, 12, 24 and 36 months of age, compared to children classified as ambivalent or secure in their attachment relationships. No significant differences were found between the secure and ambivalent group for any of the sleep parameters.

Parent-related factors and infant sleep

The transactional model predicts that parental characteristics such as personality, mental health status, and cognitions influence infant sleep indirectly through their impact on parental nighttime practices [6,18]. Previous research examining the role of maternal mental health has focused mainly on maternal depression as a correlate or predictor of infant sleep problems [22,44,45]. Recent studies have contributed to this growing field by examining facets of maternal functioning beyond depression (*e.g.*, stress, anxiety) [46[•],47–51]. In one of these studies, based on a large population-based cohort study, mothers of 9-month old infants with less favorable sleep profiles (*i.e.*, shorter reported infant and maternal sleep and more perceived infant sleep problems), had higher levels of parental stress, depressive symptoms and poorer self-reported health [46[•]]. In another large population-based study, parents characterized by lower self-efficacy and

higher overprotectiveness at 5, 17 and 29 months, reported more prolonged infant night-wakings at 29 months [52].

A few recent studies have tried to identify moderators of the links between maternal emotional distress and infant sleep [42[•],53,54[•]]. For instance, in a study with two large longitudinal cohorts, infant reactivity and gender were examined as moderators of the association between maternal symptoms of antenatal depression and infant sleep. Infant reactivity and gender were chosen because of previous findings showing that boys with reactive temperament may be more susceptible to negative environmental influences. The findings demonstrated that reactive boys had a higher number of reported awakenings and shorter sleep duration when previously exposed to maternal symptoms of antenatal depression in comparison to girls and to infants with lower reactivity [54[•]].

The role of parental cognitions in infant sleep development has received increasing attention during the last decade [18,55,56]. Recently, the examination of the links between parental cognitions and child sleep has been expanded beyond infancy and significant links have been documented also in toddlers [57,58] and in school-age children [59]. Another parenting factor that seems to be associated with parental sleep-related cognitions and infant sleep is parental cry tolerance. Parents (mothers and fathers) of infants with night-waking problems were found to have lower tolerance to infant crying in comparison to parents with infants without sleep problems and to childless couples [60[•]]. Cry tolerance in this study was measured using parental responses to audio and video recording of infant crying. The cover story for the video provided parents with a rationale that delayed response is recommended because the infant is very demanding and his parents are trying to encourage him to self-soothe. Participants were asked to indicate when they felt it was essential to intervene and soothe the infant. The delay time was used as a measure of cry tolerance. Lower tolerance for infant crying may explain why parents of sleep disturbed infants show faster responses and more active involvement in soothing their infants to sleep which may lead to less consolidated sleep in infants [60[•]]. The importance of parental responses to infant crying is discussed by Zeifman and St James-Roberts [61] in this issue.

The broader family context: marital relationship and the role of fathers

At the distal level of influences on child sleep, the transactional model specifies factors such as family stressors and marital relationship. In practice, the majority of studies on parenting and child sleep problems have focused primarily on mothers, neglecting the role of fathers and paying little attention to the role of the general family context. However, the importance of the

couple relationship as a factor that may influence children's sleep has received growing attention during the last couple of years [25^{••},62[•]]. For example, lower co-parenting quality and lower marital adjustment as perceived by the mother have been found to predict continuing infant co-sleeping arrangements through the first year of life [25^{••},63]. Based on these results, the authors suggest that persistent co-sleeping may be a symptom of preexisting heightened marital and family stress as felt by the mothers [25^{••}]. These reports are in line with recent findings showing that higher paternal involvement in infant and toddlers caregiving (a specific aspect of co-parenting) is associated with better infant sleep [62[•],64,65].

Similar results relating lower levels of co-parenting and marital satisfaction to more compromised child sleep have been found also in toddlers [66[•]], preschoolers [67] and school age children [68,69[•]]. These studies suggest that exposure to family or parent conflict may compromise children's sense of security, which may exert a negative influence on their capacity to sleep peacefully [70].

Behavioral sleep interventions

The effects parents have on their children's sleep has been demonstrated recurrently in clinical sleep interventions, in which parents are the main agents of change. Most interventions focus on modifying parents' cognitions and behaviors related to infant sleep with an emphasis on limiting parental bedtime and nighttime involvement (*e.g.*, delaying response, shortening the intervention, providing passive presence instead of active involvement) as a means to help infants develop self-soothing skills. Numerous studies in the past have demonstrated the effectiveness of such interventions in reducing infant sleep problems [15,71^{••}]. For instance, in a recent meta-analysis a small to medium effect size was reported for the frequency of night-awakenings ($Z = 5.99$, $p < 0.001$) and for night-awakening duration ($Z = 5.50$, $p < 0.001$) [71^{••}]. New intervention studies have provided further support for the effectiveness of these interventions [72]. Some of these studies have also shown positive effects on secondary outcomes such as parental mood and child behavior [73[•],74[•],75]. In a randomized controlled trial testing the effects of two behavioral interventions for infant (age 6–16 months) sleep problems, both interventions (graduated extinction and bedtime fading) produced large improvement in infant sleep onset latency, as reported by parental sleep diaries. Graduated extinction had a large effect also on nocturnal wakefulness. There were no significant changes for actigraphic sleep measures, suggesting infants still experience night-awakenings but learn to self-soothe and signal less [73[•]]. Consistent with previous findings [76], the results revealed no significant differences between intervention and control groups in emotional and behavioral problems, and in attachment security classification

(assessed with the Strange Situation Paradigm) at follow-up. Thus, those behavioral sleep interventions improved infant sleep and did not have any measured detrimental effects [73[•]]. Positive outcomes for infant sleep (objective and subjective) and for parental functioning were found in another randomized controlled study that examined the efficacy of a two-hour cognitive-behavioral group intervention for parents of 6- to 8-month-old infants with behavioral sleep problems [74[•]].

Behavioral sleep interventions in infants younger than 6 months have yielded mixed results. A recent review reported that educating parents about the use of behavioral techniques can be effective in promoting infant sleep during the first 6 months [77]. However, two recent large randomized controlled studies examining the effectiveness of early prevention/consultation found no evidence for positive effects on infant nighttime sleep [78,79]. These findings are partly consistent with the results of a recent meta-analysis reporting no significant effect of early behavioral sleep intervention on maternal reports of infant night-awakenings [80^{••}]. Nonetheless, according to this meta-analysis early intervention may have a small to medium effect on maternal reports of infant total nocturnal sleep duration. This may suggest that the number of night-awakenings does not change, but that there is a moderate reduction in their duration, or that the infant learns to be quietly awake in bed before or after signaling to the parent.

Conclusions

Recent research, using longitudinal designs, has contributed considerably to our understanding of the important role parents have in the development of their children's sleep, and some have highlighted the potential influence of children's sleep on parental functioning. Moreover, contemporary research has underlined the role of parental characteristics such as parenting stress, parental cry tolerance and co-parenting. Intervention studies have advanced the field by demonstrating how working with parents and children in a clinical setting positively influences children's and parents' sleep and functioning. Together, these recent contributions fit well into the conceptual framework of the transactional model delineating complex, multi-dimensional and bidirectional links between diverse parenting factors and the development of children's sleep. However, this area of research has yet to address several shortcomings. Most research relies on maternal reports of child sleep, and the studies that used objective sleep measures often 'failed' to find significant associations between children's sleep and parental factors. Thus, the question remains whether the links between parenting factors and child sleep exist mainly in the subjective sphere of the parent's experience. In addition, the underlying mechanisms of the link between parent characteristics and child sleep are unclear, and future studies are needed to explore possible

mediators (*e.g.*, parent–infant daytime interaction) and moderators (*e.g.*, infant temperament and physiological reactivity) on both behavioral and biological levels. Lastly, although improvement has been made in including the broader family context, there is a clear lack of research on the fathers' role in relation to their children's sleep. Insight into the parenting factors that contribute to children's sleep problems has important clinical implications, as it may enhance the development of individualized clinical interventions that take into account the particular characteristics of the child and the family.

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