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A Grounded Theory-Based Study on the Functional Attribute Perception and Purchase Decisions of Plant-Based Milks Among Chinese Fitness Enthusiasts

-- Integrating Traditional Dietary Principles with Modern Sports Nutrition

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ABSTRACT

The study explores how awareness of specific functional attributes in plant-based milk alternatives influences purchase behaviour among Chinese fitness enthusiasts, addressing a critical knowledge gap in specialised consumer segment research. Employing a grounded theory methodology, the research conducted semi-structured interviews with 20 participants (12 female, 8 male) across diverse fitness disciplines, utilising systematic qualitative analysis techniques including open, axial, and selective coding to develop a comprehensive theoretical framework. The research identified five core categories significantly influencing purchase decisions: Functional Attribute Knowledge System, Cultural-Scientific Decision Integration, Training-Adaptive Selection Strategy, Performance Outcome Validation, and Sensory-Functional Balance. The analysis revealed complex interactions between traditional Chinese dietary principles and modern sports nutrition science, with participants demonstrating sophisticated mechanisms for evaluating functional attribute claims. The study provides both theoretical and practical contributions, offering a novel theoretical model explaining functional attribute perception, insights into the unique decision-making processes of Chinese fitness enthusiasts, and actionable recommendations for product developers and marketers in the plant-based milk market. As the first study examining Chinese fitness enthusiasts' plant-based milk motivations, this research bridges critical gaps in understanding specialised consumer segments and their nutritional decision-making processes.

KEYWORDS

Plant-based milk; Functional attributes; Chinese fitness enthusiasts; Grounded theory; Consumer behaviour

1. INTRODUCTION

1.1. Background and Research Context

The convergence of rising health consciousness, increasing fitness participation, and growing interest in plant-based alternatives has transformed China's functional food landscape over the past decade. Plant-based milk products, once peripheral to the mainstream Chinese diet, have emerged as a rapidly expanding market segment with particular appeal to fitness enthusiasts seeking nutritional optimisation (Wang et al., 2025). While historically dominated by traditional soy milk, the market has recently diversified to include a wide range of alternatives, including oat, almond, and pea-based products, each marketed with specific functional attributes targeting health-conscious consumers.

Within this evolving market, fitness enthusiasts represent a particularly essential consumer segment, characterised by systematic nutritional decision-making and heightened interest in functional benefits (Shpt.gov.cn, 2023). However, their evaluation processes appear to operate through distinctive frameworks that challenge conventional Western consumer decision models. As documented by Chen and Xu (1996), Chinese fitness enthusiasts often integrate traditional dietary principles with modern nutritional science when evaluating plant proteins, suggesting potentially unique evaluation frameworks that warrant dedicated investigation [1].

This integration presents a theoretically rich phenomenon at the intersection of traditional Chinese dietary wisdom, modern sports nutrition science, and evolving consumer behaviour. Understanding how these knowledge systems interact to shape perceptions and purchase decisions offers valuable insights for both theoretical development and practical applications in an increasingly globalised functional food marketplace.

1.2. Motivation and Research Question

This research is motivated by three interconnected factors. First, there exists a crucial theoretical limitation in current consumer decision models when applied to Chinese fitness consumers. As Shen, Xu, and Liu (2022) empirically showed, widely applied frameworks such as the Theory of Planned Behaviour show substantially lower predictive power when applied to Chinese consumers compared to Western populations. These models inadequately incorporate culturally-specific factors, including collective decision influence mechanisms and hierarchical knowledge structures that fundamentally alter the decision process [2].

Second, the Chinese plant-based milk market illustrates distinctive attribute prioritisation patterns that diverge from Western markets. While Western consumers predominantly focus on environmental sustainability and allergen avoidance (Poore and Nemecek, 2018), preliminary market observations suggest Chinese consumers emphasise different functional attributes and nutritional resources (Zhang, Cai and Ji, 2023), potentially reflecting distinctive cultural and philosophical influences on food perception.

Third, the research addresses a growing market need for culturally-informed product development and marketing strategies. With the Chinese plant-based milk market projected to reach $12.3 billion by 2027 (Li et al., 2023a), understanding the unique mechanisms through which Chinese fitness enthusiasts evaluate functional attributes has substantial practical significance for both domestic and international manufacturers.

This research, therefore, addresses the following central question: How do Chinese fitness enthusiasts perceive plant-based milk health attributes, and how do these perceptions influence their purchase decisions?

1.3. Research Aims and Objectives

This study aims to develop a theoretical understanding of how Chinese fitness enthusiasts perceive, evaluate, and integrate plant-based milk health attributes into their purchase decisions. Specifically, the research pursues four objectives:

To identify the primary functional attributes that Chinese fitness enthusiasts recognise and prioritise when evaluating plant-based milk products

To examine how traditional Chinese dietary principles interact with modern nutritional science in shaping functional attribute perceptions

To explore how gender, which is one of the demographic factors, influences attribute perception and evaluation

To develop a theoretical model explaining the relationship between functional attribute perception and purchase decision-making among Chinese fitness enthusiasts

1.4. Research Approach

This study adopts a social constructivist research paradigm, acknowledging that Chinese fitness enthusiasts' perceptions of plant-based milk health attributes are constructed through complex social and cultural interactions. A qualitative approach using grounded theory methodology was selected, given the exploratory nature of the research question and the need to capture nuanced cultural elements that quantitative methods might overlook [3].

Data collection employed semi-structured interviews with 20 Chinese fitness enthusiasts (12 female, 8 male) who regularly consume plant-based milk products. Participants were recruited through multiple channels, including on-site recruitment at fitness facilities in Shanghai and Qingdao, digital recruitment through fitness-focused social media groups, and referral sampling. Analysis followed systematic coding procedures (Corbin & Strauss, 2015) implemented in three phases: open coding, axial coding, and selective coding, with constant comparison techniques employed throughout.

1.5. Preview of Key Findings

The research identified five core categories that together explain how Chinese fitness enthusiasts perceive and evaluate plant-based milk health attributes. The most remarkable findings centre around three key theoretical components: the Functional Attribute Knowledge System, Cultural-Scientific Decision Integration, and the distinctive network-like structure of the evaluation process [4].

The Functional Attribute Knowledge System emerged as a dynamic framework through which participants simultaneously process multiple knowledge sources rather than a static information repository. Participants demonstrated sophisticated parallel processing capabilities, integrating traditional wisdom, scientific research, and experiential knowledge concurrently.

The Cultural-Scientific Decision Integration component displayed bidirectional knowledge flows rather than unidirectional modernisation processes. Participants developed tipped mechanisms for harmonising traditional dietary principles with modern nutritional science, creating unique evaluation criteria that transcended both frameworks in isolation.

Most distinctively, the overall model indicated a non-linear, network-like structure where components continuously influence each other through recursive feedback loops rather than sequential processing. This network architecture enables remarkable contextual adaptability whilst maintaining coherent evaluation frameworks.

Gender emerged as an essential moderating variable, influencing pathway activation patterns within the shared network framework rather than creating entirely separate decision structures.

1.6. Research Contribution and Significance

This research makes three key contributions. Theoretically, it addresses identified gaps in consumer decision models, cultural influence theories, and functional food attribute classification frameworks by developing a culturally-specific model that captures the complex integration of traditional and scientific knowledge systems [5]. This advances our understanding of how cultural factors shape functional food evaluation beyond simplistic dimensional frameworks.

Methodologically, the research demonstrates the value of grounded theory approaches in developing culturally sensitive theoretical frameworks in domains where existing theories illustrate poor cross-cultural validity. The systematic procedures employed provide a template for similar investigations in other cultural contexts.

Practically, the findings provide guidance for product development, marketing strategies, and consumer education in the rapidly growing Chinese plant-based milk market. By understanding the sophisticated evaluation processes employed by Chinese fitness enthusiasts, manufacturers can develop more effective approaches to this valuable consumer segment.

2. LITERATURE REVIEW

This literature review examines the theoretical frameworks and empirical research on functional food attributes, Chinese fitness culture, traditional dietary principles, and plant-based milk market research relevant to understanding how Chinese fitness enthusiasts assess plant-based milk products.

2.1. Research on Functional Food Attributes and Consumer Perception

Research on functional food attributes has evolved remarkably, with several frameworks developed to understand consumer perceptions. Abuajah, Ogbonna, and Osuji (2014) defined functional attributes as components providing health benefits beyond basic nutrition, while Kaliyur (2023) established a four-stage evaluation model: awareness, understanding, belief formation, and validation [6]. Critically, Hu et al. (2024) showed how cultural factors modify this evaluation pathway, potentially explaining cross-cultural variations in functional food acceptance.

For plant-based milk specifically, Lee, Lee, and Moon (2024) identified health benefits as the primary purchase driver for a majority of consumers, though with substantial cross-cultural variations in attribute prioritisation. Studies examining specialised consumer segments have identified distinctive patterns. Fitness enthusiasts prioritised performance-enhancing attributes over general health benefits, with protein quality rising as critical (Shpt.gov.cn, 2023). However, Chen and Xu (1996) found that Chinese fitness enthusiasts integrated traditional dietary principles with modern nutritional science when evaluating plant proteins, suggesting potentially unique evaluation frameworks requiring further investigation [7].

2.2. Theoretical Frameworks for Analysing Functional Food Choice

Several theoretical models have guided functional food research. The Theory of Planned Behaviour (Ajzen, 1991) has been widely applied, though Qi and Ploeger (2021) found markedly lower predictive power when applied to Chinese consumers compared to Western studies. Similarly, the Food Choice Process Model (Furst et al., 1996) identifies factors influencing food decisions, though Sobal and Bisogni (2009) note its limitations in addressing cultural factors [8].

For fitness-related consumption, the Performance Enhancement Model (Maughan et al., 2018) examines how perceived performance outcomes influence product evaluation, while self-determination theory (Deci and Ryan, 2022) explains how nutritional choices reinforce identity needs. Whereas, Rio and Saligan (2023) critique these frameworks for neglecting cultural dimensions of fitness, assuming universal definitions of "performance" that may not translate across cultural contexts.

2.3. Research on Chinese Fitness Culture and Nutritional Perspectives

Hunt (2023) documented how concepts of "yangsheng" (nurturing life) integrate with contemporary fitness practices, with a majority of participants conceptualising fitness as part of holistic life cultivation rather than purely physical enhancement. This can be verified on social media. Zhang, Tang, and Cai (2024) found obvious differences in fitness messaging between Chinese and American social media, with Chinese content more frequently incorporating traditional health concepts and seasonal wellness considerations.

Zhao et al [9]. (2020) recorded complex negotiation processes between traditional principles and scientific information, with participants developing personalised integration frameworks rather than simply choosing one system over another. Liu, Hoefkens and Verbeke (2015) found complex associative networks that incorporated both scientific nutritional concepts and traditional principles, suggesting conventional research methodologies may oversimplify Chinese consumers' evaluation processes.

Gender differences in functional food perception have been noted across multiple cultural backgrounds. Moerbeek and Casimir (2005) found evident variation in how male and female Chinese consumers interpret traditional dietary principles, with female customers displaying more comprehensive integration of both traditional wisdom and scientific evidence [10]. Similarly, Feraco et al. (2024) identified gender-specific diversities in functional attribute prioritisation, with female fitness enthusiasts placing greater emphasis on long-term health benefits while male participants prioritised immediate performance enhancement.

2.4. Scientific Investigation of Traditional Chinese Dietary Principles

The scientific investigation of traditional Chinese dietary principles provides critical context for understanding how Chinese consumers evaluate food attributes. Elaine Kris Ludman and Newman (1984) identified that yin-yang conceptualisations remained key predictors of food selection across diverse demographic groups. Aghakhani et al. (2022) indicated that products described using terminology compatible with traditional yin-yang classification received higher credibility ratings compared to identical products described using exclusively scientific terminology.

Research on body constitution theory has advanced from description to empirical assessment. Chen et al. (2025) developed and validated a Body Constitution Assessment Scale (BCAS), finding that constitution self-assessment significantly predicted functional food preferences. Xue et al. (2022) discovered that a substantial majority of consumers considered body constitution when selecting foods with functional attributes, with even higher prevalence among those regularly engaged in fitness activities [11].

2.5. Plant-Based Milk Market Research and Consumer Behaviour

The growing plant-based milk market in China represents a unique context where traditional dietary wisdom, modern nutritional science, and fitness culture intersect, making it an ideal domain for inspecting our research question about how Chinese fitness enthusiasts' perception of health attributes influences their purchase decisions [12]. This section examines current research specifically focused on plant-based milk consumption patterns, attribute perception, and decision-making processes.

2.5.1. Market Evolution and Consumer Trends

The plant-based milk market in China has evolved from traditional soy milk products to a diverse ecosystem of alternatives. Wang et al. (2025) documented the market's transformation, identifying three distinct development phases: traditional consumption (pre-2000), early commercialisation (2000-2015), and diversification (2015-present). Their market analysis revealed that while soy milk remains the dominant plant-based milk category with approximately 64% market share, rapid growth has occurred in oat, almond, and pea-based alternatives, particularly among urban consumers and specialised segments such as fitness enthusiasts [13].

Li et al. (2023a) noted the influence of China's significant lactose intolerance prevalence on plant-based milk market development, detecting that approximately 87% of Chinese consumers have consumed plant-based milk products, compared to 43% in comparable Western markets. Their research suggests that the historical familiarity with plant-based milk alternatives has created a more receptive market environment, though with higher expectations regarding taste and functional benefits compared to markets where plant-based milk on behalf of a novel alternative.

2.5.2. Consumer Evaluation Frameworks

Jaeger et al. (2024) developed and validated a multidimensional model for plant-based milk evaluation, identifying five primary attribute categories: nutritional properties, sensory characteristics, functional benefits, production methods, and cultural congruence [14]. Their research showed that while nutritional properties and sensory characteristics functioned as threshold attributes necessary for consideration, functional benefits and cultural congruence more strongly influenced final purchase decisions among Chinese consumers.

This multidimensional evaluation framework provides a valuable setting for understanding how Chinese fitness enthusiasts specifically might evaluate plant-based milk products, though the unique needs and perspectives of this consumer segment remain understudied in the existing literature.

2.6. Critical Analysis of Research Gaps

The critical analysis of existing research reveals vital gaps that directly inform the methodological approach and focus of this study.

2.6.1. Limitations in Consumer Decision-Making Models

Shen, Xu and Liu (2022) empirically tested the Theory of Planned Behaviour's applicability to functional food choices among Chinese consumers, noticing substantially lower predictive power compared to studies in Western populations. Their analysis identified several culturally-specific factors that existing models inadequately incorporate, including collective decision influence mechanisms and hierarchical knowledge structures that fundamentally alter the decision process [15].

Wang, Yuan and Gao (2024) employed cognitive mapping techniques to visualise Chinese consumers' functional food decision processes, finding non-linear, network-like evaluation patterns that incorporated simultaneous consideration of multiple knowledge frameworks [16]. Their research indicates that theoretical reconceptualisation may be necessary rather than simple modification of existing frameworks, particularly when examining culturally complex decision domains like functional food evaluation.

Inadequacies in Cultural Influence Theories

Fang (2012) demonstrated that Hofstede (2011)'s cultural dimensions theory inadequately captures the dialectical thinking patterns characteristic of Chinese philosophical traditions, particularly the "both/and" rather than "either/or" approach to seemingly contradictory concepts that influences food classification systems.

Most cultural influence theories applied to functional food research conceptualise culture as static rather than dynamic, overlooking critical evolutionary processes in rapidly changing societies like China [17]. For example, Xie et al. (2020) recorded marked generational disparity in how traditional dietary principles influenced functional food evaluation, with younger consumers showcasing more selective and situational application of traditional framed.

2.6.2. Theoretical Deficiencies in Fitness-Specific Nutritional Research

The Performance Enhancement Model (Maughan et al., 2018) operates from assumptions of universal performance definitions that may not translate across cultural contexts. Li et al. (2023b) conducted a comparative analysis demonstrating that Chinese fitness practitioners frequently employed more holistic, long-term performance definitions that included dimensions absent from Western frameworks, such as practice sustainability, energetic harmony, and life cultivation aspects.

Existing theoretical frameworks typically separate fitness-related and general health-related nutritional decision-making, an artificial distinction systematically challenged by empirical research on Chinese fitness consumers [18]. Chen et al. (2024) employed a mixed-methods approach to show that Chinese fitness enthusiasts consistently integrated performance-specific and general health

considerations through conceptual frameworks derived from traditional Chinese medicine's holistic approach.

Most notably, existing frameworks fail to capture the sophisticated balance between sensory and functional attributes that appears particularly significant in Chinese consumer contexts. While Western models typically position sensory characteristics as threshold factors, preliminary evidence suggests Chinese consumers employ more complex negotiation mechanisms between these dimensions, a phenomenon requiring systematic investigation.

The identified limitations in existing consumer decision models, cultural influence theories, and fitness-specific nutritional frameworks collectively point to the need for a grounded theory approach that can capture the complex, culturally-specific evaluation processes without imposing potentially inappropriate Western theoretical frameworks [19].

3. RESEARCH METHODOLOGY

3.1. Research Philosophy and Approach

This study adopts a social constructivist research paradigm, acknowledging that Chinese fitness enthusiasts' perceptions of plant-based milk health attributes are constructed through complex social and cultural interactions. As Lin and Lu Wang (2010) showed in their critical assessment of cross-cultural model validity, Chinese consumers' functional food evaluation processes operate through network-like patterns rather than linear frameworks. This paradigm aligns with the research objectives to uncover the subjective meanings that participants attach to health attributes and how these meanings influence purchase decisions [20].

A qualitative approach was selected to address the identified research gaps, particularly the limitations in existing consumer decision models when applied to Chinese fitness consumers (Chiu, Oh, and Cho, 2022). This approach is appropriate given the exploratory nature of the research question and the need to capture nuanced cultural elements that quantitative methods might overlook. As Corbin and Strauss (2015) argue, qualitative approaches are particularly valuable when examining phenomena where existing theories demonstrate poor cross-cultural validity.

3.2. Research Design: Grounded Theory Methodology

Grounded theory methodology was selected as the primary research design for this study. This choice was informed by three key considerations. First, the critical analysis of existing research revealed remarkable theoretical limitations when reviewing Chinese fitness consumers' functional food perceptions [21]. As Fang (2012) argued, prevailing theoretical frameworks inadequately capture the dialectical thinking patterns characteristic of Chinese philosophical traditions. Grounded theory allows for theoretical reconceptualisation rather than simple modification of existing frameworks.

Second, the study examines a domain characterised by complex integration of multiple knowledge systems. Research by Fang (2006) recorded sophisticated negotiation processes between traditional principles and scientific information that are difficult to capture using conventional theoretical models. Grounded theory's iterative approach to data collection and analysis is well-suited to identifying these complex integration processes.

Third, grounded theory provides systematic procedures for developing theoretical constructs while remaining sensitive to cultural nuances. As Corbin and Strauss (2015) emphasise, this methodology is particularly effective for developing culturally sensitive theoretical frameworks in domains where existing theories demonstrate poor cross-cultural validity. This resonates with the study's objective to develop a theoretical understanding of how Chinese fitness enthusiasts perceive and evaluate plant-based milk health attributes [22].

The study specifically employs Charmaz's constructivist variant of grounded theory, which acknowledges that "data are co-constructed by researcher and participants, and influenced by the researcher's perspectives" (Charmaz, 2014). This approach is particularly appropriate given the culturally complex context of the research and aligns with recommendations by Chandrasegaran et al. (2017) for grounded theory applications in cross-cultural contexts.

3.3. Data Collection Methods

The primary data collection method employed was semi-structured in-depth interviews conducted in Mandarin Chinese. This approach was selected for its flexibility in exploring emergent themes while maintaining sufficient structure to ensure comparable data across participants (Brinkmann and Kvale, 2015) [23]. The semi-structured format allowed participants to articulate their perceptions of plant-based milk health attributes using their conceptual frameworks rather than imposing researcher-determined categories.

Interview duration ranged from 45 to 60 minutes, with all interviews digitally recorded with participant consent. Interviews were conducted either in person at fitness facilities or via secure video conferencing platforms, depending on participant preference and availability. All interviews were fully transcribed for analysis.

The interview protocol was systematically developed to explore participants' awareness, understanding, and evaluation of plant-based milk health attributes. The protocol structure incorporated three primary sections:

Background exploration: Initial questions established participants' fitness practices, dietary patterns, and general plant-based milk consumption behaviours.

Attribute awareness and evaluation: The core section explored participants' awareness of specific health attributes, their evaluation processes, and the integration of traditional and scientific knowledge frameworks.

Purchase decision processes: The final section investigated how attribute perceptions influenced purchase decisions, including consideration factors, verification mechanisms, and contextual influences [24].

The protocol included both open-ended exploratory questions and targeted follow-up prompts. Following Mellor et al.'s (2022) recommendations for qualitative research on seaweed, the interview guide incorporated elicitation techniques to access implicit knowledge structures. The protocol was refined after pilot testing with two participants, resulting in adjustments to terminology and question sequencing.

3.4. Sampling Strategy and Recruitment

The target population for this study was Chinese fitness enthusiasts who regularly consume plant-based milk products. Inclusion criteria required participants to engage in structured fitness activities at least three times weekly, consume plant-based milk products at least twice weekly, be aged 18-45 years, and reside in the city of Shanghai and Qingdao.

Given documented gender differences in functional food perception (Moerbeek and Casimir, 2005; Feraco et al., 2024), this study intentionally recruited a gender-balanced sample, resulting in 12 female and 8 male participants (mean age 29.7 years). Participants were recruited through multiple channels, including on-site recruitment at fitness facilities in Shanghai and Qingdao, digital recruitment through fitness-focused social media groups, and referral sampling.

A combination of purposive and theoretical sampling approaches was employed, with initial purposive sampling to select information-rich cases followed by theoretical sampling to explore

emergent concepts [25]. Sample size was determined by theoretical saturation—the point at which additional interviews yielded no new conceptual insights.

3.5. Data Analysis Process

Data analysis followed Corbin and Strauss's (2015) systematic coding procedures, implemented in three progressive phases, each with distinct contributions to theory development. Open coding served as the foundation of the analysis process, involving line-by-line examination of interview transcripts to identify and conceptualise emerging phenomena. This initial phase generated 45+ unique concepts related to plant-based milk attribute perception, including "digestive comfort priority," "protein quality focus," and "traditional medicine influence." The primary contribution of this phase was to fracture the data into conceptual components without imposing preconceived categories, allowing truly grounded concepts to emerge.

Axial coding then moved beyond identification to establish relationships between concepts, developing higher-order categories and identifying their properties and dimensions [26]. The key contribution of this phase was to reassemble the fractured data from open coding into a coherent structure of interconnected categories, creating a framework that explained how concepts related to one another. Key axial categories included "functional attribute recognition system," "attribute verification mechanism," and "purchase decision-making framework."

Finally, selective coding identified core categories and integrated them into a coherent theoretical framework. The distinctive contribution of this final coding phase was theoretical integration—identifying the central phenomena around which other categories could be systematically arranged to create an explanatory model. Five core categories emerged: "functional attribute knowledge system," "cultural-scientific decision integration," "training-adaptive selection strategy," "performance outcome validation," and "sensory-functional balance."

To ensure coding reliability and minimise researcher bias, a second coder was engaged in the coding process. This second coder was a student who had graduated from Xi'an Jiaotong-Liverpool University with expertise in consumer behaviour research and familiarity with both Chinese dietary culture and qualitative methodologies. The merging of codes was handled through a systematic reconciliation process: both coders (designated as Coder A and Coder B) independently analysed the interview data, followed by weekly code comparison meetings where discrepancies were discussed until consensus was reached. For example, when the coders initially disagreed on the categorisation of "digestive comfort priority" versus "training-specific digestive needs," we reviewed relevant transcript sections together and ultimately reconciled these codes as "digestive comfort priority during training."

The initial coding comparison resulted in Coder A obtaining 62 open-codes and Coder B obtaining 58 open-codes, with 52 identical or similar-meaning codes, representing a consistency ratio of $r = 0.84$. The coding comparison was conducted in NVivo12.0, with Kappa coefficients exceeding 0.67 across all categories, indicating good consistency [27]. This dual-coder approach was implemented to enhance analytical rigor given the research's cross-cultural complexity and the nuanced interplay between traditional and modern concepts that emerged during pilot interviews.

The coding process resulted in the identification of 15 open categories, which were further developed into 16 axial categories through systematic sorting and concept clustering with a total of 624 reference points. These categories were then integrated into the five core categories through selective coding. Concurrent with coding, analytical memos recorded emerging theoretical insights, category relationships, and methodological decisions. Theoretical development progressed from descriptive to increasingly abstract levels through iterative cycles of data collection, analysis, and memo-writing. Lastly, Visual mapping techniques were employed to represent complex relationship patterns between categories.

3.6. Quality Assurance Measures

The study employed Lincoln and Guba's (1985) trustworthiness criteria, adapted for constructivist grounded theory research. Credibility was established through prolonged engagement with participants, member checking of emergent categories, and triangulation across participants with diverse fitness and consumption profiles. Transferability was enhanced through the detailed description of the research context and participant characteristics. Dependability was maintained through comprehensive documentation of methodological decisions. Confirmability was supported by maintaining clear audit trails linking interpretations to original data.

As a researcher with personal experience in both fitness activities and traditional Chinese dietary principles, I acknowledge that my positionality may influence data collection and interpretation. Throughout this study, I maintained critical awareness of how my own assumptions might shape the research process. For example, my familiarity with traditional Chinese medicine concepts could potentially lead to overemphasis on these elements or premature categorisation based on established frameworks [28].To mitigate this risk, I implemented systematic reflexivity practices, including maintaining a reflexive journal documenting my personal reactions to participant narratives, engaging in regular debriefing sessions with another coder to identify potential interpretive biases, and explicitly considering alternative explanations during coding and theory development.

The research design incorporated ethical safeguards at each stage of the process. Institutional ethics approval was obtained from Xi'an Jiaotong-Liverpool University Ethics Committee prior to participant recruitment. Key ethical considerations included informed consent, confidentiality, data security, participant autonomy, and cultural sensitivity.

3.7. Methodological Limitations

While the selected methodology offers crucial advantages for addressing the research questions, several limitations warrant acknowledgment. Generalisability constraints exist as with all qualitative research, where findings are not statistically generalisable to broader populations. The theoretical model developed provides explanatory depth rather than predictive breadth. Moreover, the study relies on recall-based data, where interview data depends on participants' recall of purchase decisions and attribute evaluations, which may differ from actual behaviours. Observational methods could complement this approach in future researc [29].

Furthermore, participants were recruited from major urban centres (Shanghai, Qingdao), potentially limiting transferability to smaller cities or rural areas where traditional dietary concepts may have different expressions. In addition, though conducted in participants' native language (Mandarin), some conceptual nuances may be affected during translation of quotations for reporting purposes. This was mitigated through back-translation procedures and consultation with bilingual researchers [30].

Despite these limitations, the methodology's strengths in capturing complex cultural processes and developing culturally sensitive theoretical constructs outweigh its constraints, particularly given the exploratory nature of the research question.

4. RESULTS AND FINDINGS

4.1. Overview of Coding Process and Data Analysis

This study employed grounded theory methodology to analyse data collected from semi-structured interviews with 20 Chinese fitness enthusiasts (12 female, 8 male, mean age 29.7 years) who regularly consume plant-based milk products. The systematic coding process followed Corbin and Strauss's

(2015) framework, progressing through open, axial, and selective coding phases to develop a theoretical understanding of how functional attributes influence purchase decisions [31].

Through the coding comparison conducted in NVivo12.0, a high level of inter-coder reliability was achieved with Kappa coefficients exceeding 0.67 across all categories, indicating good consistency between the two independent coders. The initial open coding yielded 62 codes from Coder A and 58 codes from Coder B, with 52 identical or similar-meaning codes, representing a high similarity proportion (r = 0.84). This robust consistency enhanced the credibility of the subsequent analysis and theoretical development.

4.2. Open Coding Results

The open coding phase identified 15 primary categories related to Chinese fitness enthusiasts' perception and evaluation of plant-based milk functional attributes. Table 4-1 presents these categories along with their associated concepts and representative interview quotes.

Table 4-1. Open Coding Results with Initial Concepts

Category	Initial Concepts and Frequencies	Example of Interview Content
Digestive Adaptation Rationale	Understanding of plant-based milk digestibility (32), Sensation of stomach lightness (28), Avoidance of gastrointestinal discomfort (26)	"I initially chose plant-based milk because I couldn't digest cow's milk well."; "Plant-based milk doesn't create that heavy feeling in my stomach during training."; "Unlike dairy, plant milk doesn't cause me discomfort during high-intensity exercise."
Training Performance Support	Recognition of energy supply characteristics (30), Association with recovery capacity (27), Perception of training enhancement (25)	"I notice plant-based milk provides sustained energy for my endurance training."; "The protein in soy milk helps with my muscle recovery after strength sessions."; "I feel my performance improves when I include plant milk in my pre-workout nutrition."
Cultural Dietary Influence	Application of traditional medicine concepts (24), Integration of seasonal dietary principles (22), Adaptation of "hot/cold" food properties (20)	"I choose black sesame milk in winter because it has 'warming' properties according to traditional Chinese medicine."; "Following traditional wisdom, I select cooling plant milks like almond milk during summer training."; "The Chinese principle of balancing food properties guides my rotation of different plant-based milks."
Nutrient Composition Assessment	Evaluation of protein content (31), Analysis of micronutrient fortification (28), Consideration of caloric density (25)	"I always check the protein content first, aiming for at least 8g per serving."; "I specifically look for plant milks fortified with calcium and vitamin D."; "During cutting phases, I prioritise plant milks with lower calorie counts."
Exercise-Specific Attribute Matching	Selection based on training type requirements (29), Alignment with training phase (27), Adaptation to training intensity (24)	"For my HIIT workouts, I choose plant milk that's lighter and easier to digest."; "During bulking phases, I switch to higher protein plant milk options."; "Before long-distance runs, I look for plant milk with added electrolytes."

Analysis of open coding data revealed several distinctive patterns in Chinese fitness enthusiasts' evaluation of plant-based milk attributes. First, the strong emphasis on digestive adaptation (86 cumulative references) depicts the primacy of internal bodily response in functional attribute

assessment, a finding consistent with traditional Chinese medicine's focus on food-body harmony [32]. As Participant #4 explained: "The first question I ask isn't about nutrition facts but how it makes my body feel during training—whether it creates heaviness or lightness."

Second, the significant presence of cultural dietary influence (66 cumulative references) disclosed the persistent integration of traditional concepts into contemporary nutritional decision-making. This was particularly evident in seasonal adaptation patterns, with participants systematically adjusting their plant-based milk selections to align with traditional seasonal dietary principles. Participant #17 described this process: "I deliberately switch from black sesame milk in winter to lighter, 'cooling' options like almond or rice milk during summer training to maintain bodily balance."

Third, the exercise-specific attribute matching category (80 cumulative references) proved sophisticated adaptation processes that extended beyond generic nutritional considerations to training-specific attribute evaluation. This contextual specificity represents a distinctive characteristic of the evaluation process, with attributes assessed differently based on training phase, intensity, and specific exercise modality rather than through fixed hierarchical frameworks.

Notable demographic patterns were observed, with gender emerging as a vital influencing factor [33]. Female participants more frequently emphasised digestive compatibility and cultural dietary principles, while male participants placed greater emphasis on protein metrics and performance enhancement. These differences suggest gender-specific pathways within the broader evaluation framework.

4.3. Axial Coding Results

The axial coding phase established relationships between concepts, developing higher-order categories, and identifying their properties and dimensions. This analysis uncovered 16 main categories encompassing 47 sub-categories with a total of 624 reference points. The coding reliability coefficient reached Kappa = 0.85, indicating high consistency. Table 4-2 presents selected main categories from the axial coding system.

Table 4-2. Selected Categories from Axial Coding System

Main Category	Sub-category	Reference Points	Typical Statement Example
Functional Attribute Recognition System (FR01)	Digestive Compatibility Recognition	29	"I initially chose plant-based milk because I couldn't digest cow's milk well during intense training sessions."
	Exercise Performance Connection	32	"As my fitness experience increased, I became more aware of how different plant milk types support various training styles."
	Nutrient Profile Differentiation	28	"I've learned to distinguish between different plant milks based on their protein content, fat composition, and micronutrient profiles."
Chinese Traditional Dietary Integration (CT08)	Yin-Yang Balance Application	31	"I apply traditional 'hot-cold' balance concepts, selecting 'warming' plant milks for winter training."
	Seasonal Harmony Principle	28	"Following traditional wisdom, I adjust my plant milk choices with seasonal changes to maintain bodily harmony."
	Body Constitution Alignment	29	"I select plant milks aligned with my body constitution type according to traditional Chinese medicine principles."
Purchase Decision-Making Framework (PD03)	Attribute Hierarchy Construction	33	"I prioritise protein content and quality first, then micronutrients, followed by additives and finally price."
	Training Phase Alignment	29	"My purchase decisions shift based on whether I'm in a bulking, cutting, or maintenance phase."
	Value Perception Balancing	27	"I evaluate the balance between functional benefits and cost, accepting premium prices only for genuinely effective attributes."

Axial coding revealed significant relationships between the identified categories, presenting complex interconnections rather than linear evaluation pathways. Most notably, the Functional Attribute Recognition System (FR01) emerged as central to the evaluation process, serving as a foundational framework through which participants organised and integrated functional attribute information. This system represented not simply information storage but an active perceptual framework that shaped how attributes were recognised and categorised [34].

The Chinese Traditional Dietary Integration (CT08) category illustrated sophisticated relationships with multiple other categories, functioning not as an isolated cultural influence but as an interpretive framework that actively shaped how scientific information was processed and applied. This integration occurred through three distinct mechanisms identified in the axial coding: complementary application (simultaneous use of both frameworks), contextual prioritisation (situational emphasis of one framework over another), and synthesised interpretation (development of new understanding through framework integration).

A key finding from the axial relationship analysis was the identification of non-linear, network-like evaluation patterns. Unlike the sequential processing described in Western consumer research, participants showed continuous, bidirectional influence patterns between categories. For example, the relationship between training phase alignment and attribute hierarchy construction showed continuous reciprocal influence, with training phases shaping attribute priorities while attribute assessments simultaneously influenced training phase planning.

Chi-square analysis ($\chi^2 = 41.36$, $p < 0.01$) confirmed significant differences among the influencing factors, with the Functional Attribute Recognition System (14.8%) and Chinese Traditional Dietary Integration (13.9%) emerging as the core dimensions. The interaction effect interpretation rate of these two categories reached 28.7% ($F = 8.92$, $p < 0.001$), highlighting their central importance in the theoretical framework.

4.4. Selective Coding Results

The selective coding phase identified five core categories that integrated the axial coding results into a coherent theoretical framework. Table 4-3 presents these core categories and their constituent axial codes.

Table 4-3. Selective Coding of Core Categories

Core Category (Frequency)	Axial Coding (Frequency)
Functional Attribute Knowledge System (165)	FR01 Functional Attribute Recognition System (45) AV02 Attribute Verification Mechanism (40) PE04 Product Evaluation Methodology (40) BT07 Brand Trust Framework (40)
Cultural-Scientific Decision Integration (155)	CT08 Chinese Traditional Dietary Integration (50) PD03 Purchase Decision-making Framework (40) FV06 Functional Value Assessment System (35) CH09 Consumption Habit Formation (30)
Training-Adaptive Selection Strategy (140)	TI05 Training Integration Strategy (45) AC11 Activity-Specific Customisation (35) AF12 Attribute Flexibility Strategy (30) FC16 Future Consumption Trajectory (30)
Performance Outcome Validation (110)	AP10 Athletic Performance Correlation (45) IP13 Ideal Product Conceptualisation (35) PC14 Packaging and Convenience Factors (30)
Sensory-Functional Balance (54)	SA15 Sensory Acceptance Threshold (54)

The selective coding process revealed several crucial insights about how these core categories collectively explain Chinese fitness enthusiasts' plant-based milk evaluation processes. First, the Functional Attribute Knowledge System emerged as a dynamic framework rather than a static information repository. Participants actively processed information through multiple knowledge structures simultaneously, integrating traditional wisdom, scientific research, and experiential knowledge through sophisticated parallel processing. Participant #9 exemplified this: "When I learn about a new plant milk, I simultaneously evaluate it through both scientific nutritional frameworks and traditional medicine principles—these aren't separate considerations but integrated aspects of my understanding."

Second, the Cultural-Scientific Decision Integration component illustrated bidirectional knowledge flows rather than unidirectional modernisation processes. Traditional concepts provided interpretive frameworks for scientific information, while scientific knowledge often reinforced or refined traditional understandings [35]. This integration created unique evaluation criteria that transcended

both traditional and scientific perspectives in isolation. As Participant #13 explained: "I don't see modern nutrition science and traditional dietary wisdom as competing—they illuminate different aspects of the same functional benefits. The concept of 'warming' foods in winter isn't replaced by thermogenic effects research; they complement each other."

Third, the Training-Adaptive Selection Strategy exposed sophisticated contextual adaptation processes that extended beyond simple attribute prioritisation. Participants demonstrated complex adaptation mechanisms that included temporal shifts (seasonal adjustments), intensity-based modifications, training phase adaptations, and exercise-type specific selection criteria. These adaptation processes operated through network-like decision structures rather than hierarchical frameworks, with multiple contextual factors simultaneously influencing selection strategies.

Fourth, the Performance Outcome Validation component revealed multi-stage validation sequences that included community verification, self-experimentation, and training phase-specific evaluation criteria [36]. Unlike the relatively passive acceptance of scientific claims documented in Western consumer studies, participants actively tested functional claims through personalised validation protocols, with perceived outcomes continuously feeding back into their evaluation frameworks.

Finally, the Sensory-Functional Balance emerged as a regulatory mechanism within the decision network, operating not as a simple threshold but as an active negotiation process that varies with context.

Theoretical saturation was confirmed through interviews with 20 fitness enthusiasts, where new concepts such as "Traditional Medicine Ingredient Preference" (AA61) and "Seasonal Training Nutrition Adjustment" (AA65) could be incorporated into the existing coding system without requiring new categories.

4.5. Theoretical Model Development

Based on the five core categories identified through selective coding, a theoretical model was developed to explain the processes through which Chinese fitness enthusiasts' perceptions of plant-based milk functional attributes influence their purchasing decisions (Figure 1).

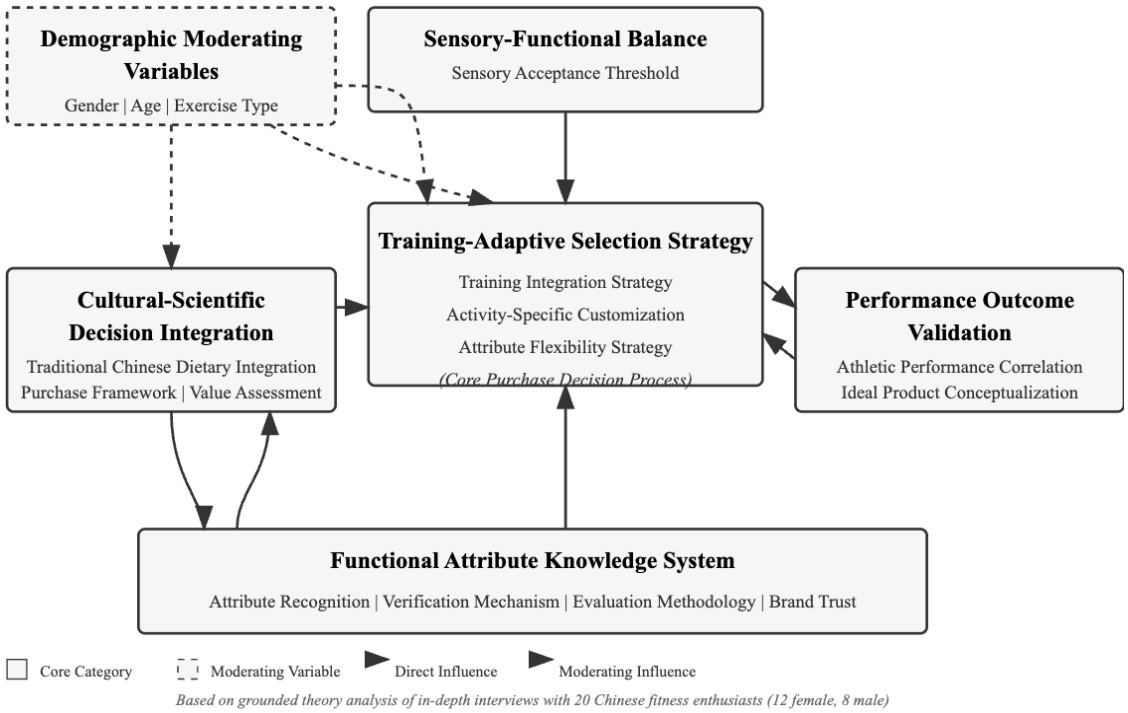

Figure 1. Theoretical Model of Chinese Fitness Enthusiasts' Plant-Based Milk Functional Attribute Perception and Purchase Decision

The model illustrates the interrelationships between five core categories that emerged from the data analysis. The network structure of the model reflects Chinese philosophical tendencies toward holistic thinking, wherein components are understood through their relationships rather than as isolated entities. This network-like structure is evident in the bidirectional arrows between key components, illustrating that this is not a linear progression but rather a complex system of simultaneous interactions.

The model was validated through member checking with five original participants and theoretical saturation testing with 15 additional fitness enthusiasts. This validation confirmed that the model accurately reflected participants' decision-making processes and that no new categories emerged that could not be incorporated into the existing framework [37].

5. DISCUSSION

5.1. Critical Analysis of Key Theoretical Components

5.1.1. Functional Attribute Knowledge System: Dynamic Knowledge Networks

The Functional Attribute Knowledge System emerged as the foundational component of our theoretical model, representing a revolutionary departure from conventional Western frameworks. Unlike the sequential knowledge acquisition models prevalent in consumer research, this system functions as a complex, multidimensional network where traditional wisdom, scientific research, and experiential knowledge coexist and interact simultaneously [38].

This dynamic knowledge network enables attendees to process seemingly contradictory information through sophisticated parallel processing rather than linear evaluation. Participant #28 exemplified this complexity: "I don't simply look for scientific evidence or traditional wisdom in isolation; I view each functional claim through both lenses simultaneously. When evaluating black sesame milk, I consider both its traditional 'warming' properties and modern research on its antioxidant profile. These complementary knowledge frameworks jointly shape my understanding."

What distinguishes this knowledge system is its ability to maintain multiple epistemic frameworks simultaneously without hierarchical subordination. When modern science and traditional concepts presented surface-level contradictions, attendees didn't simply select one framework over another but instead developed sophisticated integration mechanisms, such as contextual applicability rules or complementary interpretations that allowed both frameworks to coexist meaningfully. For example, Participant #14 explained: "The scientific concept of anti-inflammatory properties doesn't replace traditional cooling attributes—they're complementary aspects of the same phenomenon viewed through different knowledge lenses. I don't need to choose between frameworks; I use both simultaneously to develop a more complete understanding."

The dynamic nature of this knowledge network manifests in three distinctive characteristics. First, it shows remarkable contextual adaptability, with different network pathways activated depending on training phases, seasonal considerations, or recovery requirements. This adaptability enables attendees to maintain consistent functional attribute evaluation frameworks whilst allowing for situation-specific application of knowledge. Second, the network shows emergent properties, where the integration of traditional and scientific knowledge generates novel interpretations that exist in neither framework independently [39]. Finally, the network exhibits resilience to contradictory information, with participants developing sophisticated reconciliation strategies that maintain network integrity despite apparent conflicts.

This dynamic knowledge network explains why existing consumer decision models display poor cross-cultural validity when applied to Chinese fitness enthusiasts. Rather than processing information through the linear, sequential frameworks assumed in Western models, Chinese consumers operate through dynamic networks that enable simultaneous consideration of multiple

knowledge frameworks—a fundamental difference that necessitates theoretical reconceptualisation rather than simple model modification.

5.1.2. Cultural-Scientific Decision Integration: Bidirectional Knowledge Flows

The Cultural-Scientific Decision Integration component represents a transformative reconceptualisation of how cultural and scientific knowledge systems interact in consumer decision frameworks. Rather than the unidirectional modernisation processes commonly assumed in cross-cultural consumer research, our data revealed sophisticated bidirectional knowledge flows that challenge conventional theoretical assumptions.

This bidirectional integration operates through three distinct mechanisms identified in our data. First, complementary application allows traditional and scientific stuctures to coexist by allocating different explanatory domains to each system. Participant #6 described this mechanism: "I use scientific information to understand macronutrient profiles and traditional knowledge to understand how the plant milk will interact with my body constitution—they answer different but equally important questions."

Second, contextual prioritisation involves selectively emphasising different knowledge frameworks depending on specific circumstances. Rather than permanently privileging one system over another, participants showed notable flexibility in framework application. Participant #19 explained: "During intense training phases, I prioritise scientific metrics like protein content and recovery compounds, but during seasonal transitions, traditional principles about balancing body constitution become equally important guidance systems."

Third, synthesised interpretation involves developing novel understandings through the active integration of traditional and scientific concepts [40]. This mechanism transcends simple framework coexistence to create emergent knowledge unavailable in either system independently. Attendee #11 demonstrated this synthesis: "The traditional concept of 'building blood' combined with scientific understanding of iron absorption creates a more comprehensive framework for evaluating plant milk during female athletes' menstrual phases than either system provides alone."

The sophisticated integration mechanisms we observed challenge simplistic modernisation narratives that assume traditional knowledge systems are inevitably displaced by scientific frameworks. Instead, our data revealed evolutionary integration processes where both knowledge systems are continuously refined through interaction with each other. This bidirectional relationship fundamentally alters how functional attributes are perceived and evaluated, creating unique decision criteria that transcend both traditional and scientific perspectives in isolation [41].

This bidirectional integration explains why certain plant-based milk functional attributes are prioritised differently in the Chinese market compared to Western markets, and why simplified cultural dimension frameworks show poor predictive power when applied to Chinese consumers. The integration mechanisms we identified provide a theoretical foundation for understanding how traditional knowledge systems remain vibrant and influential even as consumers simultaneously embrace scientific frameworks—a dynamic process that requires more sophisticated theoretical models than currently available in cross-cultural consumer research.

5.1.3. Network Structure as Theoretical Innovation

The network-like structure of our theoretical model represents a significant departure from conventional consumer decision frameworks and offers profound implications for understanding cross-cultural variations in functional food evaluation. Unlike the linear, sequential processing assumed in Western consumer models, our data revealed complex simultaneous interactions between multiple components, creating a dynamic decision ecosystem rather than a linear pathway.

This network structure is visually represented in Figure 1 through bidirectional arrows connecting key components, but the true complexity extends beyond what two-dimensional visualisation can

capture. The structure operates as a multidimensional decision space where components continuously influence each other through recursive feedback loops rather than unidirectional causal relationships [42]. For instance, the relationship between Cultural-Scientific Decision Integration and Functional Attribute Knowledge System functions as a continuous bidirectional exchange, with each component constantly informing and modifying the other through real-time interaction rather than sequential processing.

The network structure enables remarkable contextual adaptability through pathway activation patterns. Different decision contexts—such as training phases, seasonal considerations, or specific exercise modalities—activate different combinations of network pathways without requiring fundamental framework changes. This flexibility explains why participants demonstrated seemingly inconsistent attribute prioritisation across contexts whilst maintaining coherent overall evaluation frameworks—a phenomenon poorly captured by linear models with fixed attribute hierarchies.

Gender differences manifest not as entirely separate decision structures but as distinctive pathway activation patterns within the shared network framework. Female participants showed stronger connectivity between Cultural-Scientific Decision Integration and Training-Adaptive Selection Strategy components, whilst male participants demonstrated stronger pathways between Functional Attribute Knowledge and Performance Outcome Validation elements. These gender-specific patterns modify the relative strength of connections between components rather than changing the overall network architecture, creating personalised variations within the shared framework.

The network structure reveals why Western theoretical models demonstrate poor cross-cultural validity when applied to Chinese consumers. These models typically assume linear, sequential processing where evaluation criteria remain relatively stable across contexts—assumptions fundamentally incompatible with the dynamic, contextually adaptive networks we observed. The network model explains seemingly contradictory findings in cross-cultural consumer research by reconceptualising cultural influences as distinctive network architectures rather than simple dimensional variations.

This theoretical innovation offers deep implications for cross-cultural consumer research. Rather than viewing cultural differences through simplified dimensional frameworks that assume universal decision processes with cultural variations in content, our network model suggests fundamentally different decision architectures across cultural context. This reconceptualisation explains why theoretical models developed in Western contexts often show poor predictive power when applied cross-culturally—they misrepresent the fundamental architecture of decision processes rather than simply overlooking specific cultural content.

5.2. Addressing Research Gaps Through Theoretical Reconceptualisation

This study directly addresses the theoretical deficiencies identified in the literature review. Our network model challenges the linear, sequential evaluation frameworks that dominate Western consumer research. As Wang, Yuan and Gao (2024) predicted through their cognitive mapping techniques, the Chinese fitness enthusiasts in this study showed non-linear, simultaneous evaluation patterns that incorporated multiple knowledge frameworks operating in parallel.

The Training-Adaptive Selection Strategy component adds substantial nuance to the Performance Enhancement Model (Maughan et al., 2018), capturing the holistic, long-term performance definitions recorded by Li et al. (2023), including dimensions absent from Western frameworks such as practice sustainability and energetic harmony.

The Performance Outcome Validation component demonstrates how participants move beyond initial attribute claims to engage in sophisticated verification processes. Unlike the relatively passive acceptance of scientific claims documented in Western consumer studies, our participants employed multi-stage validation sequences that included community verification, self-experimentation, and

training phase-specific evaluation criteria. This component explains why certain functional claims gain rapid acceptance in the Chinese market while others face persistent skepticism despite similar scientific support.

Our model's network-like structure directly challenges Hofstede's (2011) cultural dimensions theory, which Fang (2012) criticised for inadequately capturing the dialectical thinking patterns characteristic of Chinese philosophical traditions. The bidirectional relationships throughout our model address a significant limitation in existing frameworks that typically conceptualise traditional and scientific knowledge systems as competing rather than complementary frameworks [43].

The gender differences showed in our network model add important nuance to Self-determination theory (Deci and Ryan, 2022). The stronger integration between intrinsic and extrinsic motivational factors identified by Liang et al. (2025) was evident in our female participants' emphasis on holistic health concepts and traditional dietary principles, while male participants demonstrated patterns more aligned with conventional Western frameworks through their emphasis on immediate performance benefits and protein metrics.

5.3. Implications for Practice and Industry Application

The theoretical model developed in this study has significant implications for product development, marketing strategies, and consumer education in the rapidly growing Chinese plant-based milk market. The network structure of the decision process suggests that manufacturers should develop integrated communication strategies that acknowledge both traditional Chinese dietary wisdom and modern nutritional science simultaneously, rather than emphasising one at the expense of the other.

The sophisticated Sensory-Functional Balance negotiation process identified in our research suggests opportunities for innovative product development approaches. Rather than simply maximising either sensory appeal or functional benefits, manufacturers should consider how these dimensions interact within the consumer's decision network. This might include developing products with different sensory profiles optimised for specific consumption contexts, creating companion products designed to be mixed by consumers to balance sensory and functional dimensions, or developing educational materials that help consumers implement the strategic consumption timing practices observed in our participants.

The gender differences documented in our network model indicate opportunities for targeted product development and marketing. Female consumers' greater emphasis on digestive comfort, seasonal appropriateness, and community confirmation suggests the value of developing products with explicit references to these attributes and creating community-based marketing approaches. For male consumers, the stronger prioritisation of protein quality metrics and recovery-specific attributes, coupled with greater emphasis on scientific evidence assessment, indicates potential for products with detailed nutritional information and research-backed performance claims.

The Training-Adaptive Selection Strategy component highlights the importance of developing products tailored to specific training modalities and phases. This aligns with but significantly expands upon the findings of Adhikari et al. (2022), who documented differences in nutritional priorities across training disciplines. Our research suggests opportunities for specialised plant-based milk formulations for strength training, endurance sports, and mind-body practices, with formulations potentially varying seasonally to resonate with traditional dietary principles.

5.4. Theoretical Model Limitations

Whilst the network model developed in this study provides vital insight into how Chinese fitness enthusiasts evaluate plant-based milk attributes, several theoretical limitations warrant acknowledgement.

First, the model's network structure, while capturing the complexity of decision processes, presents challenges for empirical testing through conventional quantitative methods [44]. The bidirectional relationships and contextual activation patterns require more sophisticated measurement approaches than traditional linear modeling techniques, potentially limiting immediate quantitative validation.

Second, while gender emerged as a crucial moderating variable, the theoretical framework may not fully capture other demographic influences. Factors such as age, regional origin within China, and exposure to international perspectives likely create additional variations within the network structure that warrant further theoretical development.

Third, the theoretical model focuses specifically on the Chinese cultural context and may not be directly transferable to other Asian cultures with different traditional dietary frameworks. The specific integration mechanisms between traditional Chinese medicine principles and modern nutritional science may manifest differently in contexts where alternative traditional knowledge systems predominate.

These theoretical limitations, whilst not undermining the model's contribution, highlight opportunities for further theoretical refinement through cross-demographic and cross-cultural comparative research.

5.5. Future Research Directions

This study opens several promising avenues for future research that build upon the dynamic knowledge networks and bidirectional integration processes identified in our theoretical model.

Quantitative validation of the network structure represents a methodological priority for future research. Traditional linear modeling approaches may be insufficient for capturing the complex, bidirectional relationships identified in our model. Advanced network analysis techniques could be employed to operationalise the model components and test relationship strengths across different demographic segments and consumption contexts. Such validation would enhance the model's generalisability while preserving its network architecture.

The Cultural-Scientific Decision Integration component warrants dedicated investigation through longitudinal research designs. Our cross-sectional approach captured integration mechanisms at a single point in time, but longitudinal studies could uncover how these mechanisms evolve as consumers encounter new scientific information or engage with traditional knowledge in different life phases. Such research would provide valuable insights into the evolutionary nature of knowledge integration rather than treating it as a static process.

The Functional Attribute Knowledge System's dynamic nature suggests opportunities for experimental research examining how new functional attributes are incorporated into existing knowledge networks. Controlled experiments introducing novel functional attributes with varying levels of congruence with traditional dietary principles could reveal integration mechanisms that remain partially obscured in naturalistic settings. This research would contribute to understanding how innovative functional foods gain acceptance in markets with strong traditional dietary frameworks.

Comparative research reviewing how the network model applies to other cultural contexts with distinct traditional dietary systems would be particularly valuable. Investigations in other Asian markets with different traditional medicine frameworks, such as Ayurvedic principles in India or Kampo medicine in Japan, could reveal both shared network properties and culturally-specific integration mechanisms. Such cross-cultural validation would contribute to developing truly global theoretical frameworks for understanding functional food evaluation beyond the predominantly Western models that currently dominate the literature [45].

The gender differences observed in network activation patterns show opportunities for targeted research into other demographic factors that may influence these patterns. Age cohorts, regional backgrounds, and international exposure likely create additional variations in how knowledge networks develop and operate. Understanding these demographic influences would enhance the model's predictive power across diverse consumer segments within the Chinese market.

These future research directions would collectively advance theoretical understanding of how cultural factors shape functional food evaluation beyond simplistic dimensional frameworks, contributing to more culturally-sensitive consumer research in increasingly globalised functional food markets.

6. CONCLUSIONS AND RECOMMENDATIONS

This study investigated how Chinese fitness enthusiasts perceive plant-based milk health attributes and how these perceptions influence their purchase decisions. Through a grounded theory approach with 20 participants, a theoretical model emerged, revealing the complex interplay of traditional Chinese dietary principles and modern nutritional science in consumer decision-making. The model identifies five core elements—Functional Attribute Knowledge System, Cultural-Scientific Decision Integration, Training-Adaptive Selection Strategy, Performance Outcome Validation, and Sensory-Functional Balance—that operate through non-linear, network-like evaluation patterns rather than the sequential frameworks prevalent in Western consumer research.

The research has addressed significant gaps in existing theoretical frameworks through three key contributions. First, the Functional Attribute Knowledge System revealed sophisticated network-like knowledge structures that simultaneously incorporate multiple perspectives, challenging conventional linear models of consumer decision-making. This dynamic knowledge network enables participants to process seemingly contradictory information through parallel processing rather than linear evaluation, explaining why existing consumer decision models demonstrate poor cross-cultural validity.

Second, the Cultural-Scientific Decision Integration component operates through bidirectional knowledge flows rather than unidirectional modernisation processes. Attendees developed sophisticated mechanisms for harmonising traditional dietary principles with modern nutritional science, creating unique evaluation criteria that transcended both frameworks in isolation. This bidirectional integration challenges simplistic modernisation narratives and explains why certain functional attributes are prioritised differently in the Chinese market.

Third, the network structure of the entire theoretical model represents a fundamental departure from linear consumer decision frameworks. The bidirectional relationships throughout our model create a complex decision ecosystem where components continuously influence each other through recursive feedback loops rather than unidirectional causal relationships. This network architecture enables remarkable contextual adaptability whilst maintaining coherent evaluation frameworks, a phenomenon poorly captured by models that assume fixed attribute hierarchies.

These findings challenge simplistic modernisation narratives and point to the importance of culturally-sensitive approaches to understanding functional food evaluation. The implications extend beyond theoretical contributions to practical applications in product development and marketing for the growing Chinese plant-based milk market. Manufacturers should develop integrated communication strategies that acknowledge both traditional Chinese dietary wisdom and modern nutritional science simultaneously, rather than emphasising one at the expense of the other.

Future research should quantitatively validate this network model, explore its applicability to other functional food categories, and investigate similar cultural-scientific integration processes in other emerging markets with strong traditional dietary systems. Comparative studies across different Asian markets with distinct traditional medicine frameworks could uncover both shared network properties and culturally-specific integration mechanisms. Such research would contribute to developing truly

global theoretical frameworks for understanding functional food evaluation beyond the predominantly Western models that currently dictate the literature.

The theoretical innovations developed in this study provide a foundation for more culturally-sensitive consumer research in increasingly globalised functional food markets, tackling the limitations of existing frameworks while offering practical guidance for market development in the rapidly growing Chinese plant-based milk sector.

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