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An Exploratory Investigation of Noctcaelador and Sleep Disturbance Ascribed to Worry

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Abstract
Noctcaelador, defined as psychological attachment to the night sky, has been linked to personality traits, coping, and habitual sleep-length. However, little is known about its relationship with sleep disturbance ascribed to worry (SAW), a tendency to attribute sleep difficulties to worry. The present exploratory study examined associations between noctcaelador and SAW in a sample of 235 university students who completed the Noctcaelador Inventory and the Sleep Disturbance Ascribed to Worry Scale. Noctcaelador and SAW were modestly but significantly correlated ($r = .23$, $p < .001$). Item-level stepwise regression analyses indicated that waking from sleep worrying was the only SAW component uniquely predictive of noctcaelador, whereas enjoyment of going outside to view the night sky was the only noctcaelador item uniquely predictive of SAW. These findings suggest that noctcaelador may intersect with cognitive–affective processes linked to nocturnal worry and may reflect behavioral tendencies relevant to nighttime self-regulation. Implications and avenues for future research are discussed.

Keywords: Noctcaelador, Night Sky Watching, Sleep Disturbance, Worry

1. Introduction

Noctcaelador is a psychological construct describing an attachment to the night sky [1]. Although originally identified through factor-analytic work examining students' attitudes and behaviors related to night sky watching [1-3], more recent qualitative findings also support the existence of noctcaelador [4, 5]. Across diverse samples including national park visitors, students, and amateur and professional astronomers, between 57.5–88.0% report intentionally observing the night sky at least monthly [6-8]. Individuals higher in noctcaelador report watching the night sky more frequently and for longer periods [8]. Historically, reasons for interest in the night sky have included aesthetic, spiritual–existential, and prognostic motivations [9, 10]. Psychological research additionally suggests that night sky watching often elicits awe [11] and may reduce stress and increase positive mood [12, 13]. These positive experiences, along with a sense of self-enhancement, may provide a developmental pathway for noctcaelador [14].

Noctcaelador has been linked with feelings of connection to nature [15], enjoyment of urban nightscapes [16], astrotourism [17], and artistic or intellectual leisure interests [18]. Although noctcaelador might appear synonymous with interest in astronomy, the two constructs are statistically distinct [19], with noctcaelador representing a more emotional form of engagement. Both, however, may trace back to childhood exposure to the night sky [4, 20] and may be shaped more by psychological dispositions than mere opportunity to view the sky [15, 21]. Noctcaelador consistently relates to openness to experience [22, 23], particularly facets such as fantasy and aesthetic appreciation [24]. Similar associations have been found with creativity [25], curiosity [26], rational problem solving [27, 28], sensation seeking [29], and psychological absorption [30].

Findings regarding maladaptive psychological correlates of noctcaelador have been mixed. Studies have not found consistent relationships with mood or anxiety but have reported associations with hypomanic tendencies [31, 32]. Earlier work found a positive relationship with pathological worry [33], and noctcaelador has been linked to reduced habitual sleep length [34]. The latter finding is ambiguous: shorter sleep may reflect normal individual differences [35], but it can also indicate maladaptive pre-sleep cognitive arousal [36]. One variable that may capture the intersection of perceived sleep disruption and worry is sleep disturbance ascribed to worry (SAW). SAW is described as the attribution of sleep difficulties to worry, including problems initiating and maintaining sleep [37].

Up to 40% of adults attribute at least some sleep disturbance to worry [38]. Importantly, SAW appears to reflect a subjective

attribution rather than objective sleep loss [39]. Conceptually, SAW may develop through attributional processes [40], particularly the covariation principle [41], where one internal experience is misattributed to another despite potential third-variable influences. SAW shows bidirectional associations with both somatic and cognitive arousal [42, 43], and longitudinal studies indicate that worry predicts sleep disturbance [44] while dysphoric dreaming, a form of sleep disturbance, predicts later SAW [45]. SAW also has been linked to greater negative affect, perceived stress, and lower self-esteem and life satisfaction [40]. Although related to insomnia and worry, SAW is statistically distinct from both and reflects metacognitive perceived sleep disruption and attribution to worry rather than objective fatigue [46].

While prior work suggests noctcaelador relates modestly to worry [33] and sleep length [34], it is unknown whether it relates specifically to worry-attributed sleep difficulties. Early findings indicated that individuals high in noctcaelador reported willingness to sacrifice sleep to watch the night sky [2], although later work suggested noctcaelador was no longer related to habitual sleep length when controlling for night sky watching as a coping behavior [13]. The aim of the present study was to examine associations between noctcaelador and SAW, and to explore which specific components of each construct best accounted for observed relationships. Based on prior literature, a positive association between noctcaelador and SAW was hypothesized.

2. Methods and Measures

2.1 Participants and Procedure

Participants were 235 undergraduate psychology students (162 women, 72 men, 1 unidentified) at a university in the U.S. Ages ranged from 18–62 years (M = 27.50, SD = 10.62). Self-reported racial/ethnic identity was primarily White/Caucasian (n = 191; 81.3%), followed by African American/Black (n = 26; 11.1%), Asian (n = 9; 3.8%), Native American (n = 3; 1.3%), and other (n = 4; 1.7%). Two participants (0.9%) did not report a racial/ethnic identity.

The Institutional Review Board categorized the study as nonregulated research. Procedures followed the Helsinki Declaration (2000) and APA ethical guidelines. Participants completed anonymous paper-and-pencil questionnaires in group settings without time limits and received a small amount of extra course credit for participating.

2.2 Measures

2.2.1 Noctcaelador: Participants completed the 10-item Noctcaelador Inventory [47] using a 1 (strongly disagree) to 5 (strongly agree) scale. Higher scores reflect greater noctcaelador. One-month test–retest reliability (r = .88) and criterion validity have been established [47, 48].

2.2.2 Sleep Disturbance Ascribed to Worry (SAWS): Participants completed the 5-item Sleep Disturbance Ascribed to Worry Scale [37] using a 0 (never) to 10 (very often) scale. Higher scores indicate greater attribution of sleep disturbance to worry. Test–retest reliability (r = .83) and validity have been reported [40, 49].

2.3 Data Analyses

Analyses were conducted using SPSS v.30. Gender and race/ethnicity differences were evaluated using independent-samples t-tests. Due to distributional frequencies, race/ethnicity was grouped as White/Caucasian versus Other. Pearson correlations examined relationships among continuous variables, with effect sizes interpreted as small (r = .10), medium (r = .30), or large (r = .50) [50]. Stepwise regressions assessed item-level predictors of total scores for each construct. Significance was set at $p < .050$ (two-tailed).

3. Results

Preliminary analyses showed that age was not significantly correlated with SAWS, $r = .03$, $p = .604$, or noctcaelador, $r = .12$, $p = .064$. No significant gender differences emerged for noctcaelador, $t (232) = 0.22$, $p = .823$. However, women ($M = 19.28$, $SD = 11.27$) scored significantly higher on SAWS than men ($M = 14.68$, $SD = 11.18$), $t (232) = 2.89$, $p = .002$. Race/ethnicity was unrelated to both SAWS, $t (231) = 0.91$, $p = .362$, and noctcaelador, $t (231) = 0.91$, $p = .366$. Noctcaelador and SAWS were significantly correlated, $r = .23$, $p < .001$.

A stepwise regression predicting noctcaelador with sociodemographics forced on Step 1 and SAWS items allowed to load on subsequent steps showed that sociodemographics did not significantly predict noctcaelador, $R^2 = .024$, $F = 1.84$, $p = .141$. Only one SAWS item ("How often do you awake from sleep worrying?") entered the model on Step 2, yielding a significant increase in variance explained, $R^2 = .088$, $F = 22.54$, $p < .001$ ($\beta = .30$, $p < .001$).

When reversing the model and predicting SAWS from sociodemographics and Noctcaelador Inventory items, sociodemographics accounted for significant variance when forced onto Step 1, $R^2 = .040$, $F = 3.20$, $p = .024$, with gender the only significant individual predictor ($\beta = .19$, $p = .004$). One noctcaelador item ("I like to go outside and look at the sky at night often") entered on Step 2 and significantly increased explained variance in SAWS scores, $R^2 = .076$, $F = 19.48$, $p < .001$ ($\beta = .28$, $p < .001$).

4. Discussion

Taken together, the present findings suggest that noctcaelador is modestly but reliably associated with sleep disturbance attributed to worry. Although the effect size was small, it is consistent with prior work linking noctcaelador with worry processes [33] and with indices of reduced habitual sleep length [34]. These convergent findings imply that noctcaelador is not merely an aesthetic or recreational preference but may intersect with cognitive–affective processes relevant to nocturnal functioning.

The item-level analyses provide additional nuance. Specifically, SAW's strongest predictor of noctcaelador was waking from sleep while worrying, which represents an in-sleep cognitive intrusion rather than a pre-sleep process. This finding aligns with suggestions that awakenings due to cognitive arousal may be especially disruptive [36] and may cue efforts to regulate internal distress. Conversely, the noctcaelador item that best predicted SAW reflected a behavioral inclination (i.e., going outside to look at the sky often) rather than an affective appraisal. This asymmetry raises conceptual questions. It may be that individuals who enjoy repeatedly engaging with the night sky are more likely to rely on this behavior as a regulatory strategy when experiencing worry-related awakenings. Prior research supports the notion that night-sky engagement can serve coping or mood-regulating functions [12, 13, 28]. Thus, behavioral engagement with the night sky may be part of a

broader repertoire of responses to cognitive arousal during the night.

At a broader theoretical level, if noctcaelador partly reflects an absorptive attachment to a stable environmental stimulus [14], then individuals high in noctcaelador may orient toward the night sky in moments of affective disruption. This interpretation is compatible with research suggesting that both nocturnal nature engagement [52] and awe experiences [11] may promote emotional recalibration. However, the present study cannot determine whether night-sky engagement reduces worry, reinforces it, or merely co-occurs with worry-related sleep disruptions.

The lack of sociodemographic differences in noctcaelador aligns with previous findings showing relative stability of noctcaelador across gender, age, and ethnic groups [15, 47, 51]. Such consistency strengthens the claim that noctcaelador is better conceptualized as a personality-linked individual difference rather than a demographic or culturally localized phenomenon. Personality research further supports this view: noctcaelador is consistently related to openness to experience [22-24], creativity [25], curiosity [26], and absorption [30]-traits that facilitate perceptual and imaginative engagement with the night environment. These associations make it plausible that noctcaelador reflects a broader cognitive–affective style that shapes how individuals interpret nocturnal experiences, including sleep-related cognitions.

Nevertheless, the relationship between noctcaelador and SAW may also involve attributional tendencies. SAW specifically reflects a metacognitive interpretation of sleep difficulties rather than objectively measured sleep loss [39]. Individuals high in noctcaelador may be more inclined to assign meaning or symbolic value to nighttime experiences or internal states; an interpretation consistent with findings linking noctcaelador to nonnormative perceptual experiences [31]. Thus, both noctcaelador and SAW may share underlying cognitive styles that predispose individuals to interpret nighttime events (e.g., awakenings) in particular ways. Exploring attributional biases, interpretive frameworks, and metacognitive beliefs may therefore deepen understanding of why these constructs covary.

The limitations of this study warrant emphasis. The study's reliance on self-report measures introduces the possibility of shared-method variance and subjective biases. The student sample further limits generalizability; community-based or clinical populations may show different patterns, especially given the higher prevalence of insomnia, chronic worry, and sleep fragmentation in older adults and clinical groups. Moreover, the cross-sectional design precludes causal inference. It remains unclear whether noctcaelador contributes to worry-related sleep disturbance, whether SAW increases tendencies toward night-sky engagement, or whether a third variable (e.g., cognitive arousal, absorption, attributional bias) drives both.

Future research should consider multimethod approaches, such as diary studies, ambulatory assessment, or actigraphy, to examine temporal sequencing between nocturnal worry, awakenings, and night-sky engagement. Including broader personality measures, coping strategies, and indices of nature connectedness may help clarify the psychological architecture of noctcaelador. Finally, experimental or quasi-experimental designs exposing participants to structured night-sky viewing versus control conditions could help test whether nocturnal nature engagement buffers or exacerbates preexisting worry or sleep disturbance.

5. Conclusion

In summary, this exploratory study shows that noctcaelador is modestly related to sleep disturbance ascribed to worry, particularly worry-linked nocturnal awakenings. While the findings raise as many questions as they answer, they suggest that noctcaelador may intersect with cognitive–affective processes relevant to sleep. Whether night-sky engagement functions primarily as a coping mechanism, a personality-expressive behavior, or part of an attributional style remains an open empirical question. Continued research integrating personality psychology, sleep science, and environmental psychology is likely to yield a more comprehensive understanding of the nocturnal mind.

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