

# Children's Sleep: An Interplay Between Culture and Biology

Oskar G. Jenni, MD\*‡, and Bonnie B. O'Connor, PhD§

**ABSTRACT.** Pediatricians provide a major source of knowledge for parents about children's behavior and development, although their advice is largely based on their own cultural values and beliefs in interaction with their personal and clinical experience. This review presents cross-cultural aspects of children's sleep behavior in industrialized and complex modern societies and provides a basis for understanding dimensions and mechanisms of cultural differences. We submit that it is the interaction between culture and biology that establishes behavioral and developmental norms and expectations regarding normal and problematic children's sleep. Pediatricians need to recognize the cultural environment in which children live and be knowledgeable about how cultural beliefs and values of both families and physicians interact with the needs and biological characteristics of individual children. *Pediatrics* 2005;115:204–216; *sleep, culture, children, child development, child rearing.*

Pediatricians are widely accepted as experts in child development. In Western countries, they are a major source of knowledge for parents about children's behavior and development.<sup>1–3</sup> Many pediatricians, however, lack sound training in developmental and behavioral pediatrics, and thus their advice is largely based on their own cultural values and beliefs (many of which may be operating out of their own direct awareness<sup>4</sup>) in interaction with their personal and clinical experience. A recent study of pediatricians' knowledge about breastfeeding and advice to mothers illustrates this point: pediatric residents or practitioners who responded correctly to questions about breastfeeding were overwhelmingly those who had personal experience with breastfeeding of their own children.<sup>5,6</sup>

In recent years, pediatricians have increasingly been confronted with families of widely differing cultural origins. Worldwide geopolitical boundary shifts, changes in patterns of immigration, and refugee relocation in response to political or economic pressures have created dramatic demographic

changes in many countries. In addition, many nations' internal ethnic groups have grown to comprise significant percentages of the patient population, whose distinct needs and varied views can no longer be missed (or dismissed) in health care.

Cross-cultural issues in child development have received considerable attention not only in the pediatric but also in the psychologic and anthropologic literature.<sup>7–10</sup> Because much of this literature approaches development through the lens of enculturation and socialization, it may tend to stress the role of culture over that of biology as a "prime mover" in child development. Here, we also focus on cultural aspects of childhood sleep and sleep behavior and their interpretation. In doing so, we emphasize that both biological determinants of sleep and the ways in which culture and biology interact play a major role in establishing behavioral and developmental norms and expectations regarding normal and problematic children's sleep. Both influences must be taken into account in the provision of optimal health care and parenting advice to the full range of pediatricians' patients and their families. We draw on pediatric, psychologic, sociologic, historical, and anthropologic literature in cross-cultural research about sleep along with some references from literary and journalistic sources that (as representatives of cultural opinion and assumption) also provide valuable information and insights on the topic. It is worth mentioning that information about cultural issues in children's sleep in the scientific literature is scant, widely scattered, and fairly narrowly focused (eg, mostly regarding cosleeping and bedtime ritual). On the whole, the topic of children's sleep culture is not studied very thoroughly in any one discipline.

Small tribal, traditional, and nonindustrialized societies' sleep behaviors were the topic of a recent outstanding comparative survey by Worthman and Melby.<sup>11</sup> We expect such societies to differ radically from our own in almost every regard, but the general conclusions drawn by these authors apply equally to complex and industrialized societies, which also show considerable variability in their approaches and expectations regarding sleep. Japan and the United States, for example, are both highly industrialized and economically successful "first-world" countries, yet their deep cultural difference between emphasis on interdependence and collectivity in the former and on independence and direct competition in the latter is reflected in dramatically different approaches to training and patterning of children's sleep.<sup>12</sup> In another example, Western European countries, although geographic neighbors, do not

From the \*Department of Psychiatry and Human Behavior, Division of Child and Adolescent Psychiatry, E. P. Bradley Hospital Chronobiology and Sleep Research Laboratory, and §Division of Pediatric Ambulatory Medicine, Department of Pediatrics, Brown Medical School, Providence, Rhode Island; and ‡Department of Pediatrics, Growth and Development Center, University Children's Hospital, Zurich, Switzerland.

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Address correspondence to Bonnie B. O'Connor, PhD, Division of Pediatric Ambulatory Medicine, Department of Pediatrics, Rhode Island Hospital/Brown Medical School, 593 Eddy St, Potter Suite 200, Providence, RI 02903. E-mail: boconnor@lifespan.org  
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share common orientations about how children should fit into contemporary family styles. Italians view children as more central in their lives than do the Dutch,<sup>13</sup> for instance, and their approaches to child sleep vary accordingly. In this review our primary focus will be on culture and children's sleep in industrialized and complex modern societies.

Sleep can be considered a biologically driven behavior of the child that is strongly shaped and interpreted by cultural values and beliefs of the parents. It is important to note that many "problems" with sleep during childhood, such as difficulties falling asleep alone or waking at night and seeking parental attention, are based on culturally constructed definitions and expectations and are not necessarily rooted in sleep biology. For example, Stearns and Rowland<sup>14</sup> point out that in Japan (in contrast to the United States), insomnia is not a matter of great concern and is seldom a subject of medical consultation. In a recent study, Italian parents reported it customary and preferable to have infants sleep in their rooms with them irrespective of the availability of separate rooms and considered the American norm of putting children to bed in separate rooms to be "unkind."<sup>15</sup> Steger describes this practice more strongly as "hard and difficult training . . . that . . . causes a lot of tears,"<sup>16</sup> raising in our minds the question of whether at least some sleep-related problems of children are not in fact created by cultural practices that may be incongruent with aspects of sleep biology or with stages of a child's emotional development. Clearly, there is a need to understand better the effects of cultural norms on children's sleep behavior and their interplay with biology. Such an understanding is fundamental to comprehending what constitutes a sleep problem, when and for whom, how best to approach it, and perhaps even to work to modify some cultural standards and practices as a means of improving quality of life for children and families.

#### DEFINING AND UNDERSTANDING CULTURE

We are accustomed to thinking of culture as sets of beliefs, norms, and expectations; as matters of preference or habits of mind that may reflect nothing more than an uncritical or unconscious continuity of tradition. However, culture is much more encompassing and complex. In effect, "culture is the entire nonbiological inheritance of human beings."<sup>17(p35)</sup> Everything that human beings inherit from one generation to the next that is not passed on biologically (ie, "everything that is socially constructed and learned"<sup>17(p35)</sup>) is a part of culture. In the most straightforward language, one might accurately say, "if you got it from other human beings and you didn't get it through biology, then you got it through culture." This understanding of culture as a holographic and encompassing context of human life, learning, and behavior is critically different from the more simplistic views that have long prevailed, especially in the literature of the health professions. In these disciplines, culture is typically reduced to sets of "novel" (from the medical perspective), "quaint," or even implicitly erroneous beliefs that are attrib-

uted to patients (or perhaps only to some patients as a proxy for racial or ethnic minority status) but not to health professionals or the majority culture. Additionally, culture is commonly regarded as relevant to medicine principally when it is identified as an etiologic factor in certain health problems or considered a potential "complication" of medical care.<sup>17</sup>

Culture and biology are the 2 great streams of human continuity and change. The broad definition of culture that we have adopted encompasses far more than the "developmental niche" in which children's behavior is conditioned and regulated,<sup>18</sup> and this has significant implications. For one thing, it means that we are all included in the cross-cultural equation: culture is not something that only comes through the door with patients.<sup>19</sup> It means that not only values, languages, religions, arts, cuisines, modes of dress, family structures, authority relationships, gender roles and expectations, behavioral norms, and modes of communication are elements of culture. So also are economic and political structures, sciences, mathematics, modern information technologies, bodies of knowledge and the texts and reference works that convey them, and health care resources including modern biomedicine and sleep research. All are products of culture, and all reflect cultural shaping. It is also important to bear in mind that all cultures are partial, in the sense that they select for certain human preferences and possibilities and omit (or never even imagine) others. All are characterized by fundamental world views, and all presume their views of reality to be actual, factual, and correct: the "way things are."

#### SLEEP BIOLOGY AND SLEEP CULTURE

##### Biology

Over the past 50 years, much has been learned about the structure of sleep, its biological regulation, and purpose.<sup>20</sup> Among the explanations for the biological function of sleep, 2 hypotheses have dominated the field: (1) sleep is restorative for brain metabolism and (2) sleep serves memory consolidation and learning.<sup>21,22</sup> Considering such vital functions for the organism, sleep must be regulated by biological processes. In fact, deprivation or restriction of sleep leads to a compensatory response with increased need for sleep.<sup>23</sup> Specific biological processes (circadian and homeostatic) play an important role in determining the duration and timing of sleep.<sup>23-25</sup> The endogenous nature of sleep and its regulation have been well described on the basis of general mechanisms, but human beings obviously demonstrate considerable interindividual differences in their sleep patterns as well as in their ability to compensate for deviations from "normal" sleep. A recent study indicated that the intersubject variability of habitual sleep duration has a biological basis through the individually programmed circadian clock.<sup>26</sup> The large variability between individuals is also reflected in their biologically preferred bedtimes. "Larks," or "morning people," show a preference for waking at an early hour and find it difficult to remain awake beyond their usual bedtimes, as

compared with “owls,” or “night people,” who show a preference for sleeping at later hours and often find it difficult to get up in the morning.

Although most research on sleep biology has been performed with adults, an increase of interest is also apparent in how sleep is regulated in children and adolescents and in what function(s) sleep serves during development.<sup>27–32</sup> It is most likely that children, like adults, exhibit large individual differences in their ability to regulate sleep and in their particular “natural” sleep rhythms. Differences in sleep patterns as a function of development add to the complexity of understanding sleep biology in children.

### Culture

Numerous aspects of sleep are influenced by diverse cultural standards. How we sleep, with whom we sleep, and where we sleep are molded by culture and customs. Culture influences sleeping and waking times including whether sleep is consolidated into a single continuous period and thus is associated with a single specific “bedtime” (a term reflecting the cultural assumptions of those societies sleeping on beds); whether it is confined to nighttime or to private spaces or may also occur acceptably in daytime or in public spaces; whether it is tied to seasonal, cosmological, religious, or spiritual periods and events; and so forth. Worthman and Melby<sup>11</sup> reported on several tribal societies across the globe whose sleep patterns include lengthy daytime sleep in social groups including children; periods of both daytime and nighttime sleep with frequent arousals that may include intervals of conversation, play, or other social interaction; and acceptability of individual napping in the presence of others. (See also Steger<sup>16</sup> with respect to *inemuri* [“to be present and sleep”] in Japan.) Richter<sup>34</sup> describes the association of sleep patterns with seasonal change in China, particularly with respect to sleep amount and duration. Numerous anthropologic studies describe, as a feature of a more complete cultural ethnography, associations of sleep with cosmologic and religious or spiritual events, particularly as the observance of these culturally significant phenomena may supercede otherwise usual patterns of sleep. For instance, in Balinese society, many important spiritual observances and performances occur at night and continue until daybreak or beyond. Such events include both children and adults, either or both of whom may sleep and wake without censure several times during the course of the event, in the midst of the “audience” or celebrants, as their own needs or biological demands dictate.<sup>35,36</sup> Variability among cultures in regard to sleep-patterning expectations, and interpretations is enormous, and one can find for almost any preference, pattern, or norm its opposite number in some other cultural setting.

Cultural norms determine the boundaries between “normal” and “problematic” sleep behavior, typically based on the extent to which individuals conform to sleep-schedule and sleep-behavior expectations. Sleeping too little, too much, at the wrong times, or in the wrong places may be indicators of “abnormality” and indicative or constitutive of prob-

lematic sleep, problem behavior, or character flaw (eg, “laziness” in cultures that value industriousness, self-control, or strict regularity). Sleeping in the wrong ways, so to speak, may indicate other kinds of problems, be they physical (organic disorder causing intermittent or unrestful sleep), emotional or spiritual (restlessness, sleep talking, tossing and turning, sleep walking, nighttime fears or bad dreams interrupting sleep), or magical/supernatural (eg, sleep paralysis, which is widely interpreted culturally and individually as a form of supernatural assault<sup>37</sup>). Any of these sleep behaviors/events may be biological in origin or comprise an interplay of biological and cultural elements; however, their interpretation as problematic or not is by definition cultural, as will be the prescribed remediation for any matters identified as problems.

Cultural regulation of sleep patterns both encodes and responds to larger cultural values and social pressures, which are not in and of themselves actually “about” sleep. These include such matters as values placed on independence or interdependence of individuals and establishment of the sense of self<sup>12,38</sup>; establishment and maintenance of social class or rank identity and the behavioral emblems of their differentiation<sup>14,34</sup>; gender roles (eg, whether women rise earlier than others and prepare the household and its members for the day or whether men retire later than others because of work or social activities to which they are mandated or entitled); idealized family structures and behaviors (including not just the question of cosleeping of children and parents but also that of cosleeping of spouses); definition and enactment of religious duty; concepts of character and of moral and admirable behavior as persons; and so forth.<sup>34,39,40</sup>

Social institutional demands, such as requirements that school or work be standardized to begin at certain hours and that the children and adults who attend them be on time or that certain sectors of the society or the economy be available and functional at specific (including any and all) hours, influence the cultural regulation of sleep across societies. These patterns are both relieved and reinforced by the existence of special times (vacations, days of rest, or days of special religious or social obligation) in which the typical pattern is permitted or required to be broken in recognition of a form of social “time out.” Enculturation to these broader cultural values and social demands begins in the sleep patterning of children.

### INTERPLAY BETWEEN BIOLOGY AND CULTURE IN SLEEP BEHAVIOR

In the past century, a number of developmental theorists have conceptualized the bidirectional interplay of culture and biology in human behavior by interactional or transactional models.<sup>41</sup> These models stress that all aspects of complex systems are mutually interinfluential, covariant, and constantly dynamic. As spelled out by Chess and Thomas,<sup>41</sup> application of this approach to human behavior requires that “behavioral attributes must always be considered in their reciprocal relationship with other

characteristics of the organism and in their interaction with environmental demands, opportunities and stresses." Similarly, Sadeh and Anders<sup>42,43</sup> framed a transactional model for infants' sleep behavior by integrating "... constitutional propensities of the infant into the infant's multiple contexts . . ." <sup>43(p11)</sup>

Chess and Thomas provided an integrative analysis of the nature and dynamics of interactional processes in their concept of "goodness of fit."<sup>41</sup>

Goodness of fit results when the organism's capacities, motivations and style of behaving and the demands and the expectations of the environment are in accord. Such consonance between organism and environment potentiates optimal positive development. Should there be a dissonance between capacities and characteristics of the organism on the one hand and the environmental opportunities and demands on the other, there is poorness of fit, which leads to maladaptive functioning and distorted development.<sup>41(p21)</sup>

In the context of this article, goodness of fit means specifically that culturally defined expectations of how the child is taught and permitted to sleep match well with the individual child's sleep biology or individual characteristics (eg, physical or emotional needs). Culturally guided parental strategies around bedtime that best satisfy adult interests and needs, for example, may not be in accord with those that best serve the child's needs (poor fit for the child). Imagine, for instance, a situation in which the parents biologically prefer to go to bed late and it is an expected cultural custom to eat dinner late at night, as observed in many Southern European countries. If their child's biological preference is to wake up early in the morning, it may not be in harmony with the parents' demands and cultural expectations. As another example, American parents generally seek to provide confidence and emotional security and to accommodate individual needs of their children during the day,<sup>44</sup> but on the other hand they expect their children to go to bed at a specified time irrespective of evidence of sleepiness and to sleep alone and isolated in a dark room as culturally anticipated. The American child whose individual emotional needs might be for close proximity to parents or other family members while sleeping or for a bedtime congruent with his or her internal biological clock might find a better fit for sleeping in the normative practices of Italy or Japan than in his or her own culture.<sup>12,15,16</sup> Worthman and Melby<sup>11</sup> portrayed these inconsistencies in child care practices between day and night:

American parents put their infants to sleep under conditions of minimal sensory load, but later expect them to focus attention appropriately in a world with high sensory loads and heavy competing demands for attention.<sup>11(p110)</sup>

Poor fit between culturally normative bedtime practices and individual sleep biology or individual emotional needs may eventually lead to behavioral sleep problems. Current clinical recommendations in pediatric sleep medicine are often based on changing the individual child (extinction of the undesired behavior) or altering parental behavior (eg, reducing parental involvement around bedtime) toward accepted cultural standards rather than trying to find a balance between the child's and parents' individual

needs and thus to translate a poor fit into a good fit (or at least a better fit). This approach will sometimes involve questioning, modifying, or rejecting aspects of the childhood sleep behavioral norms of one's own culture.

## COMPARATIVE PERSPECTIVES OF CHILDREN'S SLEEP BEHAVIOR

Cross-cultural comparative research among societies of different political, economic, ideological, and historical backgrounds will provide an opportunity to delineate the respective roles of culture and biology on sleep behavior and its interpretation. Also contributory to this effort are historical studies of changes in sleep behavior and attendant attitudes within a culture over time.<sup>14</sup> Cultures are inherently dynamic, changing as new ecologic or political conditions emerge or old demands fade, adopting or adapting elements of other cultures with which they come into contact, incessantly testing conservation of the time-honored and traditional against the impulse to innovate. Cultural changes over time may be gradual or rapid and dramatic, with sudden shifts.<sup>39</sup> In contrast, biological change is slow. Low variability across cultures and over time would indicate that biological processes contribute to sleep behavior to a greater extent than does culture. Conversely, high cross-cultural variability would suggest less influence of biological mechanisms on the behavior.

Studies of children's sleep in the medical and scientific literature have focused primarily on a few key aspects of sleep behavior: sleep duration and sleep need; bedtime routines; napping; children's use of sleep aids; sleeping arrangements, particularly cosleeping of children and parents (not so much cosleeping of siblings or other children, although that also is a common practice in many cultures and social settings); sleep problems including bedtime resistance; nighttime awakenings; and sleep terrors. Clearly, these all are interconnected aspects of children's sleep, although for heuristic purposes they have often been teased apart. We address each of these areas and the questions that arise in considering the influence of cultural variation on them.

### Sleep Duration/Sleep Need

Sleep duration and sleep need (terms sometimes used interchangeably, sometimes indicating separate measures) stand in many respects at the hub of research about children's sleep, inasmuch as many other areas of interest are directly or indirectly linked to the concern with identifying, comparing, and eventually prescribing and helping promote adequate sleep for children at varying stages of development.

Before the early 20th century, professional estimates of children's sleep requirements in Anglo-European cultures were built on culturally normative opinions and loose personal observations. The German child psychologist Preyer, a pioneer in infant biography, elaborated in *Die Seele des Kindes* (The Mind of the Child) in 1881 on the phenomenon of *schlafsucht* (abnormal need for sleep) and noted the long sleep hours of his son Axel in his first 3 years.<sup>45</sup>

According to 19th-century estimates in these cultural milieus, the optimum sleep amount for a 3-year-old child was believed to be ~12 hours, whereas at 7 years old, only 8 to 9 hours were recommended for normal daytime functioning.<sup>14</sup> In the early 1900s, when psychologic experiments had begun to produce scientific data on children's sleep, a new level of interest arose, and concerns about the adequacy of children's sleep time permeated both the scientific and popular literature.<sup>14</sup> At that time, a number of authors from different countries gave details about sleep duration across childhood and adolescence.<sup>46-49</sup> The main theme of all these reports was that children at the beginning of the 20th century did not get enough sleep, a view that was in sharp contrast to the 19th-century opinion. Wulffen, a district attorney in Dresden, Germany, in the early 1900s, included a short section about insufficient sleep time among German school-aged children in *Psychologie des Verbrechers* (Psychology of the Criminal), implicitly relating inadequate sleep to the development of criminal behavior.<sup>47</sup>

In more recent decades, a proliferation of studies in different countries and ethnic groups have expanded the picture. For example, in the 1990s, Italian preschool children 2 to 4 years old were reported to have a shorter nightly sleep duration than did children in other countries.<sup>50</sup> The Italian children went to bed later and woke up earlier. This finding is in line with results from a comparative survey of bedtime behavior in Italian and American children between 1979 and 1981, which found Italian children with no clear bedtime schedules, no consistent bedtime rituals, and later bedtimes than American children, because (unlike American children at this age) Italian children often participated in evening social activities with adults and regularly fell asleep before they were put to bed.<sup>51</sup>

Chinese school children also show substantially shorter sleep duration than children in other cultures because of late bedtimes and early rise times.<sup>52</sup> This pattern is believed to result in part from academic pressures that lead to a great social and familial emphasis on study time,<sup>52,53</sup> although there is also a traditional aphorism recommending "late to bed and early to rise"<sup>34</sup> (in contrast to Benjamin Franklin's advice in America).<sup>54</sup> In Japan, as well, high cultural values placed on pursuit of study and learning may lead to reduced sleep amounts among school-aged children, who may commonly take a short sleep after dinner and later be awakened by their mothers with tea and snacks so that they may pursue their studies in peace and quiet for a few hours after their parents have retired.<sup>16</sup>

The aforementioned examples of Italian, Chinese, and Japanese sleep patterns raise a number of important questions: (1) Do primarily methodologic differences between studies account for the differences in sleep duration? (2) Do Italian, Chinese, and Japanese children get enough sleep? (3) Is the daytime behavior of Italian, Chinese, and Japanese children different from that of children in other cultures? (4) Have Chinese and Japanese children become biologically adapted to less sleep? (5) Is the culturally

defined perception of sleep function in Italy, China, and Japan different from that in other countries? The bald answer to all of these questions is: We do not know.

Only a few investigations have been specifically designed to compare cultures directly.<sup>55-57</sup> For example, Super et al<sup>55</sup> compared sleep patterns between American and Dutch infants using parental reports (with their well-known limitations, especially underestimation of time awake during the night<sup>58</sup>). They found that American infants in the 1990s slept 13 hours per day at 3 months old, whereas at the same age Dutch infants slept 15 hours per day. Up to 8 years of age, Dutch children went to bed significantly earlier than did American children, although the difference in total amount of sleep between American and Dutch youngsters diminished with increasing age. Dutch parenting in infancy and childhood is described to be organized around "the 3 Rs": *rust, regelmaat, eet reinheid* (rest, regularity, and cleanliness).<sup>55</sup> This concept was promoted in ~1900 by the Dutch Green Cross, a professional association of baby nurses, and it is still the centerpiece of advice that Dutch parents receive from pediatricians, midwives, home health visitors, and their own parents (T. Deboer, PhD, written communication, 2004). Cultural differences between Dutch and American parents in theories about children and child rearing have not been investigated in systematic ways. Thus, it is not known whether differences in sleep patterns between Dutch and American children are in fact paralleled by differences in child care practice.

Another example of cross-cultural comparison (although with somewhat different findings than those of Super et al) was provided by Lavigne et al,<sup>56</sup> who evaluated sleep duration in white, black, and Hispanic preschool children in the United States in the 1990s. They found no difference in the total amount of sleep within a 24-hour period between white and "minority" children, although differences in timing and diurnal distribution of sleep were observed. "Minority" children went to bed later, got up later, and slept less during the night than did white children but had more and longer daytime naps.

Historical trends of sleep behavior in a single country have been reported very rarely in the scientific literature.<sup>59,60</sup> In a Swiss study, Iglowstein et al<sup>60</sup> demonstrated a decrease of sleep duration and a delay in bedtime between their examined cohorts in the 1970s and 1990s. Additional analysis of the same cohorts revealed that bedtime resistance was significantly lower in the later cohorts than in the earlier cohort, which tempted these authors (among them the first author of this review) to conclude that parents in the 1990s adjusted bedtime more appropriately (better fit) to children's individually preferred bedtimes.<sup>61</sup> Because changes in social institutions and cultural practices were not assessed directly during this interval, however, the authors provided no specific cultural explanation for this phenomenon.

#### Bedtime Routines

Child and parent sleep-related behavior in middle-class Euro-American societies is notably character-

ized by a distinct presleep bedtime "ritual" for children.<sup>62</sup> Bedtime routines usually take place within the core family, in the bedroom allocated to an individual child, under firm parental supervision, and with strict procedures and explicit organization. They include a set of activities: an after-dinner bath, dressing in a particular nightdress, telling stories and singing lullabies as a gradual diminution of external stimuli, putting the child to bed followed by good-night kisses, and then leaving the child alone in his or her room. Frequently, children insist on sleeping with a light on or taking a treasured object to bed with them (such as a soft doll or stuffed animal, blanket, toy, or pacifier) or repeatedly call their parents after being put to bed for various reasons such as "another drink" or "another story" ("curtain calls").

Consistent bedtime routines, however, are not always typical for Western industrialized societies. New and Richman,<sup>51</sup> for example, compared infant care practices in families from the greater Boston area with those in families from a small town north of Rome, Italy. Whereas in American families bedtime rituals were well established and children were required to go to bed regardless of their resistance, Italian children were typically allowed to participate in the family's late-evening life and to fall asleep in the carriage or in someone's lap instead of their own rooms. Parents of Italian children were less concerned about the sleep habits of their children than were American parents and believed that their children were getting adequate amounts of sleep. On the contrary, American mothers were worried about whether their infants got "enough" sleep even when they showed strong resistance to bedtime and naps. The unstructured bedtime habits of Italian children were also reflected in their later and more fluid bedtimes than those of children from several other industrialized countries and are paralleled by the typically unstructured and flexible bedtimes reported for children from other southern European countries such as Spain and Greece.<sup>50</sup>

In still other societies, the wake-to-sleep transition of children is not a culturally "marked" event, set apart from other social activities in specialized ways. There is no formalized "bedtime"; indeed, in several cultures, it is probably more accurate to say that there is no such concept as "bedtime" per se, and there are no specific preparations of children for sleep. Of the tribal societies discussed by Worthman and Melby,<sup>11</sup> several seem to fall into this category, as do other "traditional" populations such as the highland Mayan community in Guatemala described by Morelli et al.<sup>63</sup> In this sample of 14 Mayan families, infants and young children simply fell asleep when they were sleepy, usually in someone's arms or when they were taken to bed along with a parent. Infants typically slept with their mothers from birth until they were ~2 or 3 years old or until the birth of the next child, if sooner, when they moved to sleep with their fathers or occasionally with an older sibling. Both parents and children slept in the same room by preference, and parents would commonly

occupy separate beds so that each young child could have a parental sleeping partner.

No bedtime routines were observed in the Mayan community,<sup>63</sup> and none were reported to the study's interviewers. There were no specific sleeping clothes (although some mothers dressed children in their oldest clothes for sleep), no stories read or recited, and no lullabies involved in putting children to sleep. The Mayan mothers interviewed in this study reported no sleep resistance on the part of their children and no problems with their children's sleep. The normative infant-feeding practice of nursing on demand continued during the night and was not considered a disturbance by mothers, because it did not require their full arousal. Older children in the household also share beds with one another by custom; having to sleep alone at any age is considered undesirable and a pity. The Mayan mothers in this study believed this pattern of social sleeping and child sleep behavior to be "the only reasonable way for a infant and parents to sleep." They responded with shock when told of the American pattern of putting infants and young children to sleep alone in rooms of their own and disapprovingly regarded this practice as "tantamount to child neglect."<sup>63</sup> These mothers also felt that their small children learned reliably to observe social precautions and prohibitions quite early on, because sleeping together with their parents made them feel close to other people and therefore more readily able to understand and learn from them.<sup>63</sup> Thus, the Mayan parents clearly and explicitly draw the connection between child sleeping patterns and promotion of desirable socialization goals, just as American parents do when they explain their belief that having children sleep alone from an early age fosters the culturally valued trait of independence.

In the more complex Balinese society, infants are held continuously, day and night, by a variety of adults or older children involved in their care.<sup>35</sup> Being alone for even brief periods during sleep is considered undesirable for persons of any age, because it leaves them vulnerable to spiritual risks including soul loss<sup>64</sup>; infants and young children may be particularly vulnerable. Ritual and spiritual observances, which are a centerpiece of Balinese culture and social life, typically take place at night and last for many hours, sometimes until daybreak. These events are attended by adults and children of all ages including babes in arms. Persons of any age and station in attendance at these events may slip in and out of sleeping and waking states ad libitum and in any posture, including standing.<sup>11</sup> Infants quickly acquire the capacity to sleep and to transition rapidly and smoothly between sleeping and waking states under any circumstances including situations of high stimulation, musical and theatrical performances, and noisy public observances, and this capacity is retained during adolescence and into adulthood (where it is exercised frequently, including by audience members and even key performers in ritual events<sup>36</sup>).

In part because Balinese ritual and spiritual observances require regular periods of adult sleep avoid-

ance (on the order of 1–2 days per week),<sup>11</sup> and because children are regularly included in all forms of adult social activity, there is no such thing as a routinely delineated child “bedtime.” Under a wide variety of circumstances, adults and children alike sleep and wake according to their own innate impulses. Transitions into sleep and wakefulness are characterized by virtually complete fluidity and broad social acceptability. The example of Bali provides perhaps the most extraordinary and thorough departure from so-called “Western” standards of sleep behavior and their culturally conditioned environmental requirements. This polarity is one of the most compelling examples of cross-cultural variability in sleep behavior and the range of possibilities in the cultural shaping of the biological drives propelling sleep.

### Sleep Aids

In 1951, Winnicott<sup>65</sup> introduced the concept of “transitional objects and transitional phenomena” associated with facilitating children’s transitions from waking into sleep. These sleep aids, commonly objects such as pacifiers, blankets, toys, stuffed animals, or children’s thumbs for sucking, are depicted as facilitating children’s falling asleep by providing a sense of comfort and security.<sup>66</sup> The use of a sleep aid is intimately linked to bedtime behavior, sleeping arrangements, and individuation-separation processes during the transition from wakefulness to sleep and, thus, to cultural beliefs and standards. Notably, Morelli et al<sup>63</sup> reported that no transitional objects were used by the Mayan infants in their study, a pattern that seems to typify cosleeping cultures.

Children in industrialized societies (and particularly in urban areas) frequently use sleep aids, whereas in nonindustrialized cultures there is a much lower prevalence of object attachment associated with sleep. It has been hypothesized that more physical contact between parents and children during both day and night may explain the lower incidence of sleep aids in these cultures.<sup>67,68</sup> For example, fewer Korean infants (18%) or Italian children (rural: 4.9%; urban: 31.1%) used transitional objects as sleep aids than did American children (54%) or non-Italian Western European children (61.5%).<sup>67,68</sup> In the United States, Litt<sup>69</sup> compared transitional object use between white middle-class children seen in private practice (77%) and black children seen in an outpatient clinic (46%). Black children more frequently used stuffed toys or dolls as sleep aids, and white children primarily used blankets. In all of these studies, sleeping arrangements appeared to be the main factor that determined whether children used sleep aids: Children sleeping alone were more likely to use sleep aids or transitional objects.

### Sleeping Arrangements

The norm for children in many cultures around the world is to sleep with adults or siblings, if not in the same bed or sleeping structure, then at least in the same room. Private bedrooms for children are the exception rather than the rule worldwide.

Importantly, it is not only less industrialized societies that practice cosleeping but also highly technologically advanced and complex communities, of which the classic example is Japan.<sup>70</sup> From a social-ecological perspective, climatic factors, family size, and space availability have often determined sleeping arrangements.<sup>11,14,71</sup> Space availability and climate, however, seem to play only a minor role in cosleeping in highly industrialized modern societies. Rather, parental beliefs and cultural preferences such as a high value being placed on individual independence (individualism) or on familial interdependence (collectivism) have been proposed as “driving forces” for choosing sleeping arrangements.<sup>70</sup> To illustrate this point, Claudill and Weinstein<sup>72</sup> described the difference between Japanese and American parental beliefs about infants.

In Japan, the infant is seen as a separate biological organism who from the beginning, in order to develop, needs to be drawn into increasingly interdependent relations with others. In America, the infant is seen more as a dependent biological organism who, in order to develop, needs to be made increasingly independent of others.<sup>72(p15)</sup>

Sleeping arrangements have been subjected to intensive cross-cultural analysis,<sup>52,63,70,71,73–78</sup> in part because they have attracted the attention of clinicians and researchers on the basis of their high cultural visibility and the extent to which they have been regarded as “strange” (and therefore calling for explanation) in their distinction from norms in the scholars’ own cultures. A number of thorough, well-written, insightful reviews are available.<sup>11,14,79,80</sup> Less attention has been paid to historical shifts in sleeping arrangements within a single country or culture.<sup>14</sup>

### Night Waking and Other Sleep Problems

Among behavioral sleep disturbances, frequent night waking and difficulties getting children to bed are the problems most commonly reported by parents of young children. The similarities in prevalence of such problems across cultural boundaries have led some authors to conclude that either intrinsic biological sleep regulation may play the driving role in behavioral sleep disturbances or societies around the world share common ecological features relevant to children’s sleep.<sup>81</sup> In contrast, Rona et al<sup>82</sup> found that families originating from the Indian subcontinent were more likely to report children’s sleep problems than were British or African-Caribbean families. Lower-prevalence estimates were also found for sleep problems among British children than among children from other European countries.<sup>83,84</sup> Cross-cultural comparison of behavioral sleep problems is no less hampered by methodologic difficulties than is the comparison of sleep amount,<sup>85</sup> and in fact exerts even more complex demands on researchers, because the definition of what constitutes a “problem” in children’s sleep varies widely across cultures.

## Napping

There is a small but growing literature focused on the subject of daytime napping and its relationship to both nighttime sleep patterns and biologically driven total sleep requirements and to cultural responses to various forms of daytime sleep for adults as well as for children. The term "siesta culture" is widely used to refer to cultures that sanction napping by adults.<sup>86</sup> Because the circumstances and degrees of social institutionalization of napping are so variable in these descriptions, we suggest that it would be useful to draw a distinction between (1) "nap" cultures, in which individual or collective napping occurs and is considered normal but other aspects of social and institutional life continue (eg, Japan), and (2) "siesta" cultures, redefined to refer specifically to those societies in which nap or rest time at the heat-filled midday is institutionalized to the extent that businesses and government offices close down and ordinary public social interaction ceases for the duration (eg, Italy, Mexico, or China at various times in their histories). Our searches yielded no cross-cultural studies of children's daytime sleep patterns in "siesta" cultures as compared with others, because most of this literature seems to focus on adult sleep behavior.

Social institutionalization of a midday rest or sleep time as a cultural ideal or, indeed, as a legal right of workers has sometimes been the subject of political and even constitutional protection.<sup>39</sup> Cultures that institutionalize napping stand in strong contrast to the American and Northern European monophasic sleep culture, in which daytime sleep is discouraged and avoided (or relegated to socially recognized "time-out" occasions such as weekends and vacations) except for infants and young children.<sup>16,86</sup> Preschool or day care settings for American children frequently have institutionalized and enforced nap times as part of their daily routines. Although in countries around the Mediterranean Sea and in South America, Africa, and Asia a biphasic sleep pattern is still predominant, in this time of globalization and "24/7" economies, daytime napping as a cultural standard is slowly disappearing.<sup>33</sup> In some countries such as Chile, Greece, and, more recently, China, the disappearance of the normative or once-institutionalized siesta has been accelerated by governmental legal decree.<sup>87-89</sup>

## Adolescent Sleep Behavior

Biological maturation of sleep patterns around puberty occurs within the context of culturally defined demands and expectations. In recent years, one major trend in regard to sleep behavior of teenagers has emerged from scientific studies<sup>28,90</sup>: The timing of sleep is delayed in older versus younger adolescents, resulting in presumed insufficient sleep during the school week and "catch-up sleep" during weekends. These changes may originate from shifts in family configurations, peer culture, academic demands, school culture, employment opportunities, and extracurricular activities.<sup>91</sup> Moreover, modern teenagers in developed countries are living in an environ-

ment in which television, computers, telephones, and video games are widely available, often without parental monitoring and regulation of the time spent on these activities.<sup>92</sup> Maturation of biological sleep processes, however, is strongly related to sleep timing and amount during adolescence. In this context, Carskadon and colleagues proposed that intrinsic biological changes may either compel or control the adolescent sleep phase delay, or they may be permissive of the phase delay and, thus, of social opportunities at night.<sup>28(p279)</sup> As Conger and Peterson stated, it seems that adolescence "begins in biology and ends in culture."<sup>93(p92)</sup> In other terms, sleep biology may be the driving force behind adolescent sleep patterns and "open the gate" for increasing capacity to participate in social opportunities in the evenings and at night. It is important to bear in mind, however, that "certain aspects of the intrinsic regulatory processes may themselves respond to alterations of sleep and wakefulness associated with behavioral regulation."<sup>28(p279)</sup> For example, behaviorally driven changes in the timing of light exposure (eg, by television watching late at night) directly interact with the phase-resetting mechanism of the circadian timing system and can reinforce or strengthen a phase-delay tendency.<sup>94</sup>

Cross-cultural comparisons of sleep patterns may contribute to the understanding of how cultural and biological sleep regulation interact. Presently, a comprehensive cross-cultural data set on adolescent sleep using appropriate measurement tools does not exist, although available studies from different countries seem to parallel US data on adolescent sleep patterns.<sup>95</sup>

A major cultural influence on adolescent sleep patterns in the United States is evening employment for pay,<sup>91</sup> which is fairly uncommon for Western European adolescents.<sup>96</sup> By the age of 15, most American adolescents have progressed from working in casual jobs to having regular part-time employment.<sup>97</sup> It is important to note that children's work for payment is not a phenomenon restricted to modern society. Ravenhill<sup>46</sup> reported that in England of the early 1900s, 53% of 12-year-old boys worked for payment before and after school (eg, delivering milk, bedding horses, selling various articles such as newspapers). She believed that "premature employment during childhood is a powerful influence adverse to the enjoyment of sleep either sufficient in quantity or satisfactory in quality."<sup>46(p25)</sup>

School schedules and demands are major culturally determined factors that affect the timing of sleep. Later bedtimes and shorter sleep durations have been reported for Taiwanese adolescents than for American teenagers as a result of the Taiwanese educational system's high academic demands and competition.<sup>53,95</sup> Evidence is accumulating that early school start times in the United States run counter to the biological needs of most adolescents, who exhibit a tendency to fall asleep later in the evening and wake up later in the morning (poor fit).<sup>95</sup> Thus, modifying current standards in school scheduling may improve sleep quantity and, eventually, quality of life of teenagers. Other factors open to cross-cultural

study include parental roles that regulate adolescent sleep patterns both individually and in their particular cultural contexts.

### INTERDISCIPLINARY SOURCES IN SLEEP RESEARCH

Historical, social science, and literary accounts of sleep behavior are additional invaluable resources in the challenge of understanding how and why sleep is regulated both biologically and culturally and what the outcomes of this variability may be. Ekirch,<sup>40</sup> for example, provides an informative historical overview of changes in sleep amount in the British Isles from preindustrial times, including commentary on sleep patterning and duration. Strikingly, he addresses at length the once commonly accepted notion of “first sleep,” an initial and distinct period of deep and restful sleep that was fully expected to be followed by an interval of wakefulness before the remainder of the night’s sleep, referred to as “second sleep” or “morning sleep.” This pattern of sleep was widely recognized, as is demonstrated by Ekirch’s compendious list of medical, literary, and popular sources referencing the term in English, French, and Italian from before the 13th century through the 19th century. This was considered a normal and unproblematic sleep pattern. There is no particular mention in print of waking in the middle of the night as undesirable or pathologic. Quite the contrary, Ekirch located scores of references in journals and diaries to the peacefulness and meditative appeal of this waking period. Medical books from the 15th to the 18th centuries advised the public to take “the fyrste slepe” on their right side and thereafter to sleep on the left side to promote good digestion and “more tranquil repose,”<sup>40</sup> and Christian publications suggested appropriate prayers and meditations for the pensive and quiet waking interval.

Interestingly, a polyphasic distribution of nocturnal sleep was also observed by Wehr et al<sup>98</sup> in a recent experiment with adult subjects. In this well-conducted study in the early 1990s, they found that during long nights (14 hours of darkness), sleep is separated into  $\geq 2$  bouts, with intervals of wakefulness between them, strikingly similar to Ekirch’s descriptions of the preindustrial sleep pattern and to young children’s sleep. Ekirch did not directly address children’s sleep in his article. It can safely be inferred, however, that as children were socialized at that time they also would have learned to consider polyphasic sleep normative. Thus, both historical descriptions and modern experimental findings raise the possibility that “sleeping through the night” (an important developmental milestone of early childhood) may be an “artifact of modern lighting technology.”<sup>98</sup>

In the United States, 19th-century attitudes toward sleep differed from those of the 20th century in a number of respects.<sup>14</sup> The topic of sleep was absent in 19th-century public media discussions about children, and the plentiful parent-advisory literature did not include sections about sleep. Children’s sleep behavior was not considered an issue that merited attention and comment, because it was generally

presumed that children’s sleep was by nature self-regulating and untroubled. Commentary on adult sleep focused largely on health and character and in the latter part of the century exhibited a clear moral tone: It was asserted that adult sleep difficulties could be managed with proper self-discipline, including avoidance of idleness and that “healthy people always sleep well.”<sup>14</sup> American children were thought to need no more than ~12 hours of sleep per day at age 3, with requirements diminishing to 8 or 9 hours by age 7 and to still less during adolescence. Adult sleep was considered sufficient at 6 to 7 hours per day, although 6 hours was plenty, and worry about getting any more sleep than that was considered a “waste of time.”<sup>14</sup>

Concerns about children’s sleep began to develop through the release of new scientific data in the early 20th century,<sup>46–48</sup> coupled with an increase in the number of specialists in child development between 1910 and 1920.<sup>14</sup> Sleep began to be characterized as essential for the physical health and emotional development of children and, at the same time, as a less robust and self-regulating process than had been assumed previously. Estimations of children’s sleep requirements rose dramatically, to 10 to 12 hours well into the teenage years, and considerably more for those <10 years old; for infants, the more sleep the better. In 1910, the pediatrician L. Emmett Holt, speaking as a member of the Child Health Committee, declared with alarm that “the American child is kept on a starvation ration of sleep.”<sup>14</sup> During the 1920s, parents’ handbooks, women’s magazines, and professional literature began to devote space often to children’s sleep. A primary concern was the prevention of (especially evening or nighttime) excitability that might interfere with or delay an easy transition to sleep. Activities promoting excessive excitability included reading captivating stories or waiting up with anticipation until Father came home from work. Bedtimes as early as 7:00 PM were recommended for children of all ages. Daytime sleepiness, as a potential consequence of insufficient sleep, appeared in the literature as a concern with fatigue or “the tired child.” The primary health goal in promoting plentiful sleep was avoidance of susceptibility to infectious diseases and, worse, to nervous upset or imbalance that could initiate a vicious cycle of excitability that further impeded normal sleep.

Thus began an era of extreme concern with regulation of children’s sleep both for health promotion and to advance the now-explicit goal of fostering the independence and self-control that were desirable characteristics of all upstanding citizens. Part and parcel of this training was the practice of children’s sleeping alone in their own beds and preferably in their own rooms and being taught at an early age the discipline of bedtime through the use of regular routines and firm (if distant) parental oversight. In the waning years of the 1800s and into the early 20th century, several child experts also pronounced against the use of cradles as being potential instruments of overstimulation through rocking, and teaching children to become overdependent on adult attention at bedtime.<sup>99</sup> The aforementioned Dr Holt

was a leading crusader against the cradle and against the “vicious practice” of rocking children to sleep.<sup>99</sup> The material culture of the country began to reflect the new mores as cradles became less common and the stationary crib emerged as the child bed of preference. The strong moralism of child-sleep regulation also exerted social pressure on parents, whose own characters could be impugned if they “gave in” to children’s bedtime resistance or “overindulged” their infants by rocking them to sleep.<sup>99</sup> Such connections between sleep behavior and the moral order of the larger society are a cultural commonplace and figure prominently among the reasons such deep feelings are attached to the propriety of child sleep behaviors and why preferred patterns of child sleep are so strongly resistant to acculturative pressures.<sup>100,101</sup>

#### METHODOLOGIC CONSIDERATIONS IN CROSS-CULTURAL RESEARCH

The scientific pediatric sleep literature cited in this review illustrates some of the inherent difficulties in comparative and cross-cultural research. For example, studies within and across countries and cultures have used different recruitment strategies (eg, population randomly selected from national surveys or from clinical, urban, or rural populations), measurement formats (frequencies of occurrence of the key variables), numbers of subjects, and descriptions of age ranges. In addition, the variation of reported sleep behavior across decades and within cultures limits comparability between studies performed at different times. Problems in cross-cultural research particularly arise in the attempt to compare studies of cultural groups conducted with instruments (eg, questionnaires sent by mail or filled out in the pediatrician’s office or face-to-face or telephone interviews) that have not been cross-culturally standardized, appropriately translated, or validated for the populations under study.

Another problem lies in the various definitions of key terms. For example, “sleep amount,” “sleep need,” “sleep duration,” and “time in bed” are terms that often are used interchangeably in the literature. Apart from the obvious problem that “time in bed” may not correlate with actual “time asleep” and thus is not a reliable proxy for sleep amount or duration, these common research terms may have different conceptual meanings across the cultures in which the studies were conducted. In a substantial number of studies, cultural beliefs, practices, and theories have not been assessed with appropriate instruments or qualitative inquiry. Rather, general cultural influences have been assumed or inferred according to the investigators’ own (often tacit) guiding assumptions.

Even when attention has been paid to specific cultural mores and their formative role in the understanding and orchestration of children’s sleep, a salient problem with the majority of cross-cultural research is its tacit assumption of cultural homogeneity: Chinese people believe *x*, Dutch parents do *y*, Americans or Balinese embrace *z*. We have even fallen prey to this problem in this article as a kind of

linguistic convenience. Yet cultures are not monolithic, and considerable internal variability exists in every culture. Subcultures and differing ethnic, social-class, or other identity groups can be found in any culture (each with its own values, mores, and purposes), and knowledge of a general “macro-cultural” feature does not predict individual belief and behavior.<sup>102</sup> As a caveat, it is essential to bear in mind that the now-common term “cultural diversity” has, in reality, a dual meaning and should, as a guiding principle in research, be understood to refer to diversity within as well as between cultures.<sup>102</sup>

Cross-cultural research in children’s sleep ideally should include investigation of folk illnesses and health-belief systems and the ways in which sleep is interpreted with respect to them. In addition to contributing to better understanding of cultural interpretations of the nature and purposes of sleep and the relationships between sleep and health, information of this type is of direct relevance to clinical practice with differing populations. In Haiti, for example, it is a common belief that if a person does not get sufficient rest, the volume and condition of blood in the body will be affected adversely, to the detriment of overall health and well-being.<sup>103</sup> In the Latin American phenomenon of *susto*, a form of soul loss caused by sudden fright or shock, restlessness during sleep is a diagnostic sign.<sup>104</sup> Soul loss is a cross-culturally common category of event that may itself be an illness or may lead to illness if not properly treated and is related to sleep in quite a variable range of ways.<sup>105</sup> These include the common notion that human souls wander from the body during sleep; their experiences may produce the content of some types of dreams (eg, *passim*<sup>106</sup>), and awakening a sleeper too abruptly or at the wrong time may result in the soul’s inability to return properly, thereby producing soul loss.<sup>19,35,106</sup> Children are typically considered especially susceptible to this risk as well as to other forms of supernatural danger during sleep.

We also underscore the assertion of Pachter and Harwood<sup>7</sup> that linguistic, conceptual, and measurement equivalence must be achieved in cross-cultural research before firm conclusions about effects of culture on sleep behavior can be drawn (although we add and emphasize that the first 2 can only be accomplished to the extent that terminological or conceptual equivalence exists between cultural categories relevant to sleep). Indeed, thorough investigation of the “language of sleep” in every cultural setting in which studies are conducted will be a requisite for understanding the local meanings and taxonomy of sleep and sleep-related activities and objects and a key to broader understanding of the organization and nature of human sleep. To illustrate with a few examples relevant to research: The Balinese recognize a sleep category called *tadoet poeles*, or “fear sleep,” in which social circumstances of extreme stress induce instantaneous deep sleep, apparently as a form of escape or stress relief, which can occur even in very public circumstances and from which the sleeper has to be shaken awake.<sup>11,35,36</sup> Preyer wrote about *schlafsucht*, an “abnormal need

for sleep," in his infant son,<sup>45</sup> his term implicitly revealing normative assumptions about sleep in infants; and Japanese society today recognizes a particular type of napping called *inemuri*, specifically signifying being present with others (implicitly in daytime social and business surroundings) and asleep.<sup>16</sup>

## CONCLUSIONS

Pediatricians need to recognize the cultural environment in which children live and how cultural beliefs and values interact with the needs of the individual child and with the biological characteristics of his or her sleep patterns. It is not necessary to know everything about cultural diversity or to be an "expert" on culture, but it is important to understand basic dimensions and mechanisms of cultural differences and their interaction with biology as they function in individual children and families. Knowing that children "typically" exhibit a particular behavior at a specific developmental stage is unsatisfactory; to best meet the needs of patients and families it is imperative to acknowledge individual behaviors in the context of the cultural background and social circumstances. In addition, clinicians and researchers should attend systematically to their own cultures' values and preferences and to the ways in which they condition their responses and expectations, both in the clinic and in all aspects of research design and interpretation.

Documentation and description of the cultural diversity in which children grow up and the effect of culture on their development and behavior, of which sleep is at the core, may provide an important basis for the reconsideration of our own cultures. Are the cultural standards provided by our own society optimal for the development of our children? The large diversity of children's sleep behaviors among societies and cultures may in fact indicate that an "optimal cultural standard" does not exist. Instead, individual biological determinants and needs of children must be taken into account when children's sleep patterning and sleep problems are addressed. Are all children able to adapt their biological sleep requirements to culturally defined sleep demands? Notably, the goodness of fit between individual children's needs and their cultural environments may provide a conceptual basis for clinical practice.

Internationally collaborative and broadly interdisciplinary studies are needed to disentangle the respective roles of culture and biology in children's sleep behavior. These studies must be carried out with methodologic rigor, according to disciplinary standards, with both subjective and objective measures standardized for different cultures and using both qualitative and quantitative approaches. This breadth, depth, and conceptual clarity of investigation are needed to help clinicians better understand the culture-biology interaction in the establishment of behavioral and developmental norms and expectations and eventually to comprehend what constitutes a sleep problem, when and for whom, and how best to approach it. The time is ripe.

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