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**SOCIALIZATION IN THE DEVELOPMENT OF SLEEP  
REGULATION: EFFECT OF PARENTAL BELIEFS**

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*Abstract*

Cognitive beliefs about sleep and insomnia were demonstrated to play an important role in insomnia development and perpetuation. Based on psychological model of body functions regulation, we suggest that there is a psychological transmission of at least some cognitive beliefs, expectations and regulatory strategies from parents to children in their sleep regulation. The aim was to study possible direct and indirect effects of parental beliefs about sleep, subjective sleep and behavioral sleep-wake regimen on beliefs, sleep and regimen in their adult children. 103 pairs of psychology faculty students without diagnosed sleep disturbances and one of their parents answered open questions about their typical pattern of sleep and filled Insomnia Severity Index, Dysfunctional Beliefs About Sleep Scale, Subjective Sleep Vulnerability Scale, students – Epworth Sleepiness Scale. According to the results, students whose parents perceive their own sleep as more vulnerable to different factors appraise their sleep as poorer and more vulnerable as well while dysfunctional beliefs and feeling of sleep pressure in parents correlated to dysfunctional beliefs and feeling of sleep pressure in children, respectively. Regardless of parental subjective sleep parental cognitive beliefs about sleep and its vulnerability have indirect effect on their children's sleep through their own cognitive beliefs about sleep and its vulnerability. Data are in line with the hypothesis of psychological “transmission” of sleep regulation from parents to children.

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**Keywords:** Socialization, sleep regulation, parental beliefs about sleep, subjective sleep, mediation analysis.



## **1. Introduction**

Cognitive models of poor sleep and insomnia have become one of the leading explanatory models in this sphere of somnology while cognitive behavioral therapy is suggested as the “first line” treatments for patients with insomnia (Perlis, Shaw, Cano, & Espie, 2011). Dysfunctional beliefs about sleep (Morin, 1993), pre-sleep cognitive activity (Nelson & Harvey, 2003) as well as attention and hypertrophied efforts for sleep regulation (Espie, Broomfield, MacMahon, Macphee, & Taylor, 2006) were demonstrated to play an important role in insomnia development and perpetuation. According to psychological model of body functions regulation (Tkhostov, 2002), psychological regulation of different body functions including sleep is developing during socialization when the child learns to indicate, perceive and express its interoceptive sensations. One of the important results of this socialization is a system of sociocultural demands that people try to implement controlling their physiological processes. In particular, in line with attention-intention-effort model (Espie et al., 2006), sleep disturbances lead to excessive efforts for sleep regulation that are ineffective and result in perpetuation of the disease. Even in good sleepers, empirical provocation of high intention to sleep leads to sleep fragmentation (Rasskazova, Zavalko, Tkhostov, & Dorokhov, 2014).

## **2. Problem Statement**

Based on psychological model of body functions regulation, one should further suggest that there is a psychological transmission of at least some cognitive beliefs, expectations and regulatory strategies from parents to children in their sleep regulation. Particularly, dysfunctional beliefs hold by parents could be adopted by their children thus creating a risk for insomnia development regardless parental sleep per se.

## **3. Research Questions**

The study of the development of psychological sleep regulation could be helpful for understanding psychological mechanisms of sleep disturbances. To date some empirical studies have demonstrated that parental dysfunctional beliefs about their children’s sleep are related to children’s sleep (Gregory, Cox, Crawford, Holland, & Harvey, 2009; Ng, Dodd, Gamble, & Hudson, 2013) but the question of whether this relationship exists for parental beliefs about their own sleep and whether it remains in adulthood is still open.

## **4. Purpose of the Study**

The aim was to study possible direct and indirect effects of parental beliefs about sleep, subjective sleep and behavioral sleep-wake regimen on beliefs, sleep and regimen in their adult children.

We hypothesized that:

1. Dysfunctional beliefs about sleep and subjective sleep vulnerability in adult children (students) are related to beliefs of their parents regardless (independently or after statistical control of parental subjective sleep).

2. There is indirect effect of parental cognitive beliefs about sleep on their children sleep through children's beliefs.

Parental behavioral sleep regimen is related to some aspects of sleep regimen in their adult children, but these relationships wouldn't explain indirect effects of parental beliefs.

## 5. Research Methods

103 pairs of psychology faculty students without diagnosed sleep disturbances and one of their parents (we asked to participate a parent who controlled the student's sleep in his / her childhood) participated in the study. 90 (84.9%) were females and the age of students varied 17-33 years old (mean age  $22.11 \pm 3.11$  years old). 95 of parents were mothers (89.6%). The age of parents varied 42-66 years old (mean age  $50.61 \pm 5.84$  years old).

First, both children and parents answered open questions about their **typical pattern of sleep**: time when going to sleep, sleep latency, number and length of awakenings during night, time of awake in the morning and length of staying in the bed after wake. Based on this data, **total sleep time, time in bed and sleep efficacy** were scored. Then, both children and parents filled **Insomnia Severity Index, Dysfunctional Beliefs About Sleep Scale** (Morin, 1993) and **Subjective Sleep Vulnerability Scale** (Rasskazova & Tkhostov, 2012). Students also filled Epworth Sleepiness Scale (Johns, 1991). Insomnia Severity Index and Epworth Sleepiness Scale are screening instruments measuring subjective sleep quality and subjective sleepiness, respectively. Dysfunctional Beliefs About Sleep Scale is a brief measure of cognitive beliefs about sleep and its disturbances that could lead to insomnia perpetuation. Subjective Sleep Vulnerability Scale includes 12 different reasons of sleep disturbances (for instance, "Stress", "Breath disturbances", "Noise"). Participants are asked to appraise using 1-4 Likert scale to what extent their sleep is disturbed by these factors. Total score by the scale reflect cognitive beliefs about general stability versus vulnerability of sleep to different factors (Cronbach's alpha .72).

## 6. Findings

In general, subjective sleep vulnerability and dysfunctional beliefs about sleep correlate with poorer subjective sleep, more frequent and longer night awakenings in both students and parents (Table 01). In students they are related to higher sleepiness, poorer sleep efficacy and longer sleep latency while in parents only belief in sleep vulnerability correlates to lower sleep efficacy. Feeling of sleeping "not enough" (sleep pressure), time in bed and sleep time are unrelated to cognitive beliefs about sleep and its vulnerability to different factors.

**Table 01.** Relationships between cognitive beliefs and subjective sleep / sleepiness in parents and students

Subjective sleep and sleepiness	Parents		Students	
	Subjective sleep vulnerability	Dysfunctional beliefs about sleep	Subjective sleep vulnerability	Dysfunctional beliefs about sleep
Insomnia Severity Index	.39**	.36**	.56**	.56**
Sleepiness	–	–	.27**	.23*
Sleep pressure	.02	.08	.06	.07
Time in bed	.15	.15	.11	.06
Sleep time	-.07	.04	-.05	-.05
Sleep efficacy	-.23*	-.07	-.35**	-.28**
Time when go to bed	.09	-.08	.21*	.10
Sleep latency	.16	.11	.29**	.27**
Number of awakenings	.38**	.26*	.28**	.18
Time to return to sleep after awakenings	.23*	.09	.34**	.25*
Time of awakening in the morning	.20*	.10	.20	.10
Time before get up after morning awakening	.13	-.15	.33**	.16

Note: \* -  $p < .05$ , \*\* -  $p < .01$ .

None of the students' sleep parameters were related to parents' subjective sleep (as measured by Insomnia Severity Index). However, students whose parents perceive their own sleep as more vulnerable to different factors appraise their sleep as poorer and more vulnerable as well while dysfunctional beliefs and feeling of sleep pressure in parents correlated to dysfunctional beliefs and feeling of sleep pressure in children, respectively (Table 02). Longer parental time in bed was related to higher subjective sleep vulnerability, dysfunctional beliefs, longer stay in the bed in the mornings and poorer self-efficacy in their children. Longer parental sleep time was associated with longer time in bed, later awake and longer stay in bed mornings in their children. Higher sleep efficacy in parents correlated to later going to bed and later morning awake in children.

Students' sleepiness, total sleep time, sleep latency, number and length of awakenings are unrelated to parents' subjective sleep and beliefs about it.

**Table 02.** Relationship between sleep and beliefs in parents and sleep and beliefs in their children

Subjective sleep and beliefs about sleep in students	Parents – Subjective sleep vulnerability	Parents - Insomnia Severity Index	Parents - Dysfunctional beliefs about sleep	Parents –Sleep pressure	Parents –Time in bed	Parents –Sleep time	Parents –Sleep efficacy
Students – Subjective sleep vulnerability	.23*	.11	.18	-.07	.21*	.09	-.11
Students – Insomnia Severity Index	.23*	.18	.01	.05	.14	.06	-.03
Students – Dysfunctional beliefs about sleep	.13	.19	.24*	.12	.20*	.17	.05
Students – Sleep pressure	.11	.11	.10	.30**	.04	.02	.00
Students – Time in bed	.02	.00	-.10	-.05	.18	.23*	.13
Students – Sleep efficacy	-.05	.01	-.06	-.03	-.22*	-.15	.00
Students – Time when go to bed	.16	.05	.05	-.03	.05	.15	.21*
Students – Time of awakening in the morning	.10	.02	-.11	-.07	.18	.28**	.24*
Students – Time before get up after morning awakening	.03	-.01	.07	.09	.26**	.27**	.12

Note: \* -  $p < .05$ , \*\* -  $p < .01$ .

Mediation analysis (including 10000 bootstraps to appraise confidence interval for indirect effect) supports that there is an indirect effect of parental dysfunctional beliefs about sleep through students’ beliefs ( $R^2=5.75\%$ ,  $p < .05$ , CI [.04-.36]) on their general subjective sleep (indirect effect  $.16 \pm .07$ , CI [.03-.31]). Similarly, there is an indirect effect of parental subjective sleep vulnerability on students’ sleep (indirect effect  $.22 \pm .10$ , CI [.06-.46]) through their own beliefs about their sleep vulnerability ( $R^2=5.33\%$ ,  $p < .05$ , CI [.03-.39]).

No direct effects of parental beliefs on children’s sleep were found. No support for the possible indirect effect of subjective sleep pressure in parents on their children’s sleep was revealed.

## 7. Conclusion

In accordance with psychological model of body functions regulation (Tkhostov, 2002), cognitive beliefs about sleep and its vulnerability are not only related to subjective sleep but also are related to parental own beliefs. Although this correlational data of “parent-student” pairs needs to be reproduced in other samples (especially with children of different ages), empirical data are in line with the hypothesis of psychological “transmission” of sleep regulation from parents to children. Particularly, parental dysfunctional beliefs about sleep and beliefs that own sleep is vulnerable to the different factors have

indirect effects on children subjective sleep through children's own beliefs. We hypothesize that learning to regulate their sleep from parents in the process of socialization and growing children also learn dysfunctional patterns of such regulation that could lead to poorer sleep in the future regardless of their parents' sleep problems.

Importantly, these indirect effects cannot be explained by genes because none of the sleep parameters in students was related to parental subjective sleep. Moreover, we studied adult students. Comparing to children it's doubtful that their sleep now was regulated by their parents. In the other words, these indirect effects cannot be situational and should be longtime consequences of some parent-child interactions.

On the contrary, parental behavioral regimen in regulation of sleep-wake cycle could be a factor partially explaining such "transmission" given that it was related to children regimen. However, only subjective feeling of "not enough" sleep in parents was related to such feeling in children while other behavioral strategies in parents were unstably related to some strategies in children. For instance, parental time in bed was unrelated to children's time in bed but correlated to children's poorer sleep efficacy and longer stay in bed after awake. Similarly, parental sleep time was related to children's time in bed, later morning awake and longer stay in bed while parental sleep efficacy was related not to children's sleep efficacy but to later going to bed and later awakening in the morning. Based on this data we suggest that parental regimen could be important for their children's regimen but their relationships are not obvious. Probably, better sleeping parents less worried about their children's sleep and less actively insisted that their children go to bed in time leading to easier "shift" of the sleep-wake cycle in children to the later time. Parents who longer stayed in bed demonstrated their children pattern of changing regimen when sleep deprived – strategy that is leading to poorer sleep efficacy.

Thus, regardless of parental subjective sleep parental cognitive beliefs about sleep and it's vulnerability could have indirect effect on their children's sleep through their own cognitive beliefs. Data are in line with psychological model of body functions regulation suggesting that psychological regulation of sleep-wake cycle in children is developing during socialization and "parent-child" interactions.

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