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Emojis in understanding children's food preferences and reactions

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Abstract

Emojis are widely adopted symbolic expressions for adults and children across various social media platforms. Their ability to mirror natural human facial expressions makes them universally understandable, even when communicating with individuals who may be illiterate, including adults or children. Concurrently, delving into children's sensory experiences has emerged as a prominent area of research due to its intricacy and market exploration potential. As a result, the utilization of emojis in devising sensory tests for children has been steadily gaining traction. This trend is precious in unraveling the underlying motivations behind food preferences, understanding taste perceptions, assessing the sensory attributes of food items, and gauging consumers' emotional responses to products. In this context, we comprehensively analyze the significance of evaluating children's dietary preferences and behaviors. We delve into the role of emojis in facilitating communication and conducting sensory research involving children while also addressing the challenges associated with their application in such contexts. We further explore how emojis can effectively transcend specific communication barriers.

Keywords: emoji; emotion; children; sensory tests; food.

Practical Application: Emoji-based measures provide a rapid, low-burden, and age-appropriate tool to assess children's emotional responses and food acceptance in research, product development, and school food settings, supporting more effective evaluation and promotion of healthier food choices.

1 INTRODUCTION

Children's sensory testing is often constrained by limited literacy and the higher cognitive load imposed by word- or number-based scales, which hampers the expression of nuanced food perceptions. Visual tools—especially emoji-based instruments—offer a practical alternative by reducing linguistic demands while still capturing affective responses that matter for food choice (Deubler et al., 2020; Swaney-Stueve et al., 2018). Over the last decade, evidence has accumulated that emoji measures are intuitive for young participants and can be deployed either as short, product-specific sets (discrete approach) or via simple two-dimensional grids that index valence and arousal (dimensional approach). Recent validations of pictorial, bidimensional tools such as the EmojiGrid reinforce this shift toward low-burden, language-independent measurement in food contexts (Toet et al., 2018; Toet & Van Erp, 2019).

Since 2017, the literature has progressed from proof-of-concept studies to more robust applications in child-centered food research, including school settings and cross-country samples (Gallo et al., 2017a, 2017b; Jaeger et al., 2018). A notable recent example is a 2025 multicountry study that used an emoji sorting task with 10–13-year-olds to map acceptance of Mediterranean recipes from different culinary traditions, showing that emoji-assisted tasks can discriminate preferences across culturally diverse dishes presented via photographs (Urkiaga et al., 2025).

Methodologically, this review distinguishes between discrete, category-based instruments and dimensional, valence–arousal frameworks. Discrete instruments are useful when the research question requires labeled emotional states but should rely on short, age-appropriate, product-specific emoji lists that are locally pretested for meaning (Schouteten et al., 2019; Sick et al., 2022). When the priority is comparability, intensity tracking, and minimal cognitive load, dimensional solutions are preferable; bidimensional emoji grids have shown convergent validity for food-elicited affect and can be administered with a single click, facilitating data collection with children (Toet & Van Erp, 2019; Van den Burg et al., 2021).

Interpretation, however, is not fully universal. Emoji meaning varies with age, culture, usage norms, and even platform-specific graphics, which can introduce bias if not addressed upfront (Bai et al., 2019; Schouteten et al., 2018). Recent work on intergenerational discrepancies in emoji comprehension demonstrates systematic differences in understanding and aesthetic preference, underscoring the need for local piloting and calibration before field deployment with children (Wu et al., 2024).

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Context also shapes performance. Studies comparing real foods versus images and manipulating salient product cues show that children's emoji selections shift with stimulus type and framing, and that dimensional meanings of emojis can become more intense in food-related contexts (Gallo et al., 2017b; Jaeger et al., 2018; Quinta, Santa Cruz, et al., 2023). These findings support combining emoji measures with simple hedonic ratings and behavioral endpoints (choice/intake) to enhance predictive validity, while keeping instruments brief and developmentally appropriate (Low et al., 2022; Schouteten et al., 2018).

Accordingly, this review synthesizes the state of the art on emoji-based tools in child sensory science, integrates discrete versus dimensional choices with practical guidance on list design and pretesting, and outlines a research agenda that prioritizes cross-cultural validation, multimodal measurement, and real-world applications in product development and health communication. The article proceeds by outlining core emotion-measurement options, reviewing children's food preferences, summarizing evidence on emoji tools with child participants, and discussing challenges and limitations, with actionable recommendations for researchers and practitioners.

1.1. Relevance of the work

This article is relevant because it consolidates and critically advances a rapidly growing body of research on emoji-based methods as developmentally appropriate tools for assessing children's food preferences and emotional responses. By synthesizing evidence from laboratory, school, and cross-cultural contexts, the study demonstrates how emojis reduce linguistic and cognitive barriers while capturing affective dimensions that are central to children's food choices. Importantly, it clarifies methodological trade-offs between discrete and dimensional emotion models, highlights sources of bias related to age, culture, context, and platform design, and provides practical guidance for instrument selection, pretesting, and reporting. In doing so, the article bridges sensory science, consumer research, and public health, offering actionable insights for researchers, practitioners, and policymakers seeking reliable, child-centered approaches to evaluate food acceptance, support healthier eating environments, and inform product development and nutrition communication strategies.

2 EMOTIONS, EMOJIS, AND THE DIMENSIONS OF EMOTIONAL MEASUREMENT: A COMPREHENSIVE EXPLORATION

Research in consumer science has increasingly focused on children, from infancy to preadolescence, due to their growing influence on food choices and purchasing decisions (Guinard, 2000; Laureati et al., 2015). Their preferences are primarily driven by hedonic factors (Poelman et al., 2015), and, as with adults, analyzing the emotions elicited by food provides valuable insights into their behavior (Dalenberg et al., 2014).

Adapting research methods to children's developmental stages—cognitive, physical, and social—is essential (Laureati, 2022; Quinta, Río, Baranda, & Martinez de Marañón, 2023). Graphical tools are especially effective for this group because they require minimal reading and cognitive effort (Kaneko et al., 2018), making them suitable for children with limited literacy. Recent work also shows that low-burden graphical appraisals and implicit measures (e.g., unspeeded response time) can complement emoji-based reports by tracking valence–arousal responses to food images without increasing cognitive load (Toet et al., 2024).

Traditional sensory surveys often rely on word-based questionnaires to link sensory experiences to food attributes (Schouteten & Meiselman, 2021). However, the vocabulary used to describe sensations varies across cultures and contexts (Lakoff, 1987), and translating emotions into standardized terms remains a challenge. Emotions can be expressed through subjective verbal categories or, more intuitively, through visual representations.

Emotions are complex psychological states that influence decision-making and attention (Dolan, 2002; Lang, 1987; Lang & Bradley, 2010). Visual stimuli, such as emotional faces, tend to be identified more rapidly than neutral ones in visual search tasks, suggesting the potential of perceptual tools like emojis to represent emotional responses effectively.

Lang (1987) emphasized that no single channel—such as verbal reports—can fully capture emotional experience. Emotions are also conveyed through facial expressions, posture, avoidance behaviors, and physiological reactions. Hence, relying solely on verbal reports limits the range of emotional expression, especially for children. Emojis may help bridge this gap, offering a standardized yet intuitive alternative for capturing subjective responses. Importantly, cross-platform studies in 2024 show that age, gender, culture, and platform artwork (Apple/Android/WeChat/Windows) significantly shape emoji comprehension, reinforcing the need to locally pretest icon sets when working with children (Chen et al., 2024; Wu et al., 2024).

In this context, two key dimensions are often used to evaluate emotions: Valence (positive to negative) and arousal (calm to excited) (Kensinger, 2004; Lang, 1987). These dimensions can be visualized in a bivariate graphic scale (Figure 1), serving as a

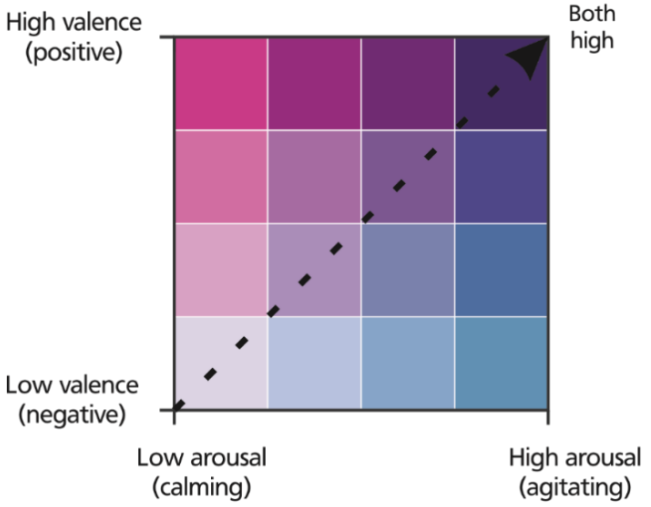

Figure 1. A potential bivariate graphic representation of fundamental emotional dimensions using color variations.

perceptual framework to represent emotional states in sensory evaluations using a single visual variable; recent evidence details how continuous graphical ratings and implicit response times map onto valence–arousal for food images, offering practical add-ons for child-friendly protocols (Toet et al., 2024).

In this framework, a specialized field of study is dedicated to detecting and differentiating human emotions. Researchers in this domain have developed various systematic approaches, or models, for identifying variations in emotional responses. Two primary models exist: the discrete model and the dimensional model. The discrete model categorizes emotions into distinct and separate categories, while the dimensional model posits that emotions are interconnected and share relationships among them (Acheampong et al., 2020). Table 1 provides an overview of the critical discrete and dimensional models applicable to modeling the spectrum of emotions linked to sensory tests in food science research. Adding to this toolkit, a 2025 normative dataset (Emoji-Dis) maps 112 face emojis to 13 discrete emotions, providing a transparent basis for curating child-appropriate icon sets when a discrete approach is required (Ferré et al., 2025).

Another effective way to represent emotional responses is through emojis—simple graphical elements that substitute brief text expressions. Their ease of use and ability to convey emotions have made them valuable in studies on food consumption (Bai et al., 2019; Low et al., 2022; Rini et al., 2022; Schouteten et al., 2023). Recent child-centered implementations further demonstrate practicality in real contexts: photo-based emoji sorting can recover meaningful acceptance patterns when tasting is infeasible; canteen Check-All-That-Apply (CATA) links valence/arousal icons to liking and neophobia at scale; and co-creation in schools has used compact 11-emoji CATA to differentiate concepts across countries (Piochi et al., 2025; Romeo-Arroyo et al., 2025; Urkiaga et al., 2025).

Emojis are particularly useful when individuals struggle to express sensory-related emotions through words alone, offering a more intuitive alternative (Vidal et al., 2015, 2016).

The widespread availability of smartphones and emoji-integrated keyboards, along with the general recognition of facial expressions they depict, reinforces their potential in sensory research (Gülşen, 2016). Still, one challenge is the inconsistency among emoji designs across platforms like Apple, Google, and Facebook, which can affect emotional interpretation (Bai et al., 2019). To address this, Unicode provides the standard character definitions, and Emojipedia documents Common Locale Data Repository (CLDR)/Unicode names and platform variants, which help researchers specify and standardize the exact artwork used in studies (Unicode Consortium; Emojipedia).

Given this, it is feasible to define consistent emoji libraries tailored for sensory testing by identifying graphical elements that effectively represent food-related emotions. This approach opens promising avenues for research and innovation in consumer studies (Ares et al., 2021; Quinta, Ríos, Llorente, et al., 2023; Velázquez et al., 2020). Where a discrete catalogue is needed, 2025 norms (Ferré et al., 2025) can guide icon selection; where dimensional coverage is key, 2024 protocols illustrate how to pair emoji outcomes with continuous valence–arousal inputs or implicit timing without increasing task burden (Ferré et al., 2025; Toet et al., 2024).

Table 1. Discrete and dimensional models to model the range of emotions.

Type of model	References	Model description
Discrete	Ekman (1999)	Emotions are distinct and can be classified into six fundamental categories: happiness, sadness, anger, disgust, surprise, and fear. The interplay of these primary emotions gives rise to more intricate and nuanced emotional states, including but not limited to guilt, shame, pride, lust, greed, and others.
	Plutchik (1980)	In this scenario, eight fundamental emotions are arranged in opposing pairs: joy versus sadness, trust versus disgust, anger versus fear, and surprise versus anticipation. The interplay between these pairs gives rise to complex emotions. Additionally, each emotion can manifest with varying degrees of intensity, influenced by the individual's interpretation.
	Ortony et al. (1988)	In this model, 22 emotions are described, including an additional 16 emotions beyond those initially proposed by Ekman as "basic emotions." However, both models maintain that emotions are contingent upon an individual's perception of an event. These emotions can also manifest at varying intensity levels, including relief, envy, reproach, self-reproach, appreciation, shame, pity, disappointment, admiration, hope, fears confirmed, grief, gratification, gloating, liking, and disliking.
Dimensional	Russell (1980)	The circumplex model distinguishes emotions within the Arousal-Valence domains. Arousal differentiates emotions based on their levels of activation or deactivation, while Valence distinguishes emotions based on their degrees of pleasantness or unpleasantness.
	Plutchik (1980)	In this bi-dimensional model, emotions are depicted within concentric circles. The innermost emotions stem from the eight fundamental emotions: joy, sadness, trust, disgust, anger, fear, surprise, and anticipation. Combinations of these primary emotions give rise to emotions found in the outermost regions of the wheel.
	Russell and Mehrabian (1977)	This three-dimensional model comprises the valence, arousal, and dominance axes. Arousal and valence correspond to a similar two-dimensional model, representing pleasantness/unpleasantness and activity/inactivity, respectively. The third dimension, "Dominance," characterizes the extent to which individuals perceive control over their emotions.

3 CHILDREN'S FOOD PREFERENCES: A GLOBAL PERSPECTIVE

Assessing children's food preferences and habits remains central to supporting healthy growth, preventing non-communicable diseases, and informing family practices, public policies, and responsible product development. As in our original framing, preferences are shaped by intertwined biological, psychosocial, sociocultural, and sensory determinants and by extrinsic cues such as labeling and marketing (Denova-Gutiérrez et al., 2023; Haines et al., 2019; Laureati et al., 2015). Updating the epidemiological context, the most recent joint estimates indicate that in 2024, more than 150 million children under five were stunted (global prevalence 23.2%), and about 35–35.5 million were overweight—underscoring stagnation in core indicators of child nutrition (World Health Organization [WHO], 2025; World Bank, 2025). Among those aged 5–19 years, > 340 million live with overweight (≈ 18%), reflecting the powerful influence of obesogenic environments across the life course (United Nations Children's Fund [UNICEF], 2020). These figures reinforce the urgency of measures that reshape food environments alongside family- and school-level actions.

Policy guidance has also advanced. In July 2023, the WHO Guideline on policies to protect children from the harmful impact of food marketing recommended comprehensive, mandatory restrictions covering all ages of childhood and targeting foods and non-alcoholic beverages high in saturated fats, trans fats, free sugars, and/or salt (HFSS)—with implementation considerations and a child-rights approach (WHO, 2023). This guidance strengthens earlier recommendations and aligns with our argument that preferences are co-produced by environments saturated with persuasive signals.

Consistent with this policy direction, front-of-pack nutrition labeling (FOPL) has accumulated new evidence. A 2024 systematic review (Cochrane-style methods) concludes that FOPL supports healthier purchase decisions and encourages reformulation, complementing back-of-pack information (Kelly et al., 2024). Additional 2024 syntheses highlight industry reformulation responses under FOPL regimes, while experimental and randomized studies show that interpretive labels (e.g., warnings, Nutri-Score, star ratings) improve the healthfulness of choices in simulated and real purchase tasks (Grummon et al., 2023; Martini et al., 2024; Paul & Rana, 2012). These results situate FOPL as a cost-effective lever that interacts with children's affective responses to foods and with caregivers' decision-making at the point of choice.

Parallel to labeling policy, educational interventions aimed at schoolchildren and caregivers are expanding. A 2024 randomized protocol tests a digital educational intervention to improve understanding and use of front-of-package warning labels among elementary school students and their caregivers; this work exemplifies how brief, tailored modules can be embedded in school settings and family routines (Avila-Montiel et al., 2024). Complementing this, a 2025 scoping review of school-based programs reports consistent gains in label literacy and improvements in simulated choices, while noting the persistent challenge of translating knowledge into sustained behavior change—a gap that future trials should address with longer follow-up and behavioral endpoints (Rana et al., 2025).

In sum, while our original section emphasized the multi-level determinants of children's preferences and the role of sensory experiences, the latest epidemiology and policy evidence sharpen the case for environment-level interventions that work in tandem with family and school strategies. The 2023 WHO marketing guideline calls for mandatory protections across childhood, and 2024–2025 FOPL evidence—together with education targeted at children and caregivers—suggests a pragmatic pathway: align the information architecture of packages with pedagogical supports that improve comprehension and steer choices. This perspective also anticipates our next sections on how visual cues (including labels) may modulate emotional responses to foods and how emoji-based measures can capture these shifts in child-centered sensory research.

4 THE USE OF EMOJIS IN FOOD SENSORY TESTS WITH CHILDREN

To broaden consumer engagement, the food industry has increasingly explored emotional responses in sensory evaluations, moving beyond traditional hedonic measures. This approach has been extended to children, for whom conventional questionnaires may be less effective. Emojis have thus emerged as promising tools to capture how children relate to food (Bai et al., 2019; Schouteten et al., 2018).

Task and stimulus up front. Children's emoji responses are task- and stimulus-dependent. Selections systematically shift across real foods versus pictures or names and across tasting, photo-based rapid sorting, naming, and CATA tasks, as well as with the testing context (e.g., school canteen vs. laboratory) (Gallo et al., 2017b; Sick, Monteleone, et al., 2020; Schouteten et al., 2018). Photo-based tasks can recover meaningful acceptance patterns when tasting is infeasible—e.g., a 2025 multicountry study with 10–13-year-olds combined photographs with emoji sorting and grouped dishes by main ingredient (Urkiaga et al., 2025). Classroom and canteen implementations further demonstrate field feasibility: primary-school programs have used emoji-style "taste-and-rate" activities to nudge healthier choices (Wilkinson et al., 2012), and canteen CATA with emoticons captured shifts in valence/arousal linked to liking and food neophobia (FN) at scale (Piochi et al., 2025). Co-creation work with preadolescents shows that a compact 11-emoji CATA discriminates snack concepts across countries (Romeo-Arroyo et al., 2025) (Table 2).

Rule of thumb for instrument choice (dimensional × discrete). When comparability and low cognitive/linguistic load are priorities, favor dimensional grids (valence–arousal), which capture both dimensions with a single response and show convergent validity with established scales (e.g., EmojiGrid). When the research question requires labeled emotional states, use short, age-appropriate, product-specific CATA emoji lists, validated locally. Recent normative resources (e.g., Emoji-Dis: 112 face emojis mapped to 13 discrete emotions) support transparent icon selection before piloting (Ferré et al., 2025).

Table 2. Sensory assessments with children using the emoji scale.

Age range	Focus of study	Results	References
7–11 years	Comparative study of children's taste and emotional responses to real food and food images	Testing with real foods increased positive emojis and words while simultaneously reducing negative emojis and words about food appearance and post-taste emotions.	Gallo et al. (2017b)
8–11 years	The study involved children using words and emojis to respond to favorite, less favored, and "only good" favorite foods before, during, and after recalling consumption. The research assessed the sensory profile of five different cookies. Half of the participants evaluated the applicability of 38 emojis drawn from a standardized emoji list, while the other half worked with 20 emojis sourced from a list of product-specific emojis.	The findings indicated that children could effectively employ words and emojis to articulate their emotional responses to various products.	Gallo et al. (2017a)
8–11 years	In this study, children assessed the emotional profile of biscuits using CATA. Half of the participants (n = 87) evaluated the relevance of 38 emojis obtained from a standardized emoji list, while the other half (n = 85) utilized a product-specific list containing 20 emojis.	The findings indicated that the product-specific emojis exhibited a higher discriminatory capability among different product samples than the standardized emoji list.	Schouteten et al. (2019)
9–13 years	The study explored the emotional connotations associated with the emojis utilized to depict eating experiences.	The results were consistent and demonstrated that the emojis were distinguishable based on valence (positive vs. negative) and power (dominant vs. submissive) dimensions and, to a lesser extent, on the level of excitation (high vs. low activation).	Sick, Spinelli, et al. (2020)
11–13 years	The study evaluated each sample's overall taste and emotional characteristics (utilizing 33 emojis) through the Check-All-That-Apply method. Additionally, the children's actual food choices were documented.	The results revealed that, on average, approximately 10% of the emojis were chosen for each sample. Emojis proved effective in distinguishing between different products, although their discriminatory power was somewhat reduced when applied to hedonically similar variants.	Schouteten et al. (2018)
9–11 years	The study investigated emojis' efficacy in expressing preadolescents' emotions triggered by recollections of food experiences within various food-related contexts while exploring potential age and gender disparities.	The selection of emojis varied across different food-related contexts, leading to varying choices for specific foods. Furthermore, both age and gender exhibited significant influences on the emoji selections made between and within foods in response to diverse dietary contexts. The methodology employed in this study holds promise for developing a tool to assess food-related emotions in preadolescents.	Sick, Monteleone, et al. (2020)
8–11 years	The study examined the relationship between emojis and adults' emotional responses to food stimuli through platforms such as Twitter and children. An online survey was employed to evaluate the utilization of a pictorial facial scale composed of emojis with children.	The findings corroborate the suitability of using an emoji-based scale to gauge emotional responses when employing stimulus names with children.	Swaney-Stueve et al. (2018)
6–12 years	The study examined how children emotionally perceived food products with varying nutrition labeling schemes displayed on the front of the packaging. The presence of nutritional labeling had a notable impact on the frequency of emoji usage.	The findings imply that nutrition labeling may discourage children from consuming products with high levels of nutrients linked to non-communicable diseases.	Lima et al. (2019)
8–9 years	The study assessed how visual stimuli, both positive and negative, influenced the snack choices of children in a school setting.	The findings indicated that positive visual stimuli increased the likelihood of girls selecting a healthy snack, whereas the negative stimulus had no discernible impact. Interestingly, the study also revealed that overweight children were more inclined to opt for a healthy snack than their peers with a normal BMI (body mass index). In essence, the research suggested that positive visual cues, such as a happy emoji, guided children toward healthier choices.	Benito-Ostolaza et al. (2021)

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Table 2. Continuation.

Age range	Focus of study	Results	References
8–11 years	This study sought to create and validate a novel emoji-based scale for evaluating children's emotional responses to specific food products.	The results demonstrate that the emoji scale introduced by K-State is suitable for gauging children's emotional reactions to the foods they sample. Moreover, the K-State emoji scale can be applied to global consumer surveys without translation.	Deubler et al. (2020)
7–14 years	This study aimed to create and validate a product-specific emoji list and employ this list to analyze children's emotional responses linked to the consumption of probiotic fermented milk prepared with various probiotic strains.	This study devised and validated an emoji list for children's assessment of fermented milk.	Cruz et al. (2021)
9–13 years	This study aimed to create a self-report questionnaire for preadolescents based on emojis, featuring a food-specific emoji list with clearly defined emotional meanings. The aim was to alleviate ambiguity in interpreting emotions conveyed by emojis among preadolescents.	The findings led to the development of an emoji-based self-report measurement tool for assessing emotional responses to food products. This tool includes two suggested response formats: the CATA Emoji Pair Questionnaire and the Emoji Pair Rating Scale.	Sick et al. (2022)
5–12 years	The primary goal of this study was to examine how the shape of food products influences the acceptance and emotional responses of school-age children. To accomplish this objective, employ a comprehensive approach beyond mere taste considerations. Analysis was founded on a holistic evaluation of emotions, encompassing the use of cognitive, physiological, and behavioral methods to understand this phenomenon comprehensively.	The findings indicated that, on the whole, there were no significant differences in acceptability. Nevertheless, it was intriguing to observe that 31% of the children were influenced by the shape of the foods, displaying a preference for the apple-shaped ones over the triangle-shaped ones. Moreover, analyzing the overall emotional responses elicited by both food products revealed statistically significant disparities. In this context, the apple shape prompted a notably more positive emotional response when compared to the triangle shape.	Quinta, Ríos, Llorente, et al. (2023)
6–12 years	This study aimed to evaluate the dimensions and semantic meanings of emojis, both in context-free scenarios and within contexts associated with food, furthermore it sought to discern how age and gender impact this perception in both sets of circumstances.	The findings suggest that the dimensional meaning of emojis is context-sensitive. When placed within a food-related context, emojis tended to evoke heightened emotional intensity, although no clear trend in terms of excitement was observed. Additionally, it was noted that both gender and age had an impact on the dimensional meaning of emojis, with this influence primarily manifesting concerning specific emoji icons.	Quinta, Santa Cruz, et al. (2023)
6–12 years	The primary objective of this study was to define a set of appropriate emojis for describing food-related experiences in research involving school-age children. They sought to evaluate their effectiveness in conveying emotions triggered by food, taking into account their capacity to distinguish among various responses within the sample. Additionally, it explored how taste, product category, and the nature of food stimuli influenced the performance of these emojis.	The results of this study identified 14 facial emojis associated with seven distinct evocative contexts. The assessment of their appropriateness revealed that these emojis could distinguish individual responses when food names triggered samples. However, this capacity did not persist when food images represented the samples. Emojis with positive connotations were often selected to convey emotional responses linked to liked and highly liked foods. In contrast, neutral and negative emojis were associated with products of a neutral or disliked nature.	Quinta, Ríos, Baranda, and Martinez de Marañón (2023)
10–13 years	To investigate children's perception and acceptance of 20 Mediterranean recipes among 10–13-year-olds in Italy, Lebanon, and Spain using photographs as stimuli and an emoji-sorting task (with CATA descriptors), assessing the method's usefulness when tasting is not possible and examining grouping patterns (e.g., by main ingredient) and cross-country differences.	In a multicountry sample of 10–13-year-olds (n = 184), photo-based emoji sorting grouped the 20 Mediterranean dishes primarily by main ingredient, with meats/cereals showing the highest acceptance and legumes/vegetables the lowest. Acceptance varied by country—Spanish children were more receptive to foreign recipes than Italian and Lebanese peers—while CATA descriptors aligned with hedonic patterns ("healthy/tasty/delicious" vs. "too many vegetables/bad taste"), and visual cues (e.g., the green color of pesto) sometimes reduced liking. Overall, photographs + emoji sorting proved a feasible substitute for tasting when in-person consumption is not possible.	Urkiaga, Mora, et al. (2025)

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Table 2. Continuation.

Age range	Focus of study	Results	References
9–14 years	The main objective of the study was to evaluate the feasibility of using a reduced set of 11 emojis in co-creation workshops with children and adolescents (9–14 years old) from Lebanon, Egypt, Portugal, Italy, and Spain, in order to discriminate emotional responses toward school-based snack prototypes.	The study showed that the 11-emoji set was effective in discriminating between different snack prototypes across the participating countries, confirming its feasibility as a tool for capturing children's and adolescents' emotional responses. Cultural differences significantly influenced the way snacks were perceived and accepted, with some concepts being better received in specific cultural contexts. In addition, food neophobia emerged as a key factor limiting acceptance, especially for novel or unfamiliar snack options. Overall, the findings highlight the potential of emojis as cross-cultural tools in sensory and consumer research, while also underlining the need to consider cultural background and individual attitudes toward new foods when developing school-based snacks.	Romeo-Arroyo et al. (2025)
7–11 years	The main objective of the study was to investigate how children aged 7–11 years, in real school canteen settings in Italy, express emotions toward meals using a CATA approach with emoticons and verbal labels, and how these emotional responses are related to food liking, food neophobia, and plate waste.	The study found that positive emotions were linked to higher meal acceptance, while negative emotions were associated with lower liking and greater plate waste. Food-neophobic children chose more negative icons and wasted more food, showing that neophobia strongly influences eating behavior. Emojis proved useful for capturing these emotional responses in school canteens.	Piochi et al. (2025)
4–11 years	The main objective of the study was to evaluate the feasibility of using emoji-style icons in classroom "taste-and-rate" sessions with children aged 4–11 years in UK breakfast clubs, in order to assess the acceptance of higher-fiber breakfast foods and to examine whether familiarization and tasting could improve acceptance in school settings.	The study found that using emoji-style icons was feasible and well accepted in school settings, allowing children to easily express their perceptions of foods. Through repeated tasting sessions, familiarization significantly improved acceptance of higher-fiber breakfast options. Overall, the findings suggest that emoji-based tools can support the introduction of healthier foods in schools by enhancing children's acceptance.	Wilkinson et al. (2012)

CATA: check-all-that-apply.

Studies indicate that combining emotional and hedonic metrics improves predictions of food choice (Dalenberg et al., 2014; Kaneko et al., 2018; Low et al., 2022; Spinelli et al., 2014). The growing use of emojis in sensory science is well documented (Cardello & Jaeger, 2021; Meiselman, 2021; Schouteten et al., 2023), but accurate interpretation remains key to understanding consumer responses. Emojis have proven effective in measuring reactions to tastings, product descriptions, and naming exercises (Jaeger et al., 2018; Quinta, Ríos, Baranda, & Martinez de Marañón, 2023; Rini et al., 2022).

Correcting the demographic inconsistency (age/gender/context). While some adult studies report small demographic effects, child-centered research shows consistent variation by age, gender, culture, and platform graphics, reinforcing the need for local pretesting of any emoji set before fieldwork (see child-specific and cross-cultural evidence).

Children's familiarity with technology also affects emoji use. Older children tend to use emojis more readily in sensory tests, especially when tests occur in familiar or less fatiguing contexts; factors like time of day and children's physical/emotional state may also influence responses (Gallo et al., 2017a; Schouteten et al., 2018).

Pre-selecting appropriate emojis is crucial to ensure relevant emotional associations in sensory analysis. Studies have shown that standardized sets can shift responses and improve clarity (Cruz et al., 2021; Gallo et al., 2017a; Schouteten et al., 2019). Beyond standardization, new normative datasets provide actionable guidance: Emoji-Dis (Ferré et al., 2025) offers discrete-emotion mappings that help curate concise, child-appropriate lists; paired with co-creation approaches in schools, these resources can seed libraries that are then validated locally (Ferré et al., 2025; Romeo-Arroyo et al., 2025).

Keep methods simple for children. Simplified methods are recommended, as excessive complexity—such as requiring children to manage valence and arousal simultaneously—may confuse or stress participants (Quinta, Ríos, Baranda, & Martínez de Marañón, 2023; Schouteten et al., 2018; Sick et al., 2022). Emoji scales have proven effective in this context; for instance, Swaney-Stueve et al. (2018) and Deubler et al. (2020) validated emoji-based tools for measuring responses to food names and tasting experiences. Field applications confirm feasibility: canteen-based CATA links emotional icons to liking and neophobia (Piochi et al., 2025), and classroom "taste-and-rate" activities use emoji-style icons to support healthier choices (Wilkinson et al., 2012).

One practical use is in packaging design: children have used more positive emojis for products without warning labels and fewer when interpretive labels (e.g., traffic lights or warnings) are present, indicating that emoji-based front-of-pack elements may help reduce the appeal of ultra-processed foods (Lima et al., 2019). However, attempts to discourage unhealthy choices using negative emojis have had limited success: in Benito-Ostolaza et al. (2021), children's snack choices were not significantly influenced by negative icons, suggesting positive reinforcement may be more effective (aligning with education plus labeling strategies).

We conducted a comprehensive search in both the Scopus and Web of Science databases, applying an advanced query that combined different synonyms and related terms to capture the breadth of research on this topic. Specifically, the search string used in Scopus was formulated as follows: we looked for articles where the title, abstract, or keywords (TITLE-ABS-KEY) included any of the terms "emoji," "emoticon," "pictogram," or "icon"; combined with words related to children such as "child," "children," "kid*," "adolescent*," "preadolescent," or "youth"*; together with food-related descriptors such as "food," "diet," "nutrition," "snack," "meal," "eating," or "consumption"; and finally linked to sensory and consumer dimensions through terms like *"sensory," "taste," "preference," "hedonic," or "consumer." An equivalent formulation was used in Web of Science (TS =).

This systematic strategy yielded 55 articles in Scopus and 17 in Web of Science, with publications spanning from 2004 to 2025. The temporal distribution confirms that emoji-based methods in child-centered food and sensory research constitute a relatively recent but steadily expanding area of investigation. Figure 2 illustrates the geographic distribution of countries contributing to the field.

5 CHALLENGING CHARACTERISTICS FOR USING EMOJIS IN SENSORY TESTING WITH CHILDREN

In child sensory testing, emoji-based measures face predictable sources of bias that must be handled explicitly: responses depend on task and stimulus (real foods versus photographs or names; tasting versus rapid-sorting or CATA), interpretation varies with age, gender, culture, and even platform artwork,

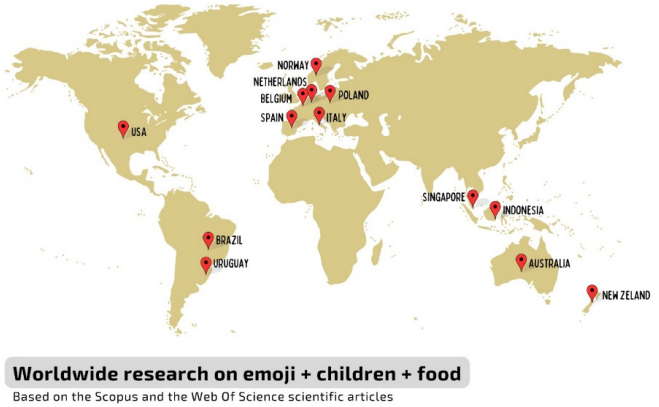

Figure 2. Mapping the global researcher landscape: A geographical exploration in Scopus and Web of Science databases.

and many instruments primarily capture valence while arousal can be under-measured if not operationalized on purpose. Making these constraints explicit up front improves validity and generalizability and avoids redundancy with the conceptual discussion in Section 4. In recent field and multicountry work, photograph-based emoji sorting with 10–13-year-olds successfully recovered meaningful acceptance patterns (e.g., grouping dishes by main ingredient) when tasting was infeasible, confirming that photo stimuli can be a defensible substitute provided the choice is justified and reported (Urkiaga et al., 2025). In primary-school settings, canteen CATA implementations linked valence/arousal icons to liking and FN at scale ($n \approx 630$), showing that simple, child-friendly protocols are feasible in real service environments; complementary "taste-and-rate" classroom activities using emoji-style icons have also proved practical for brief sessions aimed at nudging healthier choices (Piochi et al., 2025; Wilkinson et al., 2012). Together with evidence that a food context can intensify dimensional meanings of emojis, these findings motivate moving task and stimulus choices to the front of study design and reporting—i.e., declare whether stimuli are real foods, photographs, or names and why; specify whether the task is tasting, sorting, or CATA, and pair emoji outcomes with a brief hedonic rating and a simple behavior (choice/intake); and detail the environment (school canteen, classroom, or lab) alongside time-on-task and familiarization procedures.

Most child emoji scales are strongest on valence. When arousal is substantively important (e.g., excitement/activation), it should be made operational: add a compact two-dimensional graphical rating (valence × arousal) on the same trial—keeping the action simple (one tap per axis or a small emoji-labeled grid)—or include behavioral proxies such as unspeeded response time (URT) and intake/choice latency that covary with arousal for food images; recent work continues to demonstrate the feasibility of continuous graphical appraisal for valence–arousal in food contexts (Toet et al., 2024). This operationalization prevents under-capturing activation when emojis mainly signal pleasantness.

Regarding age, gender, culture, and platform, the message should be uniform across the paper: while some adult studies report small demographic effects, child-centered and cross-platform evidence shows consistent variation in emoji comprehension and aesthetics across age, gender, and culture, and across Apple/Android/WeChat/Windows artwork. Consequently, any emoji set should be locally pretested with the target age group, and the artwork/platform used must be stated in the Methods to avoid platform drift and to aid replication (Chen et al., 2024).

Curating the emoji set remains a practical lever. Keep lists short and age-appropriate; when labeled emotional states are required (discrete approach), recent normative data mapping 112 face emojis onto 13 discrete emotions can guide the selection of clearer icons before local piloting for comprehension and distinctness (e.g., ≥ 80% acceptance), after which ambiguous icons are replaced or removed (Ferré et al., 2025). This curation integrates smoothly with product-specific CATA lists used in schools and multicountry co-creation workshops, which have shown good discrimination of snack concepts across cultures.

To make studies easier to evaluate and reproduce, we recommend folding a minimum reporting checklist into the Methods as a continuous sentence rather than a figure: report (1) the stimulus (real food, photograph, or name), task (tasting, sorting, or CATA) and setting (school canteen, classroom, or lab), including any familiarization and time-on-task; (2) the emoji set source (standardized versus product-specific), number of icons, artwork/platform and any labels/translations, keeping lists short and age-appropriate; (3) the pretest sample and thresholds for comprehension/distinctness and which icons were excluded; (4) the co-measures collected (brief hedonic rating plus at least one behavioral endpoint, and a 2D valence–arousal rating or behavioral proxies when activation matters); (5) randomization/counterbalancing of sample order and icon order (and device type if digital); (6) cognitive-load controls (one action per screen; plain instructions; pragmatic time limits in schools); and (7) exclusions and safety (allergies/intolerances), along with any screening/stratification for neophobia and contextual factors such as time of day. These elements reflect what successful field and classroom implementations have already documented in 2024–2025 and align with the broader recommendation to pre-register design choices when feasible.

Finally, to keep the prose tight and avoid duplication with Section 4, references to emojis "bridging communication gaps" can be condensed to a single early mention; subsequent paragraphs should focus on what to do (report, pretest, and randomize) rather than why emojis are familiar to children. In summary, by declaring the task, stimulus and setting them up front; operationalizing valence and arousal when needed; pretesting age-appropriate, curated icon sets and stating the artwork/platform; and pairing emoji outcomes with hedonic and behavioral measures, child-centered emoji studies become both robust and replicable across labs, schools, and countries (Chen et al., 2024; Ferré et al., 2025; Piochi et al., 2025; Urkiaga et al., 2025; Wilkinson et al., 2012).

6 LIMITATIONS OF SENSORY TESTS FOR CHILDREN

When conducting sensory tests with children, limitations arise from cognitive–linguistic development, task complexity, and health/contextual factors. Children's restricted lexicon and developing logical–numerical reasoning make traditional verbal or multi-point psychometric scales difficult to use; language and measurement formats must therefore be adapted to the child's level (Laureati & Pagliarini, 2018; Panagiotou & Gkatzionis, 2022; Quinta, Ríos, Baranda, & Martínez de Marañón, 2023; Schouteten & Meiselman, 2021). Preference tasks are often appropriate because they minimize verbal demands, whereas difference/descriptive tests require more advanced reasoning typically seen in older participants (Guinard, 2000; Laureati & Pagliarini, 2018; Liem & Zandstra, 2009). In practice, age thresholds should remain flexible, but narrower age bands and prior familiarization reduce variance stemming from heterogeneous cognitive profiles and memory/perceptual-motor differences (Issanchou, 2015; Panagiotou & Gkatzionis, 2022). Complex scales can impose high cognitive load, so we recommend simple, single-action responses and short sessions in school settings; physiological measures are generally invasive for children, whereas visual, non-intrusive emojis can capture affect linked to tasting and help externalize experience (Gallo et al., 2017a; Robinson, 2018; Schouteten et al., 2018; Sick, Spinelli, et al., 2020). Recent field and multicountry implementations reinforce feasibility and underscore why task and stimulus choices must be declared up front (e.g., photograph-based emoji sorting with 10–13-year-olds when tasting is infeasible; canteen CATA linking valence/arousal icons to liking and FN; classroom taste-and-rate sessions using emoji-style icons) (Piochi et al., 2025; Urkiaga et al., 2025; Wilkinson et al., 2012).

Beyond cognition, neophobia and health conditions can confound sensory responses. Children with high FN or specific dietary/health issues (e.g., obesity/diabetes) may react differently to novel samples; studies should screen/stratify for these factors or set clear exclusion criteria and ensure stimuli are familiar enough to isolate the sensory effect from refusal tendencies (Goodell et al., 2016; Hetherington et al., 2011; Lee, 2007; Proserpio et al., 2020; Sonntag et al., 2015; Sunil et al., 2020; Williams et al., 2010). Food and respiratory allergies must be assessed to avoid safety issues and confounding, and researchers should document background exposure to ultra-processed foods, which may shape hedonic baselines (Costa et al., 2019; Elizabeth et al., 2020; Gibney, 2019; Meltzer et al., 2009; Meyer et al., 2019). Recent evidence further maps risk factors and consequences of FN/picky eating (systematic review) and documents high prevalence in preschoolers—reinforcing the need to screen or stratify FN in child studies (Campo et al., 2024; Krupa-Kotara et al., 2024) see also canteen data linking FN to emotions and waste) (Piochi et al., 2025).

To make limitations and mitigations fully operational, we ask teams to state three design decisions up front in Methods and adhere to them consistently: (i) stimulus—real foods versus photographs versus names, justifying substitutions (e.g., feasibility/hygiene) and describing familiarization; (ii) task—tasting versus sorting versus CATA, pairing emoji outcomes with a brief hedonic rating and a simple behavior (choice/intake) to strengthen prediction; and (iii) setting—school canteen, classroom, or laboratory, reporting time-on-task and supervision. In addition, pretest the chosen emoji set with the target age group (comprehension/distinctness thresholds), document the icon source and artwork/platform, and randomize/counterbalance the sample and icon order to manage fatigue and order effects. These steps align with the rationale presented earlier in the paper and translate common limitations into transparent procedures. (For platform- and age-related variability in emoji comprehension/aesthetics, see 2024 cross-platform evidence spanning Apple/Android/WeChat/Windows.) (Chen et al., 2024).

Emojis are not a panacea; they primarily index valence, and arousal may be under-captured unless explicitly operationalized. When activation is substantively important, add a compact valence–arousal graphic on the same trial (or simple behavioral proxies such as response latency or intake) and keep the interaction low-effort for children. New data show that URT covaries with both valence and arousal for food images, offering a low-burden implicit complement to emoji reports and 2D graphics (Toet et al., 2024). Finally, because heterogeneity in age, gender, and context is expected, narrowing age bands

and planning for stratification (e.g., neophobia) are preferable to pooling wide developmental ranges. By framing limitations together with concrete reporting and design rules, child sensory studies using emojis become more robust, interpretable, and replicable across settings (Chen et al., 2024; Ferré et al., 2025; Piochi et al., 2025; Urkiaga et al., 2025; Wilkinson et al., 2012).

7 CONCLUSIONS

Emojis offer a practical, child-friendly channel to capture emotional responses in sensory tests, provided their use is explicitly designed and reported. Building on our review, we reaffirm three principles that make emoji-based studies both informative and reproducible with children: (i) align the instrument with the task–stimulus–setting triad (e.g., tasting vs. photo-based sorting or CATA; real foods vs. photographs or names; school canteen/classroom vs. laboratory), (ii) pretest a short, age-appropriate icon set and state the artwork/platform, and (iii) pair emoji outcomes with a brief hedonic rating and at least one simple behavior (choice/intake). These steps directly address known sources of variability within the same age band and turn a versatile visual language into a reliable measurement tool.

Two clarifications strengthen interpretation. First, emojis primarily index valence; when arousal matters, operationalize it (e.g., a compact valence–arousal graphic on the same trial or behavioral proxies such as response latency/intake), keeping the child's cognitive load low. Second, heterogeneity by age/gender/context and platform graphics is expected; therefore, narrow age bands, local pretesting, and transparent reporting of icon meanings reduce misinterpretation and improve cross-study comparability.

Finally, we see clear applied avenues where emoji measures can add value: (a) in school and canteen programs, where short, field-friendly protocols scale well and connect affect to liking and food choice; and (b) alongside front-of-pack and other visual cues, where children's affective signals can inform communication that supports healthier decisions. In short, by treating emojis not as a replacement but as a structured complement to hedonic and behavioral measures—and by adhering to simple design and reporting rules—sensory tests with children become more robust, interpretable, and transferable across settings.

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