

Flavor Matters: How Stress-Driven Cravings Shape Emotional Coping Through Food

Zimo Huang

*Shanghai Leighton School, Shanghai, China
melodyzimo@163.com*

Abstract. Stress often alters eating behaviors, prompting shifts in flavor preferences that may serve as emotional coping strategies. This study explored the relationship between stress-induced flavor cravings and emotional eating in a general, non-clinical population. Using a cross-sectional survey, participants reported their usual eating habits, preferred flavors, and behavioral changes under stress. Analysis revealed that stress-driven flavor cravings were significantly associated with differences in emotional eating tendencies. Individuals with sweet, spicy, or sour cravings were more likely to report using food for stress relief, while those without specific cravings tended to maintain stable eating patterns and exhibit minimal emotional change after eating. Interpreted through an integrated biological, psychological, and cultural lens, including insights from Traditional Chinese Medicine linking flavors to organ systems and emotional states, the findings suggest that flavor preference can serve as both a marker and mediator of stress-coping behaviors. These results may inform culturally attuned and accessible strategies for supporting emotional regulation and public health.

Keywords: stress-related eating, emotional regulation, flavor cravings

1. Introduction

Stress and emotional dysregulation are common challenges across diverse demographic groups, including students, working professionals, and retirees. A frequent behavioral response to stress is emotional eating—defined as the increased consumption of palatable, energy-dense foods during periods of emotional distress [1,2]. Although such eating patterns may provide short-term comfort, they are associated with potential long-term health risks [1]. Physiologically, stress activates the hypothalamic–pituitary–adrenal (HPA) axis, increasing cortisol and neuropeptide Y levels, which in turn heighten appetite and reward sensitivity, particularly for foods high in sugar and fat [1,3]. Acute psychological stress has also been shown to attenuate the perception of sweet, sour, and salty tastes [4,5], potentially prompting individuals to seek more intense flavors as compensation. Over time, chronic stress can shift flavor preferences toward sweet, fatty, or salty foods [1]. Evidence from animal studies and neuroimaging suggests that stress reduces prefrontal cognitive control while enhancing reward circuitry activity, further reinforcing the consumption of highly flavored foods.

From a cultural perspective, Traditional Chinese Medicine (TCM) regards the five basic flavors—sour, bitter, sweet, pungent, and salty—as interconnected with specific organ systems and

emotional states. Although empirical research directly linking TCM theory to stress-related eating behaviors is limited, this framework offers a valuable perspective for interpreting flavor preferences under stress. While prior studies have documented stress-induced eating patterns in certain subpopulations such as adolescents or individuals with clinical conditions, little is known about how stress influences taste preferences in a general, non-clinical population.

The present study aims to address this gap by examining associations between self-reported stress and preferences for basic taste profiles in the general population, assessing whether higher stress levels are associated with increased or decreased liking for specific flavors, and interpreting these findings through an integrated biological, psychological, and cultural lens. By considering taste preference as a behavioral marker of stress, this study seeks to inform accessible and culturally sensitive strategies for emotional regulation and public health intervention.

2. Methods

2.1. Study design and participants

This study employed a cross-sectional survey design to examine the relationship between stress, flavor cravings, and emotional eating behaviors in a general population sample. Participants were recruited online and completed an anonymous self-administered questionnaire. A total of $N = 83$ valid responses were collected. The questionnaire comprised 30 structured items designed to assess respondents' usual eating habits, flavor preferences, emotional motivations, and changes in eating behaviors under stress.

2.2. Data analysis

Data were analyzed using Python. Descriptive statistics were computed for all survey items, both overall and stratified by flavor-craving group. The primary analysis examined the association between stress-related flavor cravings (Q19) and the tendency to eat to relieve stress (Q23) using a chi-square test of independence, with Cramér's V calculated to quantify effect size. When the chi-square result was statistically significant, post-hoc analyses were conducted using standardized residuals and Bonferroni-adjusted pairwise comparisons to identify which flavor-craving groups contributed most to the observed association. Secondary analyses explored differences between flavor-craving groups in other behavioral and emotional outcomes, including changes in eating frequency (Q21), primary eating motivations (Q15), appetite changes (Q27), deviations from usual eating habits (Q26), and emotional outcomes after eating (Q24). Emotional outcome categories included "Improved," "No change," and "Guilt/negative emotion," enabling direct comparison of post-consumption mood changes across groups. For these comparisons, the Kruskal–Wallis test was applied to ordinal outcomes, followed by Dunn's post-hoc test where appropriate. All categorical variables were summarized as counts and percentages. All statistical tests were two-tailed, with statistical significance defined as $p < 0.05$.

3. Results

A chi-square test revealed a statistically significant association between the flavor most craved during high stress (Q19) and the tendency to eat to relieve stress (Q23) ($\chi^2 = 56.65$, $p = 0.0023$), indicating that individuals with different flavor cravings exhibit distinct emotional coping behaviors through food (Fig. 1B). To further explore which groups contributed most to this association, we

conducted subgroup descriptive analyses for each flavor-craving category, incorporating broader stress-related eating patterns (Fig. 1–3).

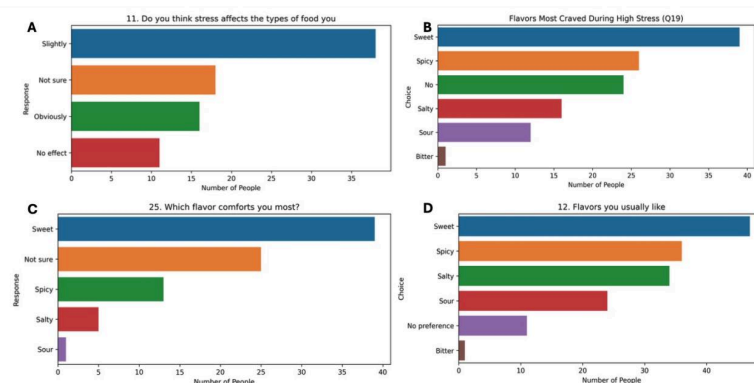


Figure 1. Impact of stress on food preference and flavor craving patterns

(A) Participants' perception of whether stress affects the types of food they choose. (B) Flavors most craved during periods of high stress. (C) Flavors that provide the most comfort when feeling stressed. (D) Flavors participants usually prefer in general. The bar lengths represent the number of respondents selecting each option.

Among participants who reported sweet cravings during stress ($n = 39$), emotional and hedonic motives for eating were prominently observed. A substantial 79.5% (31/39) reported eating to relieve stress either occasionally or often (Fig. 1B), and 48.7% (19/39) reported increased eating frequency under stress (Fig. 2C). Eating motivations were primarily driven by taste ($n = 5$), habit ($n = 5$), or a combination thereof, while few cited nutrition alone as their main reason (Fig. 2B). Moreover, usual flavor preferences (Fig. 1A) aligned closely with their stress cravings. Notably, 66.7% (26/39) reported feeling slightly or significantly better emotionally, whereas 15.4% (6/39) reported feelings of guilt (Fig. 3). These results support the interpretation that sweet cravers commonly use food for emotional self-soothing during stress.

Participants who craved spicy foods under stress ($n = 26$) similarly demonstrated food-based emotional regulation. A total of 88.5% (23/26) reported using food to relieve stress occasionally or often (Fig. 1B), and 65.4% (17/26) reported eating more frequently under stress (Fig. 2C). Interestingly, 38.5% (10/26) indicated abandoning their usual eating habits (Fig. 4C), a rate higher than that observed in sweet cravers. Emotional outcomes post-consumption were largely positive, with 69.2% (18/26) reporting improved mood, and 15.4% (4/26) experiencing guilt (Fig. 3). These results suggest spicy cravings are linked not only to emotional coping but also to more pronounced disruptions in routine eating behavior under stress.

Though fewer in number, sour cravers ($n = 12$) showed distinct behavioral characteristics. Emotional eating was prevalent, with 83.3% (10/12) indicating they ate to relieve stress occasionally or often (Fig. 1B), and 58.3% (7/12) reporting increased eating frequency (Fig. 2C).

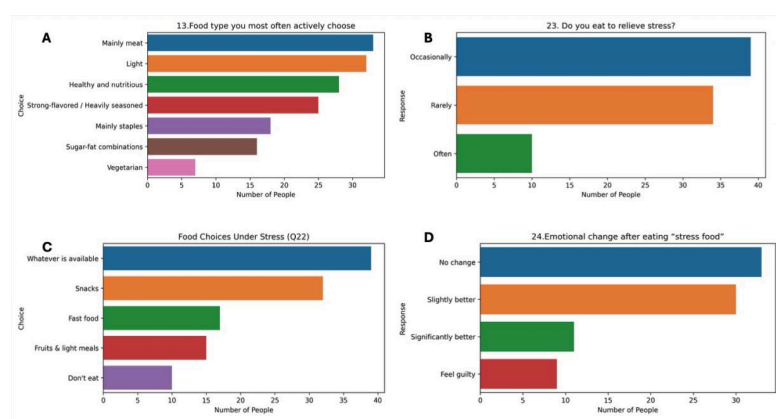


Figure 2. Food choices, eating behavior, and emotional responses under stress

(A) Types of food participants most often actively choose in general. (B) Frequency of eating to relieve stress. (C) Food choices made specifically during periods of high stress. (D) Self-reported emotional changes after consuming “stress food.”

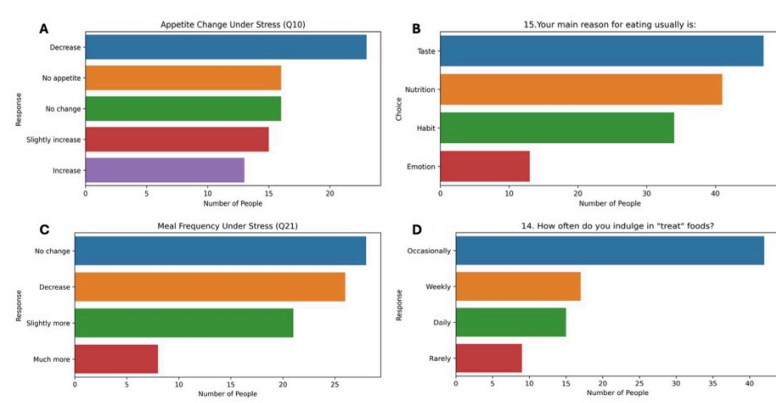


Figure 3. Appetite, eating motivation, and meal patterns under stress

(A) Self-reported changes in appetite during periods of high stress. (B) Main reasons for eating under normal circumstances. (C) Changes in meal frequency when under stress. (D) Frequency of indulging in “treat” foods.

Most retained consistent eating patterns, with 75% (9/12) stating they did not abandon their usual habits (Fig. 4C). Post-eating emotional states were largely positive: 75% (9/12) reported emotional improvement, and only one respondent reported guilt (Fig. 3). These findings suggest sour cravings may reflect a targeted and less conflicted emotional coping mechanism.

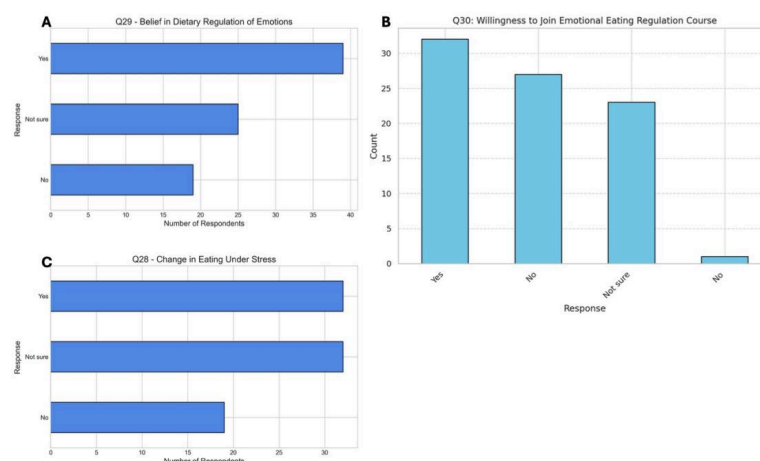


Figure 4. Perceptions of emotional eating and willingness to engage in regulation strategies

(A) Belief in the role of dietary choices in regulating emotions. (B) Willingness to participate in a course on emotional eating regulation. (C) Self-reported changes in eating behavior under stress.

Respondents who selected “No” for stress-related flavor cravings ($n = 23$) presented a markedly different profile. A dominant 87.0% (20/23) reported rarely eating to relieve stress (Fig. 1B), and only one participant reported eating more under stress (Fig. 2C). Appetite loss was common (43.5%, 10/23; Fig. 2A), while 60.9% (14/23) reported no change in eating frequency. Emotional shifts after eating were minimal: 87.0% (20/23) reported no emotional change, and none reported guilt or emotional relief (Fig. 3). In terms of motivations, 56.5% (13/23) cited nutrition or habit as the primary reasons for eating (Fig. 2B), and 39.1% (9/23) indicated no flavor preference under normal conditions (Fig. 1A). This group thus appears to maintain a stable, regulated eating pattern and likely engages alternative strategies—beyond food—for managing stress.

Finally, general perceptions regarding emotional eating regulation further contextualize these subgroup findings. Overall, 68.4% believed diet could regulate emotions (Fig. 4A), and 55.2% reported observable changes in eating behavior under stress (Fig. 4C). Notably, 41.0% expressed willingness to join an emotional eating regulation course (Fig. 4B), highlighting openness to structured behavioral interventions. These patterns reinforce that stress-related eating behaviors are both flavor-specific and modifiable, with implications for targeted dietary and psychological support strategies.

4. Discussion

This study found distinct behavioral and emotional patterns in individuals with different flavor cravings under stress. Sweet cravers displayed the strongest emotional eating tendencies, consistent with research showing that stress increases reward sensitivity and reduces cognitive control. While some found emotional relief through stress eating, others experienced guilt, likely due to awareness of the unhealthy nature of sweet foods. Spicy cravers showed similar emotional eating behaviors but were more willing to alter their eating patterns. In Traditional Chinese Medicine (TCM), spicy flavors are linked to internal heat and disruption, which may mirror the emotional turmoil of stress and explain the group's ambivalence.

Sour cravers, in contrast, demonstrated greater emotional stability and lower guilt. In TCM, sourness is associated with liver regulation and self-control, which may explain the group's resilience. Participants with no specific cravings showed minimal reliance on food for emotional

regulation, indicating that stress-driven flavor seeking may not be universal, but instead reflect different psychobiological and cultural profiles.

These findings suggest that stress influences taste preferences in ways that align with emotional and cultural patterns. Flavor preferences during stress may serve as both markers and mediators of emotional regulation. Public health initiatives and school programs could benefit from culturally informed strategies that promote healthier coping mechanisms, potentially incorporating lower-guilt flavors like sour as part of stress management interventions.

5. Conclusion

This study links stress-driven flavor cravings to emotional eating behaviors, revealing distinct coping profiles for individuals with sweet, spicy, sour, or no cravings. Sweet and spicy cravings were associated with greater reliance on food for emotional relief, while sour cravings provided a more stable coping strategy. Those with no specific cravings maintained regulated eating habits and minimal emotional changes. Viewed through biological, psychological, and cultural lenses—including Traditional Chinese Medicine—these findings suggest flavor preferences may serve as both indicators and mediators of stress regulation. This insight could guide culturally sensitive public health interventions to promote healthier emotional regulation.

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