



Short Communication

Gender differences in sleep problems: The mediating role of co-rumination and depressive symptoms

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ARTICLE INFO

Article history:

Received 5 August 2016

Received in revised form 21 October 2016

Accepted 27 November 2016

Available online 2 December 2016

Keywords:

Co-rumination

Depressive symptoms

Sleep

Social support

Mediation

ABSTRACT

Co-rumination is a dyadic tendency in which two members excessively discuss and revisit problems while focusing on negative feelings. Co-rumination is more prominent among female friends than male friends, which helps to account in part for gender differences in depressive symptoms. The current study adopted a socioemotional perspective to examine whether gender differences in sleep problems could be mediated by co-rumination in friendships and depressive symptoms. A sample of 172 young adults ($M_{age} = 19.15$) participated in a self-report study. Mediation analysis showed that females reported higher co-rumination and depressive symptoms, both of which were related to more sleep problems. Moderated mediation analysis further revealed that the mediational role of depressive symptoms between co-rumination and sleep problems was stronger for females compared to males.

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1. Introduction

Young adults (e.g., 18 to 30 years old) often experience insufficient sleep quantity (fewer than 8 h of sleep) and poor sleep quality, and are at a high risk for sleep disorders (Lund, Reider, Whiting, & Prichard, 2010; Nadorff, Nazem, & Fiske, 2011; Petrov, Lichstein, & Baldwin, 2014; Tsai & Li, 2004). Research has also found that females (compared to males) tend to report more sleep problems (e.g., low sleep efficiency, insomnia; Lund et al., 2010; Petrov et al., 2014; Tsai & Li, 2004). Based on a *socioemotional model* (Rose, 2002; Rose & Rudolph, 2006), we examined whether gender differences in sleep problems could be explained by females' tendency to engage in *co-rumination* with their friends (Rose, 2002) and their increased depressive symptoms (Hyde, Mezulis, & Abramson, 2008). We further examined whether the link between co-rumination and sleep problems through depressive symptoms would be more prominent in females than males.

According to Rose and Rudolph's (2006) socioemotional model, the emergence of gender differences in emotional distress (e.g., depression) could partially be explained by the nature of peer relationships (e.g., social support and coping processes). For example, some support processes between friends may bear emotional costs, such as *co-rumination* (Rose, 2002). Co-rumination refers to dyadic communication tendencies in which two members extensively discuss and revisit problems,

focusing on negative feelings (Rose, 2002). While co-rumination is related to closer friendship quality among adolescents and young adults, it is also related to greater emotional disturbances, including depression and anxiety (Byrd-Craven, Granger, & Auer, 2011; Rose, 2002; Rose, Carlson, & Waller, 2007). Longitudinal studies have also shown that co-rumination and internalizing problems (depressive and anxiety symptoms) were reciprocally related over time (Rose et al., 2007; Stone, Hankin, Gibb, & Abela, 2011).

Female relationships (compared to male) are more intimate in nature; therefore, it is not surprising that co-rumination is more commonly observed in female friendships (Rose, 2002; Rose & Rudolph, 2006). Gender differences in co-rumination, indeed, serve as an important mechanism accounting for gender differences in emotional difficulties. Building upon research on co-rumination, we further propose that gender differences in sleep problems could potentially be mediated through the same pathway. Unfortunately, despite previous research efforts that demonstrate the link between co-rumination and negative affect (Byrd-Craven, Geary, Rose, & Ponzi, 2008; Byrd-Craven et al., 2011; Rose, 2002), the implications of co-rumination on physical health outcomes, including sleep problems, have not attracted much research attention. Thus, the possible mediating roles of co-rumination and depressive symptoms between gender and sleep problems is still unknown. Nevertheless, previous research has shown that depressive symptoms are related to more sleep problems (Allgöwer, Wardle, & Steptoe, 2001; Lustberg & Reynolds, 2000; Simor, Krietsch, Kóteles, & McCrae, 2015). Furthermore, longitudinal research suggests that being female and having more depressive symptoms are both associated

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with the development and persistence of sleep problems (Patten, Choi, Gillin, & Pierce, 2000).

Summarizing across past literature on co-rumination, depression, and sleep (Allgöwer et al., 2001; Rose, 2002; Simor et al., 2015), an integrative model has been proposed (see Fig. 1). This model proposes that females are more likely to engage in co-rumination and, subsequently, may experience more depressive symptoms and sleep problems. In other words, gender differences in sleep problems are mediated by co-rumination and depressive symptoms (simple mediation model). Because co-rumination and depressive symptoms are more prominent among females, the effects of co-rumination on sleep problems through depressive symptoms might be stronger for females than males. Thus, an alternative model has been proposed (see Fig. 2). Specifically, it is possible that the mediating effect of depressive symptoms between co-rumination and sleep problems is moderated by gender (moderated mediation model).

2. Method

2.1. Procedure and participants

A sample of young adults attending a Midwestern public university was collected. Participants received research credits as a partial requirement for their psychology courses. Upon their enrollment in the study, participants were provided with an online survey. Informed consent was obtained online before the survey was administered. This protocol was approved by the university's IRB. A total of 172 young adults participated in the study. Participants' age ranged from 18 to 22 years ($M = 19.15$; $SD = 1.15$), with 50% female. A majority of the participants were Caucasian (90.7%), followed by Asian (4.1%), African-American (2.3%), Hispanic/Native-American (1.2%), and Others (1.7%).

2.2. Measures

2.2.1. Co-rumination

Participants' tendency to co-ruminate with a self-identified best friend was measured using the Co-Rumination Questionnaire (27-item CQ; Rose, 2002). For example, one item reads: "When we talk about a problem that one of us has, we spend a long time talking about how sad or mad the person with the problem feels." Participants rated how well each statement describes their interactions with their self-identified best friend using a 5-point Likert scale, ranging from 1 (not at all true) to 5 (really true). Co-rumination items were averaged to form a composite score (Cronbach's $\alpha = 0.96$).

2.2.2. Depressive symptoms

Participants completed the 6-item depression subscale of the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) to measure their depressive symptoms. Participants read a list of problems and complaints and decided how often they are bothered or distressed by that problem (e.g., "Feeling no interest in things") on a scale ranging

from 1 (almost never) to 4 (almost always). The BSI items were averaged to form a composite score (Cronbach's $\alpha = 0.86$).

2.2.3. Sleep problems

Participants completed the Pittsburgh Sleep Quality Index (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989), a 19-item measure that captures 7 components of sleep quality: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Each subscale has a score ranging from 0 to 3. A global score was computed by summing across the 7 components (Cronbach's $\alpha = 0.64$).

3. Results

3.1. Preliminary analyses

Descriptive statistics are presented in Table 1. Independent t -tests revealed that females were more likely to engage in co-rumination than males, $t(170) = -3.18$, $p < 0.01$. Also, females suffered from higher depressive symptoms $t(170) = -2.15$, $p < 0.05$, and more sleep problems $t(170) = -2.45$, $p < 0.05$, compared to males. Individuals who engaged in more co-rumination suffered from more depressive symptoms ($r = 0.25$, $p < 0.01$) and more sleep problems ($r = 0.21$, $p < 0.01$). Individuals with more depressive symptoms reported more sleep problems ($r = 0.42$, $p < 0.01$).

3.2. Simple mediation model

The theoretical model presented in Fig. 1 was examined with a path model implemented in *Mplus* 6.11 (Muthén & Muthén, 2011). This model had a null chi-square and degrees-of-freedom; therefore, no fit indexes were reported. Unstandardized coefficients and standard errors are presented in Fig. 1. To examine the indirect effects, bootstrapped 95% confidence intervals ($N_{\text{bootstraps}} = 5000$) were computed. Consistent with our hypothesis, the indirect effect of gender on sleep problems was also found to be significant ($CI_{95} = 0.04$ to 0.25). Specifically, females were more likely to engage in co-rumination, which in turn was related to more depressive symptoms and sleep problems.

3.3. Moderated mediation model

The theoretical model presented in Fig. 2 was examined with a moderated mediation model implemented in *Mplus* 6.11 (Muthén & Muthén, 2011). This model tested whether the effect of co-rumination on sleep problems through depressive symptoms would be stronger for females than males. In order to achieve this goal, a multi-group path model was specified in *Mplus* such that all the paths from co-rumination to sleep problems through depressive symptoms were estimated independently for males and females. Then, we constrained each of the direct paths to be equal across gender in 3 separate models. It was found that when the path from depressive symptoms to sleep problems was

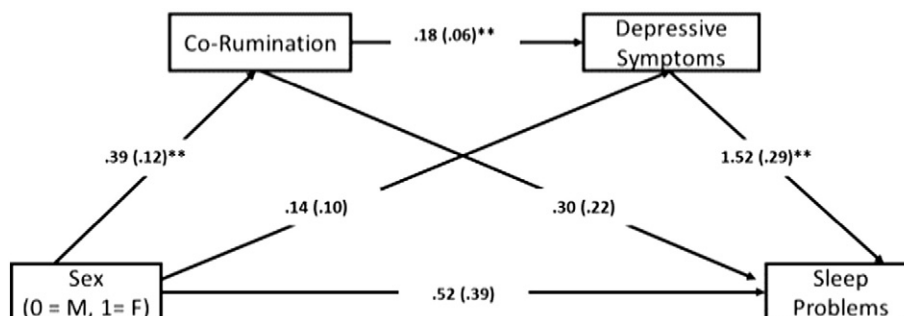


Fig. 1. Path model depicting the simple mediation model. Unstandardized coefficients are presented, with standard errors in the parentheses. ** $p < 0.01$.

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