# Bachelor Status and the Sleep Quality Among Chinese Men: A Moderated Mediation Model

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Qian Liu, Ph.D<sup>1</sup>, Yalin Zhu, B.S.<sup>1</sup>, and Yaolin Pei, Ph.D<sup>2</sup>

#### Abstract

Research has identified the status of being unmarried as a risk factor for poor sleep quality. Few studies have focused on the relationship between bachelor status and sleep quality. Moreover, little is known about the underlying mechanisms that may mediate or moderate this relationship. This study tested the mediating role of life satisfaction and moderating role of traditional value of children in the relationship between bachelor status and sleep quality among Chinese men. Data were derived from the 2018 wave of China Family Panel Studies (CFPS). The working sample included 12,102 Chinese men. The moderate mediation model was used to examine the mechanisms between bachelor status and sleep quality. Results showed that life satisfaction partially mediated the association between bachelor status and sleep quality. The mediating effect of life satisfaction was moderated by traditional value of children. Specially, the mediation effect was stronger for men with higher traditional value of children. The implications for future studies and practices are also discussed in this study.

#### **Keywords**

bachelor status, sleep quality, life satisfaction, the traditional value of children, men

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China has been facing serious bachelorhood in recent decades (Xiao et al., 2020). Between 1983 and 2020, there are over 51 million more men than women of marriageable age (Poston et al., 2011), and over 10% of men aged 50 and above will be unmarried forever (Jiang et al., 2014). The sex ratio imbalance leads to many surplus men who are unable to find brides (Klasen and Wink, 2002). These men who are over 28 years of age and unable to marry are called bachelors (Liu et al., 2014). One prior study revealed that never-married individuals have poorer health compared to those who are married (Chen et al., 2015). There is every reason to believe that these bachelors are suffering from serious health problems. Sleep is a vitally important health indicator that is associated with various other health outcomes, such as chronic diseases, cardiovascular disease, obesity, diabetes, psychiatric disorders, and even death (Bernert et al., 2014; Chien et al., 2010; Troxel et al., 2010). Consequently, it is important to examine the relationship between bachelor status and sleep quality among Chinese men.

Few studies have focused on the relationship between bachelor status and sleep quality. Only a handful of empirical studies reported that being unmarried increases the risk of poor sleep quality in adults including men and women (Chen et al., 2015; Dong et al., 2018). However, the association between bachelor status and sleep quality is not the focus of these studies, given that being unmarried also include the status of widowhood, and separated, or divorced. Moreover, less research has explored how bachelor status is associated with sleep quality.

**Corresponding Authors:** 

Qian Liu, School of Public Administration, Hunan Normal University, 36 Lushan Rd., Yuelu District, Changsha, Hunan, 410081, P.R. China. Email: liuqian67520@126.com

Yaolin Pei, Rory Meyers College of Nursing, New York University, 433 First Avenue, New York, NY 10010, USA. Email: yp22@nyu.edu

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School of Public Administration, Hunan Normal University,

Changsha, China

<sup>&</sup>lt;sup>2</sup>Rory Meyers College of Nursing, New York University, New York, USA

To fill these gaps, the present study mobilizes resource theory and the dysfunction strain paradigm to test the mediating role of life satisfaction and the moderating role of the traditional value of children in the relationship between bachelor status and sleep quality among Chinese men. The findings would advance our understanding of the negative influence of bachelor status and poor sleep quality among Chinese men, and provide a sound basis for effective intervention to improve the well-being of those Chinese bachelors.

#### Bachelor Status and Sleep Quality

Marriage is a vital social relationship that influences individuals' physical and psychological well-being across the life course (Chen et al., 2015; Umberson et al., 2006; Waite and Gallagher, 2001). According to the resource theory, the link between marriage and health is through the available emotional and material resources to the partners (Chen et al., 2015; Waite and Gallagher, 2001). Individuals in marriage foster shared emotional and material resources in the process of long-term commitment and shared fate. Because these two types of resources seem to influence sleep via different mechanisms, we discuss them separately.

Compared with the unmarried, the married have greater companionship from their partners (Waite and Gallagher, 2001), which can increase their ability to cope with stress, and improve their mental and physical health (Holt-Lunstad et al., 2008; Thoits, 2011). A large literature has documented that better physical and mental health can improve people's sleep quality (Foley et al., 2004). For example, one previous study reported that the married are less likely to report insomnia than the unmarried (Foley et al., 2004), because fewer of them report chronic conditions, depressive symptoms, and loneliness (Hughes and Waite, 2009). Meanwhile the married are wealthier than the unmarried (Wilmoth and Koso, 2002), such that they are more likely to live in cleaner, quieter, and tidier houses and better neighborhoods (Cornwell, 2014). Previous studies revealed that a disordered home environment and neighborhood can negatively impact sleep quality (Chen et al., 2015; Cornwell, 2014; Wilmoth and Koso, 2002). Prior studies reported that Chinese bachelors often come from poor families, have limited ability to earn money, and are handicapped or in poor health (Mo, 2005). According to resource theory, we speculate that bachelors are more likely to have poorer sleep quality than married men.

## Life Satisfaction as a Mediator

Life satisfaction, an important indicator of psychological well-being, is a cognitive judgment toward people's lives

(Diener et al., 1999). This judgment depends on the difference between the desired life goals and the actual outcome of one's life (Krause, 2004). Being married is a way to show that people fit into the family ideal (Abbott and Wallace, 2012). In the traditional Chinese Confucian culture, heterosexual marriage is still the norm (Yu and Xie, 2015). Getting married is men's duty (Liu et al., 2014). The gender imbalance leads to many bachelors whose path to marriage is blocked (Li et al., 2019), resulting in disharmony between their ideal goals and their actual lives. It is expected that bachelors are more likely to have dissatisfaction with their lives.

Life satisfaction influences sleep quality (Strine et al., 2008). If people judge their lives as matching their ideal life goals, they are more satisfied with their lives (Lu et al., 2019). Once the life does not fulfil their expectations, people may feel worried and anxious (Åkerstedt et al., 2007). Higher levels of worry and anxiety may reduce sleep quality (Åkerstedt et al., 2007). Some previous studies have identified that as the level of life satisfaction decreases, the prevalence of sleep insufficiency increases (Lu et al., 2019; Strine et al., 2008). In China, the inability to get married is considered deeply unfilial, and people who retain their unmarried status over a certain age often suffer from social and family pressure to marry (Attané et al., 2013). The higher the level of stress, the worse the sleep quality (Axelrod and Reisine, 1984). Therefore, we speculate that bachelors may have poorer sleep quality than married men via low life satisfaction.

The resource theory indicates that marriage can improve psychological well-being through the resources it brings to the partner (Chen et al., 2015). Taken together, the theory and empirical evidences suggest that life satisfaction may serve as a mechanism in the relationship between marital status and sleep quality. Unmarried men are more likely to have dissatisfaction with their lives than the married, which in turn leads to poorer sleep quality. That is, we speculate that life satisfaction is an important mediator in the association between bachelor status and sleep quality.

## The Traditional Value of Children as a Moderator

Although being a bachelor may impact life satisfaction and poor sleep quality, not all bachelors are equally influenced. It is important to test moderators that may buffer the relationship between bachelor status and its unfavorable outcomes. This study examines whether the indirect effect of life satisfaction is moderated by the traditional value of children.

The traditional value of children refers to the value of having a son to continue the family name and family blood (Kagitcibasi and Ataca, 2005). Confucian culture is still the mainstream in China's traditional culture, and it emphasizes filial piety and family lineage (Liu et al., 2014). The main purpose of marriage is not the love and happiness of the couple, but to have children (Yao et al., 2018). Having children is a vital part of filial responsibility, and having no children is an unforgivable sin (Liu et al., 2014; Yao et al., 2018). Failure to have children is considered a deep shame to the family (Handwerker, 1998). The dysfunction strain paradigm posits that men who find it hard to attain masculine norm expectations are more likely to suffer poor psychological well-being (Pleck, 1995). The traditional value of children may exacerbate the adverse effect of bachelor status on life satisfaction. Conformity with the culture of the traditional value of children may motivate bachelors to seek chances to marry. Previous study has revealed that bachelors who have high marriage aspirations may be more sensitive to the marriage squeeze and feel more anxiety and stress than bachelors with low marriage aspirations (Li et al., 2019), which then lead to lower life satisfaction. The relationship between bachelor status and life satisfaction may be moderated by the traditional value of children.

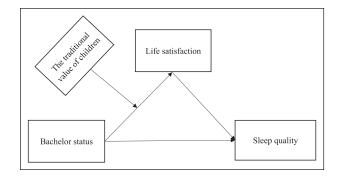
Guided by previous studies on the combination of mediation and moderation models (e.g. Hayes, 2013), if life satisfaction mediates the association between bachelor status and sleep quality, and the traditional value of children simultaneously moderates the relationship between bachelor status and life satisfaction, then the mediating effect of life satisfaction will be moderated by the traditional value of children. There may be a moderated mediation model including life satisfaction and the traditional value of children in the association between bachelor status and sleep quality. We speculate that the traditional value of children moderates the mediating effect of life satisfaction in the relationship between bachelor status and sleep quality. The mediating effect of life satisfaction will be stronger for men who have higher levels of the traditional value of children.

### The Present Study

This study tests the mechanisms underlying the relationship between bachelor status and sleep quality in Chinese men. The moderated mediation model in the current study (Figure 1) shows not only how bachelor status impacts sleep quality but also how this association depend on the traditional value of children. Specifically, we have the following three hypotheses:

*Hypothesis 1.* Bachelors suffer poorer sleep quality than married men in China.

*Hypothesis 2.* Life satisfaction mediates the relationship between bachelor status and sleep quality.



**Figure 1.** The conceptual model including bachelor status, life satisfaction, sleep quality, and the traditional value of children.

*Hypothesis 3.* The traditional value of children moderates the mediating effect of life satisfaction in the association between bachelor status and sleep quality, the mediating effect of the traditional value of children being stronger for men with lower life satisfaction.

## Method

#### Data and Sample

Data were derived from the 2018 wave of the China Family Panel Studies (CFPS), which was a nationally representative longitudinal study of Chinese people. Using probability proportional to size sampling with an implicit stratification method, the baseline CFPS dataset contained 14,960 households from 649 communities across 25 provinces/municipalities/autonomous regions in China (excluding Hong Kong, Macao, Taiwan, Inner Mongolia, Xinjiang, Tibet, Hainan, Ningxia, and Qinghai). The population of the Chinese regions in the 2010 baseline survey accounted for 95% of the country's total population (excluding Hong Kong, Macao, and Taiwan; for more details of the sample design, see Xie et al., 2012). Data collection covered a wide range of domains, including family relationships and dynamics, education, economic activities, and health. Only the 2018 wave of data were used in this study because all the key variables are available in this wave.

For the purpose of this research, the subsample was men who were aged 18 and above, with a sample size of 14,017 adult men. We then restricted the sample to respondents who had never married and were 28 years old and above, or married men. We excluded 821 participants who were widowed or divorced. Additionally, 1094 never married men were excluded because they were younger than 28 years old. Finally, 12,102 men were selected. This survey obtained ethical approval from the Peking University Biomedical Ethics Review Committee (Approval number: IRB00001052-14010).

#### Measures

**Dependent Variable.** Sleep quality was measured using a single item: "I cannot sleep well in the past week." Respondents rated their sleep quality on a scale scored from 1 (never/less than 1 day) to 4 (most of the time/5–7 days). The item was reverse coded, a higher score indicating a higher sense of sleep quality. This measurement has been used to assess sleep quality by Zhi et al. (2016) and Long et al. (2020).

*Independent Variable.* Bachelors were never-married men who were 28 years old and above (Liu et al., 2014). Bachelor status has two types: bachelors and married men. We scored the former as 1 and the latter as 0.

Mediator. Life satisfaction was directly addressed through the overall satisfaction of respondents with life in the survey. Respondents were asked to rate their life satisfaction on a five-point Likert item ranging from 1 (*very dissatisfied*) to 5 (*very satisfied*). A higher score indicates a higher sense of life satisfaction. Previous studies suggested that such a self-rating question about life satisfaction is reliable and valid in large-scale surveys (e.g., Lim & Putnam, 2010; Kahneman & Krueger, 2006).

*Moderator.* The traditional value of children was defined by continuation of the family name and family traditions (Kagitcibasi and Ataca, 2005). This was an instrument from the original value of children study (Kagitcibasi, 1982). It was measured using a single item: having children to carry on the family name. Respondents rated the item on a five-point Likert scale ranging from 1 (*not important*) to 5 (*very important*). A higher score indicates a higher sense of the traditional value of children.

*Control Variables.* Control variables were men's age, education (in years), religious faith (having, not having), *hukou* (agricultural, non-agricultural), and relative income level. *Hukou* is a household registration system in China that is used to categorize place of residence into agriculture and non-agricultural areas (Liu et al., 2016). Categorical variables were dummy coded, with the reference categories of not having belief for religious faith, and agricultural for *hukou*. Relative income level was converted into an ordinal scale whereby participants were divided into quintiles according to their situation, representing very low to very high.

#### Data Analysis Strategy

In this study, all statistical analyses were performed with Statistical Product and Service Solutions (SPSS) 22.0. We first tested the direct effect of bachelor status on sleep

Table I.	Sample Characteristics of the Subject	S
(N = 12, 1)	02).	

Variable	Mean ± SD (Range) N (%)	
Age	49.75 ± 14.43 (18–96)	
Education	8.18 ± 4.53 (0–22)	
Having religious faith or not		
Having	9,076 (75.00%)	
Not having	3,026 (25.00%)	
Hukou		
Agriculture	3,307 (27.33%)	
Non-agricultural	8,795 (72.67%)	
The relative income level	2.93 ± 1.04 (1–5)	

Note. SD = standard deviation.

quality with linear regression after controlling for the covariates. Then, we estimated the mediation model using the SPSS PROCESS macro (model 4; Hayes, 2013). In this study, life satisfaction is included as a mediator of the association between bachelor status and sleep quality. In addition, we conducted a bootstrapping procedure with 5000 resamples to produce the bias-corrected confidence intervals (CIs) to test the indirect effects. The CI that excluded zero indicated significant indirect effects.

All the regression models reported standardized coefficients and used z scores for product terms. A moderated mediation analysis was the second-stage moderation model (Edwards and Lambert, 2007) and conducted with PROCESS (model 7; Hayes, 2013). The traditional value of children was considered as a moderator of the relationship between bachelor status and life satisfaction. We tested the index of moderated mediation, which is an interval estimate of the parameter of a function linking the indirect effect to values of a moderator (Hayes, 2015). We used the Johnson-Neyman technique to test the conditional indirect effects (Bauer and Curran, 2005). The Johnson-Neyman technique mathematically derived the regions of significance at continuous levels of the moderator, which was more precisely than the common picka-point approach such as low, moderate and high. Regions of the technique at where the upper and lower bounds of 95% CI excluded zero indicated significant indirect effects (Bauer and Curran, 2005).

## Results

## Sample Characteristics

The distribution of sample characteristics for the total sample (N = 12,102) is presented in Table 1. The participants had an average age of 49.75  $\pm$  14.43 years (range: 18–92), and average education of 8.18  $\pm$  4.53 years (range: 0–22). The majority of the participants has

Variable	М	SD	Bachelor Status	Life Satisfaction	Traditional Value of Children	Sleep Quality
Bachelor status	0.05	0.21	I			
Life satisfaction	4.02	0.97	-0.12*	I		
Traditional value of children	4.22	1.07	-0.11*	0.17*	I	
Sleep quality	3.31	0.88	0.03*	-0.12*	-0.01	I

Table 2. Descriptive Statistics and Bivariate Correlations of the Study Variables.

Note. SD = standard deviation. \*p < .05.

Table 3. The Indirect Effects of Bachelor Status on Sleep Quality Through Life Satisfaction.

Variable	Sleep Quality	Life Satisfaction	Sleep Quality
Intercept	0.01	0.02*	0.01
Age	-0.03**	0.09***	-0.04**
Education	0.03**	-0.05***	0.03**
Having religious	-0.04***	-0.02*	-0.03***
Non-agricultural	-0.02	-0.02*	-0.01
Relative income level	0.08***	0.33***	0.05***
Bachelor status	-0.03**	-0.09***	-0.02*
Life satisfaction			0.11***
Indirect effects [95% bootstrap CI]			
Life satisfaction			-0.01 [-0.012, -0.007
R <sup>2</sup>	0.01***	0.14***	0.02***

Note. Standardized coefficients are presented. CI = confidence interval. Bootstrap = 5000.\*p < .05, \*\*p < .01, \*\*\*p < .001.

religious faith (75.00%; N = 9,076) and were nonagricultural *hukou* status (72.67%; N = 8,795). The average relative income level was 2.93  $\pm$  1.04 (range: 1–5).

#### Mediation Model Results

The correlations of the study variables are presented in Table 2. Bachelor status ( $r_{sleep quality} = 0.03, p < .05$ ) and life satisfaction ( $r_{sleep quality} = -0.12, p < .05$ ) were significantly associated with sleep quality, but the traditional value of children ( $r_{sleep quality} = -0.01, p > .05$ ) was not significantly associated with sleep quality. Additionally, bachelor status was negatively associated with life satisfaction (r = -0.11, p < .05).

Table 3 depicts the direct and indirect effects of bachelor status on sleep quality. In linear regression, bachelor status had a negative association with sleep quality ( $\beta =$ -0.03, p < .01). Thus, Hypothesis 1 was supported. In the mediation model, bachelor status had significant direct effects on life satisfaction ( $\beta = -0.09$ , p < .001), and life satisfaction ( $\beta = 0.11$ , p < .001) had a direct effect on sleep quality. In addition, bachelor status had indirect effects on sleep quality via life satisfaction ( $\beta = -0.01$ , 95% CI [-0.012, -0.007]). We added life satisfaction as a mediator: the direct effects of bachelor status on sleep quality decreased but remained significant ( $\beta = -0.02$ , p < .05). Therefore, Hypothesis 2 was supported.

## Moderated Mediation Model Results

As Table 4 illustrates, the interaction term *bachelor status* x *traditional value of children* had a significant interaction effect in the moderated mediation models. This result suggested that bachelor status had a negative association with life satisfaction, and this association was moderated by the traditional value of children. To facilitate the interpretation of this interaction effect, we plotted predicted life satisfaction by bachelor status separately for low and high traditional value of children (1 SD below the mean and 1 SD above the mean, respectively) in Figure 2. A simple slope test showed that the association between bachelor status and life satisfaction strengthen with an increased sense of the traditional value of children. In addition, the index of moderated mediation was significant (index = -0.002, 95% CI [-0.004, -0.001]).

To reveal the presence of moderated mediation, we reported the indirect effect at various levels of the moderator in Table 4 at 1 SD below the mean, the mean, and 1 SD above the mean. For men with low levels of traditional value of children, the indirect effect was significant (-0.007, 95% CI [-0.009, -0.004]). For men with mean levels of the traditional value of children, the indirect effect was stronger (-0.009, 95%CI [-0.012, -0.006]). The indirect effect continued to strengthen (-0.011, 95% CI [-0.014, -0.007]) as the traditional value of children

Variable	Life Satisfaction	Sleep Quality
Direct effects		
Bachelor status	-0.08***	-0.02*
Life satisfaction		0.11***
Traditional value of children	0.13***	
Bachelor status X the traditional value of children	-0.02**	
Conditional indirect effects [95% CI]		
Lower traditional value of children		-0.007 [-0.009, -0.004]
Average traditional value of children		-0.009 [-0.012, -0.006]
Higher traditional value of children		-0.011 [-0.014, -0.007]
Index of moderated mediation [95%CI]		-0.002 [-0.004, -0.001]
R <sup>2</sup>	0.16***	0.02***

 Table 4.
 The Moderated Mediation Model With as Life Satisfaction Mediator and the Traditional Value of Children as a Moderator.

Note. Age, education, religious faith, hukou, and the relative income level were controlled in the regression model. CI = confidence interval. Bootstrap = 5000.

\*p < .05, \*\*p < .01, \*\*\*p < .001.

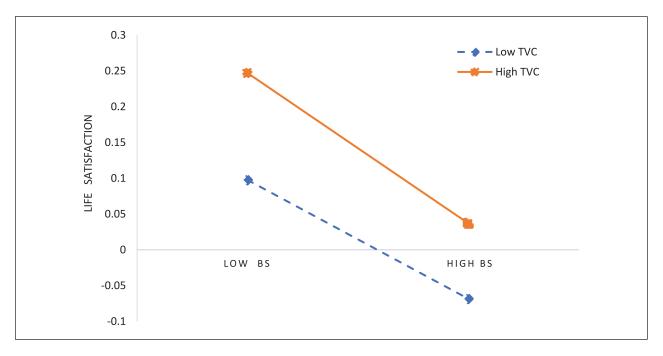


Figure 2. The association between bachelor status and life satisfaction with traditional value of children as a moderator. Note. BS = bachelor status; TVC = traditional value of children.

increased to a high level. The magnitudes of the indirect effects on sleep quality at continuous levels of the traditional value of children with 95% CI are graphically illustrated in Figure 3. The left side of the vertical dashed line represents the region of significant indirect effect. These results indicated that the indirect effect of bachelor status on sleep quality through life satisfaction was contingent on the traditional value of children, such that higher levels of traditional value of children increased the indirect effect's magnitude.

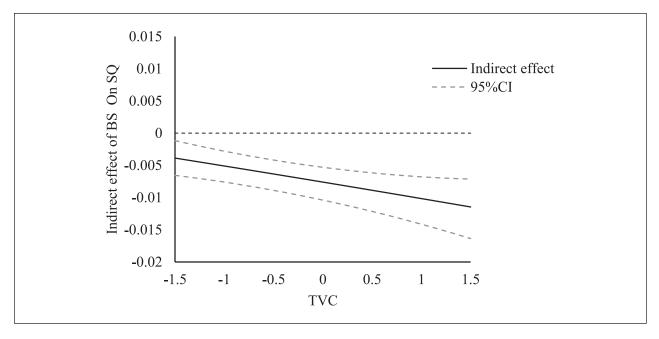
## Discussion

This study has built a moderated mediation model to explore the mechanisms underlying the relationship between bachelor status and sleep quality in male adults. Additionally, life satisfaction was used as a mediator and the traditional value of children as a moderator. The results validate the moderated mediation model.

First, this study indicates that bachelor status has a negative impact on sleep quality in males. This result is



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**Figure 3.** The conditional indirect effect of marital status on sleep quality with bootstrap confidence intervals. Note. SQ = sleep quality; BS = bachelor status; TVC = traditional value of children; CI = confidence interval. The horizontal dashed line denotes an indirect effect of zero, and the vertical dashed line represents the boundary of the region of significance.

consistent with one previous study conducted among middle-aged and older adults, which indicates that being unmarried might be negatively associated with sleep quality (Dong et al., 2018). The relationship between bachelor status and sleep quality might be explained by the resource model discussed earlier. More specifically, bachelors lack the emotional and material resources related to marriage (Chen et al., 2015; Waite and Gallagher, 2001). This finding highlights the vulnerability of bachelors in terms of sleep quality.

Second, our study shows that life satisfaction partially mediates the relationship between bachelor status and sleep quality. Previous studies have revealed that bachelor status is a predictor for life satisfaction (Zhou et al., 2011) and life satisfaction is a risk factor for sleep quality (Strine et al., 2008). To our knowledge, no research has examined the mediating effect of life satisfaction in the relationship between bachelor status and sleep quality. Consistent with our speculation, this study reported that bachelor status has a negative association with life satisfaction, and that life satisfaction partially mediates the effect of bachelor status on sleep quality. This result coincides with one prior finding in the literature revealing bachelor status as a risk factor for psychological wellbeing in China (Li et al., 2009). It may be that bachelors often face multiple stressors, such as lack of social support, low socioeconomic status, and limited marriage chances, all of which have been proved to be high risk factors for poor psychological well-being (Zhou et al.,

2011). Men who are dissatisfied with their lives might have poor sleep quality. It is possible that a low level of life satisfaction comes with severe stress, resulting in poor sleep quality (Axelrod and Reisine, 1984). Taken together, bachelor status is associated with lower life satisfaction, in turn leading to poorer sleep quality.

Third, this study reveals that the effect of bachelor status on sleep quality via life satisfaction is moderated by the traditional value of children. This effect tends to be strengthened as the traditional value of children increases to a high level. That is to say, the traditional value of children increases the indirect impact of bachelor status on sleep quality via life satisfaction. These results are consistent with prior studies revealing that adherence to traditional masculine norms has a positive impact on men's depression, anxiety, hostile behaviors, and other adverse mental health outcomes (Gerdes and Levant, 2018; Seidler et al., 2016).

Specifically, the moderating effect of the traditional value of children in the link between bachelor status and life satisfaction may be explained as follows. There is still a universal marriage culture in China, and people of marriageable age will all make their best effort to get married (Liu et al., 2014; Yang et al., 2017). Every man should get married and have children, which is a man's duty (Liu et al., 2014). Bachelors who adhere to the traditional masculine norms may have high marriage aspirations and a desire to have children, which may strengthen their sense of the conflict between reality and their ideal.

The higher the sense of conflict, the lower the level of life satisfaction. Thus, bachelors with higher traditional value of children may have lower level of life satisfaction than those who are married.

#### Limitations and Implications

Some limitations of the current study should be noted. First, this study is a cross-sectional study, and so it is hard to show accurate causal explanations for the observations. Future research needs to build a longitudinal study to test the causal associations among these variables. Second, it may be too simple to measure sleep quality with a single item. However, prior studies successfully used a similar measure, which increases our confidence in the validity of this measure (Long et al., 2020; Zhi et al., 2016). Future studies' efforts can choose a sleep quality scale that has been developed with adequate validity and reliability. Last but not least, the traditional value of children is different between Chinese culture and Western culture: it would be interesting to replicate the study in Western society and compare the differences and similarities in the different settings.

Despite these limitations, this study is the first attempt to test the mediating role of life satisfaction and the moderating role of the traditional value of children in the relationship between bachelor status and sleep quality in Chinese men. It deepens prior studies by testing the mechanisms underlying this relationship. This study provides evidence of resource theory and the dysfunction strain paradigm, especially among bachelors in China, to supplement studies that have applied this concept to men. The findings have great implication for future studies and practices. First, considering that life satisfaction is an important mechanism linking bachelor status and sleep quality, the target prevention or intervention programs aim to improve sleep quality among bachelors will be more effective if they focus on improving bachelors' life satisfaction. Second, the traditional value of children strengthens the indirect effect of bachelor status on sleep quality through the mediation of life satisfaction. It is necessary to adjust people's viewpoints about traditional masculine norms among men, especially bachelors in the Chinese context.

## Conclusion

The current study emphasizes the mediating role of life satisfaction and the moderating role of the traditional value of children in the relationship between bachelor status and sleep quality among Chinese men. The results reveal that life satisfaction mediates the association between bachelor status and sleep quality. Such a mediating role of life satisfaction also dependents on the traditional value of children. As the traditional value of children increases, the indirect effect of life satisfaction becomes stronger. Shaping the understanding of the mechanism between bachelor status and sleep quality of Chinese men is helpful in developing tailored prevention and intervention strategies to improve the sleep quality of bachelors.

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#### ORCID iD

Qian Liu (i) https://orcid.org/0000-0001-6468-821X

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