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The Role of Parental Beliefs about their Sleep and Sleep of their Child in the Regulation of Sleep and Wakefulness in Children 5–13 Years Old: Cultural-Historical Approach in Psychosomatics

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From perspective of cultural-historical approach in psychosomatics, the psychological regulation of a child's sleep and wakefulness is developed in children in interaction with significant adults. The aim was to reveal the relationship between dysfunctional beliefs of parents about their own sleep and its vulnerability as well as their violations of sleep hygiene and parental beliefs about the sleep of their children aged 5–13, the beliefs of the children about their sleep and their quality of sleep and wakefulness. 147 pairs of “parent-child 5–13 years old without diagnosed sleep disorders” participated (47 pairs with a child 5–6 years old, 49 pairs with a child 7–9 years old, 51 pairs with a child 10–13 years old). Parents answered questions about their child's sleep pattern, filled children's sleep habits questionnaire, dysfunctional beliefs about sleep and sleep vulnerability scales about their own and their child's sleep, insomnia severity index, and a scale of behavioral factors of sleep disturbances about their own sleep. Children answered the questions of children's self-report about their sleep, dysfunctional beliefs about and vulnerability of their sleep scales, pediatric sleepiness scale. According to the analysis of mediation, dysfunctional perceptions of parents about their own sleep are indirectly associated with sleepiness and sleep difficulties in children, since they increase the likelihood of the same perceptions of parents about their children's sleep. Sleepiness, according to the children appraisals, is additionally indirectly related to the dysfunctional beliefs of parents about their sleep through the mediation of the child's beliefs about their sleep. Parents' beliefs about their sleep vulnerability are associated with children's poorer sleep and sleepiness, as they increase the likelihood of the child's sleep vulnerability beliefs, which, in turn, increase the likelihood of the child's own perceptions of the vulnerability of his sleep. The data are consistent with the perspective of the psychology of physicality about the development of the psychological regulation of sleep and wakefulness of the child in interaction with significant adults.

Keywords: psychological regulation of sleep, children, parental beliefs, dysfunctional beliefs about sleep, beliefs about sleep vulnerability.

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Роль родительских представлений о своем сне и сне ребенка в регуляции сна и бодрствования у детей 5–13 лет: культурно-исторический подход в психосоматике

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С позиций культурно-исторического подхода в психосоматике психологическая регуляция сна и бодрствования ребенка формируется во взаимодействии со значимыми взрослыми. Цель нашей работы — выявление связи дисфункциональных представлений родителей о своем сне, его уязвимости, нарушениях гигиены сна с родительскими представлениями о сне их детей 5–13 лет, представлениями самих детей и их качеством сна и бодрствования. Участвовали 147 пар «родитель—ребенок 5–13 лет без диагностированных нарушений сна» (47 пар — с ребенком 5–6 лет, 49 — с ребенком 7–9 лет, 51 — с ребенком 10–13 лет). Родители отвечали на вопросы о паттерне сна ребенка, заполняли опросник о привычках детей в отношении сна, шкалы дисфункциональных представлений и уязвимости сна по отношению к своему сну и сну ребенка, индекс тяжести инсомнии и шкалу поведенческих факторов нарушений сна по отношению к своему сну. Дети отвечали на вопросы самоотчета детей о своем сне, шкалы дисфункциональных убеждений и уязвимости своего сна, педиатрической шкалы сонливости. По результатам анализа медиации, дисфункциональные представления родителей о собственном сне связаны с сонливостью и трудностями со сном у детей косвенно, поскольку увеличивают вероятность таких же представлений о сне детей. Сонливость, по оценкам самих детей, дополнительно косвенно связана с дисфункциональными представлениями родителей о своем сне через медиацию представлений ребенка о своем сне. Представления родителей об уязвимости своего сна связаны с трудностями детей со сном и сонливостью, поскольку усиливают вероятность представлений об уязвимости сна ребенка, а те, в свою очередь, — вероятность представлений самого ребенка об уязвимости его сна. Данные согласуются с представлениями психологии телесности о формировании психологической регуляции сна и бодрствования ребенка во взаимодействии со значимыми взрослыми.

Ключевые слова: психологическая регуляция сна, дети, родительские представления, дисфункциональные представления о сне, представления об уязвимости сна.

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Introduction

The cultural-historical approach in psychosomatics [1; 2] and psychology of corporeality [5] suggest that the system of psychological regulation of somatic functions is developed in a childhood in the process of interaction with significant adults, and later with peers and other adults. Human sleep is a character-

istic example of such a function: sleep disturbances provoke people to actions aimed at intensification of direct sleep regulation, which lead to sleep fragmentation only [7].

This study extends these assumptions about the psychosomatic development of various physiological functions and bodily processes [1; 3] to children's sleep. In young children, the regulation of sleep and wakeful-

ness is carried out by the parents, shaped by the parents' own system of sleep and wakefulness regulation and the child's beliefs about sleep. As the child grows and is confronted with sleep difficulties, parents' reactions to these difficulties, and their demands and constraints, sleep becomes a "partially transparent" function for the child [5]. In essence, he or she begins to recognize his or her sleep as a separate, organized process. The child develops his or her own rules and tools for regulating his or her sleep, which may be partly based on or borrowed from the parental system and partly determined by other experiences or even by experiences of counteracting to parental demands. As a result, the child's sleep and wakefulness regulation system that is initially controlled by parents is gradually interiorized by the child and partly transformed — depending on his/her relationship with the parents, the parents' behavior regarding their own sleep (which may diverge significantly from what they do regarding the child's sleep), and other life experiences (such as sleeping at camps or at friends' houses).

Unfortunately, a review of research of sleep in children demonstrates that most of studies do not address the psychological factors of sleep regulation, with the exception of behavioral factors.

Behavioral factors and the organization of children's sleep are so important that they are now included both in diagnostic criteria for sleep disorders [4; 18] and in descriptions of so-called "optimal" sleep in children as nighttime sleep without waking up and in one's own bed [14]. In particular, children's sleeping habits with regard to laying down, falling asleep, and maintaining sleep are considered to be some of the key psychological factors of insomnia in children if this insomnia is related to child and parental behavior [24]. A number of studies reveal the association (and frequent comorbidity) of sleep disorders in children with symptoms of **anxiety and depression** [8; 12], as well as lower perceived well-being [21].

As in adults, **cognitive arousal before sleep** [12] and severity of **dysfunctional beliefs about sleep** have been shown to be associated with worse sleep quality in children as assessed by both children and parents [13], although the association of dysfunctional beliefs with sleep quality in children often disappears after statistical control of anxiety and depression [8], but these studies are isolated. The **sociocultural factors** of sleep and wakefulness in children also remain under-investigated [22], which makes research on children's sleep in different countries and cultures especially relevant.

One of the few exceptions in this area is a study conducted on 45 pairs of 11–12 year old children and their parents that included objective registration of children's

sleep by actigraphy [20]. Maternal dysfunctional beliefs about children's sleep were demonstrated to be associated with worse sleep quality in children, but only according to maternal appraisals (not children's own appraisals), and were also associated with children's own dysfunctional beliefs. Although indirectly this result suggests that children at least partially internalize their parents' beliefs, it remains unclear what exactly is learned by children during socialization — the parental beliefs about their sleep, about their own sleep, or the sleep regulation strategies that parents implement in their own lives.

The **aim** of the study was to identify the relationship between parents' dysfunctional beliefs about their sleep, its vulnerability, and sleep hygiene disturbances with parents' beliefs about their 5–13 year old children's sleep, the children's own beliefs about their sleep, and the children's quality of sleep and wakefulness.

The following **hypotheses** were proposed:

1. Parental subjective sleep quality and their dysfunctional beliefs about their sleep, its vulnerability, and sleep hygiene disturbances are related to their 5-13 year old children's beliefs about sleep, children's sleepiness and sleep difficulties (as assessed by both children and parents).

2. Parental dysfunctional beliefs about their sleep and its vulnerability are indirectly related to children's sleepiness and sleep difficulties, as parents with such beliefs are more likely to think the same about their children's sleep, and children, in turn, think the same about their own sleep (mediation effects).

Methods

Pairs of "child 5–13 years old without diagnosed sleep disorders — one of his/her parents" were invited to the study. The parents filled the questionnaires and the children were interviewed, with the interviewer completing the instruments either by interview or with the child, depending on their age and ability to understand and complete the instruments.

Parents answered **questions** about their chronotype ("owl" or "lark"), the child's chronotype, their and the child's habitual sleep patterns (presence and duration of daytime sleep, time and regularity of bedtime, time to fall asleep, number and duration of night awakenings, time of awakening in the morning and time of rising in the morning), and the necessary and actual duration of their and the child's sleep. Their responses were used to calculate the child's sleep duration, time in bed, and sleep efficacy.

Parents then filled the following **scales about their child's sleep**:

1. *The Children Sleep Habits Questionnaire* (CSHQ, [23; 17]) is a questionnaire for parents designed to diagnose various aspects of sleep disturbances and child sleep patterns, including sleep behavior. It includes scales of resistance to falling asleep, delayed falling asleep, insufficient duration of sleep, night terrors, nocturnal awakenings, parasomnias, sleep breathing disorders, and daytime sleepiness. Additionally, parents rated each item by the extent to which each aspect of the child's sleep is a problem for them. In this study, Cronbach's alpha of the total score was 0.80 (0.55–0.92 for the various subscales).

2. The *Subjective Sleep Vulnerability (Fragility) Scale* [6] is based on the subjective sleep vulnerability checklist, a list of 12 subjective causes of sleep disorders, which was used for screening differential diagnosis of sleep disorders. Cronbach's alpha in this study was 0.78.

3. *The Dysfunctional Beliefs About Children Sleep Scale* (DBACS, [20; 16]) is a modification of C. Morin's Dysfunctional Beliefs About Sleep Scale to examine parents' dysfunctional beliefs about their children's sleep. Cronbach's alpha in this study was 0.81.

Parents then filled a series of **scales about their own sleep**:

4. *Insomnia Severity Index* [3; 19] is a screening scale to assess insomnia-type sleep disorders. In the normative sample the index is used as an indicator of subjective sleep quality (higher scores indicate worse sleep quality). Cronbach's alpha was 0.82.

5. *The Dysfunctional Beliefs About Sleep Scale* [3; 19] includes beliefs about sleep and sleep disorders that are associated with worse sleep quality in the normative sample and with the perpetuation of insomnia in patients. Cronbach's alpha was 0.84.

6. The *Subjective Sleep Vulnerability (Fragility) Scale* [6]. Cronbach's alpha was 0.76.

7. *Behavioral Factors of Sleep Disorders Scale* [6] – a screening scale for assessment of sleep hygiene disturbances and adherence to stimulus control principles. Cronbach's alpha was 0.74.

Children, depending on their age and ability to understand the questions, replied to the scales either as part of a structured interview or by themselves. The scales were as follows:

1. *The Sleep Self-Report* (SSR, [25; 21]) was developed as an analogue of the Children's Sleep Habits Questionnaire for use with children; it includes 26 items, the content of which is as comparable as possible to the parental version. The scale includes four subscales: sleep habits/bedtime routine, refusal to go to bed, night terrors, and sleep quality. In this study, Cronbach's alpha of the total score was 0.81 (0.55–0.71 for the various subscales).

2. *Dysfunctional Beliefs About Sleep – Children's scale* (DBASC-10, [9; 13]) is a modification of C. Mo-

rin's Dysfunctional Beliefs About Sleep scale for use with children. Young children were given the scale in the form of an interview; if they could not fully understand it, the scale was skipped (132 of 147 children, 89.8%, understood and responded to the scale). Cronbach's alpha for this study was 0.75.

3. The *Subjective Sleep Vulnerability (Fragility) Scale* [6]. Cronbach's alpha was 0.69.

4. *The Pediatric Daytime Sleepiness Scale* (PDSS, [11]) includes eight items and has been proposed for subjective assessment of sleepiness in school-age children. In this study, it was translated to Russian and used for the first time; Cronbach's alpha 0.73.

A total of 147 pairs of “child 5–13 years old – one of his parents” participated in the study. Sixty-seven respondents were girls (45.6%), 79 were boys (53.7%), and in one case the gender of the child was not specified (0.7%). The mean age was 8.29 ± 2.53 years. Of these, 47 (32.2%) were older preschool age (5-6 years), 49 were 7-9 years (33.4%), and 51 (34.9%) were 10-13 years. Sixty-one parents (41.5%) identified their children as “larks”, 72 (49.0%) as “owls”, and the rest indicated either a mixed type (“doves”) or skipped this question. No differences in chronotype (“larks” / “owls”) between children of different ages were found.

Parents included 11 fathers (7.5%), 134 mothers (91.2%), and two did not indicate their gender (1.4%). Parents ranged in age from 24 to 56 years (mean age 35.69 ± 5.86 years).

Data were processed in SPSS Statistics 23.0 software and included descriptive statistics, group comparison methods, correlation analysis, regression analysis, and mediation analysis.

Results

Parents' beliefs about their and their children's sleep and children's sleep quality

In families with better subjective quality of parental sleep, children had less sleep difficulties and sleepiness, and sleep itself was longer (Table 1). Interestingly, parental subjective sleep quality was more closely related to parental appraisals of child sleep than to child's assessments (e.g., not related to how sleepy children themselves felt during the day). Poorer parental sleep quality also correlated with poorer child sleep efficiency, as well as parent and child beliefs in child sleep vulnerability.

Dysfunctional beliefs and beliefs about sleep vulnerability regarding both own parental and children's sleep were related (Table 1; in children, the relationship was $r=0.40, p<0.01$).

The more pronounced parents' dysfunctional beliefs about their own sleep, the more often they tended to think the same about their children's sleep, and children, in turn, were also more likely to express dysfunctional beliefs about their sleep. Parents' own dysfunctional beliefs about their own sleep were related only to children's sleep difficulties as appraised by parents, whereas parents' dysfunctional beliefs about children's sleep were related to both children's sleep problems and their daytime sleepiness as appraised by both children and parents.

Parents' beliefs about own sleep vulnerability and their children's sleep vulnerability were associated with worse sleep quality in children and sleepiness according to parental appraisals, whereas their associations with sleep quality and sleepiness according to children's appraisals were weaker and did not reach the accepted level of significance in all cases.

In order to test the hypothesis that parents' beliefs about their sleep were indirectly related to the quality of children's sleep and sleepiness (through parental beliefs about the child's sleep and the child's own beliefs) a series of mediation analyses with two mediators was conducted. The dependent variables were children's difficulties of sleep and children's sleepiness as appraised by the parent and by the child's own perceptions, respectively (i.e., four dependent variables, Table 2). Sleep duration and sleep efficiency were not included in the analysis because they were not related to children's and parents' beliefs by correlation analysis.

No direct effects of parents' dysfunctional beliefs about their sleep and beliefs about their sleep vulner-

ability were found in any case. Parents' dysfunctional beliefs about their own sleep were indirect predictors of children's sleepiness and sleep difficulties (as appraised by parents) through mediation by parents' beliefs about children's sleep. In addition, all three possible mediation effects on subjective sleepiness (as appraised by children) were established. In the other words, parents prone to dysfunctional beliefs about their own sleep were more likely to think the same about their child's sleep, which, in turn, was associated with more pronounced sleep difficulties and sleepiness in their children (as assessed by parents). Sleepiness (as appraised by children) was related both to the fact that parents with dysfunctional beliefs about their own sleep also think the same about their children's sleep, which is related to the risk of sleepiness, and also to the fact that parents' dysfunctional beliefs about their children's sleep were in turn related to the risk of similar beliefs in the children themselves.

Parents who tended to consider their own sleep as vulnerable and fragile were more likely to think in the same way about their child's sleep, which, in turn, was associated with a greater likelihood that the child would consider his or her sleep as more vulnerable and — as a consequence — with more pronounced difficulties with sleep (according both to children and parents), and subjective sleepiness (according to children's appraisals). In addition, if parents considered their sleep to be vulnerable and, as a consequence, their child's sleep to be vulnerable, this latter beliefs predicted more pronounced sleep problems in the child, but only according to parental appraisals.

Table 1

Relationships between the subjective quality of sleep and parents' beliefs about their and their child's sleep and the beliefs and quality of their children's sleep: results of a correlation analysis (N=147 pairs)

	DBACS – Parents: Dysfunctional beliefs about child's sleep	Parents: Subjective vulnerability of child's sleep	ISI – Parents: Insomnia Severity Index	DBAS – Parents: Dysfunctional beliefs about own sleep	Parents: Subjective vulnerability of own sleep	Parents: Sleep hygiene disturbances
DBACS – Parents: Dysfunctional beliefs about child's sleep	1	.36**	.18	.42**	.38**	.18
Parents: Subjective vulnerability of child's sleep	.36**	1	.26	.14	.44**	.14
CSHQ – Daytime sleepiness (parental appraisal)	.32**	.19	.26	.09	.18	.18
CSHQ – Total score in child (parental appraisal)	.34**	.32**	.38**	.26	.29*	.30*
Sleep duration	-.04	-.09	-.26	-.07	-.13	-.02
Sleep efficacy	-.13	-.17	-.35**	-.12	-.17	-.09
Daytime sleepiness (child's appraisal)	.32**	.21	.16	.09	.14	.19
SSR – Total score of sleep difficulties (child's appraisal)	.21	.11	.21	.10	.18	.25
Children: Subjective sleep vulnerability	.29*	.35**	.18	.19	.21	.21
DBASC – Children: Dysfunctional beliefs about own sleep	.32**	.16	.15	.42**	.24	.18

* – p<.05, ** – p<.01 (with Bonferonni adjustment for multiple comparisons).

Table 2

Children’s sleep quality and sleepiness as affected by parents’ dysfunctional beliefs about their own sleep and sleep vulnerability, their children’s sleep and children’s own beliefs about their sleep and its vulnerability: results of mediation analyses

Dependent variables in models	Total indirect effect			Mediation	Specific indirect effects		
	β	se	95% CI		β	se	95% CI
Model 1: indirect effects of parental dysfunctional beliefs about their sleep and their children’s sleep							
CSHQ – Daytime sleepiness (parental appraisal)	.86	.33	[.29-1.63]	Parent about his/her own sleep- about his/her child’s sleep	.86	.31	[.37-1.60]
CSHQ – Total score of child’s sleep difficulties (parental appraisal)	1.93	.83	[.50-3.79]	Parent about his/her own sleep- about his/her child’s sleep	1.62	.79	[.38-3.55]
Daytime sleepiness (child’s appraisal)	.16	.04	[.09-.26]	Parent about his/her own sleep- about his/her child’s sleep	.08	.03	[.03-.16]
				Parent about his/her own sleep- about his/her child’s sleep – child about his/her own sleep	.01	.01	[.00-.05]
				Parent about his/her own sleep- child about his/her own sleep	.06	.03	[.02-.13]
Model 2: indirect effects of parental beliefs about their sleep vulnerability and their children’s sleep vulnerability							
CSHQ – Total score of child’s sleep difficulties (parental appraisal)	2.83	1.16	[1.01-5.54]	Parent’s appraisal of his/her own sleep vulnerability- of his/her child’s sleep vulnerability	1.97	.97	[.44-4.29]
				Parent’s appraisal of his/her own sleep vulnerability- of his/her child’s sleep vulnerability – child’s appraisal of his/her own sleep vulnerability	.56	.39	[.06-1.70]
Daytime sleepiness (child’s appraisal)	.13	.07	[.00-.29]	Parent’s appraisal of his/her own sleep vulnerability- of his/her child’s sleep vulnerability – child’s appraisal of his/her own sleep vulnerability	.06	.03	[.02-.15]
SSR – Total score of child’s sleep difficulties (child’s appraisal)	.06	.06	[-.04-.19]	Parent’s appraisal of his/her own sleep vulnerability- of his/her child’s sleep vulnerability – child’s appraisal of his/her own sleep vulnerability	.06	.03	[.02-.13]

Discussion

The psychological system of children’s sleep regulation as shared between children and parents: the relationship of parental beliefs and sleep quality with beliefs, difficulties with sleep and sleepiness in children. When parents’ subjective sleep quality was low, children’s sleep efficacy was lower (which is an indicator not only and not so much of sleep difficulties as an indicator of ineffective sleep regulation in a situation of sleep difficulties) and both children and parents appraise children’s sleep as more vulnerable. It is also interesting that parents’ subjective sleep quality was more closely related to parents’ than to children’s appraisals of children’s sleep: for example, parents with their own sleep difficulties were more likely to believe that their children appeared tired and sleepy during the day, whereas children were likely not to feel that way. From our perspective, parents who have difficulties with their own sleep are more likely to worry about their children’s sleep and to choose ineffective strategies for regulating their children’s sleep (e.g.,

disrupting the child’s routine), resulting in decreased sleep efficiency. Indirect evidence that the relationship between children’s sleep quality and parents’ sleep quality is partially explained by the use of dysfunctional sleep regulation strategies in both cases is the association of children’s sleep difficulties and sleepiness with their parents’ poor sleep hygiene.

According to mediation analysis, parents’ dysfunctional beliefs about their own sleep are indirectly related to children’s sleepiness (as assessed by children and parents) and children’s sleep difficulties (as assessed by parents only) through mediation by parents’ dysfunctional beliefs about their children’s sleep, and in case of sleepiness as appraised by children – also through mediation by children’s beliefs about their own sleep. In other words, the more dysfunctional beliefs about their own sleep parents have, the more likely they are to think the same about the child’s sleep, which, in turn, is associated with children’s sleep difficulties and sleepiness. In addition, both parents’ dysfunctional beliefs about their sleep and parents’ dysfunctional beliefs about their child’s

sleep are related to the child's own beliefs about their sleep, which is a predictor of greater subjective sleepiness. The data are consistent with the results of the previous study of the relationship between dysfunctional beliefs about sleep in parents and children [20].

Parents' beliefs about their sleep vulnerability were indirectly related to children's sleep difficulties (as assessed by children and parents) and their sleepiness (as assessed by children) through the following mediation: parents with such beliefs were more likely to consider their child's sleep as vulnerable as well, which, in turn, increased the likelihood that the child also appraised his/her sleep as vulnerable, and indirectly affected sleepiness and sleep difficulties. For sleep difficulties, an additional mediating effect was identified: parents' beliefs about their sleep vulnerability were related to their child's sleep difficulties through child's own beliefs about his/her sleep vulnerability.

Conclusion

1. Parents' dysfunctional beliefs about their own sleep and its vulnerability, their children's sleep and its vulnerability, and the children's own beliefs are related to each other and to the children's worse sleep quality and sleepiness.

2. Parents' dysfunctional perceptions of their own sleep are indirectly related to children's sleepiness and sleep difficulties – as they increase the likelihood of the same parental beliefs about the children's sleep.

3. Children's own sleepiness is additionally indirectly related to parents' dysfunctional beliefs their own sleep through mediation by children's beliefs about their own sleep.

4. Parents' beliefs about their sleep vulnerability are related to children's difficulties with sleep and sleepiness because they increase the likelihood of children's beliefs in sleep vulnerability, and those, in turn, increase the likelihood of children's own beliefs in their sleep vulnerability.

This study demonstrates some opportunities for research of the development of the psychological system of sleep and wakefulness regulation during ontogeny as shared between parent and child. We concentrated on the only one example of such “transmission” of sleep regulation in the interaction between child and parents (on the example of cognitive representations), but this result is fully consistent with the assumptions of psychology of corporeality about psychological regulation of sleep [5; 7]. Further research may extend the findings to other cognitive, emotional, and behavioral factors of sleep regulation.

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