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Perceived sleep quality: The interplay of neuroticism, affect, and hyperarousal☆,☆☆

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ABSTRACT

Introduction: Many adults experience poor sleep quality, and personality traits have emerged as important predictors of self-reported sleep. However, it is still unclear whether personality predicts sleep quality independent of other correlates, including mood, emotion regulation, and hyperarousal.
Aims and method: The aim of this study was twofold. First, using an online survey, we assessed the relationship between perceived sleep quality (defined here as the total score of the Pittsburgh Sleep Quality Index) and personality in 498 Italians (M age = 26.6 ± 7.4 years, 353 Female). Second, using multiple regressions, we investigated whether this association was independent of affect, emotion regulation strategies, and hyperarousal.
Results: Results replicate previous findings, showing that neuroticism is the best personality predictor of sleep quality in Italians. When examined separately, hyperarousal explained the most variance in sleep quality (R^2 = .18), followed by personality traits (R^2 = .12), affect (R^2 = .12), and emotion regulation strategies (R^2 = .01). However, when all predictors were entered into a single regression model (R^2 = .20), only agreeableness, positive affect, and hyperarousal remained statistically significant.
Conclusion: Overall, our data replicate the association between personality and perceived sleep quality in Italians, showing that neuroticism is the best predictor of worse sleep quality. Finally, we also demonstrate important roles for hyperarousal and positive affect, but not for emotion regulation strategies. Results have implications for applied research and interventions that may want to identify individuals at risk for poor sleep.

Introduction

A good night of sleep is fundamental for maintaining physical and mental health.[1] Indeed, subjective reports of the quality of nighttime sleep correlate with measures of psychosocial well-being, including mood,[2,3] satisfaction with life,[4] reduced social support,[5] and interpersonal conflict.[6] In addition, poor sleep quality is associated with lower self-reported health,[7] as well as an increased risk of type 2 diabetes[8] and cardiovascular disease.[9] Because a large proportion of the population experiences poor sleep quality,[10,11] it is important to determine who experiences poor sleep quality, and why, in order to understand long-term developmental pathways and suitable targets for interventions.

Recent findings have indicated that personality traits predict self-reported sleep quality. Personality traits can be described as the relatively enduring patterns of thoughts, feelings, and behaviors that make people uniquely themselves. A reliable and consistently replicated hierarchical model of personality is the "Five-Factor Model" or "Big Five,"[12,13] in which personality is assessed using five broad traits: conscientiousness (socially prescribed impulse control that facilitates task- and goal-directed behavior), neuroticism (the tendency to experience negative emotions and emotional lability), agreeableness (a prosocial and communal orientation towards others), openness to experience (the breadth, depth, originality, and complexity of an individual's mental and experiential life), and extraversion (an energetic approach to the social and material world).

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Within the "Big Five" framework, studies of American undergraduates[14,15] have found that low conscientiousness and high neuroticism predict poor sleep quality, although conscientiousness may be more related to sleep behaviors whereas neuroticism may be more related to subjective sleep experience.[14,16] Other studies using smaller samples of undergraduate students,[17,18] working adults,[19] and individuals with insomnia[20] show that neuroticism is the best predictor of poor self-reported sleep quality. Finally, recent studies conducted in other countries, such as Korea,[21] Australia and Finland,[22] and Turkey,[23] have also found that high neuroticism is associated with poor self-reported sleep quality. While more research is needed to determine whether relationships are similar in other age groups and cultures, the consistency of these results demonstrates that neuroticism is an important predictor of perceptions of sleep. However, little is known about why neuroticism is associated with poor sleep quality. Furthermore, poor sleep quality has been associated with several other factors such as lack of positive and high negative affect,[24] dysfunctional emotion regulation strategies,[25] and cognitive and physiological hyperarousal.[26] Similarly, negative affect is a component of neuroticism,[27] which has also been associated with ineffective emotion regulation strategies[28] and cognitive and physiological arousal.[29] Therefore, it is possible that the relationship between sleep quality and personality may be due to these factors.

Thus, the aim of this study was twofold. First, we assessed the relationship between personality and perceived sleep quality for the first time in an Italian population. We hypothesized that neuroticism would be the best predictor of sleep quality in an Italian sample, as it was in the US,[14] Korean,[21] Turkish,[23] Australian, and Finnish samples.[22] Second, using multiple regressions, we examined whether self-reported affect, emotion regulation, and hyperarousal independently predict poor perceived sleep quality. Finally, we jointly examined the relationships between personality, affect, emotion regulation, hyperarousal, and perceived sleep quality in a single, unified model with all predictors. The results will provide a picture of the relative importance of individual difference markers of poor sleep.

Participants and methods

Participants

Participants completed an anonymous, online survey after reading the written consent form and explicitly agreeing to participate in the survey. The link for the survey was shared via social media on forums/pages related to well-being and sleep behaviors, and to university listservs during January 2014. Participants volunteered their time and there was no monetary or course credit awarded for participating. The study protocol was approved by the local Ethics Committee and was conducted in accordance with the Declaration of Helsinki. A total of 747 Italian adults explicitly agreed to participate to the survey and provided a response to the first questions (demographics). Of these participants, 249 were missing some data on at least one of the questionnaires (primarily due to early survey dropouts), yielding a final sample size of 498 (353 F) with complete data. All participants were native Italian speakers between 18 to 67 years old ($M = 26.6 \pm 7.4$ years). Female and male participants did not differ on age (Females: 26.8 ± 7.6 years; Males: 26.0 ± 6.8 years; $t(496) = -1.00$, $P = .32$).

Measures

Sleep quality

Here sleep quality was defined as the total score of the Pittsburgh Sleep Quality Index (PSQI[30]). This commonly-used index is a valid and reliable ($\alpha = .83$) self-report questionnaire designed to evaluate sleep quality and disturbances over the previous month. This 18-item scale has scores ranging from 0 to 21, with higher scores indicating worse sleep quality. Scores higher than 5 indicate clinically poor nighttime sleep quality. Sample items include "How long (in minutes) has it taken you to fall asleep each night?", and "During the past month, how would you rate your sleep quality overall?". It is worth noting that the PSQI total score is the sum of different composite scales (e.g., sleep duration, sleep disturbance, and daytime dysfunction), and, therefore, it is a global, rather than specific, measure of sleep quality.

Personality

The 44-item version of "Big Five" Inventory[31] was used to assess personality. Questions are answered on a 1 to 5 scale, with a 1 meaning "not at all like me" and a 5 meaning "very much like me." Higher scores on each factor indicate higher levels of each personality trait. Sample items include "makes plans and follows through with them" (conscientiousness, $\alpha = .82$); "can be moody" (neuroticism, $\alpha = .84$); "is generally trusting" (agreeableness, $\alpha = .79$); "is full of energy" (extraversion, $\alpha = .88$); and "is curious about many different things" (openness, $\alpha = .81$).

Positive and negative affect

The Positive and Negative Affective Schedule[32] is a 20-item self-report questionnaire used to measure positive and negative affect. Higher positive affect scores ($\alpha = .88$) represent higher energy, pleasure, engagement, and concentration, whereas higher negative affect scores ($\alpha = .87$) reflect subjective distress and unpleasant engagement.[32] The scale consists of 20 words that describe different feelings and emotion, and the participants answer to "what extent you have felt this way during the past few weeks" using a 5-point rating scale, where a 1 means "very slightly or not at all" and a 5 means "extremely." Sample items include "interested" and "enthusiastic" (positive affect) and "nervous" and "guilty" (negative affect).

Emotion regulation

The Emotion Regulation Questionnaire[28] was used to assess emotion regulation strategies. This self-report questionnaire is composed of 10 items and measures two emotion regulation strategies: cognitive reappraisal ($\alpha = .79$), which represents attempts to change thoughts about an event, and expressive suppression ($\alpha = .73$), which represents attempts to reduce the expression of emotions. Higher scores indicate higher use of each strategy. Sample items include "I control my emotions by *changing the way I think* about the situation I'm in" (reappraisal) and "I control my emotions by *not expressing them*" (suppression). Participants rate each item on a scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Hyperarousal

The Hyperarousal Scale[33] is a 26-item reliable ($\alpha = .85$; 34) self-report questionnaire that assesses daytime arousal tendencies. For each item, participants respond using a 4-point scale (0 = not at all, 1 = a little, 2 = quite a bit, 3 = extremely). Hyperarousal scores positively correlate with electroencephalographic arousal and are hypothesized to measure individual trait arousal. Sample items include "My mind is always going" and "Some thoughts return too often."

Statistical analysis

Multiple regressions were used to examine associations among personality traits, affect, emotional regulation, hyperarousal, and

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