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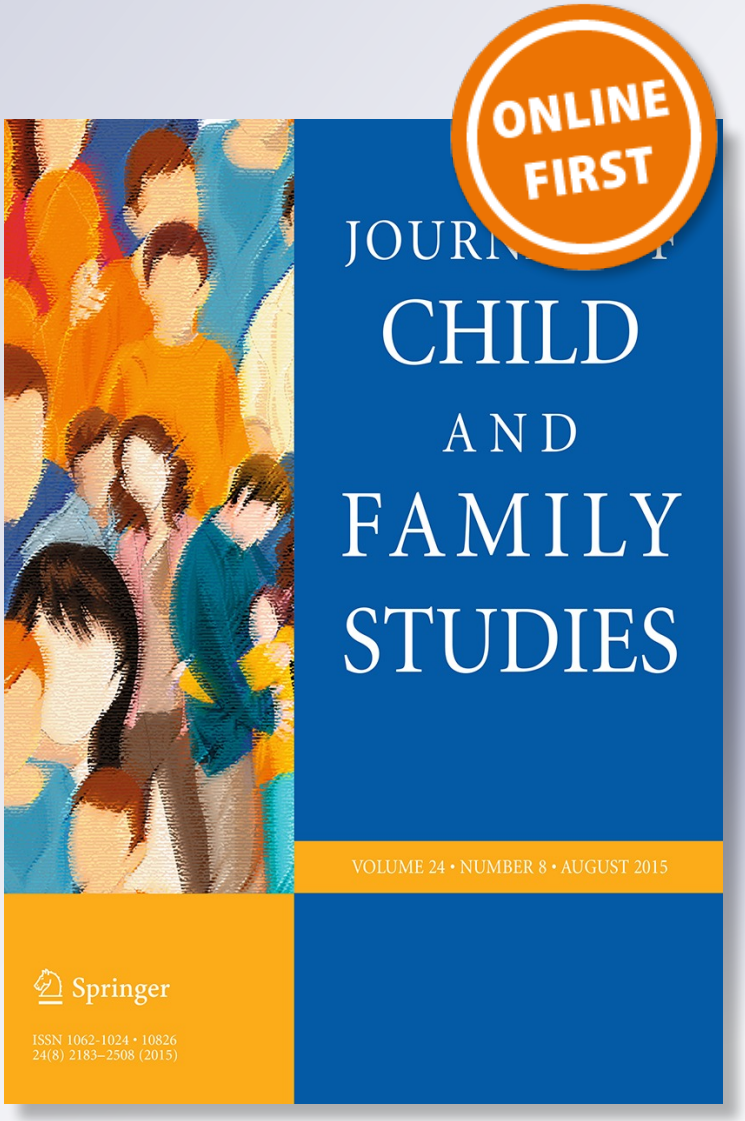

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ORIGINAL PAPER

Sleep Problems and Separation Anxiety in Preschool-Aged Children: A Path Analysis

Angelika A. Schlarb[1,2] · Stefanie Jaeger[2] · Silvia Schneider[3] · Tina In-Albon[4] · Martin Hautzinger[2]

Abstract Sleep problems occur frequently in young children, possibly causing detrimental effects on their development. Parental marital difficulties are known to put a burden on children's sleep and adjustment. However, research concerning the relation between the parental relationship quality and children's sleep difficulties is rare for preschool-aged children. This study aims to fill in the gap. Initially, caregivers of 94 preschoolers (41 girls and 53 boys, aged 2–6 years) filled in questionnaires providing information on their children's sleep and anxiety as well as on their own sleep and relationship quality. A path model approach was used to examine two competing theoretical models linking these factors. The conducted path analysis indicated that children's separation anxiety, $\beta = -.134$, $p = .017$, as well as their anxiety in general, $\beta = -.177$, $p = .024$, partially mediated the relation between the parental relationship quality and children's sleep problems. Parental sleep problems correlated with the relationship quality, $r = -.371$, $p = .030$, but had no significant influence on children's sleep. The results of our study suggest that children growing up with parents who state a low relationship quality might thus be concerned about the stability of their family system. As a result children's sleep quality might be compromised due to irritation and feelings of insecurity. The study highlights the importance of the parental relationship as an influence factor in children's sleep quality.

Keywords Relationship quality · Sleep problems · Separation anxiety · Preschoolers · Parents

Angelika A. Schlarb and Stefanie Jaeger shared first authorship.

✉ Angelika A. Schlarb
angelika.schlarb@uni-bielefeld.de

[1] Department of Psychology, Faculty of Psychology and Sports Science, University of Bielefeld, P.O. Box 10 01 31, 33501 Bielefeld, Germany

[2] Department of Psychology, Faculty of Science, University of Tuebingen, Schleichstrasse 4, 72076 Tuebingen, Germany

[3] Department of Clinical Child and Adolescent Psychology, Faculty of Psychology, Ruhr University Bochum, Universitaetsstrasse 150, 44780 Bochum, Germany

[4] Department of Clinical Psychology and Psychotherapy for Children and Adolescents, Faculty of Psychology, University of Koblenz-Landau, Ostbahnstraße 12, 76829 Landau, Germany

Introduction

Sleep problems are common in young children. Approximately 10–30 % of preschoolers have difficulties initiating or maintaining sleep (Lozoff et al. 1985; Simola et al. 2010; Wolke et al. 1994). However, inadequate sleep was shown to pose a risk to children's health and daytime functioning. Children suffering sleep loss or sleep disruptions are often tired, easily distracted, impulsive, and irritable during the day (Dahl 1996a). In addition, sleep difficulties are associated with the development of internalizing (El-Sheikh et al. 2013; Gregory et al. 2005; Gregory and O'Connor 2002; Gregory and Sadeh 2012) and externalizing problems (Gregory and Sadeh 2012; Kamphuis et al. 2012; O'Brien 2009; Smedje et al. 2001; Velten-Schurian et al. 2010) as well as academic difficulties (Dewald et al. 2010; Gottlieb et al. 2004; Mindell et al. 2006; Schlarb et al. 2012; Touchette et al. 2007).

Family stressors have been found to be related with children's sleep-wake rhythm (Sadeh et al. 2000) and might explain the high amount of sleep issues in young

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children. According to Dahl and El-Sheikh (2007), in order to sleep well one must perceive a sleeping environment as socially safe and free of physical threats. It has been shown that an important source of family stress are malfunctioning parental relationships. Existing studies suggest dissatisfaction with the couple's relationship (Bernier et al. 2013) as well as marital conflict (El-Sheikh et al. 2006, 2007; Kelly and El-Sheikh 2011) and hostility (Rhoades et al. 2012) as negatively associated factors with children's sleep quality. A recent longitudinal study revealed marital instability to predict children's sleep problems (Mannering et al. 2011).

Little is known so far about mechanisms mediating the effect between the parental relationship and children's sleep difficulties. Davies and Cummings (1994) proposed a destructive parental relationship to undermine the emotional security of the child, eventually leading to further adjustment problems. Based on this theoretical model, El-Sheikh et al. (2007) tested the child's emotional insecurity as a mediating factor between marital conflict and sleep quality as well as duration of the child. They assumed that emotionally insecure children suffer an increased arousal, triggered by worries about the stability and security of their family system (Davies and Cummings 1994). Accordingly, this might enhance the likelihood of sleep problems as high quality of sleep is physiologically incompatible with high arousal (Dahl 1996b). First longitudinal results are in line with this proposed connection. Kelly and El-Sheikh (2013) showed that aggression in the couple's relationship predicted increases in children's emotional insecurity 2 years later. In turn, children's emotional insecurity predicted their sleep problems after further 3 years.

Children affected by symptoms of separation anxiety and emotional insecurity are deeply concerned about the stability of their family. In this regard, separation anxiety disorder should be differentiated from age-appropriate fear when facing separation from a caregiver. This developmental task is usually mastered between the ages 6–20 months by children all over the world (Kagan et al. 1978). The most frequently reported symptoms are: separation related distress, avoidance of being alone or without an adult, and sleeping away from caregivers or from home (Allen et al. 2010). Studies indicate that more than 90 % of children with separation anxiety are affected by at least one sleep-related problem (Alfano et al. 2007; Chase and Pincus 2011).

To our knowledge, separation anxiety in preschoolers has not been specifically tested for an association with the parental relationship quality yet. Only two studies indicate a relationship between separation anxiety disorder in older children and parental marital problems (Foley et al. 2004a, b). Foley et al. (2004b) found that children's separation anxiety disorder diagnosed by paternal interview only was associated with marital conflict and dissatisfaction rated by the mother. Additionally, some researchers identified the parental marital quality as a predictor for childhood anxiety disorders in general (Jekielek 1998; McHale and Rasmussen 1998; Nomura et al. 2002).

Furthermore, relationship quality is also correlated with partners' sleep quality. Sleep difficulties of one partner are connected to the own dissatisfaction with the couple relationship and to the other partner's marital dissatisfaction (Strawbridge et al. 2004). Marital harmony in general is related to better sleep quality (Prigerson et al. 1999; Troxel et al. 2009). In their review, Troxel et al. (2007) proposed a bi-directional association between relationship quality and sleep. Accordingly, the quality of a couple's relationship affects their quality of sleep and vice versa. Finally, specific parental sleeping habits have recently been associated with their children's sleep patterns (Iwata et al. 2013) and sleep-related problems (Ellis et al. 2013; Komada et al. 2009).

In summary, previous studies indicate that parents' relationship quality might be related to their own sleep quality as well as to the sleep quality and anxiety issues of their children. Continuing this approach, we examine two competing models explaining the connection between these factors. First, we expect parents' relationship quality as reported by the primary caregiver to predict the extent of sleep problems in preschool-aged children. Second, we want to test if this relation is mediated by childrens' separation anxiety (separation anxiety model) or their anxiety in general (competing anxiety model). Third, we expect that parents' sleep problems are related to their relationship quality and do also predict children's sleep problems.

Method

Participants

Ninety-four families participated in the study by completing questionnaires regarding child and parental variables. Mothers were 24–47 years old ($M = 35.26$, $SD = 4.76$) and fathers were 26–54 years old ($M = 38.05$, $SD = 6.05$). The primary caregiver completed the questionnaires (94 % mothers, 5 % fathers, 1 % both parents). Eighty-four mothers and fathers were currently living in the same household, whereas in nine families the parents did not live together. In one family the father was deceased. Eighty percent of fathers and 71 % of mothers were of German origin. Almost all parents had a secondary school qualification (96 %). Fifty-four percent of mothers had a professional qualification and 42 % had a university degree. Forty-seven percent of fathers had a professional qualification and 47 % had a university degree. Most fathers had

a full-time employment (85 %) whereas mothers mainly worked part-time (58 %). Children (41 girls, 53 boys) were aged between 2 and 6 years ($M = 4.29$, $SD = 1.04$). Twenty-eight percent of them were the only child, 47 % had one sibling, and 25 % had two or more siblings.

Procedure

Families were recruited from kindergartens in the south-western part of Germany. Participation was voluntary. Interested parents received an information letter about the aim and implementation of the study as well as the corresponding questionnaires. They signed informed consent and completed the questionnaires at home, which was estimated to take 1 h. In the next step, they delivered the documents in a sealed, anonymous envelope to their children's day-care facility. Children younger than 2 years at the time of the study and day-care facilities for children with special needs (mental retardation, learning disabilities, etc.) were not included. The study was approved by the responsible ethical committee.

Measures

Child Sleep Problems

The German version of the Child Sleep Health Questionnaire (CSHQ-DE; Schlarb et al. 2010) is a validated parent-report sleep screening instrument assessing both, behavioural and medical sleep problems. The questionnaire yields a total score as well as eight subscale scores (sleep anxiety, bedtime resistance, night-waking, sleep duration, sleep-onset delay, daytime sleepiness, sleep disordered breathing, and parasomnias). Its psychometric characteristics indicate the CSHQ-DE to be an appropriate sleep screening instrument for children aged between 4 and 10 years ($\alpha = .68$). Alpha coefficients for CSHQ-DE subscales ranged between .23 and .70 (Schlarb et al. 2010). Additionally, the questionnaire was validated in a sample of younger children (2–5.5 years). Significant between-methods correlations were obtained for CSHQ, actigraphy, and sleep logs. Subscale scores were slightly higher than in older children, which is in line with the higher frequency of sleep problems observed in this young age group (Goodlin-Jones et al. 2008). Accounting for missing data, the mean item scores were created for each scale and used for further analysis. Cronbach's alpha was .82 for total sleep problems in our preschool sample, indicating good internal consistency.

Child Anxiety

The preschool version of the Spence Children's Anxiety Scale (Preschool Anxiety Scale, PAS; Spence et al. 2001) provides an overall measure of the child's anxiety together with five subscales. For this study, the subscale separation anxiety (5 items) was of special interest. Spence et al. (2001) provide further details about the development of the scale and its psychometric properties. Since an official German adaptation of the PAS does not exist so far, the original English questionnaire was translated according the criteria of Brislin (1986). Accounting for missing data, the mean item scores were created for each scale and used for further analysis. In our sample Cronbach's alpha was .84 for total anxiety and .74 for the subscale separation anxiety, indicating a moderate level of internal consistency.

Caregiver Relationship Quality

The short form of the German Partnerschaftsfragebogen (PFB-K; Kliem et al. 2012) assesses behaviours that might occur in a partnership (tenderness, dispute behaviour, and communication), resulting in a sum score for relationship quality. Accordingly, a high value indicates a high quality partnership. The instrument shows good internal consistency ($\alpha = .84$), which was confirmed in our sample ($\alpha = .82$).

Caregiver Sleep Problems

The German version of the Pittsburgh Sleep Quality Index (PSQI, Riemann and Backhaus 1996) assesses overall subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, need of medications to sleep, and day dysfunction due to sleepiness. The seven subscale scores are added up to a total value. A high value indicates a low quality of sleep. According to Buysse et al. (1989) the original instrument has satisfactory psychometric properties ($\alpha = .83$). In our German sample however Cronbach's alpha was rather low ($\alpha = .67$).

Data Analyses

In a first step, bivariate correlations among relationship quality, caregiver's sleep problems, child separation anxiety (total anxiety score), and child sleep problems were calculated for all 94 families. In a second step, a path model approach was used to examine two competing theoretical models linking these factors. If more than 10 % of the items in one questionnaire were missing, the concerning participant was excluded from further analysis. Complete data was available for 71 participants, who were thus included into the path analysis. A Path model was established and tested using SPSS Amos 24. Parameters were attained by maximum likelihood estimation. Bollen-Stine bootstrap was applied to adjust for the lack of multivariate normality, which was indicated by Mardia's test. Evaluation of model fit was based on the χ^2 value as well as on a variety of descriptive fit indices.

Results

Several moderate to strong correlations between relationship quality, caregiver sleep problems, child separation anxiety (total anxiety score), and child sleep problems could be shown. Table 1 presents means, standard deviations, and bivariate correlations between the relevant variables. According to our hypotheses it was found that (a) relationship quality was significantly associated with caregiver's sleep problems, $r = -.315$, $p = .004$, children's sleep problems, $r = -.537$, $p < .001$, and separation anxiety, $r = -.\ 319$, $p = .004$, (b) children's separation anxiety was correlated with their sleep problems, $r = .568$, $p < .001$, and (c) caregiver's sleep problems were significantly related to children's sleep problems, $r = .398$, $p < .001$. One should note that separation anxiety and the total anxiety score were both correlated with children's sleep problems ($r = .57$ vs. .55, respectively) as well as with the parental relationship quality ($r = .32$ vs. .30, respectively) to the same extend.

Path model of direct relation indicates that the relationship quality was a significant predictor for children's sleep problems, $\beta = -.530$, $p = .001$. According to our theoretical assumptions, we established a path model including separation anxiety as a mediating factor via SPSS Amos 24. Figure 1 shows the standardized regression weights, the correlation between parental relationship quality and caregiver's sleep problems, and the explained variances. Significances of the standardized values were estimated using bias-corrected bootstrapping with 95 % confidence interval based on 2000 samples. The established separation anxiety model explained 45 % of the variance of children's sleep problems, $R^2 = .454$, $p = .008$. In addition, significant predictive power was found with respect to separation anxiety, $R^2 = .107$, $p = .002$. Subsequently, a competing path model using the total anxiety score as a mediator variable, which also seems theoretically plausible, was tested (Fig. 2).

Table 2 presents the standardized total effects for the separation anxiety model. Overall, parental relationship quality had the strongest total effect on children's sleep quality, $\beta = -.467$, $p = .002$. In addition to a significant direct effect, $\beta = -.333$, $p = .002$, there was a significant indirect effect of parental relationship quality on children's sleep problems, $\beta = -.134$, $p = .017$. Consequently, children's separation anxiety partially mediated the relation between parental relationship quality and children's sleep problems. Exclusion of the significant path between parental relationship quality and children's separation anxiety resulted in a significant weakening of the model fit, $\chi^2(1) = 7.882$, $p < .01$, indicating the importance of the mediator. As expected, caregiver's sleep problems were negatively related to the parental relationship quality, $r = -.371$, $p = .030$, however, they did not significantly predict children's sleep problems, $\beta = -.166$, $p = .059$.

Table 3 shows the standardized total effects for the competing anxiety model. Beside a significant direct effect,

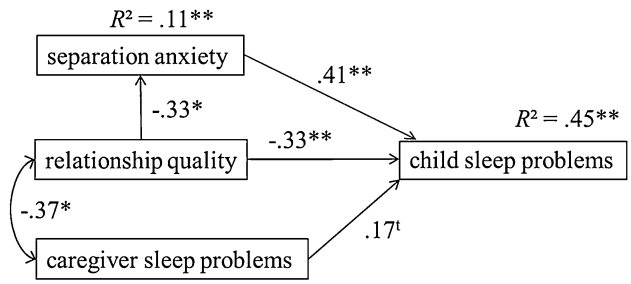

Fig. 1 Path model including separation anxiety with standardized path loadings, correlation between parental relationship quality and caregiver's sleep problems, and explained variances. *Note* $*p < .05$, $**p < .01$, $^{t}p < .10$

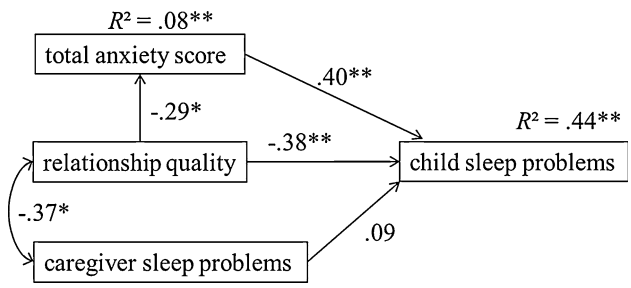

Fig. 2 Path model including the total anxiety score with standardized path loadings, correlation between parental relationship quality and caregiver's sleep problems, and explained variances. *Note* $*p < .05$, $**p < .01$

Table 1 Bivariate correlations between parent ratings, means (M), and standard deviations (SD)

	1	2	3	4	M	SD
Child sleep problems[a]					1.34	.22
Child total anxiety[a]	.55**				.30	.20
Child separation anxiety[a]	.57**	.83**			.59	.55
Relationship quality	−.54**	−.30**	−.32**		18.33	4.70
Caregiver sleep problems	.40**	.26*	.16	−.32**	5.32	2.84

Two-tailed significance, * $p < .05$; ** $p < .01$; [a] mean of item scores

Table 2 Standardized total effects—separation anxiety model

	Relationship quality	Caregiver sleep problems	Separation anxiety
Separation anxiety	−.326*	–	–
Child sleep problems	−.467**	.166[t]	.411**

* $p < .05$; ** $p < .01$; [t] $p < .10$

Table 3 Standardized total effects—anxiety model

	Relationship quality	Caregiver sleep problems	Total anxiety score
Total anxiety score	−.290*	–	–
Child sleep problems	−.500**	.086 (n.s.)	.404**

* $p < .05$; ** $p < .01$

$\beta = -.383$, $p = .001$, a significant indirect effect of parental relationship quality on children's sleep problems was found, $\beta = -.177$, $p = .024$. Thus, children's total anxiety score partially mediated the relation between parental relationship quality and children's sleep problems. The competing model explained 44 % of the variance of children's sleep problems, $R^2 = .439$, $p = .009$.

χ^2 value, based on the comparison between observed covariance matrix and model implied covariance matrix, was .068 for the separation anxiety model. For one degree of freedom this value was not significant, $p = .795$. Thus, the model was not rejected by model test. One has to note that the calculated χ^2 value is actually overestimated here due to the violated assumption of multivariate normal distribution. If it is still not significant, this strongly supports the established model.

In addition, also Bollen-Stine correction revealed no significant deviation of the model implied covariance matrix and the empirical covariance matrix. In 414 bootstrap samples the model fitted better than in the present sample and fitted worse or failed to fit in 1586 bootstrap samples. The corrected p value was given by $p = .793$. Hence, violation of the multivariate normal distribution, which was indicated by the Mardia test, affects p value. The correction provides a more accurate estimate. However, this is of less importance here because the model was not rejected in both cases, with and without correction.

Furthermore, other common fit indices indicated a good model fit. The Root Mean Square Error of Approximations (RMSEA) was .000 ($p_{\mathrm{CLOSE}} = .812$), the Tucker–Lewis Index (TLI) was 1.103, and the Normed Fit Index (NFI) was .999. A RMSEA below .06, a TLI $\geq .95$, and a NFI $\geq .95$ indicate a good fit (Hu and Bentler 1999). In sum, the model seems to be highly acceptable according to established criteria (Hu and Bentler 1999).

For the competing anxiety model χ^2 value was 1.877, which was not significant for one degree of freedom, $p = .171$. The null hypothesis that the model is correct was not rejected, Bollen-Stine bootstrap $p = .221$. In 1558 bootstrap samples the model fitted better than in the present sample and fitted worse or failed to fit in 442 bootstrap samples. RMSEA was .112 ($p_{\mathrm{CLOSE}} = .208$), TLI was .902, and NFI was .969 for der competing anxiety model. Descriptive model comparison using the Akaike Information Criterion (AIC) for non-nested models suggests a better fit for the separation anxiety model (AIC = 26.068) compared to the competing anxiety model (AIC = 27.877). Lower values indicate a better fit, however the comparison does not allow for significance testing.

Discussion

In the current study we used a path model approach to examine the relations between parental relationship quality, parental sleep problems, child sleep problems, and child separation anxiety/anxiety in general in a community sample. Based on previous research and theoretical assumptions, separation anxiety as well as anxiety in general were tested as potential mediators linking parental relationship quality and children's sleep problems (Alfano et al. 2007; Chase and Pincus 2011; Davies and Cummings 1994; El-Sheikh et al. 2007; Foley et al. 2004b).

The path model revealed partial mediation of the relation between parental relationship quality and the extent of children's sleep problems by children's separation anxiety. However, the total anxiety score might also be adequate as a partial mediator linking these variables. The separation anxiety model seems to better fit the data compared to the anxiety model, but significance testing was not possible. Therefore this hypothesis should be addressed in future research.

Although the current design does not allow for demonstration of the direction of effects, findings add to the growing literature showing that family processes such as parental relationship quality influence children's sleep (Dahl and El-Sheikh 2007; El-Sheikh et al. 2007). Even if bidirectional associations cannot be ruled out (Kelly and

El-Sheikh 2011), results support the assumption that children who are exposed to a conflictual parental relationship might be concerned about the stability of their family system (Cummings and Davies 2002; Davies and Cummings 1994). Feelings of insecurity and lack of predictability in turn are incompatible with healthy sleep (Dahl 1996b; Dahl and El-Sheikh 2007) and might be a risk factor for sleep disturbances due to irritation of the child (El-Sheikh et al. 2007; Kelly and El-Sheikh 2013).

A matter for future research is to examine mechanisms of effects that account for the strong relation between the parental relationship quality and children's sleep problems. Results of our study indicate that children's separation anxiety (or anxiety in general) might be one possible mediator. It was shown that the parental relationship quality was related to an increase in children's separation anxiety that in turn was associated with an increase in children's sleep problems. Feelings of insecurity and instability might be expressed by symptoms of separation anxiety. However, longitudinal studies are needed to further investigate directions and potential reciprocity of the observed effects as well as the influence of other mediating variables.

Based on previous research, we included caregiver's sleep quality as a predictor for children's sleep problems to address transmission and learning aspects of sleep (Ellis et al. 2013; Iwata et al. 2013; Komada et al. 2009). Nevertheless, children's sleep disruptions can also disturb parental sleep (Boergers et al. 2007; Meltzer and Mindell 2007; National Sleep Foundation 2004) thereby contributing to a diminished marital quality (Troxel et al. 2007). In turn, parents' relationship dissatisfaction might increase children's sleep problems, eventually leading to a vicious cycle of family stress and sleep problems previously described by Kelly and El-Sheikh (2011). Furthermore, children's sleep problems are often related to other childhood emotional and behavioural problems that can additionally burden the family system (El-Sheikh et al. 2013; Gregory et al. 2005; Gregory and O'Connor 2002; Gregory and Sadeh 2012; Kamphuis et al. 2012; O'Brien 2009; Smedje et al. 2001; Velten-Schurian et al. 2010).

As proposed by Rhoades et al. (2012), the parental marital quality might be a good starting point for the prevention and early treatment of pediatric sleep problems in some cases. Since the parental relationship quality seems to have a strong impact on children's sleep, stabilizing parents' couple relationship (co-parenting, strengthening of parental self-esteem, etc.) and teaching them specific education strategies (limit setting, etc.) as well as coping strategies (conflict and stress management, etc.) might break the vicious cycle. Empirical studies suggest that behavioural family programs (e.g. Schlarb and Brandhorst 2012; Schlarb et al. 2011) as well as common parenting services (Martin et al. 2011) could improve sleep quality in young children. One might assume that parents need to improve their relationship in order to improve their child's sleep. Parents who feel confident, support each other, and have a stable, satisfying relationship as well as favourable stress management strategies might be able to provide a better feeling of security and stability for their children. However, empirically validated behavioural treatments (e.g., graduated extinction and sleep education) focussing primarily on the improvement of the child's sleep and do not directly address parental relationship quality were identified as efficacious (Meltzer and Mindell 2014). The authors state that the precise factors causing the positive treatment outcome are yet to be identified (Meltzer and Mindell 2014). We belive that one possible factor might be the fact that parents receive an intervention to assist their child which strengthens their relationship indirectly. Moreover, reducing the child's sleep problems might improve parents' relationship quality in turn. Consequently, expanded research on the role of parents' relationship quality in treating and preventing pediatric sleep problems is needed.

There are some limitations of this study worth noting. First, as mentioned above we employed a cross-sectional design for this study. Thus, we were not able to test for the causal directions of effects. Nevertheless, our theoretical model was based on various empirical studies, providing evidence for the assumed relations. Clearly, longitudinal studies are needed to answer questions about directions of effects as well as possible reciprocities between the variables. Long-term studies would provide further information about the time-course of relations between parental relationship quality, childhood sleep problems, and separation anxiety. This is of special interest because separation anxiety is known to generally decrease with age (Kearney et al. 2003), whereas some sleep problems tend to persist (Jenni et al. 2005). However, separation anxiety disorder is a major risk factor for the development of further mental disorders in adolescence and adulthood (Kossowsky et al. 2013; Lewinsohn et al. 2008).

Second, all measures used were parent-rated questionnaires. Subjective caregiver reports provide useful information about many aspects of a child's sleep, like sleep schedules, sleep-related behaviours (e.g. bedtime resistance, parasomnia) or sleep-disordered breathing (Sadeh 2008). However, objective methods, such as actigraphy, would provide additional data concerning actual sleep duration and efficiency that parents might not be aware of (Sadeh 2008). Future research should therefore include several subjective sources as well as sleep logs, objective measures, and observational data to minimize single source bias (Podsakoff et al. 2003) and

augment generalizability of our results. The role of special sleep practices and environments (e.g., having a TV in the bedroom) was not assessed in this study, but might also influence children's sleep.

Third, our population was relatively small and rather homogeneous regarding socio-demographic aspects. Though, we were not able to test for moderators, like child sex, age or socio-economic state. Furthermore, as we surveyed a community sample conclusions about high-risk or even clinical populations are limited. Fourth, to enrich the proposed theoretical model, follow-up studies should also acquire data for other mediating factors of interest, such as parents' mental health or their parenting and stress management strategies.

Despite these limitations, our results demonstrate that there are interrelations between the parental relationship quality and children's sleep problems. Children's symptoms of separation anxiety partially mediate this relation highlighting the importance of further investigating these associations as well as their implications for the prevention and treatment of childhood sleep problems.

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