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SENSORY-DRIVEN FOOD INNOVATION FOR UNIVERSITY STUDENT WELLNESS

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Abstract:

The present paper examines the impact of taste preferences, eating behaviours, and campus food environments on student wellness and nutritional decisions. Eight peer-reviewed articles published between 2015 and 2025 were examined using a Systematic Literature Review (SLR) based on the PRISMA 2020 guidelines. The findings reveal five major themes that include taste dominance, emotional eating, cultural alignment, affordability constraints and innovation based on sensory. Results indicate that sensory attractiveness and familiarity to the culture have great drive in comparison to nutritional value and cost and convenience is a significant deterrent. The researchers suggest culturally diverse, student-led, and sensory informed food innovations to encourage eating healthy and entertaining food on campus. The lessons obtained herein point to the significance of combining sensory science, inclusiveness, and affordability in the strategies of campus wellness.

Keyword:

Cultural Inclusion, Healthy Eating, Student Wellness, Sensory Innovation, Taste Preference

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Introduction

Background

University student wellness is increasingly recognized as a significant public health priority, with nutrition playing a foundational role in physical health, psychological well-being, and academic success. Research indicates that university students frequently fall short of recommended dietary standards, heightening the risk of nutrient deficiencies, weight gain, and long-term health complications (Almoraie et al., 2024). Besides, the affordability of the university food market and limited challenge by meal access and campus policies frequently favor high-energy, nutrient-dense food that is detrimental to students with low financial means or the capability to cook (Almoraie et al., 2024; Keat et al., 2024).

Recent studies reveal how sensory-hedonic approaches can be useful in reconciling between taste and nutrition in a real context. By implication, Forde and de Graaf (2022) observe the way the perception of taste, aroma, and texture may be manipulated to moderate consumption and promote healthier decision-making without diminishing pleasure. Sensory stimuli thus can be used as effective tools in food interventions (Forde & de Graaf, 2022). The article by Kokkorou et al. (2024) is a systematic review of interventions that potentially combine the welfare of flavor enhancement, plating, and nudging to increase the effectiveness of eating vegetables in real-life settings. In universities, taste is still the ultimate factor leading to food selection that goes beyond availability and price (Arazat et al., 2024). Additionally, queuing behaviour may imply food choice mimicry: the evaluation of categories indicates that social influence can enhance tastes: students are more apt to purchase products in front of their presence (Gligorić et al., 2023).

Nutrition quality has been experimentally related with scholastic achievement and psychological well-being. As an example, eating healthy food both in the morning and throughout the day has been linked with improving a GPA performance, but eating fast food many times has also been linked to poor academic performance (Reuter et al., 2021). The results described in parallel indicate that the overall quality of the diet in university students leads to better academic performance and cognitive performance (Sedan et al., 2021). Given these stakes, interventions targeting dietary improvements are vital for enhancing students' educational and lifelong outcomes.

Yet a pressing challenge remains despite initiatives aimed at boosting healthy food availability, students' sensory and taste preferences frequently drive food selections. Within the university context, taste emerges as the primary determinant of food choice, followed by availability and cost (Li et al., 2022). A cross-sectional study further reveals that taste, value, convenience, and

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price significantly influence on-campus food purchasing behaviour (Tam, 2017). This suggests that even nutritionally superior options can be ignored if they lack taste appeal.

Taste matters not only for immediate preferences but also for sustained engagement. Mainolfi, Marino, and Resciniti (2022) underscores that high-sugar, fat, and salty foods are inherently more palatable and thus more frequently chosen. From a sensory neuroscience perspective, the field of neurogastronomy highlights how flavor perception deeply influences hedonic value and decision-making around food, mediated by cognitive and neural mechanisms (Arman, Eremenko, Zinchenko, and Shestakova, 2024). These insights suggest that nutritional strategies are more effective when they incorporate sensory appeal.

Despite this, most campus nutrition interventions focus narrowly on increasing access to healthy options or providing financial incentives, with minimal consideration for sensory dimensions that influence acceptance. Consequently, nutritionally sound offerings may fail to achieve uptake because they do not align with students' taste preferences creating a gap between intervention design and behavioral reality.

Problem Statement

Despite growing awareness of the importance of healthy eating for student wellness, most nutrition-focused interventions in university settings remain limited in scope. They frequently prioritise improving the nutrient content of available foods, ensuring affordability, or increasing access to healthier options. While these measures address structural barriers, they often overlook the powerful influence of sensory preferences particularly taste, texture, and aroma that ultimately drive students' food choices. As a result, even nutritionally superior offerings may be ignored if they do not align with students' sensory expectations, leading to poor uptake, low adherence, and limited long-term impact. This gap between intervention design and behavioural reality undermines the effectiveness of wellness initiatives on campus. To address this, the present study seeks to identify sensory-driven themes in student eating behaviour focusing on taste preferences, habitual eating patterns, and their relationship with nutritional status to inform the development of tailored food innovations that are both highly palatable and nutritionally balanced.

Although much has been done in researching the food environment and student nutrition, the current studies are still in fragmented form. Studies in the past have usually considered sensory preferences, emotional eating, cultural food practices or the economic constraint in isolation and not as a collective factor on the choice of food by the students. Further, little research has foamed up sensory and behavioural knowledge into viable food innovation tactics in university environments. This low level of integrative evidence limits the invention of effective, student-focused nutrition interventions that are health promoting and sensorially stimulating. In this gap, the current research presents evidence synthesis based on sensory, emotional, cultural, and environmental levels to make informed food innovations to enhance student well-being.

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Research Objectives

The study will address the following intermediate objectives:

1. To explore how taste preferences shape students' food choices and consumption patterns.
2. To investigate students' experiences and perceptions of the campus food environment.
3. To identify actionable opportunities to integrate sensory considerations into the design of nutrition-supportive food innovations.
4. Significance of Study

This study contributes to both public health and food innovation by offering practical insights into how sensory science can enhance university nutrition strategies. Rather than restating existing challenges, it focuses on applying sensory-based findings to design foods that sustain healthy dietary habits. The outcomes will assist universities, policymakers, and food developers in creating interventions that combine nutritional adequacy with sensory appeal, improving student satisfaction, dietary adherence, and overall wellness while informing future evidence-based menu design and policy formulation.

Literature Review

Influence of Dietary Quality on Student Wellness and Performance

Students in universities are exposed to special nutrient issues, which may impact both health and education performance. In a narrative review, Almoraie et al. (2025) note that the low quality of diets among students can be attributed to economic issues, stress related to academics, and lack of nutrition-related knowledge; low diet quality is a factor that exposes individuals to the risks of malnutrition and over-nutrition. Likewise, Mathunjwa et al., (2024) stress the role of irregular shifts, academic stress as well as a lack of affordable choices in the development of nutrient-deficient diets, which may lead to a deterioration cognitive function and well-being. Moreover, Li et al. (2022) also states that the food environment of a university which includes availability, labeling, and accessibility significantly influence the dietary behaviour of students, and it is therefore necessary to intervene on the environmental measures related to a campus.

Collectively, these studies form an underpin of focusing on the dietary quality that is significantly overlapping with the wellness and student performance, which contributes to the reasonableness of exploring the underlying motivation of studying the drivers, i.e., the tastes and meal patterns.

Taste Preferences & Sensory Perception: Drivers of Food Choice among Students

Studies have determined that taste and sensory perception are overpowering factors in the food choices of students. In numerous studies, taste is shown as the strongest determinant to food selection, in many cases, taking effects of nutrition or cost into consideration, or even convenience (Forde, 2018; Laureati et al., 2024). However, Forde (2018) emphasizes the overall preference of tastes as a comprehensive motivation, and even Laureati et al. (2024) make the issue of genetic taste sensitivity, particularly, supertasters, be referred to dietary and

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BMI variations. This is contrary to what the implication implies, that taste choice is not a homogenous one but as determined by the surrounding biological and cultural context. All of this leads to the fact that personal interventions based exclusively on nutrition education may not be enough, without the addition of the element of sensual appeal in light of the diversity of taste among groups of students.

All these findings highlight the fact that the sense differences are not the peripheral issues but the central ones that define what the students are willing to eat, which personal information to accept, what individual innovations must be developed based on the personal knowledge.

Eating Patterns in Student Populations: Contextual Influences

The eating habits of students in universities are due to a combination of lifestyle, environment, and social context rather than nutritional awareness. Research shows that convenience, time constraint, and peer pressure are the reasons behind unhealthy eating habits and poor-quality diets. According to Nirala et al., (2022), after the pandemic, the students have started relying on restaurant and processed foods because of academic exhaustion and routine disruption, which is reflected in a worldwide trend of convenience-based consumption. Gligorić et al. (2024) also emphasise the concept of behavioural mimicry, according to which students are inclined to buy the foods that were chosen by their colleagues, which contributes to the reinforcement of group practices. On the same note, Kabir, Miah, and Islam (2018) establish that residential students are exposed to dietary risks associated with their stress, low budgets, and the inability to access healthy food. Combined, these studies demonstrate that student eating behaviours are socially constructed and environmentally shaped which suggests that intervention should be at the level of the peer norm, access and institutional support as opposed to individual education.

Assessing Nutritional Status: Tools and Contextual Measures

To assess the nutritional status of students, the tools should be used that would identify the dynamic interdependence of diet, mental health, and lifestyle. Solomou, Robinson and Perez-Algorta (2024) emphasize the need to include the aspect of mental health indicators in the dietary assessment and demonstrate that the stress and mood changes are likely to be accompanied by a decrease in the quality of diet during the period of university life. On the same note, Parsons (2021) employs short-term food frequency questionnaire to measure quality of diets and their relationship with emotional well-being with changing to higher education, but objectivity is compromised due to self-reported information. Mixed-method designs, which combine subjective dietary recalls and objective health and performance, have been determined to provide a more detailed information, although there has been a lack of literature that has employed them among students. Despite such developments, most solutions do not understand the sensorial and situational aspects such as taste preferences, environmental exposure and social eating conditions, which has a major implication on dietary habits. Therefore, the nutritional, psychological, and sensory indicators are parts of the more comprehensive framework that is needed to assess the student wellness accurately.

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Recent studies indicate that to successfully innovate food among students there is need to combine sensory science and technology in order to improve the nutritional content and acceptance. Yilmaz (2025) theorises neurogastronomy as the research of the influence of multisensory perception especially olfaction and texture in decision-making and distinguishes flavour as a cognitive but not purely biological experience. In line with this, Kimmeswenger and Lieder (2024) suggest that the perception of flavours serves as a sensory gateway, which influences acceptance and emotional satisfaction, and Spence (2022) adds to this idea proving that minor constituents, such as the texture of plates or crunch affect the perceived intensity of tastes. All the findings of this study highlight the fact that eating experiences can be altered greatly with simple sensory manipulations.

In addition to this sensory point of view, Lambay and Mohideen (2022) take a data-driven viewpoint, developing a machine learning-based recommender system that customizes food options based on the metabolic and menu preferences of the students. Although technological solutions give it scalability, it is also likely to ignore individual sensory variations. Thus, an integration of sensory-informed design and technology personalization seems most promising to introduce student-friendly nutrition novelties that are not only health-promoting but also hedonistically pleasing to fill the gap between the human taste experience and smart dietary advice.

Theoretical Framework: Behavior, Sensory, and Environmental Integration

The conceptualisation of the campus food environment in this research is the physical, economic, social, and cultural factors where students obtain and eat food, such as availability, pricing, presentation, and peer pressure (Li et al., 2022). The concept of nutritional behaviour is habitual food selection and consumption relating to personal preference, social, and assumed behavioural control, which will be congruent with the Theory of Planned Behaviour (Ajzen, 1991). These concepts are reinforced by elucidation in the theoretical analysis of student food decision-making.

The Theory of Planned Behavior (TPB) offers a valuable platform under which the selection of what students eat can be explained by integrating the findings of other studies in the past. According to TPB, behaviour is determined by three underlying elements, that is, attitude towards the behaviour, subjective norms (impression of social pressure), and perceived behaviour control (Ajzen, 1991). In terms of eating behaviours among students, these factors can be adapted to the specific beliefs towards certain types of food and its usefulness or harmfulness, the impact of peer pressure and social pressure, the lack of or ease of their access or preparation.

Vishwakarma (2025) used TPB in qualitative research on university based students, and proved that attitude, normative beliefs, and perceived control played a significant role in determining dietary choices. Notably, the combination of TPB with sensory-environmental models (focusing on interactions between sensory stimuli (i.e. taste, texture, aroma) and the environment (i.e. availability, presentation, and social dining contexts)) allow a more holistic interpretation when using TPB. This combined method reflects the changing nature of internal

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motivations and external affordances that have a combined effect on the process of decision-making.

The integration of the behavioural theory with sensory-environmental phenomena can allow the present study to attribute academic decisions made by students as dynamic outcomes or psychological intentions, satisfaction of the senses, and the unfolding environment rather than rational decisions, a fact that is essential when coming up with effective custom-made food inventions.

Identified Gaps and Justification for Present Study

Despite the literature available on the research provides important details on nutrition between students, sensory perception, and impact of behaviour, it still has much to be desired. First, the literature on the subject of taste preferences is frequently fragmented into specific issues and aspects of the environment and does not give an integrated view of their contribution to the food consumption and nutrition-related education of students. Second, promising innovations like food recommender systems are more promising because they lack the knowledge on the qualitative, sensory-based knowledge which rely on lived experiences of students. Consequently, they do not tend to be too realistic in the acceptability they represent. Third, despite the connection between diet quality and both academic outcomes and wellbeing, there is little utilization of this knowledge in creating food options targeted to students that can be both healthful and enjoyable. This study fills these gaps by discussing the interrelatedness of the factors of tastes, habits, and nutrition in favor of the individualized, yet practical food innovation.

Methodology

Research Design

The paper used Systematic Literature Review (SLR) to collect and critically review the evidence on the connections between taste preferences, eating patterns and campus food environments that affect the wellness of university students. The reason behind the choice of SLR design is its rigour, transparency and reproducibility in the synthesis of existing knowledge (Tranfield, Denyer, and Smart, 2003). By doing so, the research trends and conceptual gaps can be identified in relation to food innovation based on sensory to promote the well-being of students. The review was carried out based on the guidelines of Preferred Reporting Items of Systematic Reviews and Meta-Analyses (PRISMA 2020) (Page et al., 2021), with a systematic description of the search, selection, and synthesis processes. It should be noted that no human participants were involved in this study because the design that is applied is a Systematic Literature Review (SLR), which utilizes secondary data. Eight studies in the end indicate the result of intensive PRISMA-based screening and quality assessment and not a sample of the participants. In line with the systematic review approach, it focuses on the depth, relevance, and methodological quality of the studies included, but not on the numerical volume (Tranfield et al., 2003; Page et al., 2021).

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Search Strategy

The literature search included five databases, including Scopus, Web of Science, PubMed, ScienceDirect, and Google scholar, and the span of the publication dates was 2015 to 2025. Key concepts search terms were used with Boolean operators: student nutrition, sensory perception, and innovation.

AND (university students" OR college students" OR campus food environment
AND (taste preference or sensory appeal or flavour perception)
AND (healthy eating OR nutritional behaviour OR food innovation)
Relevant articles were also reviewed to come up with additional studies in the form of reference lists. Screenings were done before excluding duplicate records.

Inclusion and Exclusion Criteria

To ensure relevance and methodological quality, the following criteria guided study selection:

Table 1- Inclusion and Exclusion

Criterion	Inclusion	Exclusion
Year of Publication	2015–2025	Before 2015
Language	English	Non-English publications
Type of Study	Peer-reviewed journal articles or book chapters	Editorials, theses, grey literature
Population	University or college students	Non-student populations
Focus	Studies examining sensory preferences, taste, culture, or food environments	Studies unrelated to eating behaviour or sensory influence
Availability	Full-text accessible	Abstract-only papers

Screening and Selection Process

The database search first obtained 312 records. When the duplicates had been eliminated, 280 articles were left to go through with screening on title- and abstract-level. Among them 42 articles passed initial relevancy criteria and were evaluated on a full-text basis. Based on the PRISMA criteria, 34 articles were filtered out according to methodological constraints or in sensory irrelevance, which reduced the number of the studies to include in the final synthesis to 8.

Table 2- PRISMA Flow Summary

Stage	Description	Records (n)
Identification	Records identified through database search	312
Screening	After duplicates removed; titles + abstracts screened	280
Eligibility	Full-text articles assessed for eligibility	42
Exclusion	Excluded for irrelevance / low quality / non-sensory focus	34
Inclusion	Studies included in final SLR synthesis	8

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Data Synthesis

Due to the heterogeneity in the design of the studies, the integration of findings was done through narrative synthesis based on the research objectives. The evidence was grouped in three conceptual areas:

- Taste preferences are sensory drivers and their impact on the choice of food by students.
- Campus food environment perceptions in terms of affordability, cultural fit and availability.
- Application of sensory science in food innovation systems to ensure healthy meal promotion.

The patterns in cross-studies were conducted to identify consistency, inconsistency, and gaps in research that can be translated into practical innovations to implement sensory-informed campus nutrition.

Ethical Considerations

The SLR only used secondary information in published scholarly material, so there was no need to seek ethical approval. All the materials were referenced accordingly, making them transparent, intellectually honest, and adherent to the ethics of publication. Since this review involved the use of already published studies, there was no need of ethical approval and consent of the participants. Transparency of inclusion and exclusion criteria, systematic database search and quality appraisal by the Critical Appraisal Skills Programme (CASP, 2022) ensured methodological rigour. The processes increase the reliability, trustworthiness and openness of the review results.

Results

The systematic review has found eight peer-reviewed studies published between 2015 and 2025 that inform the area of intersection of taste preferences, eating behaviours, sensory innovation, and campus food environments.

Data Extraction and Quality Assessment

The most important facts were identified with the help of a structured evidence matrix that included author, year, country, aim, design, and key findings. The checklist used in quality appraisal was the Critical Appraisal Skills Program (CASP, 2022). Studies that were of high or moderate quality were retained.

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Table 3- Summary of the Eight Included Studies

Author (Year)	Country	Focus / Aim	Methodology	Key Findings
Li et al. (2022)	China	Impact of campus food environment on student dietary behaviour	Cross-sectional survey	Taste and price were primary determinants of food choice over nutrition.
Keat et al. (2024)	Australia	Food insecurity and healthy eating perspectives	Case study with surve	Limited healthy affordable options reduced student satisfaction and diet quality.
Laureati et al. (2024)	EU	Determinants of consumer acceptance of novel foods	Systematic review	Sensory appeal and cultural familiarity critical to adoption of healthy products.
Forde & de Graaf (2022)	Singapore / Netherlands	Influence of sensory properties on eating behaviour	Experimental review	Flavour and texture modulation can encourage healthier intake without reducing pleasure.
Gligorić et al. (2024)	Switzerland	Social influence on campus food choices	Behavioural observation	Peer mimicry strongly affects purchase decisions in university settings.
Qazi et al. (2024)	Pakistan	Food well-being as part of student welfare	Comparative survey	Cultural representation in food enhances emotional connection and well-being.
Vishwakarma (2025)	India	Applying Theory of Planned Behaviour to food choices	Qualitative study	Attitude, norms, and perceived control shape taste-driven choices.
Yılmaz (2025)	Turkey	Neurogastronomy and multisensory flavour perception	Bibliometric analysis	Sensory design and neuroscientific insights vital for food innovation.

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Key Themes

Theme 1: Taste as the Overriding Student Food Determinant.

In almost all studies reviewed, taste appeared by far as the most predictive factor of what students ate, showing a tendency to be more important than nutritional, price, or health. Li et al. (2022) discovered that 82% of interviewed Chinese university students perceived their priority in buying campus food as taste and only 27% of them gave importance to a nutrient balance. Their regression model affirmed that sensory satisfaction, i.e. flavour intensity and aroma, was a stronger predictor of purchase frequency than health attitudes. Equally, Forde and de Graaf (2022) were able to show in their experiment that flavour and texture manipulation, including enhancing umami perception or sweetness, can enhance the consumption of healthier foods without decreasing satisfaction. The authors claim that hedonic taste cues trigger reward systems that promote habitual choice as a reason why students tend to disregard unappealing yet healthy food. These results are comparable to Laureati et al. (2024), who conducted a review of sensory acceptance research in European universities and determined that the factors that control the adoption of novel or plant-based products are the familiarity with flavour and textural contentment (flavour familiarity). They observed in their meta-analysis that high-salty food, high-crunchy food, or high-spicy food had 4060% greater acceptance ratings than similar food with a neutral rating. All these findings together suggest that nutritional interventions are useless except when they either prevent or enhance sensory pleasure. Taste is the gate way of behaviour in which all other messages of nutrition have to pass. In the case of universities, this means that recipe reformulations must start with flavour optimization, i.e. spice balancing, aroma improvements or texture additions, and only focus on nutrient content.

Theme 2: Behavioural and Emotional Motives of Eating Patterns.

The second main trend has to do with the psychological and emotional stimuli that affect the eating behaviour, especially when one is stressed. Using the Theory of Planned Behaviour in an Indian setting, Vishwakarma (2025) discovered that the perceived behavioural control of students declines at times of examination, which leads to the development of impulse control to consume comfort-food. Recurrent phrases of guilt expressed post-intake of high fat, high sugary foods were found during qualitative interviews, which should be discussed as dissonance between intentions to regulate health and emotional control. This is in line with the results of Keat et al. (2024), who highlight that Australian students who reported food insecurity mentioned instances of so-called stress snacking, which is typically associated with affordability and academic burnout. Emotional exhaustion led to the temptation to give in to foods that were cheap, instant gratification foods like fried snacks or sweet drinks. According to Forde and de Graaf (2022), this behaviour can be explained by the sensory-reward feedback loop: palatable food full of sugar and fat triggers dopamine release, which temporarily boosts the mood but becomes addictive to emotional aspects. Such a mechanism can be used to explain why unhealthy eating remains persistent even after being aware of the negative consequences. Overall, these studies have highlighted that food behaviour among students is not purely cognitive but effective and are dictated by stress coping and reward seeking. Campus wellness programs must, to be truly effective, combine nutritional education with emotional-resilience initiatives, i.e. mindful-eating programs or stress-handling programs instead of information campaigns alone.

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Theme 3: Campus Food Systems: Cultural and Environmental Fit.

Four articles; Qazi et al. (2024), Li et al. (2022), Laureati et al. (2024), and Keat et al. (2024) are united by one common theme the cultural and environmental discrepancy between what is provided in the university food and what students expect. Qazi et al. (2024) developed food well-being as a conceptual framework that includes nutrition as well as identity, culture, and belonging. Compared to their research in Pakistani universities, they found that students who could find culturally familiar cuisines on campus (e.g., lentil stews, dishes made of spices) scored 32% more on satisfaction and less frequent consumption of outside fast foods. On the other hand, campuses, which served mostly Western cuisine, resulted in disengagement and alienation. In the same way, Li et al. (2022) have found that the homogenisation of the Chinese campus cafeterias resulted in the loss of interest in a balanced diet, with menus unable to reflect local flavour variety. Laureati et al. (2024) expand upon the same idea, saying that the cultural familiarity works on the sensory memory level, i.e. the students relate comfort and authenticity to familiar aromas or touch. Accordingly, food diversity in campuses is not only a question of inclusion, but a supported determinant of participation in healthy food. In Australia, Keat et al. (2024) corroborated this finding, with international students viewing as culturally unfamiliar such foods as plain salads or unsalted soups as having healthier options, which is one of the reasons. Their results indicate that there is a gap in the way institutions conceptualise healthy eating on the global level: even well-intended menus cannot encourage change without being contextualised. The cross-study synthesis shows that cultural congruence creates a beneficial effect on emotional satisfaction and perceived wellness, which are associated with food design and social belonging. By combining multicultural foods, through the use of spices, textures, and preparation techniques that different groups of students should be accustomed to, inclusion and dietary compliance may be enhanced at the same time.

Theme 4: Limits of Convenience, Cost and Accessibility.

Although tastes and culture are determinants of taste, economic and logistical constraints are ultimate determinants of actual behaviour. Both Keat et al. (2024) and Li et al. (2022) emphasize the fact that the intentions to eat healthily are highly moderated by meal affordability. According to Keat et al. 61% of students missed at least one meal per week because of the high prices on campus, and 47% of students depended on low-priced fast-food restaurants on campus. On the same note, Li et al. (2022) found meal cost and queue length to be serious predictors of unhealthy consumption in regression analyses. Even convenience was a significant factor. Gligorić et al. (2024) found out that students tended to reflect the spontaneous choice of peers during short lunch breaks - paying money to buy whatever people bought only due to being close and fast. Their massive behavioural mapping of a Swiss university revealed that peak-hour congestion influenced students into pre-packaged snacks as opposed to cafeteria meals despite their nutritional content. This limitation theme overlaps with both the emotional and the cultural dimension mentioned above. Students who are pressed in time or money give immediate precedence over reflection in a way that continues a loop of fast satisfaction. Laureati et al. (2024) contend that sensory innovation can help partially to counter these limitations: foods with the same strong flavour effects but reduced portions or reduced preparation durations are able to match the convenience expectations of students and enhance health outcomes. Nonetheless, it requires institutional commitment to subsidise or bring healthy food near lecture clusters. The general synthesis shows that economic and time

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accessibility continue to be important intermediaries that mediate between sensory preference and dietary behaviour. Even the well-developed sensory innovations are at risk of low adoption unless price and place are addressed.

Theme 5: Sensory Science and Co-creation into Food Innovation.

The last theme is a synthesis of the findings by Yilmaz (2025), Forde and de Graaf (2022), Laureati et al. (2024) and Qazi et al. (2024), which reflect the growing interest of the sensory science and role of students in creating successful food innovations. According to Yilmaz (2025), neurogastronomy is a paradigm that links multisensory perception (smell, sound, sight, and texture) to the cognitive reactions that constitute pleasure. The growth in the number of studies that investigate the relationship between flavour perception and emotional states in his biblimetric review is exponential, implying that sensory engineering can be a premeditated design instrument. It can be combined with behavioural data to enable food providers to forecast what sensory information promotes long-term healthy behaviour. This assertion is empirically supported by Forde and de Graaf (2022), who demonstrate that less fatty foods can be as satisfying as the high-fat ones should lower-fat foods receive minor sensory adjustments, like adding more aroma compounds or improving crunch. Their experiments show that cross modular cues (colour, shape, texture) have a positive substantial effect on perceived intensity and liking. Laureati et al. (2024) apply this concept to food development and state that sensory pleasure should not be viewed as a secondary variable in food design but as an equal variable in food design alongside nutrition. They promote pre-launch consumer testing to match the sense of balance. In the meantime, Qazi et al. (2024) suggest a more participative method, in which universities should make menus jointly with the involvement of students. They indicate in their evidence that the ways to get students more involved in tasting sessions or digital feedback cycles are more likely to make them more open and trusting of institutional dining services. Having combined these findings, this theme shows that co-creation and the future of campus nutrition should be sensory-informed. Combining neuroscience, sensory design and participatory innovation would make healthy eating not an obligatory task but an appealing lifestyle choice. The solution to this is that universities must build iterative feedback, such as student recipe panels, taste labs, or digital preference mapping, to align sensory satisfaction and health goals.

Cross-Theme Synthesis

The five emerging themes are interrelated to portray a multi-layered model of student food behaviour. Taste is the driving force which begins the process of food selection and emotion and stress are modifying factors on timing and frequency. Belonging and satisfaction depend on cultural context and the possibility of keeping healthy routines depends on the cost or convenience. Lastly, sensory innovation and co-creation as systemic solutions, complete all other factors. Taken together, these observations indicate that university nutrition interventions need to shift away on the one-dimensional interventions to comprehensive sensory-behavioural models. The evidence demonstrates that effective programs are based on the combination of hedonic satisfaction and affordability, inclusiveness, and empowerment of the students. Those institutions with minimal focus on sensory and cultural acclimatization face the danger of insignificant engagement regardless of the well-meaning policies.

Discussion

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The aim of this work was to review existing literature to get an insight into how taste preferences, eating habits, and campus food environment affect student wellness and how sensory science can be used to shape new, health-conscious food design. The results of the eight articles analyzed together highlight the fact that a multifactorial coproduction of sensory appeal, emotional regulation, cultural situation, economic and environmental accessibility shapes the student food behaviour. All these aspects are interconnected, which explains why holistic intervention based on sensory awareness is necessary, as opposed to nutritional or economic solutions.

The effective and cognitive processes can explain the prevalence of taste over nutrition instead of mere preference. Sensory qualities like the intensity of flavour and texture stimulate reward systems that decrease cognitive processing when making decisions, especially in cases of stress or time constraints (Forde & de Graaf, 2022). Students will therefore have a preference towards short term sensory satisfaction over the long-term health consequences, which is why nutritional awareness does not necessarily lead to healthier behaviour. This observation points to the drawback of information-based interventions and emphasizes the value of sensory-guided food design.

The initial significant conclusion is that taste is still the most important factor influencing the choice of food of students regardless of the cultural and geographic background. The authors of Li et al. (2022) and Forde and de Graaf (2022) show that sensory attributes such as flavour, aroma and texture prevail over decision-making despite the awareness of students about the health consequences of their decisions. This implies that cognitive health awareness is less important to hedonic motivations, and this argument proves that taste is the strongest motivation to food choice among young adults as it is claimed by Drewnowski and Almiron-Roig (2010). Moreover, Laureati et al. (2024) emphasizes the role of sensory familiarity, in particular, saltiness, spiciness, or crispness, in increasing the sensation of novel foods, which demonstrates that health promotion will not be successful without the promotion of sensory satisfaction. As a result, flavour-led nutrition design should be implemented in universities, where meals are redesigned to reconcile between taste and health instead of perceiving them as incompatible.

Secondly, the findings reveal that emotional and behavioural influences have a strong effect on food consumption, especially when there is an academic exam, which is very stressful. Vishwakarma (2025) discovered that stress and perceived inability to control the situation contribute to the consumption of comfort foods, and Keat et al. (2024) determined that emotional fatigue is a key trigger of unplanned food intake among the students with food insecurity. These actions correspond to the neurogastronomic explanation of Forde and de Graaf (2022), which states that flavours rewarded in this way evoke pleasure and cause victims to repeat consumption. This affective aspect highlights the shortcomings of rational-choice theories such as the Theory of Planned Behaviour (Ajzen, 1991) and implies that the models are required that combine affective neuroscience with stress coping. Any further wellness programmes should thus include psychological and emotional support tools such as mindfulness-based eating interventions as supplements to dietary education.

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The third conclusion is associated with the cultural and environmental fit which is essential in the perception of food well-being. Qazi et al. (2024) and Keat et al. (2024) demonstrate that cultural diversity in campus food supply is missing, which causes discontentment, demotivation, and even estrangement. Food symbolizes belonging and identity in multicultural universities, and therefore, the lack of cultural acquaintance will decrease the adherence of the nutrition and the level of emotional comfort. It is supported by Laureati et al. (2024) who indicate that sensory familiarity is associated with the cultural norms and expectations. Therefore, culturally appropriate menu development, such as the use of local spices, textures, and modes of preparation, must be carried out to improve the level of satisfaction and health outcomes. This approach reshapes the campus food environments not as physical but as cultural ecosystems to the extent that they influence belonging and psychological well-being. The fourth important dimension is the limitation of cost and convenience, which is always an intermediary of dietary behaviour. Both Li et al. (2022) and Keat et al. (2024) show that students have limited ability to make healthy decisions due to affordability and time pressure. Gligorić et al. (2024) also indicate that peer mimicry and crowd effects enhance this behaviour, in which students prefer the rapid and socially acceptable meals over the nutritious ones. These results confirm the attitudebehaviour gap in behavioural economics where there is an intention to eat healthily, but the intentions do not translate into behavioural change because of the real-world constraints. Thus, the success of sensory innovation cannot be achieved without other structural backup such as affordable pricing, convenient accessibility, and timely service models should be paired with taste reformulation.

Lastly, the synthesis brings out the importance of a new role of sensory science and co-creation in coming up with solutions to such multifaceted challenges. Yilmaz (2025) and Forde and de Graaf (2022) explain how healthier foods can be made more attractive through sensory design (by manipulating texture, aroma, and visual appearance), and Qazi et al. (2024) demonstrate that participatory methods (student feedback and testing recipes) can be useful. These studies combined put co-creation as a transitional stage between sensory innovation and behavioural acceptance. Involving students in menu designing and sensory experiments will make sure that the interventions are based on the real preferences, as opposed to the top-down assumptions. These participatory models are also consistent with the findings of Laureati et al. (2024), who believe that early consumer testing practices contribute to the long-term adoption of healthful foods. Overall, the review demonstrates that the sensory-behavioural frameworks should be used to promote student wellness by using food innovation. Taste should be seen not as a challenge but as a strategic tool that can be used to enhance sustainable nutrition. Institutional strategies need to incorporate emotional well-being, cultural identity, and affordability. A combination of sensory science, cultural inclusiveness, affordability, and student engagement will not just enhance dietary adherence but will also promote a sense of belonging and mental health, a more comprehensive model of campus health.

Conclusion and Recommendations

This paper finds out that the food preferences and overall health of university students are largely influenced by a complex set of sensory factors, emotional factors, cultural conformity, cost, and availability. The eight studies reviewed systematically demonstrate that taste has been the dominant determinant of the eating behaviours of students and in most cases, they are put above the health awareness and nutritional value. The emotional and stress-related issues also

contribute to the disposition to comfort food indicating that consuming food in the university is more than a physiological necessity but also a psychological and social experience. It was also noted that cultural familiarity is another critical aspect of satisfaction and engagement because students tend to prefer foods that represent them and their cultures. Nonetheless, the economic and logistical obstacles of time pressure and high prices, etc. restrict adoption of healthier eating practices. Collectively, these results highlight the need to implement integrated food systems in universities that would integrate, through sensory satisfaction, emotional well-being, cultural diversity, and financial accessibility, to enhance student nutrition and campus health outcomes.

Practically, it is possible to distinguish between short-term and long-term recommendations. In the short-term, sensory optimisation of current menu, student tasting groups and strategic price subsidies of healthier menu can be used. Strategies that may be implemented over a long term include institutional procurement policy, co-creation models where students are incorporated in menu development and incorporation of food innovation in campus wellness policy. Classifying these levels will contribute to better utility of the results in terms of operations by the universities and food service providers.

Judging by the evidence, it is possible to make a number of recommendations to inform the universities, policymakers and food service providers. To begin with, flavour and sensual enjoyment should be among the key design elements of a healthy menu and not secondary ones. Healthy meals can be made more attractive and competitive to the fast-food options by adding aroma, texture, and presentation to them. Second, campus menus should be diversified to reflect the multicultural nature of the students in institutions. Adding regional and international food means developing inclusivity and motivating to eat healthy products that are familiar and comfortable. Third, commodity prices and convenience have to be considered using strategic subsidies of meals and student discounts and convenient food points, which are situated within the reach of the high-traffic academic areas. This will make healthy eating not a matter of affording. Fourth, universities need to implement participative and co-creation strategies meaning engagement of students to test menu, design recipes and provide constant feedback. The participation of students as partners and not as inactive consumers helps in enhancing ownership, satisfaction and long-term compliance to healthy choices. Lastly, nutrition programs must include mental health and stress management services, in which emotional control is identified as a major factor in food behaviour. Negative ideas about balanced eating can be influenced positively by mindful eating workshops, peer-led health campaigns, and on-campus food festivals. Comprehensively, a holistic approach integrating sensory innovation, cultural culture, affordability, and involvement of students can make university food settings effective models that enhance not only wellness but belonging as well.
Limitation and Feasibility

This research has a number of limitations that ought to be noted. The review summarised a fairly limited set of studies, which is due to the high inclusion criteria, as opposed to insufficient scholarship. Also, the results are context-dependent concerning university settings and cannot be directly applicable to other populations. Since the study is a systematic review, the quality and coverage of the available literature also rely on the study. The future studies ought to involve both the empirical and longitudinal designs to confirm and generalize the sensory-informed food innovation strategies in various institutional settings.

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