



Parents' and Children's Perceptions and Attitudes Towards Traditional and Novel Plant-Based Meat Alternatives: A Scoping Review

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The growing popularity of plant-based meat alternatives (PBMA) as a sustainable dietary option highlights the need to understand family perceptions to support their integration into daily diets. Early-life food preferences often stem from parents or caregivers. This scoping review synthesized existing findings on parents' and children's perceptions of traditional and novel PBMA and identified motivators and barriers to adopting them in family meals. A comprehensive search across 5 databases (Nutrition and Food Sciences, Web of Science, Global Health, Scopus, PsycINFO) was performed on April 1, 2024, using predefined terms. The review adhered to Joanna Briggs Institute (JBI) methodology and PRISMA-ScR reporting guidelines. The Mixed Methods Appraisal Tool was used to assess study quality. Twenty studies were identified: 5 articles on parents or caregivers, 11 studies on children, and 4 articles on parent–child dyads. Parents were more accepting of traditional PBMA (eg, lentils, tofu, beans, chickpeas), but expressed concerns over the nutritional adequacy, sodium content, and processing of novel PBMA. Among parents who were non-regular users, traditional PBMA were viewed mainly as a textural enhancement rather than a nutrient source. By contrast, children were generally more receptive to novel PBMA compared with parents, particularly when products resembled meat and were linked to environmental and animal welfare benefits. For both parents and children, taste emerged as the primary driver for repeated consumption. Strategies to increase PBMA uptake in families should be focusing on improving the sensory appeal and nutritional profile of these products, enhancing product transparency around ingredients and processing technologies, and providing tailored nutrition education that aligns with existing knowledge and cooking skills. Family-based interventions that address both parental concerns and children's motivations may be particularly effective in positioning PBMA as an accepted component of everyday family meals.

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Key words: family food choices, consumer behaviour, food preferences.

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INTRODUCTION

Plant-based meat alternatives (PBMA) encompass a wide spectrum of foods, from long-established plant protein sources, such as legumes, tofu, and tempeh, to highly engineered products designed to closely mimic the taste, texture, and appearance of meat. In this review, we distinguish traditional PBMA—that is, protein-rich plant foods in their original or minimally processed forms (eg, coagulation, fermentation, curdling)—from novel PBMA, which undergo substantial processing (eg, high-moisture extrusion, shear cell technology, or 3D printing) and are typically formulated from plant protein isolates, mycoprotein, or grain/legume derivatives to replicate meat-based sensory profiles. This scoping review examines how parents and children perceive and respond to both traditional and novel PBMA, the factors that motivate or deter their consumption, and strategies that may increase acceptance in household and community settings.

Traditional PBMA have been consumed for centuries in many cultures, particularly Asia.¹ In contrast, novel PBMA have emerged more recently, driven by consumers' growing awareness in health,² environmental sustainability and ethical concerns,³ alongside advances in food-processing technologies allowing for improved sensory profiles.^{4,5} The global market for novel plant-based protein was valued at US dollars (USD) 15.7 billion in 2024 and is projected to reach USD 25.2 billion within 5 years,⁶ signaling a major shift in protein-consumption patterns.

Nutritionally, with protein sources, animal proteins are considered the “gold standard” due to their complete profile of 9 essential amino acids with high bioavailability.⁷ In this context, traditional plant proteins are often regarded “incomplete,” as they tend to lack one or more essential amino acids, typically lysine or methionine.⁷ Due to differences in their chemical structures and the presence of antinutrients (compounds that block absorption), traditional plant proteins are less bioavailable than animal proteins.^{8,9} However, combining different plant protein sources can allow individuals to achieve “complete protein” nutrition from plant sources.¹⁰ Moreover, traditional plant proteins have been linked to numerous health benefits, including improved metabolic responses and reduction in risks of type 2 diabetes and obesity.^{11–13}

Novel PBMA are generally able to provide complete amino acid profiles equivalent to those of animal-based proteins, taking advantages of advanced processing techniques.¹⁴ Yet, empirical findings on their health effects remain mixed. Some studies show that novel PBMA have similar metabolic responses to animal proteins,¹⁵ while others even suggest benefits for glycemic

control and cardiovascular biomarkers.^{16–18} However, notably, concerns remain over their typically high sodium content,¹⁹ usage of food additives,²⁰ and low bioavailability of nutrients such as non-heme iron.²¹ Previous studies of PBMA burger patties showed twice as high sodium content as conventional meat patties.^{22,23} Furthermore, although food additives in novel PBMA are generally recognized as safe, uses of carrageenan^{24–26} and methylcellulose in these products have been linked to potential gastrointestinal discomfort.^{27,28}

With the rapid evolution of the food landscape and the anticipated continuation of this trend under environmental pressure to adopt PBMA, an increasing number of young parents are choosing plant-based diets for themselves and their children.²⁹ Indeed, parents play a pivotal role in shaping their children's dietary preferences during the early years through making the primary food decisions³⁰ and demonstrating eating patterns at meals.³¹ Children's eating behavior often follows through into adulthood, where individuals continue to make similar food decisions even after living independently.³² Additionally, compared with general consumers, parents have been shown to have a distinct decision-making process for food purchases.^{33,34} Practical considerations related to family needs, such as accommodating children's preferences, satisfying children's tastes, and using foods as rewards, have been identified as barriers to purchasing healthy foods.^{34–37}

Individual food acceptance and choices are largely shaped by environments around them. The likelihood of adults to try “novel” foods (ie, food that is not commonly part of a person's typical diet or food created using innovative technologies)³⁸ when they are with family and friends is higher, as opposed to when eating alone.^{39,40} For children, the food environment outside of home may differ from the environment of their habitual food intake. In school settings, peer modeling has been shown to increase children's willingness to eat.^{41,42} The broader exposure to a wider variety of foods outside of the home can influence children's taste and preferences, potentially altering their food choices and acceptance at home.⁴³

Aside from genetic factors,⁴⁴ children's food preferences are largely moderated by exposure, familiarity, and taste.^{45,46} For example, Birch and Marlin⁴⁷ demonstrated that repeated exposure to novel dairy products and fruits increased children's preference to these foods, highlighting the effect of repeated exposure on shaping food preference. In addition, strategies such as behavioral modeling,⁴⁸ repeated exposure,⁴⁹ and use of reward⁵⁰ have been shown to be effective in promoting acceptance and sustained consumption of novel foods in children.

Assessing consumer behaviors within a family unit offers a holistic view of cross-generational purchasing habits and how household members influence each other's decisions.^{51,52} For instance, previous research shows that the younger generation tends to select similar food brands as their parents, suggesting brand loyalty can be transmitted intergenerationally.⁵³

A person's perception towards PBMA's can influence their attitude in food choices and habitual intake. Perception refers to the interpretation of information based on prior experiences, expectations, and situational context.^{54,55} Attitude, in contrast, is a learned predisposition—positive or negative—accompanied by emotional responses towards a behavioral intention.^{56,57} While perception is dynamic and readily influenced by new information or experiences,⁵⁸ attitudes are grounded beliefs, values, and emotions, which are more difficult to modify in the immediate term.⁵⁷

Understanding both parents' and children's attitudes toward traditional and novel PBMA's can unravel their different concerns, motivations, and barriers to incorporating these products into household meals. Identifying the similarities and differences in perceptual gaps between parents and children can provide insights to foster broader consumer adoption and market growth, ultimately supporting the wider acceptance of PBMA's into family diets, and contributing to a more sustainable and health-conscious food environment for future generations.

To our best knowledge, no scoping reviews have simultaneously examined the perceptions of both parents and children regarding PBMA's. The current scoping review thus aims to:

- Review perceptions of parents and children regarding PBMA's and understand their motivators and barriers to adopting PBMA's; and
- Synthesize empirical data concerning parents' and children's acceptance or willingness to consume PBMA's in household or community settings.

Key research questions comprised the following: How do parents and children perceive PBMA's?; what are the key factors that motivate or deter parents and children from consuming PBMA's?; and what are the intervention strategies available to increase PBMA acceptance and willingness to consume?

METHODS

This scoping review was conducted following the Joanna Briggs Institute (JBI) methodology⁵⁹ and reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR)⁶⁰ ([Appendix S3](#)). The

protocol was registered with the Open Science Framework (<https://osf.io/98n7r>) on March 28, 2024, and updated on December 24, 2024.

Search Strategy

Database searches were conducted on April 1, 2024, using the following sources: Nutrition and Food Sciences (CABI), Web of Science (all databases), Global Health (via Ovid), Scopus, and PsycINFO (via Ovid). A detailed list of key word search terms is provided in the [Appendix S1](#). Gray literature searches were performed using ProQuest Dissertations and Theses Global (PQDT Global, Ann Arbor, MI, USA) and the research repositories of 8 New Zealand universities. Following the screening process, authors A.T.G. and Y.M. manually reviewed the reference lists of included studies to identify additional relevant publications. Corresponding authors of the included studies were contacted to inquire about any previously published manuscripts on related topics. [Figure 1](#) presents a flow diagram outlining the process.

Study Selection

All records identified through the database search were exported to the free version of Rayyan software (Qatar Computing Research Institute, Doha, Qatar) for eligibility screening. Duplicates were removed by A.T.G. using Rayyan's automated tool. Two reviewers (A.T.G.: 100%; Y.M.: 100%) independently screened titles, abstracts, and key words using a blind review process. A 30% validation was conducted by a third reviewer (J.C.M.). The selected studies were then independently reviewed by A.T.G. and Y.M. to determine eligibility. If there were disagreements between the reviewers (A.T.G. and Y.M.), a third independent reviewer (J.C.M.) adjudicated to help reach a joint consensus. The eligibility criteria, developed to define the 3 main concepts, are outlined in [Table 1](#).

The key outcomes extracted focus on individuals' perceptions and attitudes towards PBMA's. Acceptance and willingness to consume or purchase PBMA's are considered indicators of readiness for adopting PBMA's. Given the limited availability of studies primarily focusing on parents, children, or families, this review included publications with quantitative data, qualitative data, and mixed-methods approaches. Considering the relatively recent interest in plant-based diets, the searches were restricted to publications from the past 30 years. Only literature written in English was included, with no restrictions on geographic region. Reviews (narrative or systematic), commentaries,

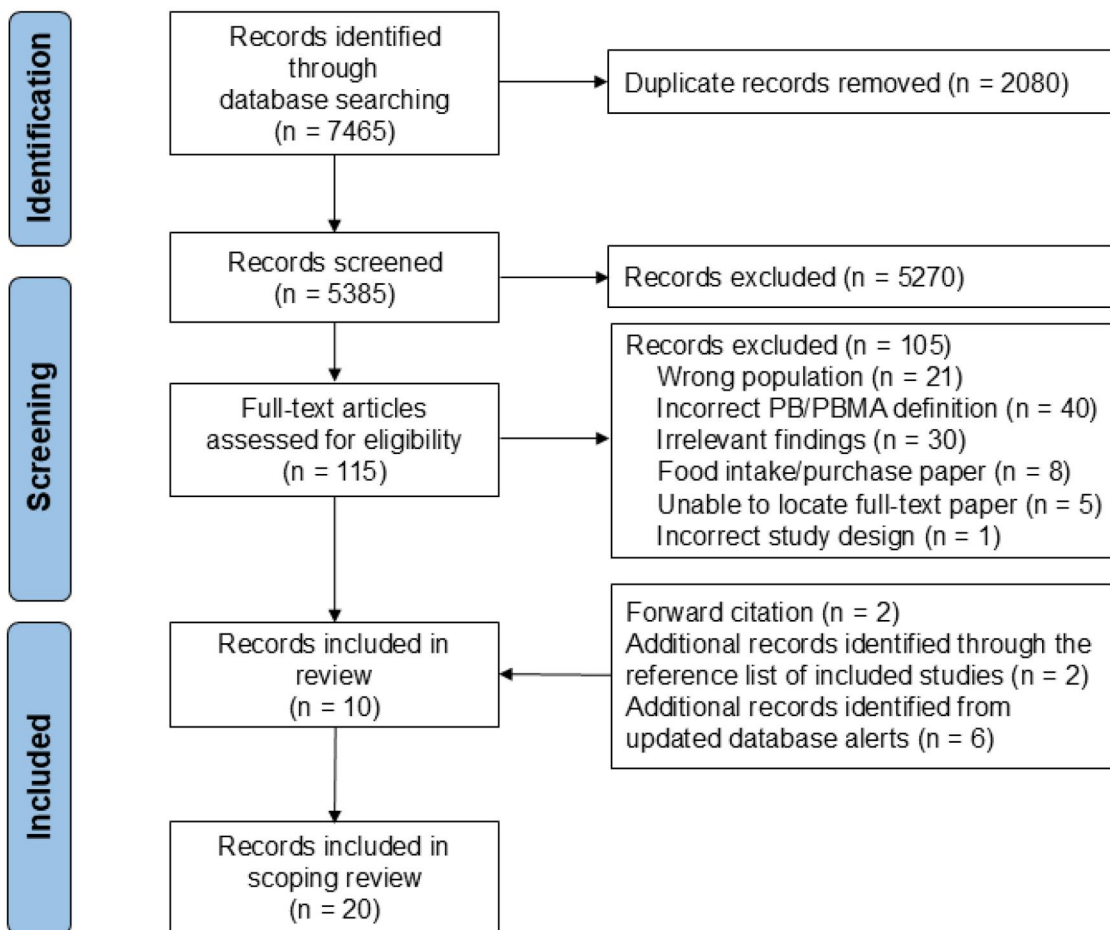


Figure 1. Flow Diagram of Data Selection Process

Abbreviations: PB, plant-based; PBMA, plant-based meat alternatives.

Table 1. Criteria for Inclusion and Exclusion of Studies

	Inclusion criteria	Exclusion criteria
Participants	Healthy population of parents, primary caregivers, and children. Parents: An individual with a biological or legal responsibility for the care, upbringing, and development of a child Primary caregivers: An individual predominantly responsible for the child's meals Children: An individual under the age of 18 y (WHO)	Non-human study population Population with specified health conditions Study population without information on parents, caregivers, or child subset Adolescents above 18 y
Concepts	Perceptions and attitudes towards PBMA Motivators and barriers in consuming PBMA Existing empirical data or interventions focused on family and children on acceptance or willingness to try PBMA	Unclear PBMA definition Defined PBMA that did not meet scoping review's definition Insect protein products, plant-based dairy alternatives Intake or purchase data without information on acceptance or willingness to try
Context	Home, family, or community setting	Hospital

Abbreviations: PBMA, plant-based meat alternative; WHO, World Health Organization.

opinion pieces, and conference abstracts were excluded from this review.

Data Charting Process

Information from all eligible studies was extracted into a standardized Microsoft[®] Excel[®] for Microsoft 365 spreadsheet (Microsoft Corporation, 2024, Redmond, WA, USA) by A.T.G. and reviewed by Y.M. Any disagreements were discussed and resolved between the reviewers. The extracted information included the following: study characteristics (year of publication, country of origin, study design), participant characteristics (age, gender, and ethnicity), methodology, outcome data, criteria used to define “plant-based” in the study, protein type and protein sources, and main findings. Outcome data included sample size and outcome measures for child and parent groups, including perceptions of PBMA, attitude towards PBMA, factors motivating or deterring PBMA consumption, strategies for providing PBMA, and intake or ratings of PBMA before and after consumption or purchase. For studies that did not provide the necessary data within the publication, corresponding authors were contacted to obtain the original data.

Study Risk-of-Bias Assessment

The methodological quality of all included studies was evaluated using the Mixed Methods Appraisal Tool (MMAT),⁶¹ with no studies excluded during this process. Given the various study designs included in this review, MMAT can assess the overall quality of the included studies.

Synthesis Method

This review used narrative synthesis to summarize and interpret the characteristics and findings of the identified studies in relation to the research questions. The studies were grouped by populations (ie, parents, caregivers, or children) and study designs; definitions of PBMA, measurement methods, and key findings are summarized in [Tables 2](#) and [3](#).

RESULTS

The search identified 7465 records, of which 2080 were duplicates ([Figure 1](#)). The remaining 5385 records were screened based on titles, key words, and abstracts. Of these, 5270 records were excluded due to clear irrelevance, such as studies involving non-human subjects, incorrect target populations, or research unrelated to plant-based topics. The remaining 115 records were examined in full text, and 105 records were excluded for

failing to meet the inclusion criteria. Ten articles from the databases were included, with an additional 10 articles identified through forward citation, reference lists of included studies, and database alerts. In total, 20 records were included in the scoping review. The MMAT quality assessment of all included studies is summarized in [Appendix S2](#). The results showed that all 20 records met the screening criteria. All qualitative studies ($n=7$) showed high quality, with 5 out of 5 experimental design and outcome data quality criteria evaluated as “yes.” Eleven (out of 13) quantitative studies showed moderate quality, meeting at least 3 out of 5 criteria, with the remaining 2 quantitative studies meeting only 2 out of 5 criteria due to unclear study design, completeness of outcome data, and analysis execution.

Of the 20 studies identified, 7 were qualitative studies and 13 were quantitative studies. There were 5 studies on parents or caregivers, 11 studies on children, and 4 studies on parent–child dyads. The findings were published between 2010 to 2025 on different types of PBMA: traditional PBMA (eg, lentils, tofu, beans, chickpeas) and novel PBMA (plant-derived meat analogs, eg, pea-based and soy-based). Intervention studies were conducted in both schools or community settings ($n=8$) and home settings ($n=2$), while quantitative non-intervention studies were carried out in schools or community settings ($n=3$) and online ($n=1$).

Parents’ Perceptions of PBMA

[Table 2](#) 62-70 summarizes the studies on parents’ perceptions and attitudes regarding PBMA. The key findings are coded by theme: awareness and knowledge; attitude towards specific protein sources in PBMA; family (parent) or familiarity (child); acceptance and preferences.

A total of 9 studies were identified, with 2 studies carried out in Asia and 7 studies were conducted in Western counterparts. The studies focused on only parents were conducted in Canada ($n=2$), while parent–child dyad studies were conducted in Canada ($n=1$), Denmark ($n=1$), the Netherlands ($n=1$), and Singapore ($n=1$). For 3 studies, parents’ responses as subdata were extracted from population/consumer studies in Australia ($n=1$), China ($n=1$), and the Netherlands ($n=1$). There were more non-intervention studies ($n=6$) than empirical studies ($n=3$) focused on parents or caregivers.

Amongst the 4 qualitative studies, 2 included novel and traditional PBMA,^{63,65} 1 study focused on only novel PBMA,⁷⁰ and 1 study included only traditional PBMA.⁶² Out of the 5 quantitative studies, there were 2 on both novel and traditional proteins,^{64,68} 2 others on traditional proteins,^{66,67} and 1 study on a novel

Table 2. Studies on Parents' Perceptions and Attitudes Regarding Plant-Based Meat Alternatives

Study (year)	Country	Sample size and age	PBMA definition	Outcome measure	Protein type and sources	Key findings
Qualitative, non-intervention Anant et al (2025) ^{70a}	Singapore	n = 19 Aged 38 to 56 y old; parents of children aged 9 to 15 y old	Novel PBMA	1. Self-reported awareness of PBMA, previous consumption and willingness to consume 2. Perceptions, beliefs and motivations on PBMA	Type: novel Sources: not specified	<u>Awareness and knowledge</u> -Awareness about PBMA: 73.3% -Greater food technology neophobia and some perceived as overly processed or artificial -Refer to social media and national guidelines for information about PBMA -Concerned about nutritional properties -Some questioned the sustainability claims of novel PBMA -Find it challenging to cook or prepare novel PBMA compared with animal-based protein -Influence of family -More likely to try if introduced by family, friends, or social settings -Acceptance and preferences -Consumed PBMA previously: 52.6% -Willingness to consume: 89.5% -Open to incorporate for variety and/or reducing traditional meat intake -Availability of novel PBMA at supermarkets, restaurants, and food centers increased willingness to consume -Anticipates novel PBMA to taste like animal protein -Willingness to purchase depends on children's preferences and nutritional needs <u>Awareness and knowledge</u> -Unaware about PBMA -Lack of knowledge and guidance on what the protein plants are (eg, aside from lentils) and how to prepare -Processed PBMA viewed as "unhealthy" -Lack of information on how to integrate PBMA at family meals
Barco Leme et al (2022) ⁶²	Canada	n = 40 Aged 25 to 54 y old; parents of children aged 2 to 12 y old	Protein from sources other than meat	Perception on PBMA	Type: traditional Sources: not specified	<u>Awareness and knowledge</u> -Unaware about PBMA -Lack of knowledge and guidance on what the protein plants are (eg, aside from lentils) and how to prepare -Processed PBMA viewed as "unhealthy" -Lack of information on how to integrate PBMA at family meals
Groen et al (2025) ⁶³	Netherlands	n = 11 ^b Aged 30 to 43 y old; unspecified child age	Traditional plant proteins: beans, lentils, legumes, and meat analogs	Flexitarian's perception on PBMA	Type: novel and traditional Sources: legumes (beans and lentils); meat analogs (not specified)	<u>Awareness and knowledge</u> -Lack of time, knowledge, or skills in finding authentic plant-based recipes -Keen to learn new vegetarian recipes but struggled with finding substitutes and recipes -Limited availability of novel PBMA, suggested for supermarkets to provide more information about PBMA

(continued)

Table 2. Continued

Study (year)	Country	Sample size and age	PBMA definition	Outcome measure	Protein type and sources	Key findings
Pater et al (2025) ^{65,a}	Netherlands	n = 36 Aged 31 to 67 y old; parents of children aged 9 to 11 y old	Traditional plant proteins and meat analogs	1. Drivers and barriers to PBMA consumption 2. Willingness to adopt PBMA within the family in a hypothetical situation 3. Perspectives on PBMA transition within the family	Type: novel and traditional Sources: not specified	<p>Attitude towards specific protein sources</p> <ul style="list-style-type: none"> -Perceived pulses and nuts as ingredients that add texture to meals rather than meat alternative <p>Influence of family</p> <ul style="list-style-type: none"> -Incorporating PBMA depends on children's preferences (eg, dislikes of beans) -Suggested to eat more plant-based meals from information they learned in school or news (eg, environment, health, and animal welfare education) <p>Acceptance and preferences</p> <ul style="list-style-type: none"> -Purchase of meat imitations is rare -Prefer to create meals that are inherently meat-free -Expressed interest to try novel PBMA but often disappointed by the taste (eg, vegetarian smoked sausage). -Some preferred novel PBMA for highly processed meat products (eg, vegetarian sausage) -Mentioned that their children were unable to tell apart meat- and plant-based meals <p>Influence of family</p> <ul style="list-style-type: none"> -Plant-based transition for children: offering PBMA and allowing children time to get used to them <p>Acceptance and preferences</p> <ul style="list-style-type: none"> -Top 4 drivers: taste, healthiness, environment, incorporation into meals -Top 5 barriers: taste, familiarity, lack healthiness, naturalness, and convenience -Most caregivers displayed willingness to substitute animal-based foods with plant-based, depending on ease, taste, and eating context. -Plant-based transition strategies: lower price, recipe provision, improve taste and sensory qualities, and increase availability and information about sustainability
Quantitative, non-intervention Malek and Umberger (2023) ⁶⁴	Australia	n = unspecified ^c Unspecified age; with children > 18 y old in the household	Plant-based protein foods (beans/peas/lentils, and meat alternatives; eg, tofu, tempeh, seitan, veggie burgers, plant-based mince)	Interest in PBMA among non-buyers and buyers via online survey	Type: novel and traditional Sources: legumes (beans, lentils, peas); soy (tofu, tempeh); wheat gluten (seitan); plant-based mince (not specified)	<p>Acceptance and preferences</p> <ul style="list-style-type: none"> -Most parents had either bought or expressed interest in PBMA (43.7%); among buyers who expressed interest, highest proportion are (1) open to all protein sources (86.4%), followed by (2) "indifferent" (31.9%), (3) prefer PBMA (39.2%), (4) prefer PBMA but averse to some novel alternatives (47.2%), (5) prefer some PBMA but averse to novel alternatives (38.2%), (6) averse to all protein alternative sources (8%)

(continued)

Table 2. Continued

Study (year)	Country	Sample size and age	PBMA definition	Outcome measure	Protein type and sources	Key findings
Phillips et al (2014) ⁶⁶	Canada	n = 401 <25 to 65 y old; caregivers of children aged 3–11 y old	Lentils	Perception on benefits and barriers towards lentils via self-administered questionnaire	Type: traditional Sources: legumes (lentils)	<u>Awareness and knowledge</u> -Perceived as “healthful” and good for the child (91%) -Low users expressed the lack of culinary skills to prepare, and believe that lentils may not be well liked by their family -No association between knowledge and intake -Weak association between nutrition knowledge and perceived benefits and barriers <u>Attitude towards specific protein sources</u> -Frequent users perceived as “healthful” and good for the child -Low users expressed the lack of culinary skills to prepare, and believe that lentils may not be well liked by their family -Parental modeling is believed to encourage their child to consume more lentils (80%) -Parents are less inclined to prepare lentil-based dishes frequently if their child does not enjoy (76%) <u>Acceptance and preferences</u> -Moderate association between intake and total belief scores ($r = 0.40$, $P < .01$)
Quantitative, observational and intervention						
Eckert et al (2025) ^{67,a}	Canada	n = 33 Mean age: 41.5 y old; parents of children aged 9 to 14 y old	Plant-based proteins (eg, legumes, beans, lentils, tofu, tempeh, textured vegetable protein, nuts, seeds)	Pre- and post-home intervention (online modules and cooking classes over 4 mo): 1. PBMA intake at home and overall 2. Attitudes, perceived behavioral control, and intentions	Type: traditional PBMA Sources: legumes (beans, lentils); soy (tofu, tempeh, textured vegetable protein); nuts; seeds	<u>Acceptance and preferences</u> -No significant changes in plant-based food intake for the main meal at home (estimated intake at the family level) -Significant increase in overall PBMA intake at post-intervention compared with pre-intervention among mothers (change, +0.4; $P < .001$) -Among mothers: significant increase in perceived behavioral control and intentions related to PBMA intake <u>Attitude towards specific protein sources</u> -Rating score: crispbread (seed-based) > falafel (chickpea-based) > mince (soy-based) and sausage (pea-based) <u>Acceptance and preferences</u> -Acceptance scores between first and last exposure remained stable except for sausage -Highest rated item was the crispbread, followed by falafel, mince, and sausage
Maya et al (2024) ^{68,a}	Denmark	n = 78 Unspecified age; parents of children aged 8 to 10 y old	Test meals that contained lentils (pasta, seeds (crispbread), chickpeas (falafel), soy-based mince, and pea-based sausages)	Acceptance towards novel and traditional PBMA between first (week 1) and last exposure (week 6) in home setting	Type: novel and traditional Sources: legumes (lentils, chickpeas, peas); soy; seeds	<u>Acceptance and preferences</u> -Acceptance scores between first and last exposure remained stable except for sausage -Highest rated item was the crispbread, followed by falafel, mince, and sausage

(continued)

Table 2. Continued

Study (year)	Country	Sample size and age	PBMA definition	Outcome measure	Protein type and sources	Key findings
Min et al (2024) ⁶⁹	China	$n = 568^d$ ≥ 51 y old; with children aged ≤ 16 y old in household	A diet that mimics the taste and texture of meat and uses primarily plant protein	Willingness to accept, taste, and purchase PBMA after positive nudging of information via online study	Type: novel Sources: not specified	Acceptance and preferences -Willingness to purchase PBMA was significantly higher after exposure to positive information compared with control group ($P < .01$) -No significant difference for willingness to accept and willingness to taste between both groups

^aParent-child dyad.

^bSubset data from $n = 30$.

^cSubset data from $n = 1012$.

^dSubset data from $n = 1000$.

Abbreviation: PBMA, plant-based meat alternative.

protein.⁶⁹ The following sections are structured into key themes derived from findings about parents' perspectives and empirical studies related to PBMA.

Knowledge and Perception. Across the 5 studies examining parents' views of PBMA, 3 articles focused on both traditional and novel PBMA,^{62,63,65} 1 study focused on novel PBMA,⁷⁰ and 1 study focused on traditional PBMA.⁶⁶ Overall, parents expressed the lack of awareness regarding novel and traditional PBMA,^{62,63,65} with raised concerns about the healthiness and nutritional content of novel PBMA being highly processed.^{62,65,70} In terms of traditional PBMA, parents were generally unfamiliar with what other traditional PBMA were other than the health benefits of lentils.⁶² Parents also incorporate traditional PBMA (ie, lentils) that they are familiar with and have nutritional knowledge about into meals.⁶⁶

While parents often refer to social media and national guidelines to make informed food choices, they still face challenges in preparing novel PBMA compared with animal protein.⁷⁰ There is also a lack of information in the supermarkets and limited guidance and culinary knowledge on how to incorporate novel and traditional PBMA into family meals.^{62,63,65,66}

Attitude Towards Specific Protein Sources in PBMA. Most studies did not specify the protein sources used in PBMA. Novel PBMA were commonly discussed in broad terms,^{63–65,69,70} while specific protein sources were provided for traditional PBMA.^{63,66,68} Of 9 studies, only 3 explicitly indicated parental attitudes on specific protein sources.^{63,66,68}

Parents had a positive attitude about traditional protein sources (eg, seeds and chickpeas) over novel options (eg, soy-based and pea-based analogs).⁶⁸ For traditional protein foods, nuts and legumes are included primarily for their textural contribution rather than for their protein content, indicating a culinary rather than nutritional rationale.⁶³ There are differing attitudes on the benefits of lentils and barriers between frequent and low users, where frequent-user parents viewed lentils positively from nutritional perspective, using the terms “healthful” and “good for children.”⁶⁶ In contrast, low-user parents highlighted culinary barriers, such as lacking in preparation skills and concerns about acceptance by family members.⁶⁶

Influence of Family. Four articles highlighted the influence of family members on parents' perspectives of PBMA (Table 2).^{63,65,66,70} Although parents believed that parental modeling, offering and allowing time to adapt, could encourage their children to consume more traditional and novel PBMA,^{65,66} they were also less

likely to incorporate lentils or beans into family meals if their child disliked them.^{63,66} The preconception that their family members may not appreciate traditional PBMA deterred parents from offering them during family meals.⁶⁶

Some parents observed that their children could not differentiate between meat and PBMA meals when offered.⁶³ Furthermore, parents shared that their children sometimes suggested PBMA meals based on information they learned in school or from the news, indicating the influence of children in meal planning.⁶³

Acceptance and Preferences. Three intervention studies,^{67–69} 3 qualitative studies,^{63,65,70} and 1 quantitative, non-intervention study⁶⁴ explored parents' acceptance and preferences towards PBMA. Most parents preferred traditional PBMA over novel PBMA.^{63,68} Nevertheless, studies conducted in Asian countries reported greater openness among parents towards novel protein sources,^{69,70} whereas in Western countries, reception to novel PBMA was more variable.⁶⁴ Furthermore, amongst parents who were receptive to novel PBMA, acceptance was largely driven by taste, particularly when sensory qualities closely resembled conventional meat products or other highly processed forms.^{63,70} Additional factors influencing parents' willingness to adopt PBMA within the family were child preference and nutritional need, lower cost, provision of recipes, increasing availability, and information about sustainability.^{63,65,70} Intervention strategies conducted virtually (ie, learning modules, providing positive information and cooking classes) led to a positive behavioral intention towards both traditional and novel PBMA, such as intake and purchase; however, these strategies did not increase actual PBMA intake at home or willingness to purchase.^{67,69}

Children's Perceptions of PBMA

Table 3^{65,67,68,70–81} summarizes the studies on children's perceptions and attitudes regarding PBMA. A total of 15 studies were identified. Similarly, the findings are coded into key themes, as described above.

One study was carried out in Asia,⁷⁰ 1 study was conducted in Africa,⁷⁴ and the remaining 13 studies took place in Western counterparts. No observational or intervention studies were carried out in non-Western counterparts. The 6 non-intervention studies were conducted in Canada ($n=1$), the Netherlands ($n=2$), Nigeria ($n=1$), Singapore ($n=1$), and the United States ($n=1$). The observational and intervention studies ($n=9$) were mostly conducted in the United States ($n=3$) and there were 6 studies in Europe

Table 3. Studies on Children’s Perceptions and Attitudes Regarding Plant-Based Meat Alternatives

Study (year)	Country	Sample size and age	PBMA definition	Outcome measure	Protein type and sources	Key findings
Qualitative, non-intervention Anant et al (2025) ^{70,a}	Singapore	n = 19 Aged 9 to 15 y old	Novel PBMA	<ol style="list-style-type: none"> Self-reported awareness of PBMA, previous consumption and willingness to consume Perceptions, beliefs, and motivations about PBMA 	Type: novel Sources: not specified	<p>Awareness and knowledge</p> <ul style="list-style-type: none"> -Awareness: 12 out of 19 (63.2%) -Majority are aware of novel PBMA (eg, Impossible products (Impossible Foods Inc., Redwood City, CA, USA)) -Some associated with vegetables and healthy <p><u>Influence of familiarity</u></p> <ul style="list-style-type: none"> -Willing to try when familiar or encouraged by peers/family <p><u>Acceptance and preferences</u></p> <ul style="list-style-type: none"> -Consumed PBMA previously: 36.8% -Willingness to consume: 78.9% -Exhibit more food neophobia than parents -Preference for convenient and/or ready-to-eat foods -Curiosity and excitement increase motivation to try -Perceived negatively (eg, soil/plant-root taste) -Prefer that it costs the same or cheaper than animal protein -Drivers to consumption: sustainability and animal welfare -Willingness to re-consume depends on first taste experience <p><u>Awareness and knowledge</u></p> <ul style="list-style-type: none"> -Perceived as “vegetarian,” “meat alternatives,” “looks like meat but not from animals,” “healthy,” “tasty”; one-third (n = 11) were uncertain of the taste <p><u>Influence of familiarity</u></p> <ul style="list-style-type: none"> -Desired characteristics: meat-like color (n = 21), appearance (n = 15), taste (n = 29), and crunchy texture (n = 15); contains ingredients, eg, carrot, potato, corn, tomato, and cheese (n = 32) <p><u>Acceptance and preferences</u></p> <ul style="list-style-type: none"> -Would opt for PBMA for their taste -Over half of the children eat PBMA once or twice per week
Pater et al (2022) ⁷¹	Netherlands	n = 34 Aged 8 to 10 y old	Meat-like products where meat portion is replaced by plant ingredients	Perception towards PBMA, consumption frequency (reported by caregivers), and desired characteristics of PBMA	Type: novel Sources: not specified	<p>Perception towards PBMA, consumption frequency (reported by caregivers), and desired characteristics of PBMA</p>

(continued)

Table 3. Continued

Study (year)	Country	Sample size and age	PBMA definition	Outcome measure	Protein type and sources	Key findings
Pater et al (2025) ^{65,a}	Netherlands	n = 36 Aged 9 to 11 y old	Traditional plant proteins and meat analogs	1. Drivers and barriers to PBMA consumption 2. Perspectives on facilitating transition to PBMA in the family	Type: novel and traditional Sources: not specified	Influence of familiarity -Familiarity drives willingness -Acceptance and preferences -Top 4 drivers: taste, animal welfare, familiarity, curiosity -Top 4 barriers: taste, familiarity, appearance, social pressure -Suggestions for transition strategies: To resemble animal protein in taste or appearance, improve taste, transparency, and improved packaging (eg, reduce plastic and enhance visuals) -Lack of knowledge on PBMA, eg, unaware that proteins can be obtained from plant sources -Had come across PBMA but could not provide examples -Children who listed examples of PBMA were unsure of their answers; ie, beans, chickpeas, tofu, spinach
Zhang et al (2022) ⁷³	Canada	n = 35 Aged 9 to 12 y old	Legumes, meat imitations, nuts and seeds, other plant-based foods	Knowledge and perceptions on PBMA	Type: novel and traditional Sources: legumes; nuts; seeds	Awareness and knowledge -High likelihood of eating tofu as PBMA (4.05 out of 5) -No association between recognition of tofu benefit and intake -No association between acceptance of tofu with different preparation method and intake -Acceptance of tofu did not differ with preparation methods (ie, steamed, boiled, and fried)
Quantitative, non-intervention						
Eze et al (2018) ⁷⁴	Nigeria	n = 603 Aged 16 y old	Tofu—constructed from soymilk and coagulant then pressed into firm blocks	Recognition of tofu benefits; acceptance and willingness to consume tofu as a PBMA via self-reported questionnaires in school	Type: traditional Sources: soy (tofu)	Awareness and knowledge -94.5% recognized tofu benefits -Attitude towards specific protein sources -94.5% recognized tofu benefits -Acceptance and preferences -High likelihood of eating tofu as PBMA (4.05 out of 5) -No association between recognition of tofu benefit and intake -No association between acceptance of tofu with different preparation method and intake -Acceptance of tofu did not differ with preparation methods (ie, steamed, boiled, and fried)
Lindke (2021) ⁷⁵	USA	n = 36 Aged 11 to 14 y old	PBMA dishes containing beans, lentils, and peas	Overall liking, specific sensory characteristics (appearance, flavor, texture) and willingness to purchase of PBMA dishes in school	Type: traditional Sources: legumes (beans, lentils, peas)	Attitude towards specific protein sources -Overall liking: bean macaroni and cheese (highest) > chili beans over sweet potato fries > lentil sloppy joe (lowest) -Acceptance and preferences -Bean macaroni and cheese: highest overall liking (5.72/9) and willingness to consume again (6.06/9); texture (<5; ie, neither like nor dislike)

(continued)

Table 3. Continued

Study (year)	Country	Sample size and age	PBMA definition	Outcome measure	Protein type and sources	Key findings
Quantitative, observational and intervention						
De Keyzer et al (2012) ⁷⁶	Belgium	n = Unspecified Aged 6 to 12 y old	PBMA meals: veggie balls, spinach lasagna, soya strips with gravy, vegetarian schnitzel	Acceptability of vegetarian lunches served in school compared with regular meat dishes (via plate waste)	Type: traditional Sources: soy	-Lentil sloppy joe: lowest overall liking (5.36) and appearance (3.88); texture (5.33) and flavor (5.61) -Chili beans over sweet potato fries: highest for flavor (5.80) and texture (5.77); overall liking (5.40) -No significant difference between any of the recipes and willingness to try (rated <5), except for liking
Eckart et al (2010) ⁷⁷	USA	n = 2853 Aged 5 to 14 y old	Test meals: soy-based veggie burger, vegetarian chili (kidney beans and textured soy protein), rice, and beans	Willingness to buy of vegan meal items in schools over 4 wk	Type: novel and traditional Sources: legumes (beans); soy (soy protein concentrate, textured soy protein)	Acceptance and preferences -No significant difference in plate waste between PBMA (16.7%) and regular (17.3%) meals Attitude towards specific protein sources -Elementary school: beans and rice (most sold); middle school: veggie burger (most sold) Acceptance and preferences -76% of vegan meals were purchased in the elementary school and 56% in the middle school -Elementary school: beans and rice (most sold) > veggie chili > veggie burger (least sold) -Middle school: veggie burger (most sold) > veggie chili > beans and rice (least sold) Awareness and knowledge -Increase in knowledge for PBMA was insignificant
Eckert et al (2025) ^{67,a}	Canada	n = 33 Aged 9 to 14 y old	Plant-based proteins (eg, legumes, beans, lentils, tofu, tempeh, textured vegetable protein, nuts, seeds)	Pre- and post-home intervention (online modules and cooking classes over 4 mo): PBMA knowledge	Type: traditional Sources: legumes (beans, lentils); soy (tofu, tempeh, textured vegetable protein); nuts; seeds	Acceptance and preferences -Pre- and post-intervention showed no difference between PBMA meals and regular meals
Flores et al (2019) ⁷⁸	USA	n = 465 Aged 5 to 14 y old	PBMA meals: tofu with roll/bun, vegetarian chili with rice, tofu with rice, tofu or lentils, pasta with chickpeas	Willingness to try PBMA meals vs regular meals in school cafeteria (via plate waste)	Type: traditional Sources: legumes (lentils, chickpeas); soy (tofu)	Acceptance and preferences -Pre- and post-intervention showed no difference between PBMA meals and regular meals

(continued)

Table 3. Continued

Study (year)	Country	Sample size and age	PBMA definition	Outcome measure	Protein type and sources	Key findings
Kokkorou et al (2025) ⁷⁹	Italy	n = 138 Aged 14 to 17 y old	Lentil and chickpea-based dishes	Liking of the legume-based dishes (via co-creation experimental session)	Type: traditional Sources: legumes (lentils, chickpeas)	Attitude towards specific protein sources -Lentil-based dishes were the most liked compared with chickpea-based dishes Acceptance and preferences -All dishes rated above neutral for liking -Significant difference in liking based on dish type ($P = .031$) -Lentil-based arancino dishes were the most liked (ie, lentil pumpkin arancino) than the chickpea-based dishes Attitude towards specific protein sources -Significant increase in liking in experimental group Acceptance and preferences -Statistical difference between control and experimental group at post-intervention ($P < .05$)
Kos and Jerman (2019) ⁸⁰	Slovenia	n = 30 (control: 15; experiment: 15) Aged 6 to 7 y old	Bean seed and green beans	Liking towards intake after tasting, post-exposure from school gardening activity (experimental group)	Type: traditional Sources: legumes (beans)	Attitude towards specific protein sources -Higher inclination to consume regular animal-based foods compared with soy-based foods Acceptance and preferences -Significantly less soy-based chicken was consumed than regular chicken in salad ($P < .0001$) -Others: insignificant difference
Lazor et al (2010) ⁸¹	USA	n = 3993 Aged 11 to 13 y old	Soy-based nuggets, "hybrid" patty, soy-based chicken substitute on salad, and macaroni and cheese w/soy pasta	Acceptance towards soy-based PBMA compared with regular animal-based foods via intake in school	Type: novel Sources: soy	Attitude towards specific protein sources -Stable acceptance for crispbread; increased for falafel (most) -Decreased acceptance for sausages Acceptance and preferences -Acceptance scores between first and last exposure did not change for crispbread and increased for falafel (most), paste, and mince (least) -Decreased acceptance for sausage (most) Awareness and knowledge -Viewed novel PBMA and tofu positively for their close resemblance to animal-based products -Perceived nuts, legumes, and tofu/tempeh positively -Associated with animal welfare Attitude towards specific protein sources -Viewed novel PBMA positively -Perceived nuts, legumes, or tofu/tempeh positively
Maya et al (2024) ^{68,a}	Denmark	n = 78 Aged 8 to 10 y old	Test meals with lentils (pasta), seeds (crispbread), chickpeas (falafel), soy-based mince, and pea-based sausages	Acceptance towards traditional and novel PBMA between first exposure (week 1) and last exposure (week 6) in home setting	Type: novel and traditional Sources: legumes (lentils, chickpeas, peas); soy	Attitude towards specific protein sources -Stable acceptance for crispbread; increased for falafel (most) -Decreased acceptance for sausages Acceptance and preferences -Acceptance scores between first and last exposure did not change for crispbread and increased for falafel (most), paste, and mince (least) -Decreased acceptance for sausage (most) Awareness and knowledge -Viewed novel PBMA and tofu positively for their close resemblance to animal-based products -Perceived nuts, legumes, and tofu/tempeh positively -Associated with animal welfare Attitude towards specific protein sources -Viewed novel PBMA positively -Perceived nuts, legumes, or tofu/tempeh positively
Pater et al (2025) ⁷²	Netherlands	n = 37 Aged 9 to 11 y old	Plant-based meat and fish (ie, tuna), ham, salami, tofu/tempeh, kidney beans, nuts	Perceptions of plant-based-meat and fish through design probe box approach, interview and cooking (ie, pizza making) in schools	Type: novel and traditional Sources: legumes (beans); soy (tofu, tempeh); nuts	Attitude towards specific protein sources -Viewed novel PBMA positively -Perceived nuts, legumes, or tofu/tempeh positively

(continued)

Table 3. Continued

Study (year)	Country	Sample size and age	PBMA definition	Outcome measure	Protein type and sources	Key findings
						<ul style="list-style-type: none"> -Positive taste perception for almonds, tofu, but not kidney beans -Influence of familiarity -Responded positively when products tasted and looked familiar -Acceptance and preferences -Mixed opinions during cooking session: taste, look, and smell -Expected novel PBMA to taste pleasant -Perceived nuts, legumes, or tofu/tempeh positively -Perceived novel PBMA negatively: taste unpleasant compared with legumes, nuts, or tofu/tempeh -Positive taste perception for almonds, tofu, but not kidney beans

^aParent-child dyad.

Abbreviation: PBMA, plant-based meat alternative.

(ie, Belgium, Canada, Denmark, Italy, the Netherlands, and Slovenia).

There were a total of 4 qualitative studies, of which 2 were about novel PBMA^{70,71} and the remaining 2 were focused on both novel and traditional proteins.^{65,73} For quantitative studies, 7 studies mentioned traditional protein only,^{67,74–76,78–80} 1 study reported on only novel protein,⁸¹ while 3 studies included both novel and traditional proteins.^{68,72,77} The following sections are structured into key themes derived from findings concerning children's perspectives and empirical studies related to PBMA.

Knowledge and Perception. A total of 6 studies examined children's awareness and knowledge on novel and traditional PBMA.^{67,70–74} There was greater awareness and openness towards novel PBMA among children in Asia,⁷⁰ while findings from Western counterparts ($n = 12$) yielded mixed perceptions on both novel and traditional PBMA. Children, especially those who are considered familiar with novel PBMA, were able to list examples of commercial products ie, Impossible meat (Impossible Foods Inc., Redwood City, CA, USA)⁷⁰ and generally described novel PBMA as “vegetarian,” “meat alternatives,” “looks like meat but not from animals.”^{71,72} Overall, children's perceptions of novel PBMA revolved around taste and comparison to the sensory profile of meat, with few children mentioning the association between PBMA intake and animal welfare.⁷² Most children associated novel PBMA positively (ie, healthy, tasty, vegetables),^{70,71} although some perceived them negatively (eg, soil or plant-root taste).⁷⁰ In contrast, 1 study found that many children lacked knowledge about novel and traditional PBMA and were often unable to provide specific examples.⁷³

Traditional PBMA (eg, tofu, tempeh, nuts, and legumes) were perceived positively among children, with tofu being considered most similar to animal-based meat.⁷² Among children, having existing knowledge about traditional PBMA (ie, tofu) did not translate to greater intake.⁷⁴ Additionally, intervention strategies consisting of online learning modules and online cooking classes did not substantially increase children's knowledge about novel and traditional PBMA.⁶⁷

Attitude Towards Specific Protein Sources in PBMA. Twelve out of 15 studies identified specific plant protein sources in PBMA, but only 8 included these in their key findings. Four studies examined traditional protein sources exclusively,^{74,75,79,80} 1 study focused on novel proteins,⁸¹ and 3 studies included both traditional and novel protein sources.^{68,72,77}

With regard to traditional PBMA, previous studies have consistently reported that, tofu (a soy-based

product), is positively perceived for its health benefits, is widely accepted by children⁷⁴, and is often described as having a meat-like taste.⁷² In contrast, the attitude towards other types traditional proteins were more varied. For example, nuts (ie, almonds) were perceived positively while kidney beans were less favored.⁷² Furthermore, there were differing attitudes towards traditional PBMA between countries. In the United States, bean-based dishes (ie, bean macaroni and cheese and chili beans over sweet potato fries) were more favored than lentil-based dish (ie, lentil sloppy joe).⁷⁵ Conversely, Italian children showed greater preference for lentil-based dishes (ie, lentil pumpkin arancino) over chickpea-based dishes.⁷⁹

For novel protein sources, the preference of soy-based PBMA was dependent on how the dish was prepared, where soy-based chicken were less preferred compared with soy-based nuggets and macaroni and cheese.⁸¹ In addition, there was a shift in attitudes from traditional to novel PBMA as children's age increased. Among elementary school children, traditional proteins (ie, beans and rice) were most chosen, whereas middle school students showed an opposite food selection, with soy-based veggie burgers being the most purchased.⁷⁷

Overall, intervention strategies applied to children showed increased openness to traditional PBMA and selected novel PBMA.^{68,80} School gardening and tasting led to positive attitudes towards bean seeds and green beans among children.⁸⁰ Similarly, a 6-week exposure study led to an increased acceptance of chickpea-based protein sources (ie, falafel) and soy-based novel protein sources (ie, soy-based mince) but a decline in pea-based sausages, which could attributed to their familiarity with the taste and texture of conventional meat sausages.⁶⁸

Influence of Familiarity. Four studies presented findings on how familiarity can influence the consumption of novel and traditional PBMA.^{65,70–72} Children expressed openness to try traditional and novel PBMA when these products were familiar or encouraged by peers or family.^{65,70} Novel PBMA that closely resembled conventional meat in appearance, taste, and texture were well received by children who were accustomed to eating meat. Additionally, incorporating familiar ingredients, such as carrots, potatoes and cheese, improved acceptance by increasing perceived familiarity.^{71,72}

Acceptance and Preferences. Eleven empirical studies examined the acceptance and preferences of PBMA in children.^{68,71,72,74–81} Of these, most studies were conducted in school settings, while 1 study took place in a home setting.⁶⁸ Additionally, 2 qualitative studies explored factors influencing acceptance.^{65,70}

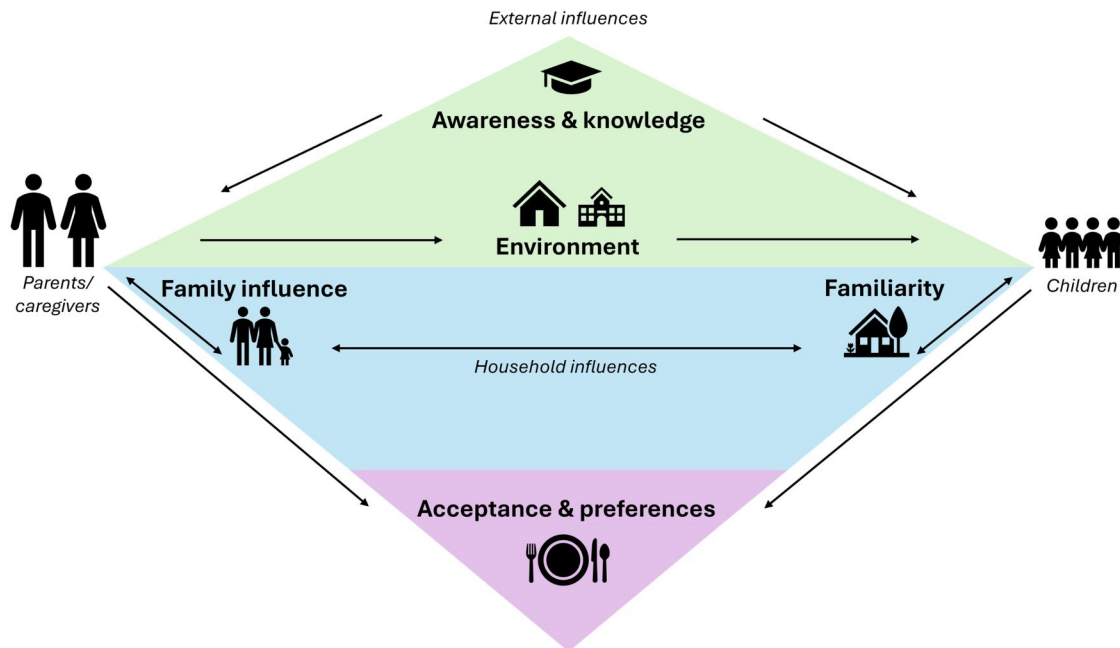


Figure 2. Illustration of the Multidimensional Factors Influencing Parents' and Children's Perspectives and Attitudes Toward Plant-Based Meat Alternatives

Overall, children's acceptance of both traditional and novel PBMA dishes was neutral to moderately positive, with most studies indicating these PBMA were not strongly disliked, even when compared with conventional meat-based meals.^{74–76,78,79,81} Some children intentionally chose and consumed novel PBMA at least once or twice a week.⁷¹

The acceptance of PBMA varied depending on dish type or preparation method. Typically, traditional PBMA were generally more preferred when incorporated into cultural foods (eg, macaroni and cheese, arancino, falafel, bread), whereas novel PBMA were favored when presented as processed-meat products (eg, nuggets and burgers).^{74,75,79,81} However, not all novel PBMA were well received—for example, pea-based sausage—suggesting that the sensory attributes did not meet children's expectations.⁶⁸

The strategies identified from the studies have been shown to increase acceptance. These include school gardening activities with tasting⁸⁰ and modifying the food environment,⁷⁷ and repeated exposure.⁶⁸ Additional factors to increase children's PBMA acceptance include positive first taste experience, lower cost, and accessible information about sustainability and animal welfare.^{65,70}

DISCUSSION

This scoping review provides an overview of existing knowledge on children's and parents' perceptions of

and attitudes towards PBMA, highlighting distinctions between traditional and novel PBMA and their plant-protein sources. It aimed to assess levels of acceptance, awareness, potential drivers, and barriers to integrating PBMA into family meals.

Discrepancy Between Parents' Perspectives and Children's Openness Towards PBMA

The factors affecting perspectives and attitudes of parents and children highlight the reciprocal influence between them (Figure 2). The synthesized data revealed a discrepancy between children and parents: willingness to try PBMA. Although our findings showed that children generally expressed openness and interest in trying both traditional and novel PBMA, they may not necessarily be given the opportunity in the household. This is largely due to parents' concerns about the high degree of processing involved in novel PBMA and their lack of culinary skills to prepare novel and traditional PBMA. As a result, children's exposure to PBMA remains limited, particularly when these foods are not part of their habitual intake.

Novel PBMA undergo substantial processing techniques, such as extrusion, sheer cell technology, 3D printing, or fractionation to achieve a meat-like texture profile,¹⁴ which raises parental concerns on their healthfulness.^{62,64,70} Although novel PBMA may offer improved digestibility, because processing techniques

can eliminate or decrease the antinutritional factors in natural plant proteins,¹⁴ parents often remain skeptical. This scepticism stems from the perception that these products are highly processed, coupled with evidence linking high intake of processed foods to obesity^{82,83} and cardiovascular diseases.^{84,85} These perceived concerns create hesitation to include these products in family meals, which underscores the importance of improving the sensory quality and perceived health value of novel PBMA.

Parental impact on children's behavior, particularly in the early years, is evident in a range of research, including technology uses⁸⁶ or physical activities.⁸⁷ While the proportion of time spent at home may decrease as children enter school, the behavioral patterns established during their formative years typically follow through into adolescence or adulthood.⁸⁸ With parents acting as the primary food providers, their skepticism or unfamiliarity with PBMA directly influences their children's acceptance.

Similarly, parents' decision to include PBMA in meals can be influenced by their children. Recent literature has highlighted children's involvement in incorporating sustainable food options at family meals⁸⁹ and participating in grocery shopping and the planning of meals.⁹⁰ This bidirectional influence suggests the potential to involve both parents and children in promoting PBMA intake.

Perspectives on PBMA varied by usage frequency. Parents who are frequent users of traditional PBMA were well informed of their nutritional benefits as a primary protein source and did not see culinary skills as a barrier. These findings are in line with previous literature where regular users of legumes were likely to associate them with nutritional understanding and integrate legumes as protein components, supporting the idea that familiarity leads to nutritional framing.^{91,92} Furthermore, it has been demonstrated that culinary capabilities not only increase cooking efficacy^{93–96} but also influence consumption of beans and legumes.⁹⁷ This suggests a targeted opportunity to better communicate the nutritional potential of plant proteins as an alternative to animal-based proteins and culinary classes to encourage intake.

Taste is identified as the dominant consideration to repeated PBMA consumption for children, which aligns with previous literature.^{98,99} While children often prefer processed foods, novel PBMA typically mimic the appearance of animal proteins accurately, although they frequently fall short in taste. Common aftertaste characteristics of novel PBMA include bean-like, bitterness, or earthiness associated with soy- or pea-isolates in the

ingredients.¹⁰⁰ These negative flavors likely contribute to a lower preference compared with traditional options and suggest a need to improve the sensory aspects by reducing off-flavors.¹⁰¹

Alongside taste, animal welfare and familiarity were identified as motivators for children's willingness to try both novel and traditional PBMA. When children perceive food products as ethically aligned with their values, such as being better for animals or the planet, their openness to trying these products increases, even if those products are unfamiliar.^{102,103} Similarly, familiarity in the form of food product, appearance, or prior exposure was found to increase acceptance.^{42,104}

Influence of Other External Factors

The food environment and cultural differences serve as both facilitators and barriers to behavioral change. The environment in which parents and children engage the most is at home, serving as the primary setting for children's development for preschool-aged children.^{105,106} Parental modeling has been shown to be an important learning tool for children.^{107,108} Although both home-based studies on parent-child dyads did not show an increase in PBMA intake or acceptance, both parents and children displayed similar levels of preference and intake. Further studies are needed to better understand the association between family dining in the home environment and PBMA acceptance.

From the synthesized data, empirical studies conducted in a school environment have demonstrated either neutral or positive acceptance of PBMA, particularly when PBMA meals were served. Furthermore, age-related differences with younger and older children in their preference towards types of PBMA also suggest that food preferences may shift from "natural form" to "processed" foods with increased autonomy, age, and exposure, as supported by previous literature.^{109–111} Schools are one of the first settings where children gain autonomy in making food choices^{112,113}; hence, food habits developed in schools may reflect their future eating behavior. Past interventions have shown the potential of using school as an environmental tool to integrate new or healthier foods into children's daily routine, which supports the potential for promoting the PBMA acceptance in these settings.

Cultural background influences the acceptance PBMA. In Asia, greater openness towards novel PBMA, particularly among children and parents, may be attributed to longstanding cultural familiarity with traditional PBMA. Soy-based products, such as tofu, tempeh, and mock meats made from wheat gluten, have

been widely consumed in Asian cuisines for centuries.^{114,115} Although traditional PBMA are minimally processed, they represent an early plant-based innovation that may ease the transition towards novel PBMA. Moreover, factors such as accessibility, cost, and cultural identity create barriers in translating awareness into actual food choices and behavior.^{116–118}

Strength of Evidence Across Studies

The included studies showed clear differences between qualitative and quantitative approaches. Qualitative studies were generally of higher methodological quality, whereas quantitative studies were more often constrained by moderate-to-low quality ratings and small sample sizes.^{67,75,80} The only home-based feeding intervention offers insights into preference for traditional and novel PBMA among parents and children.⁶⁸ However, the generalizability of its findings was still limited, as participants were recruited based on their openness to consuming plant-based foods. Furthermore, missing data due to dropouts during the intervention may reduce the strength of the outcome. A school-based plate-waste study by De Keyzer et al⁷⁶ provides evidence of the acceptability of traditional PBMA and regular meat-based meals. Another school-based study examined the purchasing behavior of various novel and traditional PBMA meals over 4 weeks and showed differences in preferences between older and younger children.⁷⁷ However, both studies used a convenience sampling method and lacked information on the number of participants and consideration of confounders, such as gender and dietary preferences. These reduce the representativeness and reliability of their findings. Therefore, findings from quantitative studies should be interpreted with caution, particularly in terms of generalizing to a broader population.

Strengths and Limitations

By including both qualitative and quantitative research, this scoping review provides a comprehensive overview of parental and child attitudes towards PBMA, encompassing both traditional and novel protein sources. Parental perspectives were strengthened by extracting relevant data from broader population studies, and completeness was enhanced by contacting study authors regarding forthcoming publications. However, only a small number of studies specifically targeted parents, limiting representativeness despite the inclusion of parent-specific data subsets. The scarcity of research on the target groups and inconsistent definitions of PBMA necessitated the inclusion of studies on vegetarian meals, which align with the review's criteria for

traditional PBMA. The scarce reporting on protein sources, especially in studies of novel proteins, restricted the assessment of ingredient-specific drivers of acceptance or rejection. Cultural comparisons were also constrained, with only 2 studies conducted in Asia.^{69,70} Finally, the review excluded young adults aged 18 to 26 years,¹¹⁹ focusing on children as the target population.

FUTURE DIRECTIONS

The review indicates several directions for future research, as follows:

1. Family-unit studies to ascertain the bilateral relationship towards PBMA preference

To date, only 2 studies have examined the parent–child dyad in relation to preferences for PBMA.^{67,68} It remains unclear if this shared preference extends to PBMA. There are likely discrepancies between parents and children in terms of their ages at which they were first introduced. Parents' exposure to novel PBMA are generally in adulthood, whereas children are more likely to encounter them in school where plant-based meal options are increasingly available. As the market for PBMA continues to expand to encourage plant-based diets, it is essential to gather more information on the reciprocal relationship between parents and children regarding their preferences for PBMA to help design targeted strategies for families with varying levels of acceptance.

2. Improve nutritional adequacy and specificity in protein sources of novel PBMA

Although novel PBMA can be nutritionally designed to match animal-based proteins, many raised concerns over their highly processed nature, presence of additives, excessive salt, nutrient bioavailability, and synthetic ingredients that are also perceived by the public.^{9,120–122} To alleviate parental concerns towards the novel PBMA, more work is needed from the food industry to develop a range of PBMA, using recognizable and natural ingredients, lower in sodium, and using innovative technologies while minimizing the use of additives.¹²³

The nutrient adequacy of PBMA, particularly the bioavailability of minerals such as iron and zinc, requires further investigation. While *in vitro* studies have demonstrated that PBMA may offer non-heme iron and zinc bioavailability comparable to that of animal meat,^{9,124,125} very few studies have isolated these effects using intervention designs. The only nutritional randomized controlled trial was conducted recently by

Mayer Labba and colleagues,¹²⁶ which compared non-heme iron absorption from bean-based PBMA with animal proteins (ie, beef and fish) in healthy women. Their results showed that PBMA had the lowest absorption and bioavailability, raising concerns about potential risk in iron deficiency. Clearly, more human trials are needed to confirm these findings and better understand the implications for iron status in PBMA.

Additionally, reporting the specificity of plant protein sources, particularly novel proteins, in future studies will help assess which ingredient drives acceptance or rejection. This will aid in product development to drive intake specific to region or culture.

3. Explore how knowledge and culinary skills shape family attitudes about PBMA

To address the lack of knowledge, public awareness of PBMA could be raised through public messaging in supermarkets, eateries, community spaces, or directly on product packaging. The messages should provide clear information on what PBMA are, their ingredients, and processing methods, to foster better consumer understanding and encourage adoption.

Public guidelines and recipes promoting plant-based foods are accessible on websites in countries such as Canada,¹²⁰ Germany,¹²⁷ the United Kingdom,¹²⁸ the United States,¹²⁹ and Sweden.¹³⁰ To extend their reach, alternative dissemination methods, such as printed materials through schools, workplaces, or directly to homes to ensure a wider reach of a target audience, could be considered.

The lack of culinary skills to prepare PBMA could be addressed through cooking demonstrations at supermarkets as well as community centers and schools to showcase that PBMA can be prepared similarly to meat and may also promote their use in meal preparation.¹³¹ In addition, having workshops targeted at parent-child pairs could equip them with practical skills and inspiration to integrate novel PBMA into meals using herbs and spices to mask undesirable flavor profiles.

4. Meal context in family acceptance

Previous studies have shown that meal context can impact food choice¹³¹⁻¹³³ and acceptance.^{40,134,135} Furthermore, PBMA are often better received when prepared with familiar recipes,^{68,71,75,79} by combining meat,^{81,136,137} or self-prepared.¹³⁸

Traditional PBMA could be introduced as a practical starting point for encouraging the adoption of a plant-based diet. For example, tofu and legumes, which are more readily accepted due to their cultural familiarity, are packed with protein, fiber, and micronutrients, and

can be easily incorporated into familiar meals.^{72,74,115} Understanding how PBMA can be best presented (eg, traditional vs novel PBMA, meal location, or combining meat with PBMA) in a family setting could be crucial to enhancing preference and acceptance to encourage greater acceptance.

5. Create a plant-based food environment and provide positive information to nudge families

Given the high percentage of children spending a substantial amount of time in schools,^{139,140} school cafeterias present a suitable setting for offering plant-based meals, enabling broad outreach to students. To our knowledge, direct studies concerning parents dining with their children in school settings remain limited. Parents' involvement in the school dining experience on a regular basis, such as weekly or monthly events when plant-based school meals are provided, may positively influence their perceptions of PBMA. Such initiatives could foster a shared understanding of the benefits of PBMA while creating opportunities to integrate plant-based meals within the family.

Behavioral strategies, nudges, and boosts can function as motivative operations that support acceptance and willingness to try new foods over time.¹⁴¹⁻¹⁴⁴ For parents, targeted nudges may include eye-catching product labels, product placements and informative posters, or newsletters about PBMA, highlighting environmental benefits and animal welfare. These approaches can encourage more frequent purchases and incorporation of PBMA into household meals.

Taken together, this scoping review highlights notable discrepancies between parental and child perceptions of and attitudes on PBMA. Parents expressed concerns regarding the nutritional adequacy, high degree of processing in novel products, and their lack of culinary skills for preparation when they are not familiar with these foods. The perceived rejection by their children also serves as a barrier to inclusion in family meals. In contrast, children indicated greater openness to PBMA, often motivated by environmental and animal welfare considerations, as well as the visual resemblance of novel PBMA to conventional meat products. Both parents and children, however, shared similar perceptions that taste would determine repeated consumption. Traditional PBMA were also more favored when PBMA are integrated into familiar dishes. Key factors for facilitating PBMA integration into family meals include raising awareness, fostering a supportive food environment, leveraging family influence, and increasing exposure to these foods.

CONCLUSION

Increasing transparency around processing methods for novel PBMA, alongside tailored educational and communication strategies, could help align parents and children with varying levels of nutritional knowledge and cooking skills. Leveraging existing positive perceptions of familiar PBMA and family-based interventions to improve awareness, culinary confidence, and liking may facilitate the integration of PBMA into everyday diets.

Future work should investigate parents and child dynamics in food decision making and improve culinary skills for preparing PBMA at home. Addressing the gaps in the food industry to develop healthier PBMA products that align with national dietary guidelines should be prioritized to support both acceptance and public health goals.

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Supplementary Material

[Supplementary Material](#) is available at *Nutrition Reviews* online.

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Conflicts of Interest

None declared.

Data availability

Data of this review were extracted from published material. Processed data are available upon request.

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