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NARRATIVE REVIEW

Integrating Behavioral Science Into Puerto Rico Culinary Education: A Theory-Driven Curriculum Model for Behavior Change

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ABSTRACT

Background: Culinary education occupies a strategic position at the intersection of gastronomy, nutrition, and public health. In Puerto Rico, post-secondary culinary programs prepare professionals who influence food environments, dietary behaviors, and cultural food practices. Despite strong technical training, evidence suggests that culinary students often exhibit suboptimal eating habits and limited translation of nutrition knowledge into sustained healthy behaviors.

Purpose: This conceptual manuscript proposes a theory-driven curriculum reform model that integrates behavioral science and nutrition into culinary education, grounded in established behavior change frameworks.

Methods: A narrative and conceptual synthesis was conducted using peer-reviewed research on eating behaviors among culinary students, reviews of experiential learning and behavioral mediators, and curricular mapping of associate-degree culinary programs in Puerto Rico.

Results: Three curricular pillars emerged: integrative capability, supportive opportunity, and reflective motivation. Mapping revealed strong technical instruction but limited integration of behavioral determinants. A theory-driven framework is proposed to embed nutrition literacy, sustainability, and behavior change strategies across culinary coursework.

Conclusions: Integrating behavioral science into culinary curricula may enhance the translation of culinary competence into sustained healthy and sustainable food behaviors. The proposed model offers a scalable framework aligned with public health and preventive medicine goals.

Keywords: culinary education; nutrition education; COM-B; behavioral science; curriculum design; Puerto Rico; public health.

Introduction

Diet-related noncommunicable diseases (NCDs) remain a leading contributor to morbidity and mortality globally and represent a critical public health challenge in Puerto Rico[1-3]. Dietary behaviors are shaped not only by nutrition knowledge but also by food environments, cultural norms, economic constraints, and behavioral determinants[4]. Culinary professionals occupy a strategic position within this nexus, as they directly influence food preparation practices, menu design, portioning, and the symbolic communication of health and culture through cuisine[5].

In Puerto Rico, university-based culinary programs have expanded rapidly, reflecting workforce demand and the cultural centrality of food. These programs produce graduates who shape institutional, commercial, and community food environments. However, emerging evidence suggests a persistent disconnect between culinary training, nutrition knowledge, and sustained healthy eating behaviors among students and professionals trained in food-related disciplines[6,7].

Empirical studies indicate that students enrolled in culinary and nutrition-related academic programs frequently demonstrate suboptimal dietary behaviors despite moderate to high levels of nutrition knowledge[8-10]. This pattern has been observed in Puerto Rican university populations and internationally, suggesting that knowledge acquisition alone is insufficient to produce durable dietary behavior change [3,5]. Structural barriers such as cost, time availability, food access, and sociocultural food norms further mediate the relationship between education and behavior[11,12].

Behavioral science offers empirically grounded frameworks capable of addressing these gaps. Models such as the Capability–Opportunity–Motivation–Behavior (COM-B) framework, Social Cognitive Theory, and the Theory of Planned Behavior emphasize that behavior emerges from the interaction of skills and knowledge, environmental opportunities, and motivational processes. These models are widely applied in public health and preventive medicine yet remain underutilized within formal culinary education[13-15].

The purpose of this manuscript is to propose a theory-driven curricular model that integrates behavioral science and nutrition into undergraduate culinary education in Puerto Rico. This paper is conceptual and educational in nature and focuses on curriculum design as an upstream, preventive strategy for improving food-related behaviors. Specifically, the manuscript aims to map behavioral science frameworks onto culinary learning objectives, identify gaps in existing culinary curricula related to behavioral determinants of eating, and propose a structured curriculum model aligned with public health and preventive medicine goals.

Theoretical Framework

COM-B Model

The COM-B model posits that behavior emerges from the interaction of Capability (knowledge and skills), Opportunity (physical and social environment), and Motivation (reflective and automatic processes)[16,17]. Culinary education traditionally emphasizes capability through technical skill development but often neglects opportunity and motivation.

SOCIAL COGNITIVE THEORY

Social Cognitive Theory highlights key determinants of behavior such as perceived self-efficacy, observational learning, and reinforcement within a dynamic interaction of personal, behavioral, and environmental factors[15-18]. Culinary laboratories provide ideal environments for mastery experiences; however, without explicit reflection and feedback, gains may remain task-specific rather than behavior-generalizable.

THEORY OF PLANNED BEHAVIOR

Although first conceptualized by Ajzen[13,19], recent syntheses affirm that attitudes, subjective norms, and perceived behavioral control remain the principal determinants of intention and behavior within the Theory of Planned Behavior[14]. Culinary education may therefore operate as a contextual intervention by reshaping normative expectations and perceived agency related to healthy, sustainable, and economically viable food practices[20,21].

Methods

This manuscript represents a conceptual and theory-driven curriculum model rather than an intervention study. A narrative and conceptual synthesis approach was employed, integrating

empirical evidence on eating behaviors among culinary and nutrition students, narrative reviews of experiential learning and behavioral mediators, and curricular mapping of associate-degree culinary programs in Puerto Rico. Courses were mapped to COM-B domains and Bloom's[22] learning domains (cognitive, psychomotor, affective) to identify integration opportunities and gaps.

Sources included:

Empirical findings from a cross-sectional study of Puerto Rican university students enrolled in nutrition and culinary programs[3].

A narrative review examining experiential learning, behavioral mediators, and structural barriers in culinary education[5].

Curricular sequences from three associate-degree culinary programs:

Universidad Ana G. Méndez[23]

Universidad Interamericana de Puerto Rico[24]

National University College[25]

Results

CURRICULAR MAPPING FINDINGS

Across all three programs, strong emphasis was observed in culinary technique, food safety, and operations management. However, behavioral-science constructs—such as motivation, habit formation, and environmental constraints—were rarely explicit.

EMERGENT CURRICULAR PILLARS

Integrative Capability: Embedding nutrition literacy, nutrient retention, and menu engineering within technical courses.

Supportive Opportunity: Addressing cost, access, sustainability, and procurement within management and purchasing courses.

Reflective Motivation: Incorporating identity formation, reflection, and behavior-change planning in laboratories and practicums.

To address the persistent gap between culinary education and dietary behavior observed across institutions, targeted curricular innovations are warranted. A growing body of evidence indicates that nutrition knowledge and culinary skill acquisition alone are insufficient to produce sustained dietary behavior change, underscoring the need for educational approaches that explicitly engage the behavioral determinants of eating[12,20,26]. Courses that integrate behavioral science, applied culinary skills, food environments, and community engagement may be conceptualized as strengthening capability, opportunity, and motivation for health-promoting food practices, consistent with COM-B–informed behavior change mechanisms[17,26-28]. Furthermore, the integration of behavior-change theory, reflective laboratory experiences, and real-world food system exposure has been shown to enhance self-efficacy, professional responsibility, and contextual feasibility, providing a viable pathway for translating culinary competence into sustained healthy and sustainable dietary behaviors[8,9,21].

As presented in **Table 1**, this model synthesizes key behavior change theories commonly applied in health, education, and media-based interventions, highlighting their core constructs and relevance to curriculum and intervention design. By juxtaposing frameworks such as Social Cognitive Theory[18], the Theory of Planned Behavior[5], and the COM-B model, the table illustrates both conceptual overlap and complementary mechanisms through which knowledge, skills, motivation, and environmental factors influence behavior. This comparative synthesis establishes the theoretical foundation for the proposed curriculum model and clarifies how each framework informs targeted pedagogical and behavioral strategies.

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Table 1. Proposed curriculum courses mapped to behavioral determinants and intended educational impact.

Curriculum Component	Behavioral Target (COM-B)	Instructional Focus	Intended Outcome
Behavioral Foundations of Culinary Practice	Capability (psychological); Motivation (reflective)	Determinants of eating behavior, intention formation, self-efficacy	Improved theoretical understanding of dietary behavior relevant to health promotion
Applied Culinary Nutrition and Food Environment	Capability (physical and psychological); Opportunity (physical and social)	Healthy menu design, food access, affordability, sustainability	Enhanced translation of nutrition principles into feasible culinary practice
Experiential Cooking With Behavioral Reflection	Capability (physical); Motivation (automatic and reflective)	Sensory training, portion control, structured reflection	Strengthened self-efficacy and habit-oriented culinary skills
Community-Based Culinary Application	Opportunity (social); Motivation (automatic)	Service learning and applied food–health interventions	Transfer of culinary skills to real-world, health-promoting contexts

Collectively, the proposed curricular courses address the full spectrum of behavioral determinants articulated within the COM-B framework. By enhancing behavioral capability, expanding environmental opportunity, and strengthening motivational processes, these courses move beyond traditional knowledge-based instruction to engage the complex, multifactorial drivers of eating behavior. This integrated, theory-driven approach increases the likelihood that culinary students will translate technical competence and nutrition knowledge into sustained healthy and sustainable dietary practices. Figure 1 depicts a COM-B–informed curricular pathway positioning culinary education as an upstream preventive strategy through which capability, opportunity, and motivation interact to shape dietary behavior and mitigate risk for diet-related noncommunicable diseases.

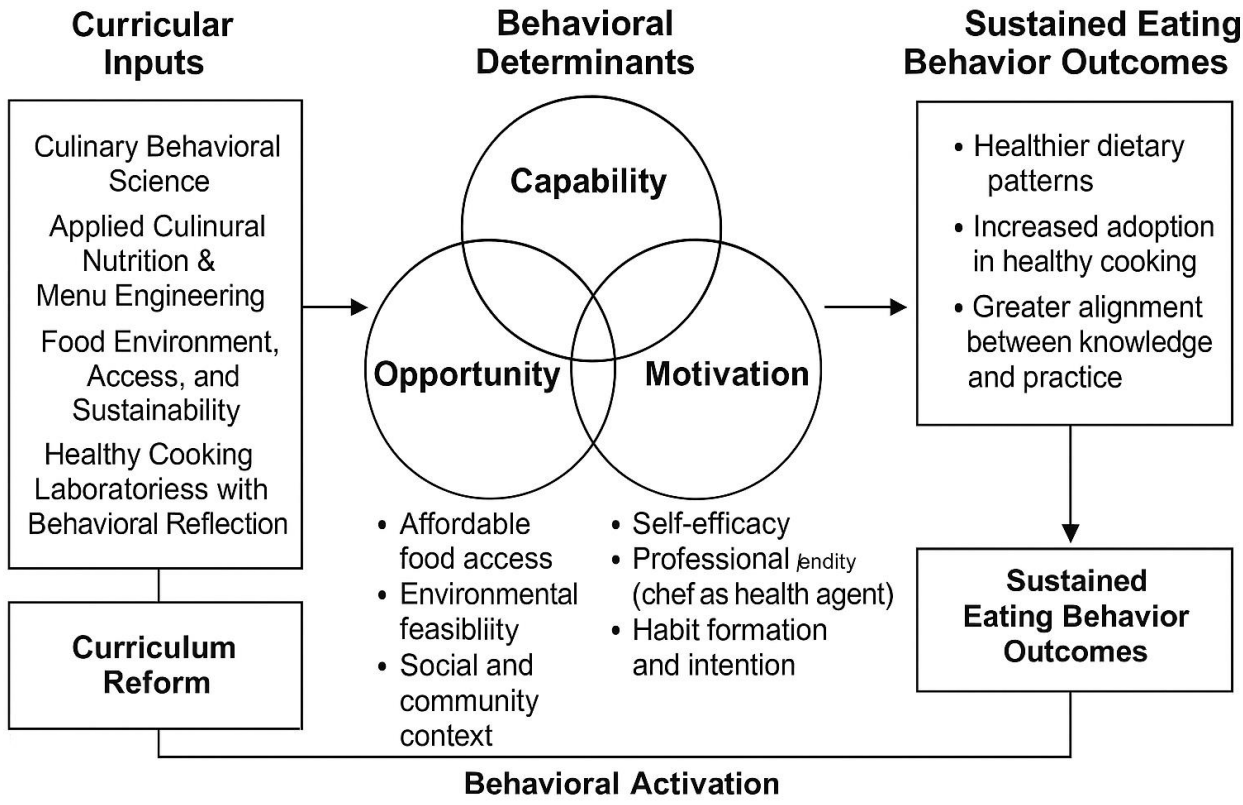

Figure 1. Theory-driven curricular pathway linking culinary education to eating behavior through capability, opportunity, and motivation.

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Discussion

The integration of behavioral science frameworks across Puerto Rican culinary curricula highlights the limitations of traditional, skill-focused culinary education in addressing contemporary public health challenges. While culinary programs excel at developing technical competence, behavioral capability alone is insufficient to ensure sustained healthy or sustainable dietary practices[26]. Without explicitly addressing motivation and environmental opportunity, the preventive health potential of culinary education remains underutilized.

The proposed COM-B–informed curriculum model reframes culinary education as an upstream intervention within the prevention continuum. Culinary professionals function as intermediaries between dietary guidelines, food systems, and lived eating experiences, positioning them as influential actors in shaping food environments that affect population health[27]. From a medical and public health perspective, this approach aligns with calls to address diet-related NCDs through environmental and behavioral determinants rather than relying solely on individual-level counseling or downstream clinical interventions.

Curricular mapping revealed that nutrition-focused coursework represents a small proportion of total credit requirements, and none of the reviewed programs explicitly address behavioral modification or theory-driven behavior change strategies. These finding parallels empirical evidence indicating that even among students trained in food and health-related disciplines, dietary behaviors are shaped more strongly by contextual and motivational factors than by formal nutrition education alone[28,29].

Recent literature further supports the necessity of integrating behavioral, motivational, and environmental components into culinary education. Studies demonstrate that improvements in culinary knowledge and confidence do not reliably translate into personal or professional practice without structured behavioral reinforcement[26]. Evidence also suggests that cooking skills are not independently associated with improved diet quality unless supported by enabling environments and motivational drivers. These findings align closely with the COM-B framework and reinforce the theoretical coherence of the proposed model[30,31].

Although conceptual in nature, this framework offers a structured foundation for future empirical testing, curriculum evaluation, and policy discussion. Future research should pilot the model using longitudinal designs, assessing outcomes such as diet quality, self-efficacy, professional practice patterns, and downstream impacts on food environments and population health. Limitations include the absence of intervention testing and restriction to associate-degree programs; however, the consistency of identified gaps supports the relevance and transferability of the model.

Conclusion

A theory-driven integration of behavioral science into culinary education represents a critical pathway for aligning culinary training with contemporary public-health priorities. Embedding COM-B principles across culinary curricula moves programs beyond technical skill acquisition toward the deliberate cultivation of behavioral capability, motivation, and environmental opportunity. Within the Puerto Rico context—where food systems, culture, and health inequities intersect—this approach positions culinary graduates not only as skilled practitioners, but as agents of change capable of shaping healthier, more sustainable, and culturally responsive food environments. Institutionalizing behavior-change frameworks within culinary education therefore offers a scalable strategy to strengthen workforce preparedness, enhance population-level dietary outcomes, and reinforce the role of culinary professionals as leaders in public-health–oriented food systems.

Conflict of Interest Statement:

None.

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