Sleep positions of couples at sleep onset: Association with relationship quality and relationship duration

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Summary. Most couples spend their nights together in one bed. Although several studies investigated the effect of co-sleeping on the sleep of the individuals, research into the sleep behavior of couples is scarce. One study, for example, looked at the hypothesis that relationship quality is related to the intimacy of the couple's position at sleep onset, however, did not find a significant relationship due to small samples size. The present study was carried out to address this topic. Overall, 128 participants living in a stable relationship completed the online survey. Whereas the association between the intimacy of the sleep-onset position and relationship quality was only marginally significant (small effect size), couples living together and sleeping in larger beds are more likely to choose less intimate sleeping positions. This change in behavior, sleeping with greater distance to the partner, might be mediated by living together and bed size. In summary, the findings of this study indicate that studying sleep behavior and sleep arrangement of couples might be fruitful for basic sleep research and for the field of sleep medicine.

Keywords: Sleep position, couples' sleep, relationship quality

1. Introduction

Several review articles (Richter, Adam, Geiss, Peter, & Niklewski, 2016; Troxel, 2010; Troxel, Robles, Hall, & Buysse, 2007) pointed out the discrepancy that sleep research and sleep medicine had almost exclusively focused on individual sleep, that is, sleep laboratory recommendation are single rooms for polysomnography, whereas most couples co-sleep. For example, in a US survey of 629 participants with stable relationship (18 years and older) about 90% slept regularly in the bed with their partner (Statista, 2017). The important question is whether and how sleep is affected if the partners share the bed. Actigraphic studies (Dittami et al., 2007; Pankhurst & Horne, 1994; Spiegelhalder et al., 2017) indicate that there might be an increase in body movements during sleep and reduced sleep efficiency in women (Dittami et al., 2007), even though the subjective sleep quality is higher in co-sleeping nights compared to nights sleeping alone (Spiegelhalder et al., 2017). The finding of reduced slow wave sleep in shared nights (Monroe, 1969) was not confirmed by a more recent polysomnographic study (Drews et al., 2020); interestingly both studies found an increase in REM sleep; one interpretation was that the presence of a partner might facilitate perceiving the sleeping environment as "safe" (Drews et al., 2020). So far, the number of studies and number of couples per study are quite small, that is, many questions how sleep is affected by co-sleeping with a partner are still unanswered. This is especially important if one or both partners has a sleep disorder, for example, Blumen et al. (2012) reported that snoring of the bed partner might make it more difficult to fall asleep again, even though the number of awakenings did not increase. Despite possible impairments of the sleep architecture, most couples want to share bed as this sharing is linked to feelings of safety and intimacy (Rosenblatt, 2006). Interesting, the studies addressing sleep in couples did not take a closer look how couples are sharing the bed, e.g., lying close together with physical contact or have some distance between them.

In addition to general aspects of sharing the bed, the couples' specific sleep position at sleep onset might be related to relationship quality, that is, an intimate sleep position might reflect an intense relationship (Dunkell, 1977). Klösch, Dittami, and Zeitlhofer (2009) reviewing Dunkell's (1977) cases and theories put forward the hypothesis that intense body contact while sleeping is related to high relationship intimacy. Junker, Bergel, Deresko, Freund, and Schredl (2016) found a small effect (d = 0.207) for the association between relationship quality and the intimacy of the couple's position at sleep onset, however, due to the relatively small sample size (N = 60) the correlation was not significant. Solely, the relationship duration showed a significant effect (d = 0.366), the longer the partners were together, the less intimate was the sleep-onset position (Junker et al., 2016).

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The aim of the present study was to replicate the findings of Junker et al. (2016) in a larger sample. That is, we tested the hypotheses whether the intimacy of the couples' positions at sleep onset is positively related to relationship quality and whether the relationship duration is related to sleep position intimacy, i.e., long-term couples will have less intimate sleep-onset positions.

2. Method

2.1. Participants

The sample used in this study consisted of 128 persons (83 women, 45 men) who were recruited by the authors affiliated with the Medical School Hamburg (convenience sample). The mean age was 29.10 ± 11.84 years and ranged from 18 to 62 years. All of the participants were in a relationship at the time of the study (mean duration: 63.91 ± 88.59 months, range: 1 to 456 months). Whereas 63 persons were university students, 57 persons were employees, with a small group of college students (N = 5) and persons not working at the moment (N = 3). More than half of the sample lived with their partner (N = 67), whereas 61 did not live together. Almost all couples were heterosexual (N = 113) with five couples being homosexual (10 participants did not specify their sexual orientation). The nights per week spent together was 4.88 ± 2.33. The widths of the beds the couples slept in was distributed as follows: 90 cm (N = 2), 140 cm (N = 54), 180 cm (N = 57), and 200 cm (N = 15). Similar bedtimes of the partners were reported by 90 participants, whereas 38 participants stated that their bed time differs from the bedtime of their partner. Forty-six participants stated that their partner is snoring, and 29 participants reported that their partner or they themselves have sleep problems.

2.2. Research Instruments

The sleep position questionnaire was developed by Junker et al. (2016) and can be found in the appendix of this publication. The instrument includes sociodemographic items and questions about their relationships, e.g., the length of the relationship, frequency of sharing the bed (nights per week), bed size, snoring, sleep problems, similar bedtimes of the partners. Several items were added, e.g., questions about bed size, similar bedtimes.

Six illustrations (see Figure 1) were presented to measure the preferred position of the couple at sleep onset. In addition, the participants estimated the percentage of falling asleep in this preferred position. Participants could also describe their sleep-onset position if it does not fit into the six categories.

For measuring relationship quality we included the short version of the partnership questionnaire (PFB-K) that was developed by Kliem et al. (2012). The questionnaire consists of 10 items: three items for each sub scale "disputing behavior", "Tenderness" and "mutuality/communication" and one extra item for the overall happiness within the relationship. The scale format was a four-point Likert ranging from 0 = never/very seldom to 3 = very often. The relationship-happiness item was a six-point Likert scale from 0 = very unhappy to 5 = very happy. The total score for each subscale was calculated by adding the scores of the 9 items with the items regarding "disputing behavior" reversed (range: 0 to 27). Cronbach's alpha for the nine-items scale was high: α = .84 (Kliem et al., 2012). For the present sample, the value for Cronbach's alpha was slightly lower α = .788 (N = 128).

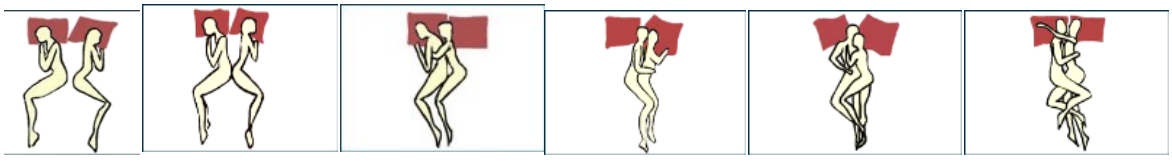
2.3. Procedure

Information regarding the study "Sleep position and relationship quality" was introduced to eligible participants. The obvious inclusion criterion for participation was to be in a stable relationship at the time of the study. Participants were asked to answer the items of the online survey as spontaneously as possible. The six sleep position were ranked by Junker et al. (2016) into 5 groups with increasing intimacy (see Figure 1). One participant had to be excluded from the analysis regarding the intimacy of the sleep-onset position because s/he stated that the couple does not share the bed. Another three participants had to be excluded from the regression analyses as they reported that they share not a single night per week with the partner or did state that 0% of the main sleep position was shared.

The statistical analysis procedures were carried out with SAS 9.4 and Spearman Rank correlations and ordinal regressions were used as the sleep position intimacy scale was ordinal. Effect sizes were computed according to Cohen (1988) using the website of Lenhard and Lenhard (2016).

3. Results

The mean value of the relationship quality (PFB-K) was 21.41 ± 3.84 (Range: 8 to 27), whereas the average estimate for the overall happiness in the relationship item was 4.27 ± 0.86. The item was highly correlated with the PFB-K sum score: r = .693 (p < .0001, N = 128).



1 2 3 3 4 5

Ranking of the closeness of the sleep onset positions (1 to 5)

Figure 1. The illustrations used in the sleep position questionnaire to capture the preferred position to fall asleep.

Table 1. Percent of participants reporting this sleep-onset position as their most frequent position (N = 127).

Ranked Position	Frequency	Percent
	2	1.57%
	22	17.32%
	55	43.31%
	24	18.90%
	24	18.90%

Table 1 shows the rank order of the most frequent positions. The percentage indicates how many participants stated that the corresponding position was the most frequent one. On average, the couples started 72.50 ± 24.27% of all nights spent together in their preferred sleep-onset position.

To test the two hypotheses, we used an ordinal regression to determine the association between relationship quality and relationship duration and sleep position intimacy. The correlation between PFB-K total score and relationship duration was r = -.355, p = .0001, N = 128. As possible confounders, age, gender, and the percentage of nights spent in this sleep-onset position were included. The regression analysis for sleep position intimacy indicated that relationship quality showed are marginally significant association with small effect size, whereas relationship duration showed a significant association with medium effect size (see Table 2). The possible confounding variables age, gender, and the percentage of nights spent in this sleep-onset position were not related to sleep position intimacy. The adjusted R^2 of this regression analysis was .1062.

In order to understand the association between relationship duration and sleep position intimacy, we correlated bed width (r = .333, p = .0002, N = 128) and living together (r = .554, p < .0001, N = 128) with relationship duration. That is, long-term couples were more likely to live together and share a larger bed. Interestingly, including these two variable into the regression analysis for sleep position intimacy indicated that relationship duration is no longer significant but participants living together with their partner and share a larger bed showed less intimate sleep positions at sleep onset (see Table 3). The association between relationship quality and sleep position intimacy was not affected. The adjusted R^2 of this regression analysis was .2512.

In an exploratory fashion, we conducted three additional analyses and included an additional variable to the regression analysis depicted in Table 3 separately. First, there was no significant association between sleep position intimacy and snoring of the partner, similar the presence of a sleep disorder in one of the partners showed no significant association to sleep position intimacy. Also having similar bedtimes were not associated with sleep position intimacy. However, having similar bedtimes was positively associated with relationship quality (r = .292, p = .0008, N = 128). The responses of the item about the importance of being close to the partner at sleep onset was distributed as follows: very important (N = 34), important (N = 62), not that important (N = 19), and not important (N = 13). This item showed a high correlation of r = .473 (p < .0001, N = 127) to sleep position intimacy, but only a small correlation to relationship quality (r = .206, p = .0194, N = 128).

4. Discussion

The present findings showed marginally significant correlation between the intimacy of the couples' position at sleep onset and overall relationship quality (small effect size) and relationship duration (medium effect size) – comparable to the previous study of Junker et al. (2016). Interestingly, within the relationship between relationship duration and sleep position intimacy, the bed width and the living together played a major role, that is, couples living together in larger beds are more likely to sleep with distance to each other. Snoring and sleep disorders had no correlation to the intimacy at sleep onset.

Prior to discussing the findings in detail, several methodological issues have to be addressed. The first issue concerns the sample characteristics. Although the age mean

Table 2. Ordinal regression for sleep position intimacy (N = 124).

Variable	Standardized estimate	Wald χ^2	p-value	Effect size
Age	-.0266	0.04	.8442	0.036
Gender (1 = f, 0 = m)	.0156	0.03	.8727	0.031
Percentage of sleep position	-.1323	1.9	.1681	0.250
Relationship duration	-.2377	9.1	.0395[1]	0.563
Relationship quality (PFB-K total score)	.1388	2.0	.0789[1]	0.256

[1]one-tailed

Table 3. Ordinal regression for sleep position intimacy (N = 124).

Variable	Standardized estimate	Wald χ^2	p-value	Effect size
Age	.0815	0.3	.5608	0.099
Gender (1 = f, 0 = m)	.0175	0.03	.8626	0.031
Percentage of sleep position	-.1884	3.7	.0550	0.351
Relationship duration	-.0881	0.4	.2647[1]	0.114
Relationship quality (PFB-K total score)	.1522	2.3	.0666[1]	0.275
Living together (1 = yes, 0 = no)	.3498	9.0	.0022	0.560
Bed width (1 = 90 cm to 4 = 200 cm)	.2430	5.3	.0218	0.423

[1]one-tailed

and the age range is larger compared to Junker et al. (2016), the sample is not representative for the German population. This can be seen in the higher values of relationship quality: 21.41 ± 3.84 (present sample) vs. 18.4 ± 4.9 (normative German sample) as relationship quality decreases with age (Kliem et al., 2012) as the present sample was younger compared to the normative sample. In a similar way, the overall relationship happiness was higher in the present sample compared to the normative sample (4.27 ± 0.86 vs. 3.7 ± 0.9). One might expect that a larger variability in relationship quality might facilitate finding correlations between this measure and co-sleeping behavior. Also, the sample size was too small to study the effect of sexual orientation on sleep-onset positions, as almost all couples were heterosexual. The second issue relates to the six presented sleep positions. Although all participants were able to choose one of the positions, several comments indicate that sleep positions have a larger range, e.g., sleeping apart but in the same direction, both partners in supine position holding hands. Thus, it would be desirable to develop a more comprehensive set of sleep position for future studies. Third, the present findings are based on the reports of one partner; it would be very interesting to elicit both partner's perspectives regarding the sleep positions and, in addition, individual parameters of both partners like chronotype (see discussion below) and, of course, relationship quality. Another interesting topic for future research is the objective measuring of sleep positions at sleep onset but also during sleep, e.g. by using 3D cameras (Masek, Lam, Tranthim-Fryer, Jansen, & Baptist, 2018). This might also help to understand how partners may affect each other's sleep (cf. Drews et al., 2020).

First, it has to be noted that sleep behavior of couples, in this case the sleep position at sleep onset, is highly variable (see Table 1), with spooning as the most common sleep-onset position. As expected, relationship quality was related to the intimacy of the couples' sleep-onset position; however, the association was not very strong. One of the exploratory analyses indicate that couples might have different preferences regarding their need for closeness at sleep onset, about 75% of the participants stated that closeness to the partner at sleep onset is important or very important for them but for a smaller percentage physical closeness was not that important. This preference is not that closely related to relationship quality (see small correlation coefficient), that is, this wish for physical closeness at sleep-onset is one of many facets that play a role in the relationship of couples. For corroborating the findings of an association between sleep position intimacy and relationship quality, larger samples as in the present study and in Junker et al. (2016) are necessary.

Second, the association between relationship duration and the intimacy of the couple's position and sleep onset reported by Junker et al. (2016) was replicated. A more detailed analysis indicated that sleep arrangements changed over time and might help to explain the changes in the intimacy of the sleep-onset position. It is remarkable that adding bed width and the living together variable to the regression analysis, the percentage of explained variance increased from 10% to 25%, indicating that these two variables go beyond the simple association between relationship duration and sleep position intimacy. The couples living together and spending their nights in larger beds tended to have sleep positions with more space between them. Again, this might be explained by preferences, that is, couples that value having enough personal space at sleep onset might buy larger beds. The other aspect is practicality, that is, if the couple is not living together, the apartments might not be spacious enough for large beds. These exploratory analyses indicate that sleep arrangement of couples is a very interesting topic for future research.

In this study, we did not find an effect of having sleep problems or a snoring partner is affecting the sleep position intimacy. Given that, sleep problems and snoring might affect the sleep quality of the partner (Richter et al., 2016; Troxel, 2010), it would be interesting to include measures of sleep quality (not done in the present study) in order to learn more about the effect of sleep arrangements on sleep. Especially, sleep onset latency would be very interesting in the context of the present topic, that is, the question whether the couples' positions at sleep onset affect sleep latencies in both partners. So far, only the factor whether the couple is co-sleeping in one bed or sleep separately in different locations on sleep quality was studied (Drews et al., 2020; Spiegelhalder et al., 2017). We also did not find an effect of having different bedtimes in general on the intimacy of the sleep-onset position (if they decide to go to bed at same time). However, mismatched bedtimes were associated with lower relationship quality. As the study was cross-sectional,

it cannot be differentiated whether relationship problems might lead to avoiding same bedtimes or whether having differing chronotypes might be a burden for the relationship (cf. Sprajcer, Stewart, Miller, & Lastella, 2022). Studies (Gunn, Buysse, Hasler, Begley, & Troxel, 2015; Gunn, Lee, Eberhardt, Buxton, & Troxel, 2021) showing that the couples'sleep-wake concordance (whether couples are awake or asleep at the same time) is associated with couples' relationship quality support these lines of thinking and might be an independent factor in addition to sleep-onset positions.

To summarize, sleep behavior in couples is an understudied topic (Richter et al., 2016; Troxel, 2010), but nevertheless – as the findings of the present study indicate – a very interesting topic for basic sleep research and sleep medicine alike as sleep of one partner can be affected by the other partner. An interesting study was carried out by Doerr et al. (2022): In a placebo-controlled experiment, the participants self-applied nasal oxytocin for five nights having the effect of improving sleep quality but no effect on relationship intimacy. It would have been very interesting to study whether intimacy at sleep onset increased in this study. On the other hand, it would be very interesting to study whether intimate sleep-onset position can increase oxytocin levels via the intense physical contact (cf. Macdonald & Macdonald, 2010). Large-scaled studies are necessary to investigate the importance of co-sleep behavior for couples and the effect of co-sleeping on each other's sleep and its association to relationship quality.

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