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Research Paper

Cognitive Overload and Trait Food Craving as Predictors of Binge-Eating Tendencies in University Students

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ABSTRACT

Binge eating tendencies among university students is linked to academic stress to maladaptive eating patterns. This cross-sectional study examined cognitive overload and trait food craving as predictors of binge eating tendencies among Indian university students (N=253: 73.1% female, aged 18-25) using standardized self-report measures. Trait food craving and binge eating tendencies showed a strong positive correlation ($\rho = .578$, $p < .01$) Multiple regression indicated that trait food craving significantly predicted binge eating tendencies ($\beta = .57$, $p < .001$), while cognitive overload emerged as a small negative predictor ($\beta = -.12$, $p = .023$). Moderation analysis established that cognitive overload reduced the craving-binge eating relationship at higher load levels ($B = -0.005$, $p = .019$). Findings establish craving management and emotional regulation as major interventions.

Keywords: *Cognitive Overload, Eating Behavior, Trait Food Craving, Binge-Eating Tendencies, Academic Stress*

Disinhibited eating behaviors like binge eating tendencies can be understood through few psychological processes including trait food craving and cognitive overload. These factors are often witnessed among university students, a population well versed with operating under heavy social and academic demands. Within the Indian context, these pressures are further intensified by rising academic competition and expectations, leaving students vulnerable to maladaptive coping patterns. Subclinical binge eating tendencies are especially prevalent within this demographic, which may act as precursors to clinical pathology (Prunell-Castañé et al., 2021).

Binge eating tendencies are characterized by patterns of excessive consumption of food, usually within a discrete period of time and at quantities more than what an average individual may be able to consume, accompanied by a perceived loss of control which may lead to distress and anxiety (Benzerouk et al., 2020). At a subclinical level, such behaviors may be better reflected in emotional eating and grazing often as a response to certain internal or external cues (Huff, 2020). Within the student population, these behaviors are

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often linked to irregular eating patterns such as skipping meals, stress or emotional eating with food acting as a maladaptive coping mechanism (Shatwan & Alzharani, 2024).

The present study investigated the interactions of perceived cognitive overload and dispositional food craving jointly contribute to binge eating tendencies among Indian university students. While these two variables have been associated independently with dysregulated eating behavior, their combined effects upon individuals within a single framework are less explored, especially in a non-Western population.

Hart & Staveland (1988) describe cognitive overload as a subjective experience of mental strain emerging from a combination of task and environmental demands against the individual's unique capacity. This construct based off of Sweller (1988)'s cognitive load theory, is often described as a state wherein the individual's limited cognitive resources are exhausted, leading to difficulties in further executive decision-making processes (Paas et al., 2003). This difficulty in the efficient functioning of mental processes, as per the Dual-Process Theory, leads to the dominance of the mind's impulsive system that favors impulsive and automatic processes that are either habitual or provide instant gratification (Hofmann et al., 2009). This framework is often utilized to reason that individuals operating under high cognitive load may become more susceptible to appetitive impulses.

Trait food craving on the other hand refers to the stable, inherent individual disposition towards experiencing frequent and intense desires to consume specific and often highly palatable foods across time and contexts (Cepeda-Benito et al., 2000). Unlike state-level craving, which is situationally triggered and transient, trait craving reflects an enduring vulnerability that has been consistently associated with disinhibited eating patterns, including binge eating (Meule & Kübler, 2012; Zorjan et al., 2025). The Elaborated Intrusion Theory of Desire by Kavanagh et al. (2005) posits a mechanism wherein cravings arise as a consequence of elaborated vivid mental imagery, intensifying the motivational state of a person and utilizing increasing levels of working memory (Morris, 2020). The continuous cognitive engagement with food-related fantasies may further increase the occurrence of behavioral enactment due to the conscious, top-down cognitive process of mental rehearsal especially when regulatory resources are limited (Meule & Kübler, 2014).

Together, while these frameworks suggest that while trait food craving may act as a stable factor in determining levels of binge eating tendencies, its translation into behavior may depend upon the availability of mental resources because under conditions of higher cognitive load an individual may be less able to inhibit craving driven urges (Meule & Kübler, 2014). However, a diverse group of literature also suggest a mechanism providing the opposite outcome, wherein, under cognitive overload an individual may be unable to allocate the attentional resources to process and act upon the food-related cues around them (Morris, 2020). These two mechanisms collaboratively imply towards a more situation specific role of cognitive overload in inducing binge eating tendencies.

The interaction between cognitive overload and trait food craving is particularly prominent within Indian population, with higher reports of persistent cognitive strain (Shravanthi et al., 2025). Despite this, studies based on the relationship of cognitive load and trait craving jointly remain sparse.

METHODOLOGY

Design

The present study employed a quantitative, cross-sectional, correlational research design to examine the relationships between perceived cognitive overload, trait food craving and binge eating tendencies among university students. The study collected data between March to April 2026 using self-report questionnaires administered through an online survey format. The hypotheses and the plan for analyses were developed prior to data collection on the basis of the theoretical frameworks outlined in the Introduction.

The target sample size was set at approximately 250 participants to ensure adequate statistical power for detecting interaction effects in moderation analyses. Recommendations for the same indicate larger samples (e.g., $N \geq 200$) are required to detect small to moderate interaction effects (Hayes, 2022). The final sample ($N = 253$) therefore meets this criterion and was considered sufficient for the planned analysis. Demographic details such as name, age, gender and institution they are enrolled in at the moment of data collection were collected.

IBM SPSS Statistical Software (Ver. 27) was utilized to conduct analyses that assess the distribution of the data, which suggested significant deviations from normality ($p < .05$) leading to the subsequent use of non-parametric statistical analysis.

Spearman's rank-order correlation was used to examine the relationships among the variables, along with regression analyses that were conducted to assess the predictive effects of cognitive overload and trait food craving on binge eating tendencies. Additionally, moderation analysis was performed using PROCESS macro (Model 1) to examine whether cognitive overload moderates the relationship between trait food craving and binge eating tendencies. Mean-centering and bootstrapping procedures were applied to estimate interaction effects and reduce multicollinearity. The level of significance was set at $p < .05$.

Objectives

1. To evaluate perceived cognitive overload as a predictor of binge eating tendencies.
2. To assess the predictive utility of trait food craving for binge eating tendencies.
3. To examine whether cognitive overload moderates the association between trait food craving and binge eating tendencies.

Hypothesis

1. Trait food craving will significantly predict binge eating tendencies.
2. Cognitive overload will significantly predict binge eating tendencies.
3. Cognitive overload will moderate the relationship between trait food craving and binge eating tendencies.

Participants

A total of 260 responses were initially received. 7 responses were excluded owing to inconsistent or incomplete data, resulting in a final sample data of 253 participants, which comprised of responses from 185 identifying as female, 66 male and 2 identifying non-binary from within the age group of 18–25 years ($M = 22.11$, $SD = 1.61$).

Recruitment occurred randomly across the various universities in India through the use of social media platforms, student forums and direct outreach.

Only the responses collected from individuals who met the set inclusion criteria were utilized in the following data analyses. The inclusion criteria requiring participants to be (a) aged between 18–25 years old, (b) enrolled within a university program (in India) and (c) a resident of India.

Voluntary participation and informed consent were ensured prior to data collection. Although identifying information (name, age and institution) was collected for academic record purposes, all data was anonymized prior to analysis.

Measures

Three measures were used in this study,

1. **National Aeronautics and Space Administration Task Load Index** or known as NASA-TLX for short (Hart & Staveland, 1988) for Perceived Cognitive Overload assessed perceived cognitive overload. It is a 6-item multidimensional measure of subjective workload, evaluating 6 dimensions including: mental, physical, temporal demands in addition to performance, effort and frustration. Participants were instructed to respond to the items based on their typical academic activities such as completing coursework, attending classes and studying. Responses exist on a continuous scale, with higher scores indicating a higher perceived cognitive load. In the present study, the scale demonstrated an acceptable internal consistency (α = .779).
2. **Food Cravings Questionnaire – Trait – reduced (FCQ-T-r)** (Meule et al., 2014) for Trait Food Craving. This 15-item scale is scored along a 6-point Likert scale ranging from '1 (never/not applicable)' to '6 (always)', assessing the general tendency of experiencing food cravings. Higher scores indicate greater levels of food craving. In this present study, the Food Craving Questionnaire – Trait – reduced demonstrated excellent internal consistency (α = .935).
3. **Binge Eating Scale** (Gormally et al., 1982) measured binge eating tendencies. It is a 16-item self-report designed to examine the emotional and behavioral components of binge eating. The scale consists of a set of statements, from which the best suiting option is selected as per the participant's experience. Higher scores indicate greater levels of binge eating behaviors. In the present study, the scale demonstrated excellent internal consistency (α = .922).

Variables

- Dependent Variable: Binge Eating Tendencies
- Independent Variable: Trait Food Craving
- Moderating Variable: Cognitive Overload

Procedure

The study used an online survey administered via Google Forms for data collection. The link was distributed to the sample population through multiple channels including social media platforms, student groups, and direct communication.

To minimize potential sources of bias, participation was voluntary and informed consent was obtained prior to data collection. Although identifying information (e.g., name and institutional affiliation) was collected for administrative purposes, the self-report method was utilized to select their gender identity, from predefined categories (male, female, and non-binary). All data was anonymized prior to analysis. Standardized and validated

instruments were used, and instructions were kept consistent across participants, with the complete form taking up to 10 minutes to complete. Responses were screened for completeness and plausibility prior to analysis, and entries not meeting inclusion criteria or demonstrating inconsistent responding were excluded. Adequate encouragement was provided to participants to provide honest responses based on their experiences.

RESULTS

Demographics and Preliminary Analyses

The final sample consisted of 253 valid responses (73.1% female, 26.1% male and 0.8% non-binary), with a standard deviation of 1.61 (SD = 1.61) and a mean age of 22.

Descriptive statistics and internal consistency coefficients for all study variables are listed in Table 1. All scales demonstrated acceptable to excellent reliability (α = .779–.935). Normality testing was performed, which were indicative of significant deviations ($p < .05$), indicating the need to use non-parametric analysis.

Table No. 1 Descriptive Statistics and Internal Consistency of Study Variables

Variable	M	SD	α
Cognitive Overload	62.49	17.66	.779
Trait Food Craving	43.08	14.88	.935
Binge Eating Tendencies	10.82	9.41	.922

Spearman's Rank Order Correlation

Spearman's correlations among the three study variables are present in Table 2. Trait food craving was positively and significantly correlated with binge eating tendencies ($r_s = .578$, $p < .001$). Cognitive overload was found to be not significantly correlated with trait food craving ($r_s = .048$, $p > .05$) or binge eating tendencies ($r_s = −.019$, $p > .05$).

Table No. 2 Spearman's Rank-Order Correlations Among Study Variables

	1	2	3
1. Cognitive Overload	-		
2. Trait Food Craving	.048	-	
3. Binge Eating Tendencies	−.019	.578*	-

Multiple Regression Analysis

Findings from the multiple regression analysis are present in Table 3. The overall model was significant ($F(2, 250) = 62.74$, $p < .001$), accounting for 33.4% of variance in binge eating tendencies ($R^2 = .334$). Trait food craving was found to positively and significantly predict binge eating tendencies ($B = 0.362$, $t = 11.080$, $p < .001$, $\beta = .573$), whereas cognitive overload was found to significantly and negatively predict binge eating tendencies among university students ($B = −0.063$, $t = −2.286$, $p = .023$, $\beta = −.118$).

Table No. 3 Multiple Regression Predicting Binge Eating Tendencies

Predictor	B	SE	β	t	p
Constant	−0.836	2.212	-	−0.378	.706
TLX Scores	−0.063	0.028	−.118	−2.286	.023
FCQ Scores	0.362	0.033	.573	11.080	< .001

Note. $R^2 = .334$, $F(2, 250) = 62.74$, $p < .001$.

Moderation Analysis

Results of the moderation analysis are present in Table 4. The interaction between trait food craving and cognitive overload was significant (B = −0.005, t = −2.36, p = .019), indicating that cognitive overload moderated the relationship between trait food craving and binge eating tendencies. Additionally, the negative interaction coefficient suggests that higher levels of cognitive overload weaken the positive association between trait food craving and binge eating tendencies.

Table No. 4 Moderation Analysis of TLX on the Relationship Between FCQ and BES

Predictor	B	SE	t	p
Constant	10.9	0.48	22.65	< .001
Trait Food Craving (X)	0.37	0.03	11.42	< .001
Cognitive Overload (W)	−0.07	0.03	−2.41	.017
Interaction (X × W)	−0.005	0.002	−2.36	.019

Note. $\Delta R^2 = .015$, $F(1, 249) = 5.58$, $p = .019$. N = 253. Variables were mean-centered prior to analysis. PROCESS macro (Model 1; Hayes, 2022) was utilized for the moderation analysis.

DISCUSSION

The present study aimed to examine the roles of perceived cognitive overload and trait food craving in predicting binge eating tendencies among university students along with the moderating effect of cognitive overload in this relationship. The results indicate that while trait food craving is a strong and stable predictor of binge eating tendencies, cognitive overload is more context dependent where while it doesn't directly correlate with binge eating tendencies, it did emerge as a small but significant negative predictor for it, suggesting higher levels of cognitive overload were related with lower levels of binge eating tendencies. The findings diverge from the commonly held belief that increased cognitive exhaustion may lead to poorer inhibition and in turn greater impulsivity.

One possible explanation for these findings may be that cognitive load may function as an attentional constraint rather than a self-regulatory failure (Morris, 2020). According to this reasoning, a higher cognitive load may lead to insufficient amounts of attentional resources being allocated to process and act upon cues and cravings as large amounts of cognitive resources are delegated to the task related processes instead (Paas et al., 2003). As a result, individuals in this condition may simply not be able to respond to the stimuli leading to a drop in binge eating behavior (Ward & Mann, 2000). This understanding aligns with the view of cognitive overload acting as an attentional focus and limiting responsiveness to unrelated stimuli (Morris, 2020).

These findings exert the importance of approaching cognitive load as a contextual variable that affects how cravings are expressed in action, sometimes impairing self-regulation and sometimes restricting the processing of non-task relevant stimuli (Ward & Mann, 2000).

Overall, the study contributes by enhancing the understanding of binge eating tendencies and the psychological factors that may influence them to some capacity depending on contextual situations. While trait food craving emerged as a strong predictor of binge eating tendencies, cognitive overload stood out as a small but significant negative predictor of

binge eating tendencies along with playing a moderating role in between trait food craving and binge eating tendencies.

CONCLUSION

To conclude, the present study highlights the strong predictive role of trait food craving in determining binge eating tendencies among university students, while cognitive overload demonstrates a more complex and contextual relationship. While, cognitive overload did not directly influence binge eating, it significantly moderated the craving-binge eating relationship by weakening it when cognitive overload is at higher levels.

Limitations

The findings of the study may be interpreted with certain notes of caution as the study utilizes self-report measures for the examination of all three variables which may introduce bias and may introduce scope for misunderstanding or selective interpretation of items and instructions. Furthermore, this study's sample consisted of young adult university students, restricting generalizability. Additionally, the uneven gender distribution in the sample limited the ability to examine potential gender differences in binge eating tendencies and related variables.

Implications

Interventions for binge eating and weight loss may benefit from the findings of this study, enhancing the understanding of the benefits of targeting food craving and cue-reactivity rather than plain self-control. While at university level, settings of food consumption and availability may require changes to reduce exposure to unhealthy cues, including strategies inspired by choice architecture that would nudge individuals towards more balanced choices without impeding autonomy.

Statement of Declarations

No external funding was received for the conduction and preparation of this study. The authors declare no known conflict of interest in relation to this study.

Ethics Declaration

Prior to participation, all participants were provided with information about the purpose and nature of the study and were informed that their participation was voluntary. Informed consent was obtained electronically through a mandatory consent item presented before the study questionnaires and only participants who indicated their consent were able to proceed to the questionnaires.

Limited identifying and demographic information, including participants' names, age, gender, university affiliation, and email addresses, was collected to characterize the study sample and to help identify duplicate or potentially invalid responses. These identifiers were removed from the dataset used for analysis, and the data were analyzed in this form. Participant information and research data were handled confidentially and used solely for research purposes.

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Conflict of Interest

The author declared no conflict of interests.

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APPENDIX

Descriptional Statistics and Correlational Matrix

Table 5: Mean, Standard Deviations and Spearman's Rank-Order Correlations Among Study Variables

	M	**SD**	**1**	**2**	**3**
1. Cognitive Overload	62.49	17.66	-		
2. Trait Food Craving	43.08	14.88	0.048	-	
3. Binge Eating Tendencies	10.82	9.41	−.019	.578*	-

Note. N = 253. Spearman's rho (r_s) reported. *p < .001.