

**When packaging sounds shape the mind: The influence of non-musical sounds  
on attitudes and judgements towards the brand**

**Gabtni iméne**

PhD in Marketing and Lecturer at Esprit School of Business (ESB)  
Research Laboratory: *Entreprises et Recherches en Marketing* (ERMA)  
University of Tunis El Manar

Email : [imen.gabtni@Esprit.tn](mailto:imen.gabtni@Esprit.tn)

**Kaouther SAIED BENRACHED**

Full Professor at the Faculty of Economics and Management of Tunis  
Research Laboratory: *Entreprises et Recherches en Marketing* (ERMA)  
University of Tunis El Manar

Email : [kaouther.benrached.@fsegt.utm.tn](mailto:kaouther.benrached.@fsegt.utm.tn)

## **When packaging sounds shape the mind: The influence of non-musical sounds on attitudes and judgements towards the brand**

### **Abstract**

This study investigates the impact of non-verbal, non-musical brand sounds on consumers' mental imagery, and how this imagery influences their attitudes and product evaluations. Using an experimental design, 90 participants were exposed to radio advertisements featuring brand-related packaging sounds—such as fizzing and liquid pouring—integrated with verbal messages. The findings demonstrate that these sounds significantly increase the quantity of mental images generated by listeners, which in turn enhances their attitude toward the advertisement. Although the vividness of the mental images does not directly affect attitude toward the ad, it positively influences perceptions of product quality. These results reveal a dual pathway through which brand-evoked sounds shape consumer responses: while image quantity drives affective reactions to advertising, image vividness informs cognitive judgments about the product. This research offers novel insights into the role of non-musical auditory cues in brand communication and opens promising avenues for sensory and audio-based marketing strategies.

**Key words:** Auxiliary sounds, mental imagery, quality perception, auditory advertising, sensory marketing.

### **Résumé :**

Cette recherche examine l'impact des sons de marque non verbaux et non musicaux sur l'imagerie mentale des consommateurs, ainsi que leur influence sur les attitudes publicitaires et les jugements de qualité perçue. Une étude expérimentale a été menée auprès de 90 participants exposés à des publicités radio intégrant des sons liés à l'emballage du produit — tels que l'effervescence ou le versement d'un liquide — combinés à un message verbal. Les résultats montrent que ces sons augmentent significativement la quantité d'images mentales générées, ce qui améliore l'attitude à l'égard de la publicité. Si la vivacité des images mentales n'influence pas directement cette attitude, elle a en revanche un effet positif sur la perception de la qualité du produit. Ces résultats mettent en évidence un double mécanisme d'influence : la quantité d'images agit sur la dimension affective de la réponse publicitaire, tandis que la vivacité des images informe les jugements cognitifs portés sur le produit. Cette étude apporte un éclairage original sur le rôle stratégique des sons non musicaux dans la communication de marque et ouvre de nouvelles perspectives pour le marketing sensoriel et sonore.

**Mots-clés :** Sons auxiliaires, imagerie mentale, perception de la qualité, publicité auditive, marketing sensoriel.



# When packaging sounds shape the mind: The influence of non-musical sounds on attitudes and judgements towards the brand

## Introduction

Brands unconsciously shape people's thoughts and behaviors (Oh et al., 2020). Among the five senses traditionally used in marketing, sound has long been explored through music, jingles, and voice (Allan, 2007; Schmitt, 2009). In an effort to enhance the impact of their brands, researchers and marketing professionals have explored the five senses to gain in-depth knowledge of how to implement sensory cues. These cues include elements such as the rubbing sound of a Sharpie pen that can reinforce brand perception (Watch, 2015), the sound of the closing of a lipstick tube (Romagny and al., 2024), as well as the aural symbolic aspects of brand names that can influence preference of product attributes (Pogacar and al., 2018; Pathak and al., 2019; Jang and al., 2024). Sensory information received by customers plays a significant role in their experience (Biswas, 2019), functioning as a diagnostic cue that allows them to draw conclusions about products (Bone and Ellen 1999; Ringler, and al., 2020; Romagny and al., 2024). These sounds, often described as “auxiliary sounds” (Yorkston, 2010) or “environmental sounds” (Özcan & van Egmond, 2009), have traditionally been viewed as functional by-products of product interaction. However, emerging research suggests that they may operate as full-fledged sensory triggers, capable of shaping consumer experiences independently of traditional advertising content (Ringler & al., 2021; Peng-Li & al., 2022).

Various disciplines are increasingly interested in ‘sound’ (Spence, 2016; Graakjær and Bonde, 2018; Ketron and Spears, 2020; Arroyo and Arboleda, 2020; Khenfer and Cuny, 2020; Ringler and al., 2020; Almiron and al, 2020), due to the power of sound as highlighted by research in psychology, cognitive psychology, neuroscience and sound design (Zatorre and Halpern, 2005; Mendoza and Foundas, 2007; Godefroid, 2011; Bizley and Cohen, 2013; Denis, 2019; Lee and al., 2019; Romagny and al., 2024). Sound has the capacity to form memories of certain experiences, induce emotions, promote or discourage certain behaviours, modulate mood and stress levels, promote a particular social atmosphere (DeNora, 2000), and even affect our experience of food and drink (Spence, 2016). More brands are re-evaluating their approach to sound. Researchers such as Minsky and Fahey (2017) have recently highlighted a trend towards using sounds based on product attributes or function. For example, Harley Davidson opted for a distinctive ‘po-ta-to, po-ta-to’ roar, Snapple added a gratifying pop of sound to the opening of its bottles. According to several studies (Ringler et al., 2020; Romagny et al., 2024), there is no specific work that focuses on the role of sound attributes in product perception. This observation is confirmed by Treasure (2011), who points out that the use of sound in products is a key element of audio branding but is rarely seen as an opportunity. The study conducted by Lyon (2000) is in line with this perspective, asserting that sound, composed of a complex set of attributes that are both aesthetic and functional, can serve as a source of motivation for consumers who appreciate the use of a product, as well as an indicator of its proper functioning. Research on consumption-related sounds has shown that auditory cues during use can modulate sensory expectations, such as crispness (Zampini & Spence, 2004), freshness (Spence & Wang, 2015), and flavor intensity (Spence, 2015). However, little is known about sounds occurring before consumption, such as packaging sounds in advertising contexts (Underwood and Klein, 2002; Gil-Pérez & al., 2020)

Our study moves the focus from the “sound of consumption” to the peripheral sonic environment of the product, particularly the sounds that accompany product handling, opening, or pouring. These seemingly incidental auditory cues may act as sensory stimuli with the potential to activate mental imagery processes, thereby influencing consumer judgments. Packaging is considered as an important product attribute that plays a major role in creating and communicating brand identity and image (Underwood, 2003). According to Wang and Spence (2019), the sounds we hear, before or during the use of a product, can also influence our expectations about a product's functional and sensory attributes, as well as our hedonic evaluations, although this is often overlooked.

Consumers can have an indirect experience with a branded object, such as through advertising (Brakus and al., 2009). Sound effects can help the listener perceive a sound image, which can be symbolic or iconic (Rodero and al., 2015). This highlights the importance of non-musical audio branding in brand creation and development. As an example, the Coca-Cola brand uses the sound effect of opening a bottle to symbolise the expectation of change. In addition, the brand uses natural sound effects that characterise the product, such as the sound of gas escaping when a can is opened, as well as the combination of liquid and ice, which have reinforced Coca-Cola's identity for many years (Rodero and al., 2015). A study by Rodero (2012) found that the introduction of sound effects into a radio play enhances the ability to mentally picture events, as radio is often referred to as a ‘theatre of the mind’ due to its perceived ability to create images in the imagination of listeners (Bolls, 2002, p. 537). Mental imagery offers a relevant theoretical lens to understand these effects. Importantly, imagery is multidimensional: the quantity of images reflects the level of sensory activation, while their vividness reflects the richness and clarity of the imagined scene (Childers et al., 1985). These two dimensions may have distinct roles, with quantity primarily influencing affective evaluations and vividness influencing more cognitive judgments (Krishna et al., 2017). This distinction becomes crucial when contrasted with classical persuasion models. According to the attitude-toward-the-ad (Aad) model (Mitchell & Olson, 1981), positive evaluations of an advertisement should spill over into brand or product evaluations. Likewise, mere exposure theory (Zajonc, 1968) assumes that familiarity generated by repeated exposure increases liking. However, if non-musical packaging sounds operate as direct sensory signals, they may bypass these evaluative filters. They may trigger mental representations that influence cognitive judgments (e.g., perceived quality) independently of the overall ad evaluation. This possibility challenges a fundamental assumption of advertising persuasion and calls for rethinking how non-musical sounds operate in brand communication.

To address this gap, the present research examines whether packaging sounds can activate mental imagery and how the distinct dimensions of imagery—quantity and vividness—shape consumer responses. We focus on their dual influence on (1) attitude toward the advertisement (affective response) and (2) perceived product quality (cognitive judgment). We specifically investigate whether non-musical, non-verbal sounds act as sensory cues capable of influencing judgments through imagery, independently of traditional attitudinal pathways. This allows us to examine the impact of the sounds generated by the operation of a branded object on brand perception. Our research problem is therefore as follows: *“What influence do a brand's non-verbal and non-musical sounds have on consumers' reactions to the brand, through the activation of mental imagery?”*. By addressing this question, the study contributes to a deeper understanding of sensory

persuasion, proposing a conceptual shift in how auditory cues are viewed in consumer research.

## LITERATURE REVIEW

**Non-verbal sounds**, referred to as 'sound effects' (Miller and Marks, 1992; Rodero et al., 2015), 'auxiliary sounds' (Yorkston, 2010) or 'environmental sounds' (Özcan and van Egmond, 2009; Rehan, 2016), are residual types of sound. They are non-verbal and non-musical sounds that are, or are presented as being, derived from the movement of physical objects. Traditionally considered as functional noises accompanying product use, recent research shows that these cues can act as full sensory stimuli (Graakjær & Bonde, 2018; Spence, 2016). Research on consumption-related sounds (Zampini & Spence, 2004; Spence, 2015) demonstrates that the auditory feedback produced during use can shape sensory expectations (crispness, freshness, effervescence). While these studies focus on sounds occurring during consumption, our research focuses on sounds emitted by packaging before consumption, particularly in advertising contexts. According to Wang & Spence (2019), packaging sounds can influence hedonic and functional expectations even before the product is consumed. These sounds may therefore function as diagnostic signals (Ringler et al., 2020), conveying product-related information such as carbonation, texture or purity. Recent findings on ASMR (Broadbridge et al., 2023) also show that subtle sounds like tapping, pouring or cracking can activate involuntary sensory responses, attention and immersion—suggesting that packaging sounds may trigger unique sensory reactions beyond their purely functional role.

**Mental imagery** is the simulation or recreation of perceptual experience (Kosslyn and al., 2001; Pearson, 2007) according to sensory modalities (Pearson and al., 2013). These sensory modalities can be visual, auditory, olfactory, tactile, etc (Helme-Guizon and al., 1997; Gavard-Perret and Helme-Guizon, 2003). Some researchers, such as Kosslyn, Behrmann and Jeannerod (1995), have postulated that "visual mental imagery consists of "seeing" in the absence of appropriate immediate sensory input, auditory mental imagery consists of "hearing" in the absence of immediate sensory input, and so on. Defined as the recreation of perceptual experience in the absence of direct stimulation (Kosslyn et al., 2001), imagery is known to influence attitudes, memory, and evaluations in advertising contexts (Bone & Ellen, 1992; Babin & Burns, 1997).

Imagery is distinct from perception, which is the recording of physically present stimuli' (Nanay, 2021). Its activity can be triggered by a stimulus perceived in a single sensory modality. For example, a subject exposed to an advertisement for a coffee brand that includes a painting depicting a scene of coffee drinking can imagine himself 'in' the scene, feel flavors, taste in the mouth (impression), or hear the noise made by the elements depicted in or inferred from the painting (Helme-Guizon, 1997; Gavard-Perret and Helme-Guizon, 2003). It is multidimensional because it has several dimensions: vividness (clarity, detail, sensory realism, richness of representation), quantity (number of images generated, image flow, ease of image generation) and elaboration (Childers and al., 1985; Babin, 1992). This distinction aligns with Krishna et al. (2017), who show that different components of imagery activate distinct pathways in consumer evaluation.

Some research has shown that the inclusion of sound effects in radio commercials increases listeners' image activity and that when the increase in image activity is

accompanied by a positive emotional response, there is an improvement in attitude towards advertising (AAD) (Miller and Marks, 1992). A number of studies, such as Spence and Deroy (2013), have been concerned with the investigation of the influence of sensory stimuli on consumers' mental imagery. Other researchers, such as Nanay (2021), support the idea that the treatment of mental imagery as not necessarily conscious would bring a much needed explanatory unification to mental imagery research. Various studies are in agreement that the role of mental imagery in the attitudinal and behavioural responses of individuals should not be underestimated (Mitchell, 1986; Bone and Ellen, 1992; Babin, 1992; Burns and al., 1993; Babin and Burns, 1997; Helme-Guizon, 1997). A few studies have examined the effects of imagery on attitude and found that image elicitation strategies appear to promote positive attitudes and facilitate learning (Lutz and Lutz, 1978). Imagery has been shown to influence cognitive and affective responses to the advertising message, including ad recall, attitude towards the brand and attitude towards the ad (Bone and Ellen, 1992; Burns and al., 1993; Unnava and al., 1996; Babin and Burns, 1997). In addition, research has shown that the inclusion of sound effects in radio commercials increases the listener's imagery activity and that when the increased imagery activity is accompanied by a positive emotional response, the attitude towards the commercial improves (Atwood, 1989; Babin and Burns, 1998; Miller and Marks, 1992; Miller and Marks, 1997). The results of the study conducted by Bone and Ellen (1992) suggest that the vividness and quantity/ease of imagery affect the attitude towards the ad. They find that mental imagery may be a determinant of attitude towards the ad. Hence our hypothesis **H.1. Mental imagery will have a positive effect on attitude towards the ad when stimulated by non-musical and non-verbal sounds.**

**Mental Imagery as a predictor of perceived quality.** Several neuroimaging studies have shown that conceptual processing of sensory perceptions results in neural activation of corresponding brain regions (Zatorre and Halpern 2005; Gonza'lez and al. 2006; Rolls 2005; Simmons and al., 2005). Consumers can therefore form inferential judgments based on imagined sensory signals. Other research (Kreuzbauer and Malter, 2005) has sought to explain how embodied cognition and perceptual symbol systems allow product designers to influence consumers by communicating key perceptual features through subtle changes in product design elements. Indeed, sounds could provide listeners with information about both the actions (e.g. knocking) and the objects (e.g. hardware) that produce the sound (Lemaitre, 2016). The understanding and interpretation of this information from sound stimuli associated with a branded object may be conditioned by mental imagery. Auditory cues may simply improve the reliability of the observer's judgement without changing the actual value of perceived roughness (Lederman, 1979). Miller and Marks (1992) suggest that the learning of brand information is enhanced by mental imagery. Since ease and vividness of mental imagery are strongly related and have similar effects on judgments (Bone and Ellen 1992), vivid mental imagery is used to refer to both. Thus, one of the responses that an individual may have when confronted with a stimulus is the perception of quality, which is considered by some authors (Aaker and Biel, 2013) to be the consumer's judgement of the excellence or overall superiority of a product. However, we propose the following hypothesis: **H.2. Mental imagery has a positive effect on the quality perceived by consumers when stimulated by non-musical and non-verbal sounds.**

**Attitude-toward-the-ad and perceived quality.** Two streams of literature examine how advertising affects perceived quality: direct and indirect pathways. For the indirect effects of advertising on perceived quality, the largest body of research examines the impact

of advertising elements on brand beliefs and attitudes (Kirmani and Zeithaml, 1993). Indeed, there are at least three ways in which advertising can influence consumers' perceptions of product quality: (1) by providing information about product attributes (learning theory: Lavidge and Steiner, 1961); (2) by increasing consumers' familiarity with the brand (simple exposure theory: Wilson, 1979); and (3) by shaping consumers' attitudes towards advertising (attitude-toward-the-ad theory: Mitchell and Olson, 1981). According to Moorthy and Hawkins (2005), these alternative pathways are not mutually exclusive. However, several theoretical considerations invite us to question whether non-musical sounds necessarily follow the classical evaluative pathway typically described in advertising models such as the Attitude-Toward-the-Ad framework (Lutz, MacKenzie, & Belch, 1983; Mitchell & Olson, 1981) and dual-process theories including the Elaboration Likelihood Model (Petty & Cacioppo, 1986) and the Heuristic-Systematic Model (Chaiken, 1980). These models generally assume that affective responses to the advertisement guide subsequent cognitive evaluations of the brand or product. Yet packaging sounds may operate as direct sensory signals, activating cognitive processes without necessarily altering attitude toward the advertisement (Aad).

Unlike verbal or visual ad elements typically filtered through evaluative processing, non-musical sounds may trigger sensory-based, bottom-up inferences. This suggests that such cues could bypass the traditional evaluative filter assumed in dominant persuasion frameworks, functioning more as experiential stimuli than message-based elements. In other words, these sounds may prompt consumers to generate vivid mental imagery and quality-related judgments independently of affective reactions toward the ad itself. Thus, attitude towards the ad may still directly or indirectly (via attitude towards the brand) affect the formation of brand judgments (Kirmani and Zeithaml, 1993), supporting the following hypothesis: **H3. Attitude towards the ad positively influences quality perceptions.**

## **METHODOLOGY**

As we are trying to measure the causal effect between variables, we have chosen an experimental approach. This approach is defined by Enis and Cox (1975) as one in which explanatory variables are manipulated and the effects of this manipulation on a dependent variable are measured. In the context of this experiment, we created an audio advertisement, a medium known to facilitate the formation of mental images by limiting visual interference (Miller and Marks, 1997). This choice also allows us to isolate the perceptual impact of non-musical packaging sounds, which recent literature conceptualizes not merely as functional cues but as sensory triggers capable of eliciting mental imagery and subtle sensory responses (Spence, 2015; Broadbridge et al., 2023). We identified and constructed the independent variable (presence/absence or simultaneous presence of sounds associated with the brand object), assuming that this manipulation alone would affect the hypothesis to be tested. The independent variable is therefore the modality (type of sound). The advertising message examined combines "sound effects" and a "verbal message". The sound effects used in the spot represent the sounds generated during the handling or consumption of the branded object (e.g., effervescence, pouring). These consumption-related, non-musical sounds have been shown to activate cognitive and affective mechanisms distinct from those elicited by symbolic or musical stimuli (Zampini and Spence, 2004; Spence and Wang, 2015). They were embedded as background elements complementing the verbal message and ensuring semantic congruence.

The Fast-Moving-Consumer-Goods sector was chosen for several reasons identified in sensory marketing literature (Krishna, 2012; Velasco et al., 2014; Spence and Wang, 2015; Spence, 2020): significant investment in advertising communication, broad demographic reach, and frequent exposure to everyday consumption sounds. We therefore selected sparkling fruit water, a category characterized by ecologically valid packaging and consumption sounds (fizzing, pouring) that are naturally salient and particularly relevant for studying the role of non-musical cues in mental imagery. In creating the script, we used a “hook” to attract attention. The manipulations are shown below: verbal message (voice-over) + packaging sound (non-musical, non-verbal).

The script describes the product consumption experience using vivid language, following examples in marketing and psychology literature (Frey and Eagly, 1993). The choice of a fictitious brand was essential to avoid influencing participants’ responses, as familiar brands may activate stored knowledge or attitudes that interfere with the sensory processing of sound stimuli. We chose radio for two main reasons: it promotes mental imagery (Miller and Marks, 1997) and avoids potential visual biases that could alter the perception of the auditory stimuli integrated into the spot. This decision is also consistent with the objective of evaluating whether non-musical sounds act as direct sensory signals capable of bypassing classical evaluative filters in advertising. To test the above hypotheses, we conducted a questionnaire survey with a sample of 90 individuals. The sample was heterogeneous (students, doctoral students, households, professionals, etc.) to ensure generalizable results.

## RESULTS – DISCUSSION

To explore whether auditory mental imagery stimulated by non-verbal packaging sounds can influence attitudes and judgments toward a brand, we employed several validated scales. The quantity and vividness of imagery were measured using the scale developed by Ellen and Bone (1991), which includes three 7-point bipolar items for imagery quantity. Attitude toward the ad was measured with three 7-point semantic differential statements developed by Derbaix (1995). Perceived quality was assessed using the scale from Keller and Aaker (1992), selected for its suitability to advertising contexts (Low and Lamb, 2000). Given the exploratory nature of the study and the moderate sample size, Partial Least Squares (PLS) was adopted. According to Hsu & al. (2006) and Henseler & al. (2009), PLS is appropriate for small samples and does not impose strict normality constraints (Jöreskog, 1982). The reliability and construct validity indicators were satisfactory. For the structural model,  $R^2$  values ( $> 0.26$ ) indicate good explanatory power, and the GoF value ( $0.830 > 0.36$ ) reflects strong model fit. The results of the direct effects relating to packaging sounds show that:

**1. Attitude toward the ad does not affect perceived quality.** Contrary to classical persuasion predictions, Aad did not significantly shape quality perceptions. Traditional models assume that ad evaluations spill over into product evaluations (Mitchell & Olson, 1981; Kirmani & Zeithaml, 1993). In our study, however, packaging sounds such as fizzing or pouring acted as direct sensory signals that activated cognitive inferences independently of Aad. Participants’ evaluations of the ad’s appeal did not translate into higher quality judgments, suggesting that non-musical, non-verbal sounds provide diagnostic sensory information rather than operating through affective appraisal. Packaging sounds therefore function as direct sensory cues, shaping product-related cognition without requiring an evaluative transfer from Aad.

**2. Quantity of mental images positively influences Aad, whereas vividness does not.** The number of mental images generated by packaging sounds had a positive effect on attitude toward the ad. Participants exposed to ads containing packaging sounds reported generating more mental images, which improved their evaluation of the ad. This is consistent with research showing that sound effects in audio advertising enhance imagery activity and strengthen Aad by increasing cognitive engagement (Miller & Marks, 1992; Bone & Ellen, 1992; MacInnis & Price, 1987). However, vividness did not influence Aad. The images formed were not necessarily clear or detailed, indicating that quantity—rather than precision—drives affective responses. This distinction aligns with imagery research showing that quantity supports affective engagement, whereas vividness serves different cognitive functions (Miller et al., 2000; Holmes & Mathews, 2010). Packaging sounds therefore act as imagination triggers, stimulating mental simulation and fostering affective reactions even when imagery is not highly vivid. This aligns with recent findings showing that subtle non-verbal sounds can evoke spontaneous mental simulation and enhance experiential involvement (Krishna, 2012; Elder & Krishna, 2022).

**3. Vividness of imagery significantly enhances perceived product quality.** Vividness of mental imagery strongly increased perceived product quality. Although vividness did not affect Aad, it significantly improved consumers' quality judgments, consistent with research showing that vivid sensory simulations enhance diagnostic processing and strengthen product-related inferences (MacInnis & Price, 1987; Keller & McGill, 1994; Petrova & Cialdini, 2005). Vivid imagery provides clarity, detail, and sensory richness—elements that reinforce evaluative certainty and diagnosticity (Marks, 1999; Escalas, 2004). When consumers mentally “hear” a crisp fizz or a refreshing pour, the realism of these representations strengthens perceptions of freshness or product superiority. This echoes sensory marketing studies showing that vivid imagery enhances perceived realism and product beliefs (Krishna, 2012; Elder & Krishna, 2022).

Findings reveal a dual mechanism through which non-verbal packaging sounds shape consumer responses. Imagery quantity primarily influences affective reactions (Aad), while imagery vividness drives cognitive evaluations of product quality. This distinction is consistent with work emphasizing differentiated roles of imagery dimensions (Krishna et al., 2017; Elder & Krishna, 2022). The absence of a link between Aad and perceived quality departs from classical persuasion models (Mitchell & Olson, 1981; Kirmani & Zeithaml, 1993). Instead, packaging sounds appear to function as direct sensory signals that provide diagnostic information independently of evaluative pathways (Ringler et al., 2020; Romagny et al., 2024). These implications are best understood by considering how packaging sounds interact with brand positioning, industry expectations, and communication channels.

**Implications by Brand Positioning.** Brand positioning determines the appropriate auditory signature. Premium and luxury brands should use precise, crisp sounds that convey craftsmanship and material quality, consistent with evidence that precision cues enhance perceived quality and prestige (Aaker, 1996; Spence & Wang, 2015). Mass-market or youth-oriented brands benefit from dynamic, playful sound profiles that amplify imagery quantity and evoke freshness and energy (Gorn et al., 1993; North et al., 1999).

Eco-conscious or minimalist brands should use soft, naturalistic sounds to reinforce authenticity and environmental coherence, avoiding engineered cues that could undermine sustainability claims (Krishna, 2012).

**Implications by Industry Sector.** Packaging sounds influence expectations differently across industries. In food and beverages, fizzing, bubbling, or pouring cues enhance imagery vividness and expectations of freshness (Zampini & Spence, 2004; Spence & Wang, 2015). In cosmetics, subtle closure sounds signal hygiene, quality, and functional precision (Romagny et al., 2024). In technology and electronics, mechanical cues serve as indicators of engineering quality and structural robustness (Lemaitre, 2016). Across sectors, auditory cues must align with other sensory dimensions within a multisensory branding system.

**Implications by Communication Channel.** Channels vary in their ability to foreground sound. Radio and podcasts maximize mental imagery activation (Miller & Marks, 1997), making packaging sounds central persuasive cues. Digital environments require short, distinctive cues adapted to varied listening contexts. ASMR-related findings suggest heightened sensory immersion in headphone-based media (Broadbridge et al., 2023; Cohen et al., 2024). In cluttered environments, excessive sounds risk irritation and cognitive overload, requiring adjustments in intensity and complexity.

**Strategic Components to Integrate into Communication.** Packaging sounds should be embedded within a coherent sensory strategy based on empirical testing. Distinctive auditory cues can reinforce brand identity, stimulate mental imagery, and enhance engagement and perceived quality (Graakjær & Bonde, 2018; Spence, 2020). Premium brands benefit from high-fidelity cues, while mass-market brands may emphasize stimulating imagery quantity. Managers must also account for consumer heterogeneity in sound sensitivity. Finally, sensory innovation should be grounded in experimentation. Future developments in AI-driven sound design, AR/VR environments, and interactive platforms offer opportunities to create adaptive, personalized auditory ecosystems that optimize mental imagery and product perception.

## **BIBLIOGRAPHIC REFERENCES**

1. Aaker, D. A. (1996). Measuring brand equity across products and markets. *California management review*, 38(3).
2. Allan, D., (2007), "Sound advertising: A review of the experimental evidence on the effects of music in commercials on attention, memory, attitudes, and purchase", *Journal of Media Psychology*, 12 (3).
3. Alhaddad, A. (2015). Perceived quality, brand image and brand trust as determinants of brand loyalty. *Journal of Research in Business and Management*, 3(4), 01-08.
4. Allan, D. (2007). Sound advertising: a review of the experimental evidence on the effects of music in commercials on attention, memory, attitudes, and purchase intention. *Journal of Media Psychology*, 12(3), 1-35.
5. Bartholmé, R. H., & Melewar, T. C. (2011). Exploring the auditory dimension of corporate identity management. *Marketing Intelligence & Planning*, 29(2), 92-107.
6. Bizley, J. K., & Cohen, Y. E (2013). The what, where and how of auditory-object perception. *Nature Reviews Neuroscience*, 14(10), 693-707.
7. Bodden, M. & Belschner, T. (2014). "Comprehensive automotive active sound design part 1: electric and combustion vehicles", *Proceedings of Inter-noise, 2014, Melbourne*, pp. 1-6.

8. Brakus, J. J., Schmitt, B. H., & Zarantonello, L. (2009). Brand experience: what is it? How is it measured? Does it affect loyalty? *Journal of marketing*, 73(3), 52-68.
9. Broadbridge, V., Mangió, F., & Domenico, G. D. (2023). How brand managers can maximize engagement with ASMR YouTube content: Influencers who give you the “tingles” through autonomous sensory meridian response cues. *Journal of Advertising Research*, 63(4), 313-334.
10. Eid, D. (2024). The effect of ASMR marketing on consumer perceptions.
11. Sawilowsky, S. S., & Blair, R. C. (1992). A more realistic look at the robustness and type II error properties of the t test to departures from population normality. *Psychological bulletin*, 111(2), 352
12. Carron, M. (2016). *Méthodes et Outils pour Définir et Véhiculer une Identité Sonore* (Doctoral dissertation, Université Paris 6 (UPMC)).
13. Carron, M., Dubois, F., Misdariis, N., Talotte, C., & Susini, P. (2014). Designing Sound Identity: Providing new communication tools for building brands “corporate sound”.
14. Cohen, J., Sands, S., Campbell, C., & Mavrommatis, A. (2024). Sonic sensations: Navigating the mixed outcomes of ASMR in retail advertising. *Journal of Retailing and Consumer Services*, 80, 103900.
15. Correia, F. M. (2017). *Audio branding empowerment: a dissertation proposal about the interactive process between brands and consumer behaviour* (Doctoral dissertation).
16. Dacremont, C. (2003). Croustillant : aspects méthodologiques de la mesure sensorielle d'une caractéristique de texture complexe. *Anthropology of food*, (1).
17. Denis, M. (2019). Chapitre 4. La perception auditive : notions fondamentales et applications audiologiques. In *La psychologie cognitive*. Éditions de la Maison des sciences de l'homme.
18. Ellen, P. S., & Bone, P. F. (1991). Measuring communication-evoked imagery processing. *ACR North American Advances*.
19. Enis, B. M., & Cox, K. K. . (1975). Ad experiments for management decisions. *Journal of Advertising Research*, 15(2), 35-41.
20. Galan, J. P. (2003). *Musique et réponses à la publicité : effets des caractéristiques, de la préférence et de la congruence musicales*. Toulouse : Université des sciences sociales.
21. Gil-Pérez, I., Rebollar, R., & Lidón, I. (2020). Without words: The effects of packaging imagery on consumer perception and response. *Current Opinion in Food Science*, 33, 69-77.
22. Godefroid, J. (2011). *Psychologie. Science humaine et science cognitive* (3e édition, 2e tirage 2012), Bruxelles : Editions De Boeck Université.
23. Gorn, G. J., Goldberg, M. E., & Basu, K. (1993). Mood, awareness, and product evaluation. *Journal of Consumer Psychology*, 2(3), 237-256.
24. Graakjær, N. J., & Bonde, A. (2018). Non-musical sound branding—a conceptualization and research overview. *European Journal of Marketing*, 52(7/8), 1505-1525.
25. Gustafsson, C. (2015). Sonic branding: A consumer-oriented literature review. *Journal of Brand Management*, 22(1), 20-37.
26. Keller, K. L., & Lehmann, D. R. (2006). Brands and branding: Research findings and future priorities. *Marketing science*, 25(6), 740-759.
27. Klausen, H. B. (2019). 'Safe and sound': What technologically-mediated ASMR is capable of through sound. *SoundEffects-An Interdisciplinary Journal of Sound and Sound Experience*, 8(1), 87-103.
28. Knoeferle, P., Velasco, C., & Spence, C. (2016). Knoeferle, K. MMultisensory brand search: How the meaning of sounds guides consumers' visual attention. *Journal of experimental psychology: applied*, 22(2), 196.
29. Kolbe, R. H., & Burnett, M. S. (1991). Content-analysis research: An examination of applications with directives for improving research reliability and objectivity. *Journal of consumer research*, 18(2), 243-250.
30. Langeveld, L. v. (2013). “Product sound design: intentional. in Coelho, D.A. (Ed.), *Advances in Industrial Design Engineering*, InTech, Rijeka, pp. 47-74.

31. Lederman, S. J. (1979). Auditory texture perception. *Perception*, 8(1), 93-103.
32. Lee, A. K. C., Wallace, M. T., Coffin, A. B., Popper, A. N., & Fay, R. R. (2019). (Eds.). *Multisensory Processes: The Auditory Perspective* (Vol. 68). Springer.
33. Miller, D. W., & Marks, L. J. (1992). Mental imagery and sound effects in radio commercials. *Journal of Advertising*, 21(4), 83-93.
34. Millot, L. (2008). *Traitement du signal audiovisuel: applications avec Pure Data*. Dunod.
35. North, A. C., Hargreaves, D. J., & McKendrick, J. (1999). The influence of in-store music on wine selections. *Journal of Applied psychology*, 84(2), 271.
36. Nufer, G. (2018). The sound of brands (No. 2019-1). *Reutlinger Diskussionsbeiträge zu Marketing & Management*.
37. Oh, T. T., Keller, K. L., Neslin, S. A., Reibstein, D. J., & Lehmann, D. R. . (2020). The past, present, and future of brand research. *Marketing Letters*, 1-12.
38. Olson, J. C., & Jacoby, J. (1972). Cue utilization in the quality perception process. *ACR Special Volumes*.
39. Özcan Vieira, E., & Schifferstein, H. N. (2014). The effect of (un) pleasant sounds on the visual and overall pleasantness of products. In *Proceedings of the colors of care: The 9th international conference on design and emotion*, 6-7 October 2014, Bogota, Colombia. Ediciones Uniandes.
40. Peng-Li, D., Alves Da Mota, P., Correa, C. M. C., Chan, R. C., Byrne, D. V., & Wang, Q. J. (2022). "Sound" decisions: the combined role of ambient noise and cognitive regulation on the neurophysiology of food cravings. *Frontiers in Neuroscience*, 16, 827021.
41. Ringler, C., Sirianni, N. J., & Christenson, B. (2021). The power of consequential product sounds. *Journal of Retailing*, 97(2), 288-300.
42. Rodero, E. L. (2015). "When the internet seems to be deaf. Sound resources to enrich online radio advertising". et station conference proceedings: radio, sound and internet, 2015, Braga, pp. 362-372.
43. Romagny, S., Sault, T., Bouchet, C., Thiebaut, L., Vincenzi, F., & Morizet, D. (2024). From noise to sound: Setting the base of packaging sound design for cosmetics by physical, sensory and cognitive characterization of lipstick closing sounds. *Food Quality and Preference*, 113, 105058.
44. Schmitt, B. (2009). The concept of brand experience.
45. Spence, C. &. (2010). The influence of auditory cues on the perception of, and responses to, food and drink. *Journal of Sensory Studies*, 25(3), 406-430.
46. Spence, C. (2011). Sound design: using brain science to enhance auditory & multisensory product & brand development. In *(((ABA))) Audio Branding Academy Yearbook 2010/2011*, (pp. 33-51). Nomos Verlagsgesellschaft mbH & Co. KG.
47. Spence, C. (2012). Auditory contributions to flavour perception and feeding behaviour. *Physiology & behavior*, 107(4), 505-515.
48. Spence, C. (2014). Multisensory advertising & design. In B. Flat & E. Klein (Eds.). *Advertising and design. Interdisciplinary perspectives on a cultural field*, (pp. 15–27). Bielefeld: Verlag.
49. Spence, C. (2015). Eating with our ears: assessing the importance of the sounds of consumption on our perception and enjoyment of multisensory flavour experiences. *Flavour*, 4(1), 3.
50. Spence, C., & Wang, Q. J. (2015). Sensory expectations elicited by the sounds of opening the packaging and pouring a beverage. *Flavour*, 4(1), 35.
51. Spence, C., & Zampini, M. (2006). Auditory contributions to multisensory product perception. *Acta Acustica united with Acustica*, 92(6), 1009-1025.
52. Steiner, P. (2009). *Sound Branding*. Gabler.
53. Szybillo, G. J., & Jacoby, J. (1974). Intrinsic versus extrinsic cues as determinants of perceived product quality. *Journal of Applied Psychology*, 59(1), 74.
54. Treasure, J. (2011). *Sound business*. Management Books 2000 Limited.

55. Underwood, R. L., & Klein, N. M. (2002). Packaging as brand communication: effects of product pictures on consumer responses to the package and brand. *Journal of marketing theory and practice*, 10(4), 58-68.
56. Wang, Q. J., & Spence, C. (2019). Sonic Packaging: How Packaging Sounds Influence Multisensory Product Evaluation. In *Multisensory Packaging*, Palgrave Macmillan, Cham, pp. 103-125.
57. Woods, A. T. (2011). Effect of background noise on food perception. *Food Quality and Preference*, 22(1), 42-47.
58. Woods, A. T., Poliakoff, E., Lloyd, D. M., Kuenzel, J., Hodson, R., Gonda, H., ... & Thomas, A. (2011). Effect of background noise on food perception. *Food Quality and Preference*, 22(1), 42-47.
59. Zampini, M., & Spence, C. (2004). The role of auditory cues in modulating the perceived crispness and staleness of potato chips. *Journal of sensory studies*, 19(5), 347-363.