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Original paper

Personality traits and self-reported bruxism in university students: A cross-sectional study

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ABSTRACT

Introduction: Bruxism, defined as repetitive masticatory activity, is a common condition with a multifactorial etiology. Although linked to stress and personality traits, few studies have examined medical students – a population with chronic academic stress, whose specialized knowledge may enhance self-report reliability. This study aimed to assess the association between personality traits and self-reported bruxism in this group.

Material and methods: A cross-sectional survey was conducted among 204 students of the Medical University of Silesia (150 women, 54 men). Bruxism was assessed by self-report using a modified version of the Baron et al. questionnaire, while personality traits were measured with the NEO-FFI inventory. Group differences (non-bruxism, awake bruxism – AB, sleep bruxism – SB) were analyzed using ANOVA, and predictors of bruxism status evaluated through logistic regression.

Results: Based on self-report, 56 participants (27.5%) were classified as having bruxism, including 26 (12.8%) with SB. ANOVA indicated significant differences only for conscientiousness ($F(2,201) = 4.57$; $p = 0.011$), with lower scores in the SB group compared to non-bruxers ($p = 0.0088$). Logistic regression showed higher conscientiousness was associated with lower odds of being classified as a bruxer; however, this association was borderline (OR = 0.87; 95% CI: 0.76–1.00; $p = 0.051$). No significant associations were observed for neuroticism, extraversion, openness, or agreeableness.

Conclusions: In this cohort, lower conscientiousness was the most consistently observed trait associated with self-reported bruxism, particularly its sleep subtype. The multivariable findings were borderline and overall predictive performance modest; therefore, the results should be considered exploratory and hypothesis-generating, pending confirmation in studies using objective bruxism assessment.

KEYWORDS

personality traits, cross-sectional study, sleep bruxism, NEO-FFI, self-reported bruxism

INTRODUCTION

Bruxism, defined by Lobbezoo et al. [1] as “a repetitive jaw-muscle activity characterized by clenching or grinding of the teeth and/or by bracing or thrusting of the mandible”, manifests in two distinct forms based on circadian rhythm: sleep bruxism (SB) and awake bruxism (AB). In the present study, the term “bruxism” refers exclusively to self-reported bruxism assessed by questionnaire and does not imply clinical or instrumental verification of SB or AB and accordingly

the subgroups examined represent self-reported phenotypes. Self-reported bruxism is a common condition, with overall estimated prevalence rates ranging from 8% to 31% in the general population when not differentiating between subtypes and without significant gender differences [2]. When differentiating between circadian manifestations, self-reported prevalence estimates indicate that AB affects approximately 22%–31% of adults, while SB occurs in approximately 13% [2,3]. These figures are primarily derived from questionnaire-based studies rather than polysomnographic or electromyographic assessments and should be interpreted accordingly. However, self-report questionnaires may be affected by recall bias, and more intensive longitudinal methods, such as ecological momentary assessment (EMA), have been proposed to improve the accuracy of AB [4]. Nevertheless, a recent long-term study demonstrated that the frequency of self-reported AB remained relatively constant over a six month period, suggesting that self-report may have some consistency over time in healthy individuals without major clinical changes [5]. It is important to consider these figures within the context of contemporary diagnostic frameworks. According to the international consensus on bruxism assessment [3], a diagnosis can be classified into three levels: *possible* (based on self-report only), *probable* (based on clinical examination with or without positive self-report), and *definite* (confirmed by instrumental assessment, with or without positive self-report and/or positive clinical inspection). As this study relies exclusively on self-report without clinical or instrumental verification, its findings pertain to *possible* SB and AB. This distinction should be considered when interpreting the results. The aetiology of SB is complex and multifactorial, arising primarily from the interplay of genetic predisposition, neurophysiological mechanisms (e.g., sleep micro-arousals, dopaminergic pathways), and psychological factors. In contrast to earlier views, morphological factors like occlusion are now recognized as playing only a minor or negligible role, if any [6]. Heightened levels of stress, anxiety, and emotional tension are frequently reported correlates of SB, although causality remains unclear [7]. This naturally raises the question of whether deeper-seated, stable psychological constructs – personality traits – are associated with bruxism susceptibility. Personality encompasses the relatively enduring characteristics that influence an individual's cognitions, motivations, and behaviors across situations. Core dimensions such as neuroticism, conscientiousness, or extraversion may influence stress reactivity, coping mechanisms, and potentially, the propensity for bruxism [8]. Despite growing interest in this field, previous research examining the relationship between personality traits and bruxism has yielded both converging and conflicting findings. Kampe et al. [9] reported that bruxers exhibited significantly higher levels of somatic anxiety and muscle tension, as well as lower socialization. Within their sample, individuals with frequent teeth clenching (≥1–2 episodes per week) were particularly characterized by elevated psychic and somatic anxiety. In a more

recent study by Montero and Gómez-Polo [10] using the NEO Five-Factor Inventory (NEO-FFI), self-reported bruxers exhibited higher neuroticism and extraversion, along with lower conscientiousness. Notably, this study also revealed a strong association between bruxism and dental anxiety. However, current evidence is largely derived from general populations [9,10], with a critical absence of focused analyses among medical/dental students. This is a key group to study, as they are particularly exposed to high academic stress and their specialized knowledge may enhance the reliability of self-reported bruxism assessment. To address this gap, this cross-sectional study examines the association between self-reported SB and fundamental personality traits within this specific academic cohort.

The primary aim of this cross-sectional study was to examine the association between personality traits and self-reported SB frequency among medical university students – a population with heightened academic stress and a potentially enhanced capacity for reliable symptom assessment.

MATERIAL AND METHODS

Study design and participants

An anonymous cross-sectional study was conducted among students of the Medical University of Silesia. A total of 212 questionnaires were initially collected. Eight respondents were excluded due to missing values on at least one predictor variable required for the inferential models. Thus, in accordance with the complete-case analysis approach, the final analytical sample consisted of 204 adult students aged ≥18 years, including 150 women and 54 men. Recruitment took place between April 2024 and April 2025 through two channels: online distribution, where questionnaires were disseminated via official student social media groups, and on-site collection, with paper-based questionnaires administered during academic classes. Participation was entirely voluntary, and completion of the questionnaire was considered informed consent. No personally identifiable information was collected, and IP addresses were not stored for online responses. In accordance with local and national regulations for anonymous educational surveys, the study did not require approval from a Bioethics Committee.

Bruxism assessment

Bruxism activity was evaluated using a 5-item questionnaire adapted from Baron [11]. The questionnaire was modified by the authors to align with the study objectives and to facilitate self-assessment. Specifically, the question requiring palpatory examination of the masseter muscles was removed, ensuring that the entire instrument could be used in a self-report format without the need for clinical evaluation. Thus, bruxism classification in this study was based exclusively on

self-reported symptoms and self-perceived tooth wear, without clinical or instrumental verification. Participants responded dichotomously (yes/no) to the following items:

1. Do you experience periodic headaches, morning headaches, or morning discomfort?
2. Do you experience pain localized in the masticatory muscles or temporomandibular joint during mandibular movement (e.g., yawning, mastication)?
3. Do you exhibit reciprocal clicking sounds in the temporomandibular joint (during both mouth opening and closing)?
4. Do you experience restricted mandibular mobility?
5. Have you observed attrition (wear) of anterior teeth and canines?

Participants reporting three or more affirmative responses were classified as bruxers. For subtype differentiation, individuals were assigned to the SB group if they provided an affirmative response to Item 5 (visible attrition) and reported at least two additional positive responses. Conversely, individuals were classified into the AB group if they reported three or more affirmative responses alongside a negative response to Item 5.

This SB/AB subtyping represents a non-standard, questionnaire-based algorithm developed for the purposes of this study and should be interpreted as reflecting self-reported phenotypes rather than clinically or instrumentally confirmed SB or AB.

Personality assessment

Personality traits were assessed using the validated Polish adaptation of the NEO-FFI [12]. This 60-item self-report questionnaire measures five fundamental personality domains derived from factor analysis of Costa and McCrae's extended model. Responses were recorded on a five-point Likert scale (1 = "strongly disagree" to 5 = "strongly agree"). Domain scores were calculated by summing the relevant items, applying reverse-scoring where appropriate, yielding a theoretical range of 0–48 points per domain. Higher scores indicated greater intensity of the respective personality trait.

The five domains were defined as follows:

1. Neuroticism: A tendency to experience negative emotions (e.g., anxiety, anger), emotional instability, and low stress tolerance.
2. Extraversion: A propensity for social engagement, assertiveness, high activity levels, and positive emotionality.
3. Openness: Cognitive curiosity, receptivity to novelty, and an appreciation for aesthetic and intellectual experiences.

4. Agreeableness: An interpersonal orientation characterized by altruism, trust, and cooperativeness, as opposed to antagonism.
5. Conscientiousness: Goal-directed persistence, organization, self-discipline, and achievement motivation.

Sten scores were standardized to Polish norms (sex/age adjusted as provided by the test manual), with higher stens indicating a higher standing on the given trait. In all inferential analyses, personality traits were treated as continuous variables (per 1-sten change). Table I summarizes the sociodemographic characteristics of the study sample, whereas Table II presents the distribution of self-reported bruxism activity. Sociodemographic variables and self-reported bruxism measures were subsequently evaluated as candidate predictors in the logistic regression model.

Table I. Sociodemographic description of the study sample (n = 204)

Sociodemographics	Mean	SD
Age (years)	22.9	3.38
Age groups	N	%
18–24	163	80
25–30	36	18
31–40	5	2
Gender	N	%
Woman	150	74
Man	54	26

Table II. Description of the bruxing activity in the study sample (n = 204)

Anamnestic questionnaire regarding bruxing activity	Prevalence of affirmative respondents	
Self-report bruxism according to Baron [11]	N	%
1. Do you experience intermittent headaches, morning headaches, or morning discomfort?	111	54.4
2. Do you feel pain localized to the masticatory muscles and the temporomandibular joint during jaw movements (such as yawning or chewing)?	58	28.4
3. Do you experience clicking or popping in the temporomandibular joint (TMJ)?	78	38.2
4. Do you experience restricted jaw movement?	44	21.6

5. Have you noticed wear of your anterior teeth and canines?	47	23.0
Prevalence of self-reported bruxism	N	%
Non-bruxers (less than three affirmative items)	148	72.5
Bruxers (three or more affirmative items)	56	27.5
Type of self-reported bruxism	N	%
Non-bruxers	148	72.5
Awake bruxers (affirmative responses 3 or more and a negative response to item n° 5)	30	14.7
Sleep bruxers (affirmative responses 3 or more and a positive response to item n° 5)	26	12.8

Data analysis

Continuous variables (personality sten scores) were summarized as mean ± SD and compared across the three groups – non-bruxers, AB, and SB – using one-way ANOVA. Distributional assumptions were inspected by Shapiro–Wilk tests within groups and by visual diagnostics (histograms/density plots and Q–Q plots); homogeneity of variances was examined with Levene's test. When the omnibus ANOVA was significant, Tukey's HSD provided multiplicity-controlled post-hoc contrasts (family-wise $\alpha = 0.05$). For robustness to non-normality and unequal variances, a Welch ANOVA was performed with Games–Howell pairwise comparisons as sensitivity analyses. Effect sizes for omnibus tests are reported as eta-squared (η^2) with 95% CIs where appropriate.

To assess whether sociodemographic and personality variables predict bruxism status (bruxer vs non-bruxer), we fitted a binomial logistic regression with forward stepwise selection (AIC) from the intercept-only model. Candidate predictors were sex, age band and the five sten traits; bruxism subtype (awake/sleep) was not used as a predictor to avoid information leakage. Given the relatively modest number of bruxism cases (n = 56) in relation to the number of candidate predictors, the stepwise selection procedure may be susceptible to model instability and potential overfitting; therefore, the regression results should be interpreted as exploratory.

Results are presented as odds ratios (OR) per 1-sten increase with 95% Wald CIs and two-sided *p*-values. Model discrimination was summarized by the area under the ROC curve (AUC); calibration by the Hosmer-Lemeshow test using deciles of predicted risk; overall performance by McFadden's and Tjur's pseudo-R^2 and the Brier score. For interpretability, classification metrics are reported at the conventional 0.50 threshold and at the Youden-optimal threshold (maximizing sensitivity + specificity - 1). All analyses used R (R Foundation), significance was set at $\alpha = 0.05$.

RESULTS

The final dataset comprised N = 204 respondents, allocated to three mutually exclusive subgroups: non-bruxers (*n* = 148), AB (*n* = 30), and SB (*n* = 26). Table III presents the gender and age distribution across these subgroups.

A one-way ANOVA revealed a statistically significant difference between the groups only for the conscientiousness trait ($F(2,201) = 4.57$, $p = 0.011$, $\eta^2 = 0.044$), indicating a small-to-moderate effect size. Post-hoc analysis using Tukey's HSD indicated that the SB group had significantly lower conscientiousness scores compared to the non-bruxers (p = 0.0088). The difference between the SB and AB groups was of borderline significance (p = 0.0506), while no difference was observed between AB and non-bruxers (p = 0.9997). No other personality traits showed significant group effects.

A sensitivity analysis using Welch ANOVA and Games-Howell pairwise comparisons was performed to ensure robustness against potential assumption violations. This analysis confirmed the initial findings (Welch ANOVA: $F(2,49.11) = 5.07$, $p = 0.010$ Games-Howell: SB vs. non-bruxers, $p = 0.0088$; SB vs. AB, $p = 0.0418$; AB vs. non-bruxers, $p = 0.9997$) (Table IV).

Binomial logistic regression with forward stepwise selection (AIC) was performed to identify factors associated with bruxism status (bruxer vs. non-bruxer). The final model comprised two variables: conscientiousness and sex (Table V). A one-sten increase in conscientiousness was associated with lower odds of being a bruxer (OR = 0.87, 95% CI: 0.76 to 1.00, p = 0.051), although this association did not reach conventional statistical significance and should be interpreted as borderline. Male sex showed a non-significant association with reduced odds of bruxism compared to female sex (OR = 0.57, 95% CI: 0.27 to 1.21, p = 0.141). Age bands and the other four personality traits (neuroticism, extraversion, openness, and agreeableness) were not retained as significant predictors by the selection algorithm. The overall predictive performance of the final model was modest.

Table III. Sample characteristics by group

	Non-bruxers (n = 148)		Awake bruxers (n = 30)		Sleep bruxers (n = 26)	
	Man (n = 43)	Woman (n = 105)	Man (n = 5)	Woman (n = 25)	Man (n = 6)	Woman (n = 20)
18–24	33	88	5	19	2	16
25–30	9	15	0	6	3	3
31–40	1	2	0	0	1	1

Table IV. Personality traits (sten scores) by bruxism subgroups

Trait	Non-bruxers (n = 148)		Awake bruxism (n = 30)		Sleep bruxism (n = 26)	
	Mean	SD	Mean	SD	Mean	SD
Neuroticism (a)	5.30	2.59	5.60	2.33	6.27	2.66
Extraversion (a)	5.36	1.90	5.20	2.16	4.38	2.33
Openness (a)	5.37	1.96	5.40	1.77	5.85	2.38
Agreeableness (a)	5.93	2.29	5.80	2.48	5.54	2.67
Conscientiousness (a/ab/b) †	7.21	2.24	7.20	2.12	5.81	2.06

† Statistically significant inter-group comparisons according to ANOVA test ($p < 0.05$)

(a, ab, b) These letters besides the symbol † indicate the subgroups (a – non-bruxers; ab – awake-bruxers; b – sleep-bruxers). Subgroups sharing at least one letter do not differ, whereas different letters denote a significant Tukey-adjusted pairwise difference.

Table V. Logistic regression model (forward stepwise) for predicting the risk of being classified as bruxer after including all the potential predictors (sociodemographic and personality-related)

Parameter	β	p-value	OR	CI-95% OR	
				(Lower)	(Upper)
Conscientiousness (per 1 sten)	−0.14	0.051	0.87	0.76	1.00
Sex: Male vs Female	−0.57	0.141	0.57	0.27	1.21

In summary, the analyses suggested that lower conscientiousness was the most consistently observed personality trait associated with bruxism in this cohort. This association was particularly evident in the SB subgroup, as supported by the ANOVA with post-hoc tests and a directionally consistent, though borderline, effect in the multivariate model.

DISCUSSION

This study identified a significant inverse association between conscientiousness and bruxism, which was particularly robust and specific to the SB subtype in a cohort of medical students. While the pattern observed in the multivariate regression was directionally consistent with the group comparisons, the regression coefficient for conscientiousness reached only borderline significance. Therefore, lower conscientiousness should not be interpreted as a confirmed independent predictor, but rather as a trait showing a consistent signal across analyses in this exploratory context. However, given the cross-sectional design and exploratory analytic framework, these findings should be interpreted as hypothesis-generating rather than confirmatory. Our findings partially align with previous research, such as the study by Montero and Gómez-Polo [10], who also reported lower conscientiousness in self-reported bruxers. However, our study adds a crucial nuance by demonstrating that this relationship is driven primarily by the SB subgroup, while the AB profile was indistinguishable from that of non-bruxers. This distinction supports the growing consensus that AB and SB have different pathophysiological and psychological underpinnings [3]. While existing literature often links psychosocial factors predominantly to AB [13], our findings highlight a crucial distinction for SB. This discrepancy suggests that the link between personality and SB may be explained not by broad psychopathology but by behaviors influencing sleep quality and autonomic nervous system function. The specificity of the association to SB points towards processes related to sleep arousal and autonomic nervous system regulation [14]. It is plausible that individuals with lower conscientiousness, potentially exhibiting poorer stress management and less regular sleep-wake cycles, experience heightened autonomic reactivity during sleep [15]. This, in turn, could facilitate the micro-arousals and increased masticatory muscle activity characteristic of SB [16]. This potential pathway is supported by the findings of Duggan et al. [17], who demonstrated that low conscientiousness was one of the strongest personality predictors of poor sleep quality in their study. Thus, our results lend indirect support to the contemporary model of bruxism as a predominantly centrally regulated phenomenon [6], by identifying a psychological factor specifically associated with its sleep subtype. The exact nature of this relationship, whether personality modulates central nervous system reactivity directly or through behavioral pathways, remains to be elucidated.

Notably, we found no significant link between neuroticism and bruxism, contrasting with previous general-population studies [10,18,19]. This divergence may be attributed to the unique characteristics of our cohort. Studies have shown that medical students experience high levels of chronic academic stress [20], making elevated perceived stress a common baseline experience for many individuals in this population. In such a relatively homogeneous high-stress environment,

neuroticism may lose its discriminatory power as a differentiating factor for bruxism. Instead, the critical vulnerability factor may shift to an individual's capacity for stress management and adaptive coping - domains more closely aligned with conscientiousness. However, it is important to emphasize that the association between conscientiousness and bruxism in the logistic regression model was only borderline significant ($p = 0.051$). Given the exploratory nature of the stepwise selection procedure and the relatively small number of bruxism cases ($n = 56$), these findings should be interpreted with caution. They represent a signal warranting further investigation rather than a definitive conclusion. Replication in larger, preferably longitudinal cohorts incorporating objective bruxism assessment is necessary before lower conscientiousness can be considered a reliable risk indicator for SB. Consequently, in this specific context, lower conscientiousness – potentially manifesting as poorer organization, self-discipline, and ability to maintain healthy routines – may tentatively be considered a factor of interest in relation to stress-related somatic manifestations such as SB [21].

This study has several limitations that should be considered when interpreting the results. A key limitation is the dependence on self-reported measures for bruxism classification, which may be influenced by participants' subjective interpretation of symptoms. Consequently, it must be reiterated that all subgroups assignments reflect self-reported phenotypes and do not correspond to clinically or instrumentally verified sleep or AB – a distinction that should remain central to the interpretation of the present findings. While the medical background of our cohort might have potentially improved the accuracy of self-reporting, this method remains susceptible to bias and cannot replace objective verification. Recent studies comparing self-report with real-time EMA have shown only weak to moderate correlations for AB behaviors, suggesting that individuals may not fully recall the frequency or type of their oral behaviors [4]. It should be noted that EMA also relies on self-report, but its repeated, real-time design reduces recall bias compared to retrospective questionnaires. Interestingly, a six month EMA study reported that the frequency of self-reported AB remained relatively stable over time in healthy young adults, which may suggest some degree of consistency in self-report [5]. This further underlines the need for complementary objective or intensive longitudinal approaches in future research. Furthermore, the specific classification of participants into SB and AB subgroups was based on a non-standardized version of Baron questionnaire [11]. These criteria have not been independently validated for distinguishing between bruxism subtypes. This introduces an additional layer of uncertainty, as the assignment to SB or AB may not fully align with clinically or instrumentally confirmed diagnosis. This common constraint in bruxism research underscores the need for future studies to incorporate clinical or instrumental measures. The relatively small sample size, particularly in the bruxism subgroups ($n =$

26 for SB, n = 30 for AB), limited the statistical power of the analyses. This may have increased the risk of errors, potentially explaining why significant associations were not detected for other personality traits that showed marginal differences. Furthermore, the use of a convenience sample comprising medical students from a single university limits the generalizability of our findings to other populations, such as non-students or the general population. While this sampling approach is suitable for exploring potential associations and generating hypotheses for future research, it is not representative of the general population. Therefore, all reported associations and results should be interpreted with caution.

These findings highlight the importance of a holistic approach to bruxism management, integrating psychological and behavioral factors alongside traditional interventions. While this epidemiological study does not address clinical diagnosis or treatment, its results suggest that in high-stress academic environments, self-regulation and conscientiousness – reflected in organization, sleep hygiene, and stress coping – may be more relevant to SB than generalized anxiety or occlusal factors. Therefore, holistic management of students with suspected bruxism could benefit from addressing these behavioral domains. Importantly, the NEO-FFI should not be used as a screening tool for SB, nor should personality assessment be considered a diagnostic substitute for clinical or instrumental evaluation, as this would overinterpret the data. Future longitudinal studies with objective bruxism measures in larger, more diverse populations are needed to confirm the relationship between personality traits and bruxism onset. Furthermore, research exploring the efficacy of interventions targeting stress management and self-regulatory skills in reducing bruxism activity would be of significant clinical value.

CONCLUSIONS

Within this specific cohort of medical students, lower levels of conscientiousness were the only personality trait showing a statistically significant group difference in relation to self-reported SB. Notably, the personality profile of AB appeared indistinguishable from that of non-bruxers, tentatively suggesting that the association with conscientiousness may be more specific to the sleep subtype in this population. It is important to note, however, that the logistic regression results revealed only a borderline significant association for conscientiousness ($p \approx 0.05$), and the overall predictive performance of the model was modest. Therefore, these findings should be treated as hypothesis-generating. The observed association may be related to less effective stress management and poorer sleep hygiene practices associated with lower conscientiousness. While these results contribute to the growing body of evidence highlighting the role of psychological factors in bruxism, moving beyond the historical focus on morphological causes, they should be

interpreted cautiously and considered preliminary. Future research with objective diagnostic measures and longitudinal designs is warranted to confirm these associations and explore their underlying mechanisms.

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Conflict of interest

The authors declare no conflict of interest.

Authors' contribution

Study design – S. Baron
Data collection – W. Galińska, W. Kukla, J. Jakimów
Data interpretation – W. Galińska
Statistical analysis – D. Owczarczyk
Manuscript preparation – W. Galińska, W. Kukla, D. Owczarczyk
Literature research – W. Galińska, W. Kukla

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