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All or Nothing in Sensory Marketing: Must All or Only Some Sensory Attributes Be Congruent With a Product's Primary Function?

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Abstract

Given the challenges and costs of implementing high sensory congruence, this article examines whether all sensory attributes, such as product color and ambient music, must match a product's primary function to ensure favorable product evaluation or whether a match of only some sensory attributes is sufficient. For this purpose, we consider multiple sensory attributes and their fit with a product's primary function in terms of key semantic associations. In contrast with approaches that focus on a single sensory attribute and its fit with a product's primary function, this approach allows investigating the impact not only of high versus low sensory attributes–function congruence but also of partial sensory attributes–function congruence. We conduct three experimental studies in online and field settings and two product settings (cooling and heating pads) that consider sensory attributes at the product and ambience level across the senses of vision, smell, and hearing. Our findings show that depending on its type, partial sensory attributes–function congruence can lead to favorable product evaluation similar to high sensory attributes–function congruence or unfavorable product evaluation similar to low sensory attributes–function congruence. Thus, sensory attributes–function congruence has non-linear degressive or progressive positive effects on product evaluation. Overall, these findings indicate that if properly designed, a match of only selected sensory attributes with a product's primary function can indeed lead to sufficiently favorable product evaluation and, thus, help avoiding unnecessary effort in implementing high sensory congruence.

Keywords: Multisensory marketing; Congruence; Product color; Ambient color; Ambient scent; Ambient music

Introduction

To generate favorable consumer responses, both retailers and manufacturers increasingly rely on multisensory marketing, purposefully exposing consumers to multiple sensory stimuli at the point of sale (Lindstrom 2010). These stimuli are typically product-related (e.g., product color, texture; Hultén, Broweus, and van Dijk 2009; Lindstrom 2010) and ambience-related (e.g., ambient color, light, scent, music; Biswas, Lund, and Szocs 2019; Biswas et al. 2017) attributes and are intended to affect the senses in a way that highlights the merchandise's benefits for consumers (Lwin, Morrin, and Krishna 2010). For this purpose, previous research suggests the need for semantic congruence, which refers to the fit of the semantic associations among the sensory attributes (Krishna, Elder, and Caldara 2010; Spangenberg, Grohmann, and Sprott 2005).[1] Thus, managers increasingly strive to align the semantic associations from sensory attributes with each other—for example, the product color blue and the ambient scent of spearmint both indicate the same characteristic (i.e., coolness) and thus fit well together in terms of a key semantic association (e.g., temperature).

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[1] Semantic congruence is related but not identical to crossmodal correspondence. According to Adams (2018) and Spence (2012), crossmodal correspondence refers to the tendency for one sensory attribute to elicit associations with or expectations of another sensory attribute (e.g., Ngo, Piqueras-Fiszman, and Spence 2012). Specifically, semantic congruence can be considered a possible reference point of crossmodal correspondence and thus represents a key concept in such correspondence (Krishna, Elder, and Caldara 2010).

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Making things even more complicated, the product's primary function (e.g., cooling in the case of a cooling pad) also typically addresses the senses and is likewise sensory in nature. Thus, managers are confronted with the need to also ensure congruence between the sensory attributes and the product's primary function (Bosmans 2006; Mitchell, Kahn, and Knasko 1995). For example, the impact of multisensory marketing for a cooling pad might vary significantly depending on whether the sensory attributes are highly congruent with the product's cooling function, such as when product color (e.g., blue) and ambient scent (e.g., spearmint) signal coolness, or whether these attributes are not congruent at all with its cooling function, such as when product color (e.g., red) and ambient scent (e.g., vanilla) indicate warmth to consumers. In both cases, the congruence between sensory attributes is high (product color matches ambient scent), while the congruence between the sensory attributes and the product's primary function differs considerably (product color and ambient scent match the product's primary function in the former case but do not in the latter).

Thus, it seems that managers must expend considerable efforts to ensure congruence between all sensory cues (i.e., sensory attributes and product's primary function). However, given the complexity of the retail environment, including the multitude of product- and ambience-related sensory attributes, this objective can only be achieved, if at all, through significant expenditures of time and money. Therefore, given the challenges and costs of implementing high sensory congruence, managers would profit from theoretical insights into whether a fit of all sensory attributes with the product's primary function is required for sufficiently favorable consumer responses or whether a fit of only some sensory attributes would be similarly effective (in terms of consumer responses) and, thus, even more efficient (in terms of effort in achieving consumer responses).

The literature on sensory congruence provides no answer to this question. One stream deals with *sensory attributes congruence*, concentrating on the impact of non-existing (i.e., low) versus existing (i.e., high) congruence between multiple sensory attributes but not on the impact of the congruence of these attributes with the primary function of the related product (e.g., Krishna, Elder, and Caldara 2010; Mattila and Wirtz 2001; Velasco et al. 2015). Another stream examines *sensory attributes–function congruence*. These studies mostly focus on the fit of a single sensory attribute with the product's primary function, thereby examining the impact of non-existing (i.e., low) versus existing (i.e., high) congruence of this attribute with the product function (e.g., Bosmans 2006; Knoeferle et al. 2016; Mitchell, Kahn, and Knasko 1995). Although studies from both streams have considerably advanced theoretical understanding of sensory congruence, they focus on the impact of low versus high sensory congruence and, thus, on linear effects of sensory congruence (see Table 1).

Consequently, the literature lacks studies on partial sensory congruence, including studies on partial sensory attributes–function congruence, in which some attributes (e.g., blue product color indicating coolness) match the product's primary function (e.g., cooling) while others (e.g., vanilla ambient scent indicating warmth) do not. This gap in research is problematic because it impedes investigation of non-linear effects of sensory congruence and, thus, of questions such as whether a fit of only selected sensory attributes with the product's primary function is sufficient to ensure favorable consumer responses.

To answer this question and help fill this research gap, this article focuses on partial sensory attributes–function congruence and related potential non-linear effects of sensory attributes–function congruence on product evaluation. Examining this topic requires considering multiple sensory attributes, some of which match the product's primary function and some of which do not. In three experiments in online and field settings and two product settings (cooling and heating pads), we compare the impact of partial sensory attributes–function congruence with that of high and low sensory attributes–function congruence in which all or no sensory attributes, respectively, match the product's primary function (cooling or warming). Moreover, by distinguishing whether the multiple sensory attributes are at the same level (product) or different levels (product and ambience) and of the same sense (vision) or different senses (vision and smell or vision and hearing), we can also compare the impact of different types of partial sensory attributes–function congruence.

This article contributes to the literature in several ways. First, we introduce the concept of partial sensory attributes–function congruence to the marketing discipline. This concept addresses the challenges and costs of implementing high congruence between sensory cues in a retail environment and helps broaden the perspective of researchers and practitioners beyond a pure focus on existing versus non-existing sensory attributes–function congruence.

Second, we provide theoretical insights into the impact of partial sensory attributes–function congruence on consumers' product evaluation. By comparing this impact with the impact of high and low sensory attributes–function congruence, we reveal non-linear effects of sensory attributes–function congruence on product evaluation. These insights into the functional form of this relationship add to the literature by showing that a linear approximation based on a comparison of existing and non-existing sensory attributes–function congruence would be oversimplified. Moreover, we show that a match of some sensory attributes with the product's primary function may, or may not, be sufficient for ensuring favorable product evaluation, depending on the type of partial sensory attributes–function congruence.

Third, and related to the latter, we present a distinction of different types of partial sensory attributes–function congruence. Same- versus cross-level partial sensory attributes–function congruence refers to whether the sensory attributes congruent with the product's primary function are at the same level as the product's primary function (i.e., product level) or at a different level (i.e., ambience level). Same- versus cross-sense partial sensory attributes–function congruence refers to whether the sensory attributes congruent with the product's primary function relate to the same sense as the incongruent sensory attributes (e.g., vision and vision) or to different senses (e.g., vision and smell). We show that depending on whether partial sensory attributes–function congruence occurs under a same- or cross-level and a same- or cross-sense condition, its impact on product

Table 1
Overview of research on sensory congruence.

Research		Approach				Topic			
Streams	Studies	Sensory cues		Extent of sensory congruence		Functional form of effects of sensory congruence		Type of partial sensory congruence	
		Sensory attribute(s)	Primary function	Low/high (extreme extents)	Partial (medium extent)	Linear	Non-linear	Same-/cross-level	Same-/cross-sense
Sensory attributes congruence	For example, Becker et al. (2011), Imschloss and Kühnl (2017), Krishna, Elder, and Caldara (2010), Mattila and Wirtz (2001), Morrison et al. (2011), Schifferstein and Verlegh (1996), Spangenberg, Grohmann, and Sprott (2005), Velasco et al. (2015)	Multiple	No	●	○	●	○	○	○
Sensory attributes–function congruence	For example, Bone and Jantrania (1992), Bosmans (2006), Knoeferle et al. (2016), Mitchell, Kahn, and Knasko (1995), North, Hargreaves, and McKendrick (1999), Schifferstein and Blok (2002)	Single	Yes	●	○	●	○	○	○
	This study	Multiple	Yes	●	●	●	●	●	●

evaluation varies, thus determining the functional form of the relationship between sensory attributes–function congruence and product evaluation. These differentiated theoretical insights help guide researchers and practitioners on whether they must strive for high sensory attributes–function congruence at all and, if not, under what conditions partial sensory attributes–function congruence is sufficient for achieving favorable product evaluation.

Framework and Hypotheses Development

Theoretical Background

To develop our framework, we build on gestalt theory (Demangeot and Broderick 2010; Holahan 1982) and schema congruity theory (Mandler 1982; Meyers-Levy and Tybout 1989), both suitable theories for multisensory congruence. *Gestalt theory* suggests that consumers perceive external stimuli, such as sensory cues, as a whole (i.e., a total configuration) rather than only each stimulus separately. Both sensory attributes (e.g., product color or ambient scent) and the product's primary function (e.g., cooling) heighten consumer senses, thus serving as sensory cues (Krishna 2012; Spence et al. 2014). Accordingly, consumers are likely to view multiple sensory attributes and the product's primary function as a whole rather than each sensory cue separately (Holahan 1982). In line with this reasoning and claims by previous research (Thomson 2016), to examine consumers' multisensory experience, sensory attributes and the product's primary function must be considered together.

While gestalt theory helps explain how consumers perceive external stimuli, *schema congruity theory* details in which way consumers process these stimuli (Mandler 1982). According to the theory, consumers organize knowledge about a product (e.g., its primary function) in mental structures (i.e., schemata) that cannot be easily changed once established (Mandler 1982; Roggeveen, Goodstein, and Grewal 2014). When confronted with external stimuli (e.g., sensory attributes) related to the product, consumers try to access the corresponding schemata to process these stimuli fast and easily on the basis of joint semantic associations (Beals 1998; Neisser 1976). The extent to which the external stimuli fit the existing schemata in terms of these associations determines the degree of semantic congruence (Bone and Ellen 1999; Mandler 1982; Roggeveen, Goodstein, and Grewal 2014), which thus serves as the proper reference point for the fit between sensory attributes and the product's primary function (Krishna, Elder, and Caldara 2010). In turn, the degree of semantic congruence is likely to foster processing fluency, or the ease with which consumers process stimuli (Lee and Labroo 2004; Schwarz 2004; Van Rompay and Pruyn 2011).

Conceptual Framework

In our framework, *sensory attributes* include generic characteristics of the product itself (i.e., product color) or its environment (e.g., ambient color, scent, music). The *product's primary function* refers to the key purpose of product use (e.g., cooling in the case of a cooling pad) (Townsend, Montoya, and Calantone 2011). Given our theoretical considerations, we define *sensory attributes–function congruence* as the extent of joint fit of multiple sensory attributes with the product's primary function in terms of semantic associations. Because the primary function of our focal products (cooling and heating pads) is temperature-related, we focus on temperature as a key semantic association. For example, when facing multiple sensory attributes of a cooling pad, such as product color and ambient scent, consumers are likely to try to draw on the existing schemata for this product and to process these stimuli on the basis of temperature-related associations. In the case of *high* sensory attributes–function congruence, all sensory attributes match the product's primary function (e.g., for a cooling pad, both product color and ambient scent signal coolness and thus fully fit the product's cooling function). In the case of *low* sensory attributes–function congruence, none of the attributes match the product's primary function (e.g., for a cooling pad, both product color and ambient scent indicate warmth and thus do not fit the product's cooling function at all). Appendix A provides these and other illustrations of high and low sensory attributes–function congruence, as well as an overview of the stimuli used in our empirical studies.

In addition to considering these maximum and minimum manifestations of sensory attributes–function congruence, our framework particularly focuses on the intermediate manifestation of this construct—that is, *partial* sensory attributes–function congruence, which occurs when some, but not all, of the sensory attributes fit the product's primary function. For example, this would be the case if for a cooling pad, product color indicates coolness but ambient scent signals warmth, and thus the sensory attributes partly match the product's cooling function.

We consider different types of partial sensory attributes–function congruence. The first type refers to whether the sensory attributes congruent with the product's primary function are at the same level as the product's primary function (i.e., product level), defined as *same-level* partial sensory attributes–function congruence, or at a different level (i.e., ambience level), labeled as *cross-level* partial sensory attributes–function congruence. Consistent with this, Velasco and Spence (2019) distinguish between high-level sensory stimuli, which include stimuli at the product level, and low-level sensory stimuli, such as several types of stimuli at the ambience level. The second type refers to whether the sensory attributes congruent with the product's primary function relate to the same sense as the incongruent sensory attributes (e.g., vision and vision), defined as *same-sense* partial sensory attributes–function congruence, or to different senses (e.g., vision and smell), labeled as *cross-sense* partial sensory attributes–function congruence. Appendix A provides further illustrations of same- versus cross-level and same- versus cross-sense partial sensory attributes–function congruence, as well as an overview of the stimuli in our empirical studies.

Finally, as a focal consumer response, our framework focuses on *product evaluation*, or the extent to which consumers judge a product favorably (Bosmans 2006). Because consumers typically base their purchase decision on this construct, studies

in a retailing context frequently use it as a dependent variable (Imschloss and Kuehnl 2019; Spangenberg, Crowley, and Henderson 1996).

Hypotheses About Impact of High versus Low Sensory Attributes–Function Congruence

Our investigation of the impact of partial sensory attributes–function congruence begins with a comparison of the impact of the construct's maximum and minimum manifestations on product evaluation. For this purpose, we draw on gestalt and schema congruity theories (Holahan 1982; Mandler 1982) and, in particular, on the concept of processing fluency (Schwarz 2004) and sensory dominance (Hoegg and Alba 2007).

Impact of High Sensory Attributes–Function Congruence. Consumers organize information about a product in schemata that cannot be easily altered (Mandler 1982; Roggeveen, Goodstein, and Grewal 2014). When consumers encounter external stimuli related to a product, they try to process them by accessing the information stored in schemata about the product, such as their knowledge about the product's primary function (Beals 1998; Neisser 1976). When all sensory attributes (e.g., cool product color and cool ambient scent) correspond well to consumers' schemata about the product (e.g., their knowledge of a cooling pad's primary function), this reconfirmation of schemata is likely to lead to perceptions of comfort and pleasure that transfer to the related product in the form of a positive evaluation (Fiske and Taylor 1991; Meyers-Levy and Tybout 1989). A match of all sensory attributes with the product's primary function is also likely to facilitate consumers' cognitive treatment of these external stimuli, resulting in high processing fluency (Lee and Aaker 2004; Van Rompay and Pruyn 2011). Because consumers typically expect compatibility of external stimuli and, thus, ease of processing, high processing fluency is likely to induce favorable affective reactions, thus promoting liking and other favorable evaluative judgments of the related product (Lee and Labroo 2004; Reber, Winkielman, and Schwarz 1998).

Impact of Low Sensory Attributes–Function Congruence. By contrast, when the sensory attributes (e.g., warm product color and warm ambient scent) do not match the respective schemata at all (e.g., knowledge of a cooling pad's primary function), this lack of confirmation is likely to cause perceived discomfort and unpleasantness that spill over to the related product in the form of negative evaluations (Fiske and Taylor 1991; Meyers-Levy and Tybout 1989). In addition, because a mismatch between sensory attributes and a product's primary function is typically unexpected, it may result in low processing fluency, triggering unfavorable affective consumer reactions and, in turn, disliking and other negative evaluative judgments of the product (Winkielman and Cacioppo 2001). Thus:

H1. High sensory attributes–function congruence leads to higher product evaluation than low sensory attributes–function congruence.

Hypotheses About Impact of Partial Sensory Attributes–Function Congruence (Same- vs. Cross-Level)

Subsequently, we examine how same- and cross-level partial sensory attributes–function congruence, respectively, perform in terms of product evaluation compared with low and high sensory attributes–function congruence (H2–H3). With the reasoning for these effects, we also derive predictions on whether same- or cross-level partial sensory attributes–function congruence performs better in terms of product evaluation (H4).

Impact of Same-Level Partial Sensory Attributes–Function Congruence. Consumers are likely to interpret sensory attributes (e.g., product color) that are at the same level as the product's primary function (i.e., product level) as significantly more diagnostic and, thus, relevant for the function than non-product-related (e.g., ambience-related) sensory attributes (Feldman and Lynch 1988). Therefore, in consumers' process of judging whether their schemata about the product (e.g., their knowledge of a cooling pad's primary function) holds true, product-related sensory attributes are likely to dominate non-product-related attributes (Beals 1998). Consequently, when product-related sensory attributes (e.g., cool product color) fit the product's primary function (e.g., cooling) but non-product-related sensory attributes (e.g., warm ambient color) do not, the congruence of the former type of sensory attributes tends to prevail over the incongruence of the latter type of sensory attributes, resulting in perceptions of comfort and pleasure and, in turn, high product evaluation (Meyers-Levy and Tybout 1989; Neisser 1976; Spence et al. 2014). When consumers process stimuli, they can also more easily group together sensory attributes and the product's primary function that are at the same level, resulting in enhanced processing fluency and, thus, favorable affective reactions and evaluative judgments of the related product (Lee and Labroo 2004; Palmer 1999). These arguments suggest that same-level partial sensory attributes–function congruence results in a high level of product evaluation. Consequently, and considering our reasoning for H1, we predict the following:

H2. Same-level partial sensory attributes–function congruence leads to (a) higher product evaluation than low sensory attributes–function congruence but (b) a similar level of product evaluation to that of high sensory attributes–function congruence, suggesting a degressive positive effect (i.e., a rise on a diminishing scale).

Impact of Cross-Level Partial Sensory Attributes–Function Congruence. When the sensory attributes (e.g., ambient color) that match the product's primary function are at a different level than the product's primary function (i.e., non-product level), consumers may view them as significantly less diagnostic and, thus, relevant for the function than product-related attributes (Feldman and Lynch 1988). Thus, these non-product-related sensory attributes are likely to be less valid for consumers to judge whether their schemata about the product is confirmed (Beals 1998). Therefore, when non-product-related sensory attributes (e.g., cool ambient color) are congruent with the product's primary function (e.g., cooling) but product-related attributes (e.g., warm product color) are incongruent, the incon-

gruence of the latter type of sensory attributes tends to dominate the congruence of the former type of sensory attributes, resulting in perceptions of discomfort and unpleasantness and, in turn, low product evaluation (Feldman and Lynch 1988; Fiske and Taylor 1991; Neisser 1976; Spence et al. 2014). In addition, the lack of processing fluency owing to sensory cues at different levels may cause unfavorable affective consumer reactions and, thus, disliking and low product evaluation (Winkielman and Cacioppo 2001). These arguments indicate that cross-level partial sensory attributes–function congruence leads to a low level of product evaluation. Therefore, and considering the reasoning for H1, we propose the following:

H3. Cross-level partial sensory attributes–function congruence leads to (a) a similar level of product evaluation to that of low sensory attributes–function congruence but (b) lower product evaluation than high sensory attributes–function congruence, suggesting a progressive positive effect (i.e., a rise on an increasing scale).

Finally, our reasoning that same-level partial sensory attributes–function congruence causes high product evaluation (H2) while cross-level partial sensory attributes–function congruence leads to low product evaluation (H3) implies that the former performs better in terms of product evaluation. Because this conclusion about the superiority of same-level partial sensory attributes–function congruence directly and unambiguously results from our arguments for H2 and H3, we do not provide a separate reasoning for this prediction. Thus:

H4. Same-level partial sensory attributes–function congruence leads to higher product evaluation than cross-level partial sensory attributes–function congruence.

Hypotheses About Impact of Partial Sensory Attributes–Function Congruence (Same- vs. Cross-Sense)

Next, we explore how same- and cross-sense partial sensory attributes–function congruence, respectively, perform in terms of product evaluation compared with low and high sensory attributes–function congruence (H5–H6).

Impact of Same-Sense Partial Sensory Attributes–Function Congruence. If the sensory attributes (e.g., cool product color) congruent with the product's primary function (e.g., cooling) relate to the same sense (e.g., vision) as the incongruent sensory attributes (e.g., warm ambient color), no sensory attribute dominates another sensory attribute because of the general superiority of one sense over another (Hoegg and Alba 2007). Thus, consumers are likely to process each of these attributes to a considerable extent, which makes them realize that some sensory attributes do not match their schemata about the product, impairing cognitive treatment of these attributes and, thus, processing fluency (Jia, Shiv, and Rao 2014; Van Rompay and Pruyn 2011). Consequently, consumers tend to feel some discomfort and unpleasantness (Meyers-Levy and Tybout 1989), as well as some negative affective reactions, and thus form unfavorable evaluative judgments of the related product (Reber, Winkielman, and Schwarz 1998). Thus, some incongruence among same-sense attributes is likely to impede higher levels of product evaluation, which would rather demand broad congruence across same-sense attributes. Thus, and considering our arguments for H1, we propose the following:

H5. Same-sense partial sensory attributes–function congruence leads to (a) a similar level of product evaluation to that of low sensory attributes–function congruence but (b) lower product evaluation than high sensory attributes–function congruence, suggesting a progressive positive effect (i.e., a rise on an increasing scale).

Impact of Cross-Sense Partial Sensory Attributes–Function Congruence. If the sensory attributes (e.g., cool product color) congruent with the product's primary function (e.g., cooling) relate to a sense (e.g., vision) that differs from the sense (e.g., smell) to which the incongruent sensory attributes (e.g., warm ambient scent) are related, consumers are likely to focus more strongly on the sensory attributes of the more dominant sense (Hoegg and Alba 2007). Thus, consumers will assess the sensory attributes in a more differentiated manner according to their dominance (Orth and Wirtz 2014). In this context, incongruent sensory attributes are likely to attract more initial attention, which endangers the balance of their cognitive system (Fiske and Taylor 1991; Krishna, Elder, and Caldara 2010). To ensure cognitive balance, consumers will thus turn to congruent sensory attributes that, then, become increasingly dominant for their processing and their assessment of stimuli congruence (Neisser 1976; Spence et al. 2014). Consequently, they will ultimately perceive a fit of the sensory attributes with their schemata about the product, which fosters cognitive treatment of these attributes and, thus, processing fluency (Van Rompay and Pruyn 2011). As a result, they are likely to feel fairly comfortable and pleasant (Meyers-Levy and Tybout 1989) and to develop favorable evaluative judgments of the related product (Lee and Labroo 2004). Therefore, and taking into account our previous reasoning for H1, we propose the following:

H6. Cross-sense partial sensory attributes–function congruence leads to (a) higher product evaluation than low sensory attributes–function congruence but (b) a similar level of product evaluation to that of high sensory attributes–function congruence, suggesting a degressive positive effect (i.e., a rise on a diminishing scale).

Theoretically, analogous to H4, our arguments related to the impact of same- and cross-sense partial sensory attributes–function congruence on product evaluation suggest a difference in product evaluation between same- and cross-sense partial sensory attributes–function congruence. However, because our studies are situated in either a same-sense condition (Study 1) or a cross-sense condition (Study 2 and, for validation purposes, Study 3), we cannot directly compare the two conditions, while controlling for other influencing factors of product evaluation (e.g., type of senses and sensory attributes, type of empirical setting). Thus, we do not develop and test corresponding hypotheses.

Table 2
Overview of studies.

	Study 1		Study 2		Study 3	
Empirical setting	Online setting		Field setting		Field setting	
Independent variables	Sensory attributes–function congruence (low/partial/high); Type of product (cooling pad/heating pad)		Sensory attributes–function congruence (low/partial/high); Type of product (cooling pad/heating pad)		Sensory attributes–function congruence (low/partial/high); Type of product (cooling pad/heating pad)	
Sensory product function	Cooling/heating		Cooling/heating		Cooling/heating	
Sensory attributes	Product color (cool/warm)	Ambient color (cool/warm)	Product color (cool/warm)	Ambient scent (cool/warm)	Product color (cool/warm)	Ambient music (cold/warm)
Level (level modality)	Product (cooling pad/heating pad)	Ambience (merchandize display)	Product (cooling pad/heating pad)	Ambience (air)	Product (cooling pad/heating pad)	Ambience (air)
Sense (sensory modality)	Vision (color)	Vision (color)	Vision (color)	Smell (scent)	Vision (color)	Hearing (music)

Overview of Studies

We test our hypotheses across three experimental studies in either an online or a field setting (see Table 2). All studies focus on the extent of sensory attributes–function congruence (low, partial, and high) and type of product (cooling pad and heating pad) as the independent variables. Each product is associated with a primary product function—that is, cooling (in the case of the cooling pad) and heating (in the case of the heating pad). Moreover, to be able to examine partial sensory attributes–function congruence, all studies consider two sensory attributes, one located at the product level and one located at the ambience level.

For consistency, all studies focus on vision as the sense related to the first sensory attribute. However, they differ in the sense related to the second sensory attribute (vision, smell, or hearing) and the sensory modality (color, scent, or music). Study 1 is situated in a same-sense condition (vision and vision), and Study 2 (vision and smell) and Study 3 (vision and hearing) are situated in a cross-sense condition. Moreover, all studies use product color as the sensory attribute at the product level but differ in the sensory attribute at the ambience level (ambient color, scent, or music) and the level modality at the ambience level (merchandize display or air).

Study 1: Product Color and Ambient Color (Online Setting)

Pretest

To control for sense, we selected two sensory attributes related to vision, thus focusing on a same-sense condition. In addition to product color, we selected ambient color, specifically the color of the merchandize display, as the second sensory attribute, because people connect certain colors with a high or low temperature from natural associations (Labrecque and Milne 2012). For example, ice or the sea are cold, leading people to associate a blue color with low temperatures, while fire or the sun are hot, leading them to associate a red color with high temperatures (Ho et al. 2014). To determine colors that differ in perceived temperature but not in liking, we pretested Berlin and Kay's (1969) eleven universal colors with 35 consumers (Amazon Mechanical Turk [MTurk]; 58.7% women; $M_{age} = 39.9$ years) (Labrecque and Milne 2012). We manipulated hue (i.e., pigment of the color) and kept saturation (i.e., chroma of the color) and lightness (i.e., degree of darkness or value of the color) constant. Of the eleven colors, consumers rated red as the warmest and blue as the coolest ($M_{blue} = 2.46$ vs. $M_{red} = 6.31$; $t(34) = 10.64$, $p < .001$). Both colors did not differ in liking ($M_{blue} = 5.74$ vs. $M_{red} = 5.17$; $t(34) = 1.33$, $p = .19$).

Subsequently, 37 consumers (MTurk; 81.9% women; $M_{age} = 35.7$ years) assessed saturation (low vs. high) and lightness (low vs. high) for red and blue hue. They rated red with high saturation and high lightness as the warmest color and blue with high saturation and high lightness as the coolest color. The two colors differed in perceived temperature ($M_{blue} = 2.00$ vs. $M_{red} = 5.14$; $t(36) = 7.93$, $p < .001$) but not in liking ($M_{blue} = 4.54$ vs. $M_{red} = 4.27$; $t(36) = .87$, $p = .39$).

Method

Design, Participants, and Procedure. Three hundred forty-six consumers (40.2% women; $M_{age} = 35.5$ years) participated in a 3 (attributes–function congruence: high vs. partial vs. low) × 2 (product: cooling pad vs. heating pad) between-subjects design. We conducted the experiment in an online setting using MTurk. The participants read a scenario that asked them to evaluate a new cooling (or heating) pad a firm intended to introduce to the market. Depending on the experimental condition, they saw a cooling or heating pad with red or blue product color on a red or blue merchandize display. Because in reality merchandize displays typically include several products, we created a merchandize display with multiple products. The exact stimuli appear in Appendix A.

Measures. We asked participants to closely examine the product presentation. As the key consumer response, we assessed product evaluation with four items (negative/positive, unfavorable/favorable, I dislike it/I like it, and unattractive/attractive; $\alpha = .92$) (Spangenberg, Crowley, and Henderson 1996). To be able to empirically test processing fluency as the underlying

mechanism of our hypotheses, we measured this variable with three items (difficult/easy, unclear/clear, and disfluent/fluent; $\alpha = .88$) (Graf, Mayer, and Landwehr 2018). As downstream variable, we measured purchase intention with three items (e.g., "The likelihood of purchasing this cooling/heating pad is high"; $\alpha = .92$) (Dodds, Monroe, and Grewal 1991). Then, participants indicated whether they owned a similar product and assessed the perceived temperature (cool/warm) of the red and blue color for our manipulation check. For all scales, we used seven-point scales. Finally, we verified that participants were not color-blind (Ishihara 1990) and asked for some demographics (e.g., gender, age). Ownership and demographics had no systematic effects, so we did not include them in further analyses.

Results

Manipulation Check. We conducted a repeated measures analysis of variance (ANOVA) with perceived temperature as the within-subject factor and the product as the between-subject factor. We found a significant main effect for perceived temperature ($M_{blue} = 3.72$ vs. $M_{red} = 5.73$; $F(1, 344) = 187.38$, $p < .001$, $\eta^2 = .35$). For both the cooling pad ($M_{red} = 5.75$ vs. $M_{blue} = 3.62$; $F(1, 344) = 110.13$, $p < .001$, $\eta^2 = .24$) and the heating pad ($M_{red} = 5.71$ vs. $M_{blue} = 3.81$; $F(1, 344) = 79.43$, $p < .001$, $\eta^2 = .19$), participants rated the red color as warmer than the blue color, confirming the success of our manipulations.

Test of Hypotheses. For both cooling pad (CP) and heating pad (HP), ANOVA results show that high sensory attributes–function congruence leads to higher product evaluation than low sensory attributes–function congruence (CP: $M_{high} = 5.79$ vs. $M_{low} = 4.94$; $F(1, 95) = 14.07$, $p < .001$, $\eta^2 = .13$; HP: $M_{high} = 5.72$ vs. $M_{low} = 4.98$; $F(1, 86) = 7.53$, $p < .05$, $\eta^2 = .08$), providing support for H1.

For H2, we found that same-level partial sensory attributes–function congruence leads to higher product evaluation than low sensory attributes–function congruence (CP: $M_{partial} = 5.65$ vs. $M_{low} = 4.94$; $F(1, 87) = 8.65$, $p < .01$, $\eta^2 = .09$; HP: $M_{partial} = 5.62$ vs. $M_{low} = 4.98$; $F(1, 77) = 4.75$, $p < .05$, $\eta^2 = .06$) but a similar level of product evaluation to that of high sensory attributes–function congruence (CP: $M_{partial} = 5.65$ vs. $M_{high} = 5.79$; $F(1, 96) = .52$, $p = .47$, $\eta^2 = .01$; HP: $M_{partial} = 5.62$ vs. $M_{high} = 5.72$; $F(1, 73) = .20$, $p = .65$, $\eta^2 = .00$). Therefore, the data confirm H2a and H2b. Thus, we find full evidence of a degressive positive effect of sensory attributes–function congruence on product evaluation (Fig. 1). With respect to H3, we found that cross-level partial sensory attributes–function congruence results in a similar level of product evaluation to that of low sensory attributes–function congruence (CP: $M_{partial} = 4.84$ vs. $M_{low} = 4.94$; $F(1, 82) = .12$, $p = .73$, $\eta^2 = .00$; HP: $M_{partial} = 4.89$ vs. $M_{low} = 4.98$; $F(1, 87) = .08$, $p = .78$, $\eta^2 = .00$) but lower product evaluation than high sensory attributes–function congruence (CP: $M_{partial} = 4.84$ vs. $M_{high} = 5.79$; $F(1, 91) = 13.59$, $p < .001$, $\eta^2 = .13$; HP: $M_{partial} = 4.89$ vs. $M_{high} = 5.72$; $F(1, 83) = 9.42$, $p < .01$, $\eta^2 = .10$). Thus, the results provide support for H3a and H3b as well as a progressive positive effect of sensory attributes–function congruence on product evaluation (Fig. 1). Confirming H4, the results show that same-level partial sensory attributes–function congruence results in higher product evaluation than cross-level partial sensory attributes–function congruence (CP: $M_{same} = 5.65$ vs. $M_{cross} = 4.84$; $F(1, 83) = 8.67$, $p < .01$, $\eta^2 = .10$; HP: $M_{same} = 5.62$ vs. $M_{cross} = 4.89$; $F(1, 74) = 6.17$, $p < .05$, $\eta^2 = .08$).

Because Study 1 is situated in a same-sense condition, it enables testing H5 (but not H6, which refers to a cross-sense-condition). We found that same-sense partial sensory attributes–function congruence results in a similar level of product evaluation to that of low sensory attributes–function congruence (CP: $M_{partial} = 5.27$ vs. $M_{low} = 4.94$; $F(1, 127) = 1.79$, $p = .18$, $\eta^2 = .01$; HP: $M_{partial} = 5.21$ vs. $M_{low} = 4.98$; $F(1, 120) = .08$, $p = .38$, $\eta^2 = .01$) but lower product evaluation than high sensory attributes–function congruence (CP: $M_{partial} = 5.27$ vs. $M_{high} = 5.79$; $F(1, 136) = 6.23$, $p < .05$, $\eta^2 = .04$; HP: $M_{partial} = 5.21$ vs. $M_{high} = 5.72$; $F(1, 116) = 4.94$, $p < .05$, $\eta^2 = .04$). Therefore, the data confirm H5a and H5b as well as a progressive positive effect of sensory attributes–function congruence on product evaluation (Fig. 1). Table 3 provides an overview of the hypotheses, experimental conditions, and results of Study 1.

Mediation Analyses. To check our theoretical reasoning that processing fluency serves as an underlying mechanism of our hypotheses, we conducted mediation analyses with 10,000 bootstrap samples (PROCESS Model 4, Hayes 2018). With the exception of H2a, the results provide evidence for processing fluency as the underlying mechanism, thus supporting our theoretical reasoning. Moreover, to analyze whether sensory attributes–function congruence affects purchase intention through product evaluation, we conducted a mediation analysis with 10,000 bootstrap samples (PROCESS Model 4, Hayes 2018). Indeed, we found that through product evaluation, such congruence ultimately affects purchase intention (indirect effect = .68; 95% confidence interval = [.38–1.00]. This finding underscores the relevance of product evaluation as the focal consumer response variable in our study and provides further evidence for the importance of sensory attributes–function congruence.

Discussion

Study 1 demonstrates that partial sensory attributes–function congruence can lead to different levels of product evaluation. When partial sensory attributes–function congruence occurs under a same-level condition (i.e., the sensory attributes congruent with the product's primary function are also at the product level), such congruence results in favorable product evaluation similar to that of high sensory attributes–function congruence. However, when it occurs under a cross-level condition (i.e., the sensory attributes congruent with the product's primary function are not at the product level) or under a same-sense condition (i.e., the sensory attributes congruent with the product's primary function relate to the same senses as the incongruent ones), such congruence leads to unfavorable product evaluation similar to that of low partial sensory attributes–function congruence. These findings provide evidence for non-linear effects of sensory attributes–function congruence on product evaluation and indi-

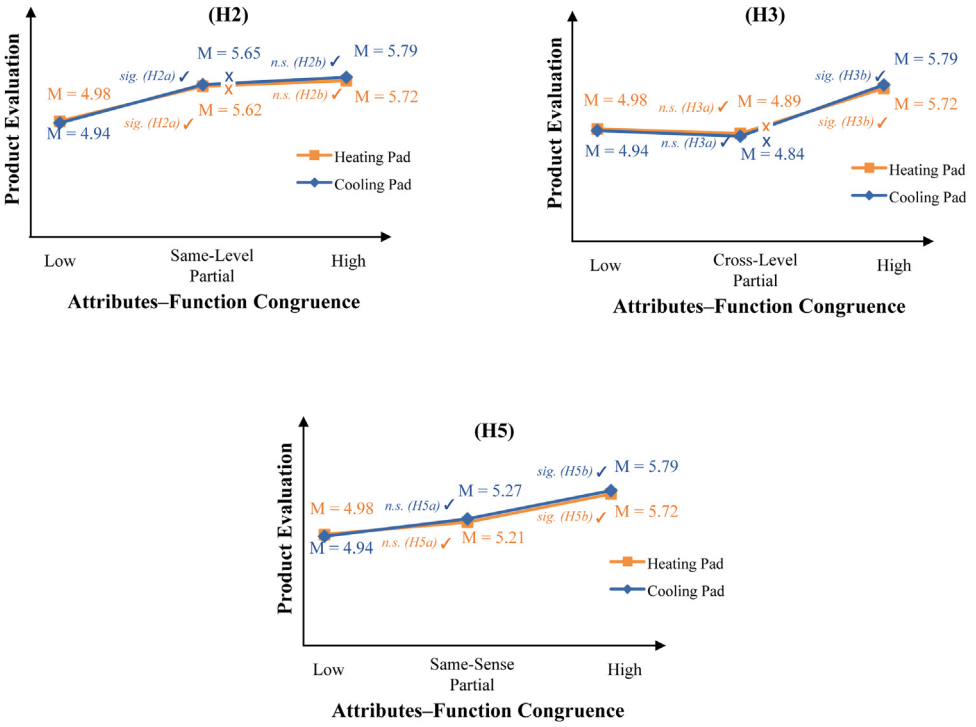


Fig. 1. Study 1: visualization of results of hypotheses testing for H2, H3, H5.

cate that the functional form of this relationship (i.e., whether it is degressive positive or progressive positive) depends on the type of partial sensory attributes–function congruence.

Study 2: Product Color and Ambient Scent (Field Setting)

To ensure comparability, our focal product remains a cooling (or heating) pad. While Study 1 focused on one sense (i.e., vision), we extended our scope to two senses (i.e., vision and smell). In doing so, we aim to analyze whether under a cross-sense condition, the effects of sensory attributes–function congruence remain stable in direction and differ in functional form than the effects under a same-sense condition. Consistent with Study 1, we selected product color as a sensory attribute. In addition, we selected ambient scent, which plays a key role in consumer decision making at the point of sale (Krishna, Elder, and Caldara 2010).

Pretest

We conducted a pretest with 28 students (42.9% women; $M_{age} = 24.4$ years) to identify scents that differ significantly in perceived temperature but not in liking. We placed eleven drops of oil from each of six essential oils labeled only with a capital letter (A to F) on a cotton ball in small glass bottles (Bosmans 2006; Spangenberg, Crowley, and Henderson 1996). Then, we asked participants to randomly select one glass bottle, open it, and sniff at least three times before assessing the scent's perceived temperature and liking. Moreover, participants saw the red and blue color on a PC screen with the instruction to assess the degree to which the color is congruent with the scent (Koschate-Fischer, Huber, and Hoyer 2016). Finally, participants had to close the glass bottle and to smell coffee grounds before rating a new scent, to clear the nasal passage (Krishna, Lwin, and Morrin 2010).

Participants rated vanilla as the warmest scent and spearmint as the coolest scent. The two scents differed in perceived temperature ($M_{spearmint} = 2.29$ vs. $M_{vanilla} = 6.04$; $t(27) = 11.89$, $p < .001$) but not in liking ($M_{spearmint} = 6.11$ vs. $M_{vanilla} = 5.64$; $t(27) = 2.00$, $p = .06$). For the red color, participants assessed the vanilla scent as more congruent than the spearmint scent ($M_{red\ vanilla} = 4.70$ vs. $M_{red\ spearmint} = 1.95$; $t(27) = 7.38$, $p < .001$), and vice versa for the blue color ($M_{blue\ spearmint} = 5.45$ vs. $M_{blue\ vanilla} = 2.17$; $t(27) = 7.34$, $p < .001$).

Method

Design, Participants, and Procedure. Two hundred fifty-six consumers (53.0% women; $M_{age} = 37.0$ years) participated in a 3 (attributes–function congruence: high vs. partial vs. low) × 2 (product: cooling pad vs. heating pad) between-subjects design. We conducted the experiment in a field setting consisting of a retail shop with products from different manufacturers, including an area primarily used for product presentations. We used this separated area to conduct our experiment.

We approached participants while they were shopping and asked them to assess a new cooling (or heating) pad stored in a closed box (see Appendix A). The participants had the chance to hold the pad and, thus, to experience the product and its temperature, which was the same for both types of pads. Depending on the experimental condition, participants saw a cooling or heating pad with red or blue product color and were sitting in a vanilla-

Table 3
Hypotheses, experimental conditions, and results of Study 1.

	Low sensory AFC		Partial sensory AFC (same-sense: vision/vision)				High sensory AFC
			Same-level		Cross-level		
H1: High sensory AFC leads to higher product evaluation than low sensory AFC.							
Product color (cooling pad)	warm			< (H1) ✓			cool
Ambient color (merchandise display)	warm						cool
Product color (heating pad)	cool			< (H1) ✓			warm
Ambient color (merchandise display)	cool						warm
H2: Same-level partial sensory AFC leads to (a) higher product evaluation than low sensory AFC but (b) a similar level of product evaluation to that of high sensory AFC.							
Product color (cooling pad)	warm	< (H2a) ✓	cool			= (H2b) ✓	cool
Ambient color (merchandise display)	warm		warm				cool
	Suggested overall effect: Rise on a diminishing scale ✓						
Product color (heating pad)	cool	< (H2a) ✓	warm			= (H2b) ✓	warm
Ambient color (merchandise display)	cool		cool				warm
	Suggested overall effect: Rise on a diminishing scale ✓						
H3: Cross-level partial sensory AFC leads to (a) a similar level of product evaluation to that of low sensory AFC but (b) lower product evaluation than high sensory AFC.							
Product color (cooling pad)	warm	= (H3a) ✓			warm	< (H3b) ✓	cool
Ambient color (merchandise display)	warm				cool		cool
	Suggested overall effect: Rise on an increasing scale ✓						
Product color (heating pad)	cool	= (H3a) ✓			cool	< (H3b) ✓	warm
Ambient color (merchandise display)	cool				warm		warm
	Suggested overall effect: Rise on an increasing scale ✓						
H4: Same-level partial sensory AFC leads to higher product evaluation than cross-level partial sensory AFC.							
Product color (cooling pad)			cool	> (H4) ✓	warm		
Ambient color (merchandise display)			warm		cool		
Product color (heating pad)			warm	> (H4) ✓	cool		
Ambient color (merchandise display)			cool		warm		
H5: Same-sense partial sensory AFC leads to (a) a similar level of product evaluation to that of low sensory AFC but (b) lower product evaluation than high sensory AFC.							
Product color (cooling pad)	warm	= (H5a) ✓	cool		warm	< (H5b) ✓	cool
Ambient color (merchandise display)	warm		warm		cool		cool
	Suggested overall effect: Rise on an increasing scale ✓						
Product color (heating pad)	cool	= (H5a) ✓	warm		cool	< (H5b) ✓	warm
Ambient color (merchandise display)	cool		cool		warm		warm
	Suggested overall effect: Rise on an increasing scale ✓						

Notes: AFC = attributes–function congruence; √ fully confirmed; (√) partially confirmed; (–) not confirmed.

or spearmint-scented room (see Appendix A). The scent was diffused throughout the room with a scent machine designed for retailer use that was out of participants' sight (Bosmans 2006; Madzharov, Block, and Morrin 2015). We presented the warm scent for five days and the cool scent for four days and fully ventilated the room between the two scent conditions. The room temperature was kept at a constant level during all sessions.

Measures. To ensure consistency with Study 1, we asked participants to answer the questions on a laptop. The initial questions pertained to product evaluation ($\alpha = .90$), followed by ownership. Then, we asked for the perceived temperature of the product color and the ambient scent, required for our manipulation checks. We verified participants' ability to adequately view colors and smell scents and asked for some demographics (e.g., gender, age). Similar to Study 1, ownership and demographics had few and non-systematic effects, so we excluded them from further analyses.

Results

Manipulation Checks. We ran an ANOVA with perceived temperature as the dependent variable and ambient scent as the independent variable. For both the cooling pad ($M_{vanilla} = 4.82$ vs. $M_{spearmint} = 3.17$; $F(1, 100) = 35.92$, $p < .001$, $\eta^2 = .26$) and the heating pad ($M_{vanilla} = 5.21$ vs. $M_{spearmint} = 4.38$; $F(1, 96) = 10.57$, $p < .01$, $\eta^2 = .10$), participants rated the vanilla scent as warmer than the spearmint scent. Then, we conducted a repeated measures ANOVA for both products with perceived temperature of the blue and red pad as a within-subject factor. For both the cooling pad ($M_{red} = 5.03$ vs.

$M_{blue} = 1.57$; $F(1, 135) = 535.16$, $p < .001$, $\eta^2 = .80$) and the heating pad ($M_{red} = 6.02$ vs. $M_{blue} = 2.82$; $F(1, 119) = 207.95$, $p < .001$, $\eta^2 = .64$), participants assessed the red color as warmer than the blue color. These results indicate a successful manipulation.

Test of Hypotheses. Consistent with Study 1, we found support for H1, as high sensory attributes–function congruence results in higher product evaluation than low sensory attributes–function congruence (CP: $M_{high} = 5.22$ vs. $M_{low} = 4.57$; $F(1, 66) = 5.39$, $p < .05$, $\eta^2 = .08$; HP: $M_{high} = 5.54$ vs. $M_{low} = 4.95$; $F(1, 58) = 4.69$, $p < .05$, $\eta^2 = .08$).

In contrast with Study 1, we found only partial support for H2a. Same-level partial sensory attributes–function congruence leads to higher product evaluation than low sensory attributes–function congruence attributes–function congruence in the cooling but not in the heating pad condition (CP: $M_{partial} = 5.49$ vs. $M_{low} = 4.57$; $F(1, 66) = 11.08$, $p < .01$, $\eta^2 = .14$; HP: $M_{partial} = 5.42$ vs. $M_{low} = 4.95$; $F(1, 58) = 2.47$, $p = .12$, $\eta^2 = .04$). Consistent with Study 1, same-level partial sensory attributes–function congruence leads to a similar level of product evaluation to that of high sensory attributes–function congruence (CP: $M_{partial} = 5.49$ vs. $M_{high} = 5.22$; $F(1, 66) = 1.52$, $p = .22$, $\eta^2 = .02$; HP: $M_{partial} = 5.42$ vs. $M_{high} = 5.54$; $F(1, 58) = .20$, $p = .66$, $\eta^2 = .00$), in support of H2b. Thus, we find partial support for a degressive positive effect on product evaluation (Fig. 2). As in Study 1, H3a is fully supported, as cross-level partial sensory attributes–function congruence leads to a similar evaluation level to that of low sensory attributes–function congruence (CP: $M_{partial} = 4.81$ vs. $M_{low} = 4.57$; $F(1, 66) = .59$, $p = .45$, $\eta^2 = .01$; HP: $M_{partial} = 4.68$ vs. $M_{low} = 4.95$; $F(1, 58) = .66$, $p = .42$, $\eta^2 = .01$). By contrast, H3b is only partially confirmed, as cross-level partial sensory attributes–function congruence results in lower evaluation than high sensory attributes–function congruence in the heating but not in the cooling pad condition (CP: $M_{partial} = 4.81$ vs. $M_{high} = 5.22$; $F(1, 66) = 2.44$, $p = .12$, $\eta^2 = .04$; HP: $M_{partial} = 4.68$ vs. $M_{high} = 5.54$; $F(1, 58) = 7.42$, $p < .01$, $\eta^2 = .11$). Thus, we find partial support for a progressive positive effect on product evaluation (Fig. 2). As in Study 1, same-level partial sensory attributes–function congruence leads to higher evaluation than cross-level partial sensory attributes–function congruence (CP: $M_{same} = 5.49$ vs. $M_{cross} = 4.81$; $F(1, 66) = 6.89$, $p < .05$, $\eta^2 = .10$; HP: $M_{same} = 5.42$ vs. $M_{cross} = 4.68$; $F(1, 58) = 4.76$, $p < .05$, $\eta^2 = .08$). Thus, the results provide full support for H4.

Because Study 2 is situated in a cross-sense condition, it enables testing H6 (but not H5, which refers to a same-sense-condition). We found partial support for H6a as cross-sense partial sensory attributes–function congruence leads to higher evaluation than low sensory attributes–function congruence in the cooling but not in the heating pad condition (CP: $M_{partial} = 5.15$ vs. $M_{low} = 4.57$; $F(1, 100) = 5.32$, $p < .05$, $\eta^2 = .05$; HP: $M_{partial} = 5.05$ vs. $M_{low} = 4.95$; $F(1, 88) = .12$, $p = .73$, $\eta^2 = .01$). In addition, the results provide full support for H6b, as cross-sense partial sensory attributes–function congruence leads to a similar evaluation level to that of high sensory attributes–function congruence (CP: $M_{partial} = 5.15$ vs. $M_{high} = 5.22$; $F(1, 100) = .11$, $p = .74$, $\eta^2 = .00$; HP: $M_{partial} = 5.05$ vs. $M_{high} = 5.54$; $F(1, 88) = 3.15$, $p = .08$, $\eta^2 = .04$). In summary, our results partially confirm that under a cross-sense condition, sensory attributes–function congruence shows a degressive positive effect on product evaluation (Fig. 2). In Table 4, we show the hypotheses, experimental conditions, and results of Study 2.

Discussion

In general, Study 2 confirms the findings of Study 1, indicating that partial sensory attributes–function congruence can result in different levels of product evaluation, thus contributing to broaden the validity of results to a cross-sense condition (vision and smell). It provides full evidence that under a same-level condition (i.e., the sensory attributes congruent with the product's primary function are also at the product level) or under a cross-sense condition (i.e., the sensory attributes congruent with the product's primary function relate to different senses as the incongruent ones), partial sensory attributes–function congruence leads to favorable evaluation similar to that of high sensory attributes–function congruence. Moreover, the study offers full support that under a cross-level condition (i.e., the sensory attributes congruent with the product's primary function are not at the product level), partial sensory attributes–function congruence results in unfavorable evaluation similar to that of low partial sensory attributes–function congruence. These findings provide further evidence for non-linear effects of sensory attributes–function congruence on evaluation. The study also shows that the specific functional form of this relationship differs under a cross-sense and cross-level condition from that under a same-sense condition (see between-study comparison of Study 2 with Study 1) and same-level condition (see within-study comparison in Study 2), respectively.

Study 3: Product Color and Ambient Music (Field Setting)

For comparability purposes, our focal product is still a cooling (or heating) pad. Consistent with Study 2, we focused on a cross-sense condition. However, to verify the previous findings for another cross-sense condition, we now selected vision and hearing. To ensure consistency across studies for one sensory attribute, we again selected product color. Moreover, we selected ambient music, which is an important atmospheric element in retailing (Biswas, Lund, and Szocs 2019).

Pretest

We conducted a pretest with 37 university students (56.8% women; $M_{age} = 22.0$ years) to determine music compositions that differ considerably in perceived temperature but not in liking. Music compositions can be distinguished according to time (rhythm, tempo, phrasing), pitch (melody, mode), and texture (orchestration, volume) (Bruner 1990). According to Hallam, Cross, and Thaut (2009), they are considered warm when having rough rhythm, fast tempo, staccato phrasing, up and down melody, and mode in a-flat-major and when the orchestration

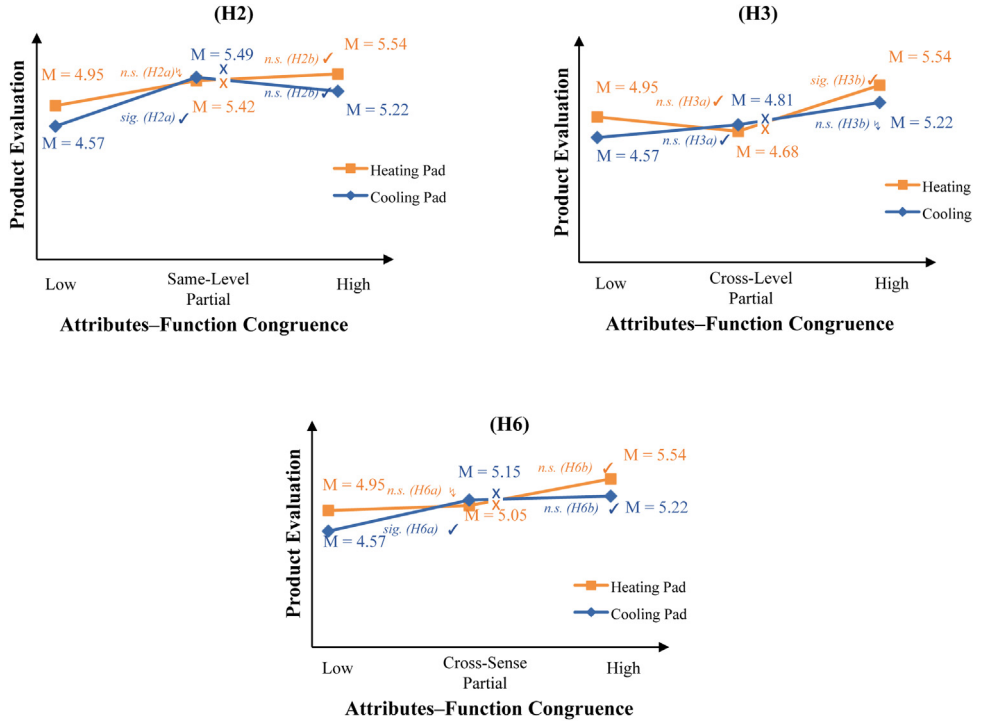


Fig. 2. Study 2: visualization of results of hypotheses testing for H2, H3, H6.

primarily comprises concert guitar, flute, and oboe. By contrast, they are considered cold when having smooth rhythm, slow tempo, legato phrasing, mostly down melody, and mode in e-major and when the orchestration primarily comprises double bass, cello, viola, and violin. A professional musician composed four warm and four cold music compositions based on these criteria, while holding their volume constant. To reduce confounding effects, we used newly created compositions from the classical music genre (Mattila and Wirtz 2001).

In a computer lab, participants sat in front of a PC and wore headphones. We asked them to listen to each music composition, which was presented in a counterbalanced order, and then to assess perceived temperature and liking for each composition. In addition, they saw the red and blue color and had to assess the degree to which the color is congruent with the music composition (Koschate-Fischer, Huber, and Hoyer 2016). We selected the two compositions that differed the most in perceived temperature ($M_{\text{cold music}} = 3.43$ vs. $M_{\text{warm music}} = 6.27$; $t(36) = 8.11$, $p < .001$) but not in liking ($M_{\text{cold music}} = 5.08$ vs. $M_{\text{warm music}} = 5.43$; $t(36) = .92$, $p = .36$). For the red color, participants rated the warm composition as more congruent than the cold composition ($M_{\text{red warm music}} = 5.19$ vs. $M_{\text{red cold music}} = 2.81$; $t(36) = 7.26$, $p < .001$), and vice versa for the blue color ($M_{\text{blue cold music}} = 4.45$ vs. $M_{\text{blue warm music}} = 2.35$; $t(36) = 5.06$, $p < .001$).

Method

Design, Participants, and Procedure. Two hundred six consumers (48.5% women; $M_{\text{age}} = 34.8$ years) participated in a 3 (attributes–function congruence: high vs. partial vs. low) × 2 (product: cooling pad vs. heating pad) between-subjects design. We conducted the experiment in the same field setting as in Study 2. Depending on the experimental condition, participants saw a cooling or heating pad with red or blue product color and sat in a room with warm or cold ambient music (see Appendix A). We started the music before the first participants entered the room (Spangenberg, Grohmann, and Sprott 2005) and played it in continuous loop over the loudspeakers on a constant volume level (Biswas, Lund, and Szocs 2019). We used the warm ambient music for three days and the cold ambient music for three days and kept the room temperature at a constant level during all sessions.

Measures. As in Studies 1 and 2, participants answered questions on a laptop. The first questions referred to product evaluation ($\alpha = .86$), followed by ownership and perceived temperature of the product color and the ambient music. We controlled for ability to view colors and hearing ability and asked for some demographics. Again, ownership and demographics had few and non-systematic effects. Thus, we did not consider them in further analyses.

Results

Manipulation Checks. An ANOVA with perceived temperature as the dependent variable and ambient music as independent variable showed that for the cooling pad ($M_{\text{warm}} = 5.41$ vs. $M_{\text{cold}} = 4.54$; $F(1, 98) = 13.89$, $p < .001$, $\eta^2 = .12$) and the heating pad ($M_{\text{warm}} = 5.42$ vs. $M_{\text{cold}} = 4.28$; $F(1, 104) = 35.82$, $p < .001$, $\eta^2 = .26$), participants assessed the warm music as warmer than the cold music. We also ran a repeated measures ANOVA for both products with perceived temperature of the blue and the red pad as a within-subject factor. For both the cooling

Table 4
Hypotheses, experimental conditions, and results of Study 2.

	Low sensory AFC		Partial sensory AFC (cross-sense: vision/smell)				High sensory AFC
			Same-level		Cross-level		
H1: High sensory AFC leads to higher product evaluation than low sensory AFC.							
Product color (cooling pad)	warm			<			cool
Ambient scent (air)	warm			(H1) ✓			cool
Product color (heating pad)	cool			<			warm
Ambient scent (air)	cool			(H1) ✓			warm
H2: Same-level partial sensory AFC leads to (a) higher product evaluation than low sensory AFC but (b) a similar level of product evaluation to that of high sensory AFC.							
Product color (cooling pad)	warm	<	cool			=	cool
Ambient scent (air)	warm	(H2a) ✓	warm			(H2b) ✓	cool
	Suggested overall effect: Rise on a diminishing scale ✓						
Product color (heating pad)	cool	<	warm			=	warm
Ambient scent (air)	cool	(H2a) (-)	cool			(H2b) ✓	warm
	Suggested overall effect: Rise on a diminishing scale (✓)						
H3: Cross-level partial sensory AFC leads to (a) a similar level of product evaluation to that of low sensory AFC but (b) lower product evaluation than high sensory AFC.							
Product color (cooling pad)	warm	=			warm	<	cool
Ambient scent (air)	warm	(H3a) ✓			cool	(H3b) (-)	cool
	Suggested overall effect: Rise on an increasing scale (✓)						
Product color (heating pad)	cool	=			cool	<	warm
Ambient scent (air)	cool	(H3a) ✓			warm	(H3b) ✓	warm
	Suggested overall effect: Rise on an increasing scale ✓						
H4: Same-level partial sensory AFC leads to higher product evaluation than cross-level partial sensory AFC.							
Product color (cooling pad)			cool	>	warm		
Ambient scent (air)			warm	(H4) ✓	cool		
Product color (heating pad)			warm	>	cool		
Ambient scent (air)			cool	(H4) ✓	warm		
H6: Cross-sense partial sensory AFC leads to (a) a higher level of product evaluation than low sensory AFC but (b) a similar level of product evaluation to that of high sensory AFC.							
Product color (cooling pad)	warm	<	cool		warm	=	cool
Ambient scent (air)	warm	(H6a) ✓	warm		cool	(H6b) ✓	cool
	Suggested overall effect: Rise on a diminishing scale ✓						
Product color (heating pad)	cool	<	warm		cool	=	warm
Ambient scent (air)	cool	(H6a) (-)	cool		warm	(H6b) ✓	warm
	Suggested overall effect: Rise on a diminishing scale (✓)						

Notes: AFC = attributes–function congruence; √ fully confirmed; (√) partially confirmed; (–) not confirmed.

pad ($M_{red} = 4.18$ vs. $M_{blue} = 1.92$; $F(1, 99) = 101.28$, $p < .001$, $\eta^2 = .51$) and the heating pad ($M_{red} = 6.23$ vs. $M_{blue} = 3.28$; $F(1, 105) = 216.37$, $p < .001$, $\eta^2 = .67$), participants rated the red color as warmer than the blue color. These findings indicate a successful manipulation.

Test of Hypotheses. Consistent with Studies 1 and 2, the results show that high sensory attributes–function congruence leads to higher product evaluation than low sensory attributes–function congruence (CP: $M_{high} = 5.64$ vs. $M_{low} = 4.69$; $F(1, 48) = 9.00$, $p < .01$, $\eta^2 = .16$; HP: $M_{high} = 5.77$ vs. $M_{low} = 4.72$; $F(1, 51) = 19.17$, $p < .001$, $\eta^2 = .27$), providing support for H1.

Largely consistent with Studies 1 and 2, the results provide support for H2a and H2b. We found that same-level partial sensory attributes–function congruence leads to higher evaluation than low sensory attributes–function congruence (CP: $M_{partial} = 5.72$ vs. $M_{low} = 4.69$; $F(1, 42) = 7.92$, $p < .01$, $\eta^2 = .16$; HP: $M_{partial} = 5.50$ vs. $M_{low} = 4.72$; $F(1, 56) = 14.57$, $p < .001$, $\eta^2 = .21$) but a similar level of evaluation to that of high sensory attributes–function congruence (CP: $M_{partial} = 5.72$ vs. $M_{high} = 5.64$; $F(1, 48) = .08$, $p = .79$, $\eta^2 = .00$; HP: $M_{partial} = 5.50$ vs. $M_{high} = 5.77$; $F(1, 51) = 1.45$, $p = .24$, $\eta^2 = .03$). Thus, largely consistent with Studies 1 and 2, we find full evidence of a degressive positive effect on product evaluation (Fig. 3). Analogous to Studies 1 and 2, the results show that cross-level partial sensory attributes–function congruence results in a similar evaluation level to that of low sensory attributes–function congruence (CP: $M_{partial} = 5.03$ vs. $M_{low} = 4.69$; $F(1, 48) = .95$, $p = .34$, $\eta^2 = .02$; HP: $M_{partial} = 5.16$ vs. $M_{low} = 4.72$; $F(1, 51) = 2.88$, $p = .10$, $\eta^2 = .05$), thus confirming H3a. In addition, and largely consistent with the other two studies, we found support for H3b, as cross-level partial sensory attributes–function congruence leads to lower evaluation than high sensory attributes–function congruence (CP: $M_{partial} = 5.03$ vs. $M_{high} = 5.64$; $F(1, 54) = 5.67$,

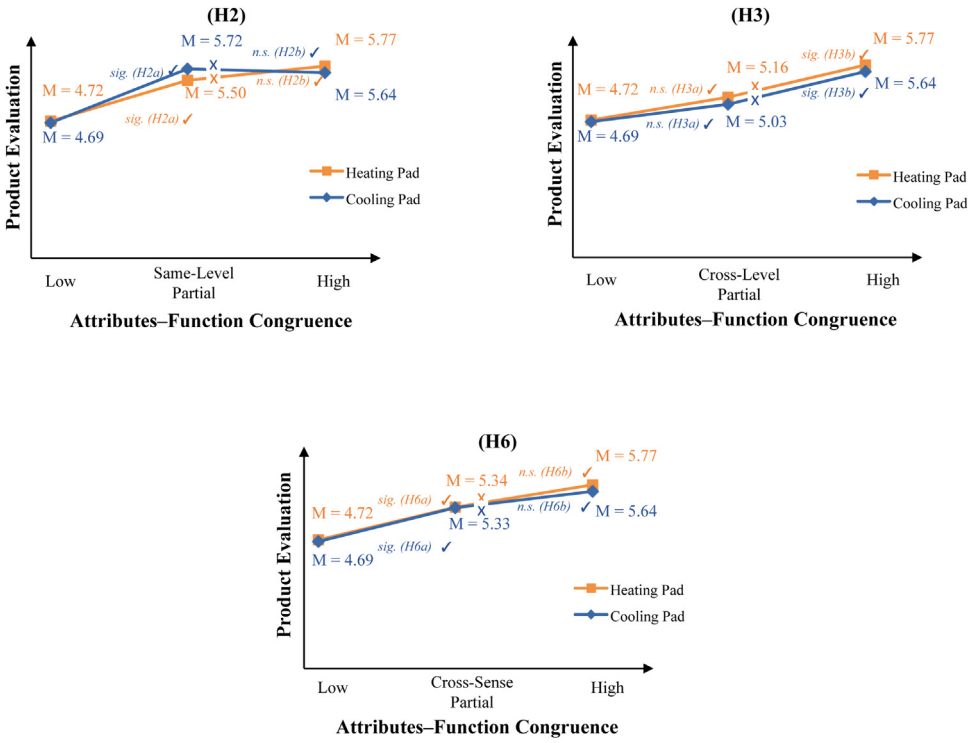


Fig. 3. Study 3: visualization of results of hypotheses testing for H2, H3, H6.

$p < .05$, $\eta^2 = .10$; HP: $M_{partial} = 5.16$ vs. $M_{high} = 5.77$; $F(1, 46) = 4.76$, $p < .05$, $\eta^2 = .09$). Therefore, and largely consistent with the other two studies, we find full evidence of a progressive positive effect on product evaluation (Fig. 3). Relatively similar to Studies 1 and 2, we found partial support for H4, as same-level partial sensory attributes–function congruence results in higher evaluation than cross-level partial sensory attributes–function congruence (CP: $M_{same} = 5.72$ vs. $M_{cross} = 5.03$; $F(1, 48) = 5.37$, $p < .05$, $\eta^2 = .10$; HP: $M_{same} = 5.50$ vs. $M_{cross} = 5.16$; $F(1, 51) = 2.02$, $p = .16$, $\eta^2 = .04$).

As is Study 2, Study 3 is situated in a cross-sense condition, which enables testing H6 (but not H5, which refers to a same-sense-condition). Similar to Study 2, we found evidence of H6a and H6b, as cross-sense partial sensory attributes–function congruence leads to higher evaluation than low sensory attributes–function congruence (CP: $M_{partial} = 5.33$ vs. $M_{low} = 4.69$; $F(1, 70) = 4.46$, $p < .05$, $\eta^2 = .06$; HP: $M_{partial} = 5.34$ vs. $M_{low} = 4.72$; $F(1, 80) = 9.68$, $p < .01$, $\eta^2 = .11$) but a similar evaluation level to that of high sensory attributes–function congruence (CP: $M_{partial} = 5.33$ vs. $M_{high} = 5.64$; $F(1, 76) = 1.70$, $p = .20$, $\eta^2 = .02$; HP: $M_{partial} = 5.34$ vs. $M_{high} = 5.77$; $F(1, 75) = 3.76$, $p = .06$, $\eta^2 = .05$). In contrast with Study 2, the results even offer full support for a corresponding degressive positive effect on evaluation (Fig. 3). Table 5 offers an overview of the hypotheses, experimental conditions, and results of Study 3.

Discussion

Study 3 largely verifies the findings of Studies 1 and 2 for another cross-sense condition (vision and hearing), thus extending the validity of our results. It provides further evidence that depending on the situational condition (cross- vs. same-level and cross- vs. same-sense), partial sensory attributes–function congruence can lead to rather low or high levels of product evaluation. Moreover, similar to Study 2, it finds evidence of non-linear effects of sensory attributes–function congruence on evaluation. Finally, it shows that under a cross-sense and a cross-level condition, the effects of sensory attributes–function congruence differ in their functional form from the respective effects under a same-sense condition (see between-study comparison of Study 3 with Study 1) and same-level condition (see within-study comparison in Study 3), respectively.

To summarize, Table 6 reports our findings across all three studies, revealing general patterns of theoretical insights. Of the 24 tests of predicted effects, 20 (i.e., 83%) indicated full support (i.e., for both cooling and heating pad) and four (i.e., 17%) partial support (i.e., for either cooling or heating pad). Similarly, of the nine investigations of functional forms, six (i.e., 67%) provided full support and three (i.e., 33%) partial support. Thus, overall, we find ample evidence of our predictions.

General Discussion

Theoretical Implications

This article offers three key contributions to the marketing discipline. First, we introduce the concept of partial sensory attributes–function congruence. In doing so, we contribute to extending the view of researchers beyond a mere distinction of existing versus non-existing congruence of sensory attributes with a product's primary function. Adopting this broader perspective opens up new questions to investigate, such as the

Table 5
Hypotheses, experimental conditions, and results of Study 3.

	Low sensory AFC		Partial sensory AFC (cross-sense: vision/hearing)				High sensory AFC
			Same-level		Cross-level		
H1: High sensory AFC leads to higher product evaluation than low sensory AFC.							
Product color (cooling pad)	warm			<			cool
Ambient music (air)	warm			(H1) ✓			cold
Product color (heating pad)	cool			<			warm
Ambient music (air)	cold			(H1) ✓			warm
H2: Same-level partial sensory AFC leads to (a) higher product evaluation than low sensory AFC but (b) a similar level of product evaluation to that of high sensory AFC.							
Product color (cooling pad)	warm	<	cool			=	cool
Ambient music (air)	warm	(H2a) ✓	warm			(H2b) ✓	cold
	Suggested overall effect: Rise on a diminishing scale ✓						
Product color (heating pad)	cool	<	warm			=	warm
Ambient music (air)	cold	(H2a) ✓	cold			(H2b) ✓	warm
	Suggested overall effect: Rise on a diminishing scale ✓						
H3: Cross-level partial sensory AFC leads to (a) a similar level of product evaluation to that of low sensory AFC but (b) lower product evaluation than high sensory AFC.							
Product color (cooling pad)	warm	=			warm	<	cool
Ambient music (air)	warm	(H3a) ✓			cold	(H3b) ✓	cold
	Suggested overall effect: Rise on an increasing scale ✓						
Product color (heating pad)	cool	=			cool	<	warm
Ambient music (air)	cold	(H3a) ✓			warm	(H3b) ✓	warm
	Suggested overall effect: Rise on an increasing scale ✓						
H4: Same-level partial sensory AFC leads to higher product evaluation than cross-level partial sensory AFC.							
Product color (cooling pad)			cool	>	warm		
Ambient music (air)			warm	(H4) ✓	cold		
Product color (heating pad)			warm	>	cool		
Ambient music (air)			cold	(H4) (-)	warm		
H6: Cross-sense partial sensory AFC leads to (a) a higher level of product evaluation than low sensory AFC but (b) a similar level of product evaluation to that of high sensory AFC.							
Product color (cooling pad)	warm	<	cool		warm	=	cool
Ambient music (air)	warm	(H6a) ✓	warm		cold	(H6b) ✓	cold
	Suggested overall effect: Rise on a diminishing scale ✓						
Product color (heating pad)	cool	<	warm		cool	=	warm
Ambient music (air)	cold	(H6a) ✓	cold		warm	(H6b) ✓	warm
	Suggested overall effect: Rise on a diminishing scale ✓						

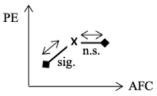
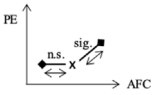
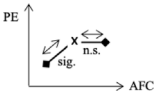
Notes: AFC = attributes–function congruence; √ fully confirmed; (√) partially confirmed; (–) not confirmed.

impact of partial versus high and low sensory attributes–function congruence and conceptual distinctions of different types of partial sensory attributes–function congruence.

Second, we offer theoretical insights into how partial sensory attributes–function congruence affects consumers' product evaluation, both in absolute terms and relative to high and low sensory attributes–function congruence. In doing so, we reveal that the functional form of the impact of sensory attributes–function congruence on product evaluation is nonlinear (i.e., degressive or progressive). This finding indicates that a linear approximation based on a comparison of existing and non-existing sensory congruence would be oversimplified and suggests distinguishing between more than just two manifestations of this construct. Moreover, we show that a fit of some sensory attributes with the product's primary function can either lead to favorable product evaluation similar to that of high sensory attributes–function congruence or to unfavorable product evaluation similar to that of low sensory attributes–function congruence, depending on the type of partial sensory attributes–function congruence.

Third, not only is our study the first to consider partial sensory attributes–function congruence, but we also distinguish between different types of partial sensory attributes–function congruence—that is, a same- versus cross-level condition and a same- versus cross-sense condition. For a same- versus cross-level condition, the functional form of the impact of sensory attributes–function congruence on product evaluation differs between a degressive effect (when the sensory attributes congruent with the product's primary function are at the same level as the function) and a progressive effect (when the sensory attributes congruent with the product's primary function are at a different level as the function). By contrast, for a same- versus cross-sense condition, the functional form differs between a progressive effect (when the sensory attributes congruent with the

Table 6
Summary of results of hypotheses testing across studies.

Hypotheses	Study 1	Study 2	Study 3
H1. High sensory AFC leads to higher product evaluation than low sensory AFC.	√	√	√
H2. Same-level partial sensory AFC leads to (a) higher product evaluation than low sensory AFC but (b) a similar level of product evaluation to that of high sensory AFC.	a) √ b) √	a) (√) b) √	a) √ b) √
Suggested functional form: 	√	(√)	√
H3. Cross-level partial sensory AFC leads to (a) a similar level of product evaluation to that of low sensory AFC but (b) lower product evaluation than high sensory AFC.	a) √ b) √	a) √ b) (√)	a) √ b) √
Suggested functional form: 	√	(√)	√
H4. Same-level partial sensory AFC leads to higher product evaluation than cross-level partial sensory AFC.	√	√	(√)
H5. Same-sense partial sensory AFC leads to (a) a similar level of product evaluation to that of low sensory AFC but (b) lower product evaluation than high sensory AFC.	a) √ b) √	a) n/a b) n/a	a) n/a b) n/a
Suggested functional form: 	√	n/a	n/a
H6. Cross-sense partial sensory AFC leads to (a) higher product evaluation than low sensory AFC but (b) a similar level of product evaluation to that of high sensory AFC.	a) n/a b) n/a	a) (√) b) √	a) √ b) √
Suggested functional form: 	n/a	(√)	√

Notes: AFC = attributes–function congruence; PE = product evaluation; √ fully confirmed; (√) partially confirmed; n/a not applicable (because of study design restrictions).

product's primary function relate to the same senses as the incongruent ones) and a degressive effect (when the sensory attributes congruent with the product's primary function relate to different senses as the incongruent ones). Therefore, we reveal not only differences between same- and cross-level and between same- and cross-sense conditions but also differences between level- and sense-related conditions (i.e., between both types of situational conditions) that determine the functional form of the relationship between sensory attributes–function congruence and product evaluation. These theoretical insights highlight the importance for researchers to determine the corresponding type of partial sensory attributes–function congruence they want to analyze or the different types they want to compare. Moreover, they help identify the conditions under which partial sensory attributes–function congruence is sufficient for achieving favorable product evaluation.

Finally, we also reveal theoretical insights into the general superiority of same- versus cross-level partial attributes–function congruence. We show that same-level partial attributes–function congruence results in higher product evaluation than cross-level partial attributes–function congruence, indicating that the former is generally superior. This finding can be explained by potentially different modes of processing (Leibowitz and Post 1982; Morin, Dubé, and Chebat 2007). In the case of same-level partial attributes–function congruence, the sensory attributes congruent with the product's primary function are at the product level, on which consumers are likely to focus and thus process related information in a detailed manner (i.e., a focal mode), while in the case of cross-level partial attributes–function congruence, the congruent sensory attributes are at the ambience level, on which consumers typically put less emphasis and thus tend to process related information only in a holistic manner (i.e., ambient mode). By contrast, with respect to the superiority of same- versus cross-sense partial attributes–function congruence, our theoretical reasoning and findings for related hypotheses (H5–H6) would suggest that the latter is generally superior. However, as mentioned, our experimental design did not allow us to test this assumption empirically, so we leave this for future studies.

Practical Implications

The point of departure of this research was the observation that when relying on sensory marketing activities to create a superior consumer retail experience, managers seem to believe that they need to ensure full congruence among all sensory stimuli, such as between all sensory attributes and the related products. This perceived requirement is fueled by prior studies showing that full sensory congruence leads to consumers' favorable evaluative judgments (Bosmans 2006; Mitchell, Kahn, and Knasko 1995) and by commonsense considerations that a full match of sensory stimuli is always desirable. However, owing

to the complexity of the retail environment, including the multitude of product- and ambience-related sensory attributes, this goal typically turns out to be overly ambitious in business practice. Even if full sensory congruence could be achieved, it would usually only be possible with considerable effort. This led to the question whether a fit of all sensory attributes with the product's primary function is really always necessary and worthwhile or whether a fit of only some sensory attributes with the function would be sufficient for a favorable product evaluation, while being easier to implement at lower expenditures of time and money.

Our research provides a differentiated answer to this question by revealing that a fit of some sensory attributes with the product's primary function can or cannot be sufficient, depending on which sensory attributes are congruent with the product's function. Thus, if properly designed, partial sensory attributes–function congruence can serve as a similarly effective and even more efficient strategy than high sensory attributes–function congruence. Given the challenges of realizing high sensory attributes–function congruence and the associated costs of implementation, this recommendation is good news for managers and should encourage them to tackle congruence-related challenges.

Our research also offers guidance to managers on how to best design partial sensory attributes–function congruence. We advise managers that when planning their sensory marketing activities, they should carefully select and arrange the sensory attributes. Considering our recommendations in terms of level- and sense-related aspects can help them select the right sensory attributes to take full advantage of partial sensory attributes–function congruence.

For level-related aspects, we recommend focusing on the congruence of the product-related (i.e., same-level) sensory attributes with the product's primary function rather than of the non-product-related (i.e., cross-level) sensory attributes. For example, in the case of a cooling pad, ensuring that the product color rather than the ambient color signals coolness is more important. For sense-related aspects, our theoretical reasoning and findings for related hypotheses suggest that the cross-sense option appears to be more promising and, thus, managers should avoid that for the same sense both congruent and incongruent sensory attributes exist. Therefore, we recommend that congruency efforts start by focusing on one sense (e.g., vision) for which managers try to ensure congruence of all related sensory attributes and then add back corresponding efforts for sensory attributes related to other senses (e.g., smell). For example, in the case of a cooling pad, ensuring that both product color (vision) and ambient color (vision) are congruent with the product's primary function while ambient scent (smell) is incongruent seems more crucial than ensuring that both product color (vision) and ambient scent (smell) are congruent with the function while ambient color (vision) is incongruent.

Finally, our advice for managers that not all sensory attributes need to be fully congruent with the product's primary function implies that sensory attributes also do not always have to be fully congruent with each other. Specifically, as long as the product-related sensory attributes are congruent with the product's primary function, their incongruence with non-product-related sensory attributes may not be too severe from a consumer standpoint. Moreover, as long as all sensory attributes related to the same sense are congruent with each other, their incongruence with sensory attributes related to other senses is likely to have a negligible effect. These suggestions should comfort managers responsible for sensory marketing activities and help them focus on the right sensory attributes.

Limitations and Future Research Avenues

This study has several limitations that offer opportunities for further research. First, our sensory attributes relate to vision, smell, or hearing as a sense and to color, scent, or music as sensory modality. Further research might focus on other senses (e.g., touch, taste) or on other sensory modalities (e.g., size, olfactory intensity, sound volume). Second, we focus on temperature as semantic association. Future studies might investigate other semantic associations such as weight. Third, our studies focus on either a same-sense or a cross-sense condition, which impedes a direct comparison of the two conditions, while controlling for other determinants of product evaluation (e.g., type of senses and sensory attributes, type of empirical setting). By considering both a same-sense and a cross-sense condition within the same experiments, further research could directly examine whether these conditions differ in product evaluation and, if so, how. Fourth, because some of our hypotheses are formulated in the absence of differences, our corresponding findings serve only as an empirical indication of the related expectations rather than providing real statistical support. Thus, the findings should be interpreted with caution. Fifth, as we used both higher (i.e., vision and hearing) and lower (i.e., smell) senses, it would be useful to determine the degree of impact of partial congruence when including a higher sense cue versus a lower sense cue. Sixth, we focus on only two products from the same category (cooling pad and heating pad). Future studies could try to verify our findings for other product categories (e.g., fragrances, detergents). Finally, because of the central importance of product evaluation for retailers and manufacturers in the medium to long run, our research focuses on this outcome variable. However, there might be situations in which other outcome variables might also be of interest. For example, for new product launches, managers might also be interested in evoking surprise about the product to gain consumer attention at the point of sale. We found indicators in our data that sensory attributes–function congruence might also have an effect on product surprise. Thus, we encourage researchers to investigate the corresponding impact on this and other interesting outcome variables in more detail. Moreover, instead of purchase intention, research could analyze actual behavior as the outcome variable, such as by asking participants to choose between products or giving them money that they could either keep or use to buy the product.

Executive Summary

In the past years, both retailers and manufacturers have increasingly focused on creating multisensory retail experiences

to positively influence consumer behavior. By exposing consumers to a multitude of product-related (e.g., product color) and ambience-related (e.g., ambient color, scent, music) sensory attributes at the point of sale, managers try to enhance their product evaluation.

Existing research suggests striving for high semantic congruence between these sensory attributes and the product's primary function. For example, for a cooling pad, all sensory attributes would need to signal coolness, such as through a perceived cool product color and cool ambient color, scent, or music. However, to achieve this goal, managers would need to invest signficant time and money with no guarantee of ultimate success. Therefore, the question arises whether all sensory attributes really must fit with the product's primary function to achieve sufficiently favorable product evaluation or whether a fit of some sensory attributes would be enough. So far, the literature provides no answer to this question.

We fill this research gap by conducting three experimental studies in either an online or field setting comprising sensory attributes at the product and ambience level across the senses of vision, smell, and hearing. To answer our question, we introduce the concept of partial sensory attributes–function congruence to the marketing discipline, which refers to both sensory attributes (e.g., a cool product color) that fit with the product's primary function (e.g., cooling in the case of a cooling pad) and sensory attributes (e.g., a warm ambient color) that do not show a corresponding fit. Moreover, we reveal that partial sensory attributes–function congruence results in a similar level of product evaluation to that of either high or low sensory attributes–function congruence, leading to a non-linear functional form of this relationship. Thus, the short answer to our question is that a fit of some sensory attributes with the product's primary function may, or may not, be sufficient. In addition, we identify the circumstances (same-/cross-level and same-/cross-sense) under which partial sensory attributes–function congruence leads to sufficiently favorable product evaluation, showing that to achieve this goal, congruence of the right sensory attributes is crucial.

Finally, this article provides helpful guidance on how to design sensory attributes and their fit with the product's primary function. Given the considerable efforts required for implementing high sensory attributes–function congruence in a retail environment, knowing whether a fit of some sensory attributes with the related primary function of a product would be sufficient is essential. Our findings provide a differentiated answer to this question and help managers select the sensory attributes on which they should focus their congruency efforts. For example, we advise them to focus on the congruence of product-related (rather than non-product-related) sensory attributes with the product's primary function. Moreover, we recommend concentrating on the congruence of sensory attributes related to one sense (e.g., vision), such as product color and ambient color, rather than on the congruence of sensory attributes related to other senses (e.g., smell), such as ambient scent. In summary, this research offers new ways for managers to effectively and efficiently design a multisensory experience in retailing.

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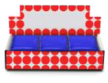
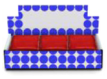
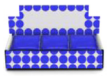
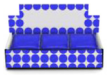
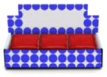
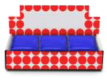
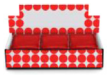
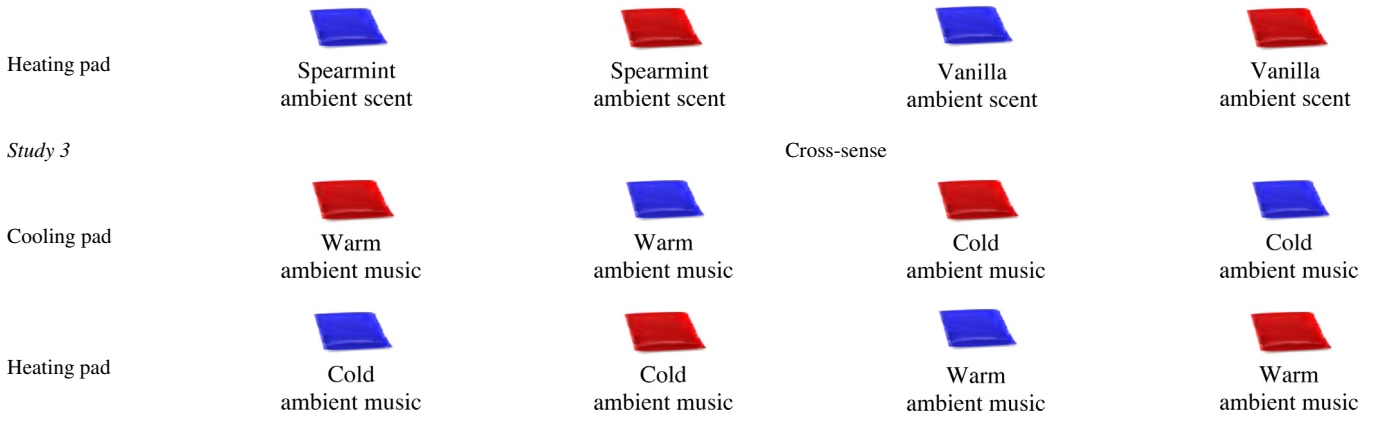
Conflict of interest

None declared.

Appendix A.

Stimuli used in studies.

	Low sensory attributes–function congruence	Partial sensory attributes–function congruence		High sensory attributes–function congruence
		Same-level	Cross-level	
Study 1		Same-sense		
Cooling pad (3 units on a merchandize display)				
Heating pad (3 units on a merchandize display)				
Study 2		Cross-sense		
Cooling pad	 Vanilla ambient scent	 Vanilla ambient scent	 Spearmint ambient scent	 Spearmint ambient scent



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