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Anticipated identification costs: Improving assortment evaluation by diagnostic attributes

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Abstract

Consumers often make quick assessments of product assortments, to determine if these are worthwhile for further investigation. They anticipate how difficult it will be to distinguish the various options in the assortment, which will influence their assortment evaluations. We reason that these anticipated identification costs are conceptually and empirically distinct from anticipated decision-making costs, and that extrinsic product attributes, which are not consumable themselves, can reduce anticipated identification costs and improve assortment evaluation, by highlighting intrinsic product differences. In addition, we posit that the impact of such diagnostic extrinsic attributes depends on the assortment's complexity. Results of two experiments support these predictions.

Keywords: Identification costs; Decision costs; Diagnosticity; Extrinsic attribute; Assortment evaluation

1. Introduction

Not only is it often difficult for consumers to choose an option from the vast assortments that they encounter, but it is also frequently difficult to distinguish the options from each other and to identify the relevant alternatives and their key attributes in the first place. Thus, consumers are faced with identification costs, to determine which distinct options exist in assortments and what their attributes are, and decision-making costs, to determine which options and attributes are preferred over others. In their first appraisal of product assortments, before making an actual product choice, consumers develop anticipations about these costs, which guide their decisions to use one assortment over others to make their final product choice from. Whereas marketing and consumer behavior research has examined decision-making costs in detail, we know much less about identification costs. The present research focuses on anticipated identification costs, how these can be reduced, and what the implications are for consumers' evaluation of assortments.

Consumers routinely assess product assortments by a quick glimpse at a window display, a glance at a website, or a fleeting look at a supermarket aisle to determine which assortments are worthwhile for further investigation. They often want to minimize their costs of thinking (Shugan, 1980), and form anticipations of the required costs before actually making a specific choice from an assortment of products. When an assortment appears taxing to choose from, this first evaluation may turn out negative and the assortment may be dismissed altogether. Hence, it is important for providers of choice sets to keep anticipated costs low (Fennema & Kleinmuntz, 1995; Reid & Brown, 1996; Schwartz, 2004). The few studies that have distinguished between *ex ante* anticipations and *ex post* experiences of costs, suggest that these deviate substantially (Fennema & Kleinmuntz, 1995). Because assortment evaluations and decisions about which assortments to examine in more detail are based on them, it is important to understand how anticipations about future costs are formed.

Accurately and quickly identifying products can be overwhelming, for example, when being exposed to 32 different liquid detergents on the website of online grocer Peapod, or when standing in front of the shelf with all 285 cookies that Barry Schwartz encountered in his neighborhood supermarket (Schwartz, 2004). Before they can choose a specific option from

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the assortment, consumers need to identify whether a box contains cookies filled with, for example, chocolate, nuts, or peanut butter. This identification task is made simpler when perceptually salient, extrinsic attributes communicate hidden intrinsic attributes, as when package color is diagnostic for the taste of the cookies, or a uniquely shaped bottle highlights a specific type of detergent. Managing such extrinsic perceptual attributes may be easy when assortment sizes are small, such as when the color black signals that the car is a T-Ford, and there is only one model in the showroom. However, when assortments are large and diverse, as they are now with multiple brands, product versions, and types, the crucial issue becomes, how perceptually salient extrinsic attributes can be used to manage anticipated identification costs for assortments and in which situation a specific strategy is successful.

The present research makes a case for distinguishing between the costs of making decisions between options in an assortment, about which quite a lot is known, and the costs of identifying the options in the assortment, which are often substantial in practice, and about which we know much less. We aim to show how perceptual, extrinsic attributes of products, which do not provide consumption utility themselves but clarify distinctions between products, can reduce the anticipated costs of identification and increase the value of assortments, and thus are beneficial for decision makers engaged in evaluating product assortments. In this way, support for our ideas would imply that the utility of assortments as a whole can be improved without necessarily improving the utility of any of the options in the sets, and thereby that assortment utility is more than the sum of the individual product utilities. Support for these ideas would also be in line with increasing evidence that the decision-making costs involved in comparing multiple products are not the only, and maybe not even the most prominent, costs in consumer judgment and choice. Instead, consumers may rely on automated, visual routines (Loewenstein, 2001), or on singular evaluation of an object (Posavac, Sanbonmatsu, Kardes, & Fitzsimons, 2004). This research adds to this emerging stream of literature by showing the importance of anticipated identification costs over and above decision-making costs in assortment evaluation, and by identifying perceptual factors — under control of marketing management — that influence these costs.

2. Anticipated costs of identifying choice options

Anticipated identification costs are high when meaningful differences between options are difficult to discern, which seems quite common in consumer markets for the following reasons. Meaningful differences between options are often unobservable, such as the taste of cookies and the cleaning power of laundry detergents (experience or credence attributes). Moreover, mounting competition reduces the observable differences between options in the first place. This is aggravated by the growth of store brands, me-too products, and copycats, resulting in assortments with many deliberate similarities between products (Warlop & Alba, 2004; Wilke & Zaichkowski, 1999). The increase of brand extensions across multiple categories and the fragmentation of categories into sub-sub-categories further complicate the consumer's task to determine what the attributes of specific options are, and how these differ from the other options in the set. Conversely, due to positioning efforts and "meaningless differentiation," options that are actually identical are communicated to be different on (irrelevant) attributes as well (Broniarczyk & Gershoff, 2003; Carpenter, Glazer, & Nakamoto, 1994). As a consequence, consumers commonly face situations where actually different options in an assortment appear to be the same, and where actually identical options appear to be different, which increases the anticipated identification costs.

Whereas identification costs might be considered a specific type of search cost, they are quite different from decision-making costs. That is, during search consumers aim to establish (a) where the potential options are located in space (such as in which stores, departments, aisles, shelves), and (b) what the identity of potential options is (such as their category, and bundle of consumable attributes, e.g., the presence or type of nuts in cookies), with the latter task incurring identification costs. When potential options are jointly offered at a single physical or virtual location, which is increasingly the case in hypermarkets and on-line stores (consider the 1372 Italian cookbooks on Amazon), the costs to locate these options in space are minimal, but the identification costs may be high and these are our focus.

Identification costs differ qualitatively from decision-making costs, or the costs of thinking (Shugan, 1980). Decision-making costs are incurred to reduce uncertainty about which option from the set is optimal, result from attribute tradeoff difficulties, and are resolved by using rules and heuristics (Chatterjee & Heath, 1996; Garbarino & Edell, 1997). Decision-making costs may be high when consumers find themselves in front of an overstocked retail shelf, looking "in impotent rage at a vast selection of products, all ever-so-slightly different" (Reid & Brown, 1996, p. 10), when these differences require multiple, fine tradeoffs between options in order to choose one. Consumers may also stare at a wall of laundry detergents, not even knowing which ones clean white laundry, soften the fabric, smell good, and so forth, as they all look the same. Then identification costs are high, which is not uncommon (Foxman, Muehling, & Berger, 1990). In other words, to make a choice from an available assortment, consumers need to reduce at least two types of uncertainty, identity and preference uncertainty (Urbany, Dickson, & Wilkie, 1989), and they anticipate specific costs to accomplish this. Consumers anticipate incurring identification costs to reduce identity uncertainty (what the options are) and decision-making costs to reduce preference uncertainty (which option is preferred). Thus, we propose that anticipated identification costs and decision-making costs, both of which are relevant in evaluating a choice set, are conceptually related but different concepts. Both types of anticipated costs are not only relevant when consumers attempt to choose a single product from an assortment, but also when they first form a consideration set containing several products (Hauser & Wernerfelt, 1990; Shocker, Ben-Akiva, Boccara, & Nedungadi, 1991). Before deciding which of the options to include in a consideration set, consumers need to identify the options and their discriminating attributes.

Interestingly, the extant literature has examined the general search for potential products, and the costs of making a decision in great detail (e.g., Bettman, Luce, & Payne, 1998; Moorthy, Ratchford, & Talukdar, 1997), but has had less to say about identification costs, perhaps assuming that when choice options are jointly available their differences are transparent. Attempts to decompose the choice process into elementary information processes have occasionally included a step of "reading attribute values into short-term memory" (Payne, Bettman, & Johnson, 1988), which acknowledges that the identification of attribute values and options requires effort. Yet, this step has received surprisingly little attention, is broader than commonly thought — including, for example, inferring the diagnosticity of extrinsic perceptual attributes, combining textual and pictorial information, anticipating the ease of determining the attributes of products — and has implications for assortment evaluation. Furthermore, the potential dependence of anticipated identification costs on characteristics of the choice set has not been examined. We believe that one such characteristic, extrinsic product attributes in the set, can influence anticipated identification costs and, consequently, assortment evaluation by communicating product differences in the set.

3. Influence of extrinsic attributes

Suppose that with Barry Schwartz (2004), we are in front of a cookie shelf with a few hundred options to choose from. It is unlikely that all options can be identified fully in a single glance. Focal, effortful attention is needed to determine differences and similarities between the multi-attribute products (Quinlan, 2003). Depending on the use of visually salient, extrinsic attributes, such as package design, this product identification process may require more or less effort. Extrinsic attributes are not a "consumable" and not physically part of the product (Steenkamp, 1990). To effectively communicate about intrinsic attributes of products, these extrinsic attributes need to be perceptually salient and draw attention. Examples include color, orientation, size, and aspects of shape (Wolfe & Horowitz, 2004). The question thus becomes how these salient extrinsic attributes can support the identification process and reduce anticipated identification costs.

The communicative function of extrinsic attributes can be expressed in at least four distinct choice sets, depicted in Table 1. We use a set of four (bags of) cookies as illustration, with type of chocolate (either dark or milk) and nut content (with or without nuts) as intrinsic attributes. Package color is the extrinsic attribute here. In set I, all options have the same extrinsic attribute-level: all cookies in the example come in a red package. Color is not diagnostic for cookie content, nor does it differentiate the products. Although this is somewhat extreme, comparable situations may result from multiple me-too products, a uniform store brand, extreme copying activity in a category (Warlop & Alba, 2004), or from the dominant use of brand or category color codes, such as red for all flavors of Campbell's soup. In set II, package color differentiates products with an identical intrinsic attribute, in our example with the same chocolate type or nut content. Color is neither a consumable attribute nor diagnostic for any of the intrinsic product attributes, but it merely differentiates the options. Previous research has examined a related situation where products are differentiated on trivial attributes, which appear to create a meaningful product difference but are in reality irrelevant (Broniarczyk & Gershoff, 2003; Brown & Carpenter, 2000; Carpenter et al., 1994). Here, we focus on the communicative function of extrinsic attributes for intrinsic, "hidden" attributes rather than on their implied consumption benefits. In set III, the extrinsic attribute is diagnostic for one intrinsic attribute difference: package color is diagnostic for type of chocolate, but not for nut content. Typical examples are the color of food packaging or laundry detergents (Garber, 1995) (brown signals chocolate cookies, colorful packages signal that the detergent is for colorful laundry). The extrinsic attribute is diagnostic for one intrinsic attribute, and signals the underlying actual differences between options on this intrinsic attribute (Feldman & Lynch, 1988). Finally, in set IV, all options have a unique extrinsic attribute-level; the extrinsic attribute is diagnostic for each option in the set, which ensures that the products are perceptually distinct (Warlop, Ratneshwar, & Van Osselaer, 2005). This occurs when attempts are made to distinguish each individual product from the others in the set,

Table 1
Illustrating the use of extrinsic attributes to communicate product differences: a cookie example

Options in the choice sets	Intrinsic attributes		Extrinsic attribute (color) in four choice sets of cookies			
			Set I	Set II	Set III	Set IV
	Chocolate	Nut content	Uniform	Attribute-level differentiation	Attribute-level diagnosticity	Item-level diagnosticity
1	Dark	Nuts	Red	Red	Red	Red
2	Dark	No nuts	Red	Blue	Red	Blue
3	Milk	Nuts	Red	Blue	Blue	Green
4	Milk	No nuts	Red	Red	Blue	Yellow
Comparing choice sets:						
• Number of different colors			1	2	2	4
• Diagnosticity of extrinsic attribute			No	No	For a single intrinsic attribute	For the full product
• Differentiation by extrinsic attribute			No	For each intrinsic attribute	No	For the full product

for example, when each Italian cookbook has a unique cover to set it apart from the rest.

The four sets in Table 1 result from systematic variations in an extrinsic attribute, whereas the intrinsic attributes of the options remain identical throughout the different sets. Interestingly, research to date has emphasized the opposite situation: effects of variation in the intrinsic attributes of options on effort and set evaluation. For example, sets of options with similar intrinsic attribute values are relatively difficult to evaluate, because of high decision-making costs (Biggs, Bedard, Gaber, & Linsmeier, 1985; Stone & Schkade, 1991). Consequently, we know little about consumers' response to extrinsic attribute alterations, even though these are frequently managed in marketing practice, and theoretically relevant because of their potential effect on anticipated identification costs.

It seems reasonable to expect that consumers will anticipate the highest identification costs in set I, where the extrinsic attribute makes the options appear less differentiated than they actually are. In addition, anticipated identification costs should be high in set II as well, because the extrinsic attribute is non-diagnostic and potentially confusing. Conversely, anticipated identification costs are likely to be lowest in sets III and IV, where the extrinsic attribute is diagnostic for an attribute or even the full item. Following the lower anticipations of identification costs, evaluations of the complete assortment should be higher for choice sets III and IV compared to choice sets I and II. Therefore:

H1. Diagnosticity of extrinsic attributes reduces anticipations of identification costs and thereby increases assortment evaluation.

The question remains if diagnosticity at the attribute-level or the item-level has larger effects, and under which conditions. Attribute-level diagnosticity communicates on one intrinsic attribute, and extrinsic and intrinsic attributes levels are aligned. An example is color-coding, for example of chocolate bars, where color reveals product taste (red for bitter, green for hazelnut) but does not identify the full product attribute bundle (because different products that have their taste in common, will have the same color). This provides a minimal number of easy to learn associations between the extrinsic and intrinsic attribute: it becomes easy to identify the taste from the color. Item-level diagnosticity communicates about the full product: it sets each product apart from all other products. This can result from attempts to make each product distinctive (Warlop et al., 2005), as when distinctive product designs are used to gain consumer attention (Bloch, 1995).

Item-level diagnosticity has the advantage that the each and every item in the set, thus the "full product," can be identified from a single attribute-level. It comes, however, at the disadvantage of requiring a separate attribute-level for each product, which may unduly increase identification costs when assortments become complex. That is, when an assortment is complex because there are many products and intrinsic attribute differences (Payne, Bettman, & Johnson, 1992), item-level diagnosticity may become overwhelming with each product having a different attribute-level for the extrinsic attribute (e.g., a different color). This reasoning suggests that the effects of diagnosticity on anticipated identification costs and assortment evaluation depend on assortment complexity, and that item-level diagnosticity can become too difficult when assortments become complex.

Complex assortments present high information load to consumers, who are subsequently more likely to attend to information selectively and focus on the information that is easy to process (Kardes, Cronley, Kellaris, & Posavac, 2004). The complexity of the assortment may require cognitive resources and decrease consumers' capacity to process complexity in identifying the products. This suggests that attribute-level diagnosticity, not diagnostic for the full product but also not very difficult, will be favored over the more difficult item-level diagnosticity in complex environments. On the other hand, when an assortment is simple, item-level diagnosticity is less difficult, and consumers may appreciate both item-level and attribute-level diagnosticity equally. We hypothesize that:

H2. In complex assortments, item-level diagnosticity leads to higher anticipated identification costs and lower assortment evaluations than attribute-level diagnosticity. In simple assortments, type of diagnosticity does not influence anticipated identification costs and assortment evaluation.

Support for these hypotheses would demonstrate how assortment evaluation can be managed by adapting extrinsic attributes, in different situations. Specifically, it would reveal how the reduction of anticipated identification costs through extrinsic attributes is contingent on the complexity of the assortment under scrutiny, and that consumers are aided more by attribute-level (=partial) diagnosticity than by item-level (=full) diagnosticity in complex assortments, but not in simple assortments. This would demonstrate more generally how consumption utility and consumer welfare could be improved by perceptual strategies of marketing management to reveal and highlight the intrinsic distinctions between products. We present the results of two experiments that test the predictions. The experiments disentangle anticipated identification costs from anticipated decision-making costs, show how extrinsic attributes can lower anticipated identification costs (in Experiment 1, testing Hypothesis 1), investigate the moderating influence of assortment complexity (in Experiment 2, testing Hypothesis 2), and show how reduced anticipated identification costs increase assortment evaluation.

4. Experiment 1: comparing diagnosticity and differentiation

4.1. Method

4.1.1. Participants and design

One-hundred-and-eighty-six students were randomly assigned to one of four assortments of potato chips, forming a 2×2 (diagnosticity×differentiation) between-subjects design. After disregarding 5 participants with a food allergy, 181 participants remained (106 males and 75 females, mean age was 20.8 years).

4.1.2. Procedure

Fig. 1 provides the assortments that were used. Each contained 16 different potato chips, by crossing chip type (fries, rings, nachos, and chips) and chip flavor (Greek, Mexican, Caribbean, and Oriental). Package color was the extrinsic attribute, because color is a basic perceptual feature with a prominent role in visual information processing (Quinlan, 2003; Wolfe & Horowitz, 2004) and is especially suited to communicate product differences (Garber, 1995). The experiment was administered on personal computers using

Fig. 1. Experimental stimuli in Experiment 1.

Table 2
Anticipated identification costs, decision-making costs, and assortment evaluation for the four choice sets: experiment 1

Choice set	Identification costs	Decision-making costs	Assortment evaluation
I: Uniform (n=44)	5.81 (1.81)	6.60 (1.30)	4.52 (1.99)
II: Attribute-level differentiation (n=43)	6.16 (1.89)	6.12 (1.71)	4.48 (2.02)
III: Attribute-level diagnosticity (n=46)	4.25 (2.31)	5.47 (1.81)	5.36 (2.00)
IV: Item-level diagnosticity (n=48)	4.76 (1.99)	5.44 (1.93)	5.31 (1.56)

Measures are on a 1–9 low to high scale. Means with standard deviations in parentheses.

Authorware (Kellogg & Bhatnagar, 2002). Participants were informed that they would evaluate the chips assortment of a new producer and received a free product (e.g., candy bar, cookies, fruit) as a reward for participation. The experiment took 5 to 10 min to complete.

4.1.3. Measures

To measure anticipated costs, we used nine-point scale measures similar to those used in prior research on effort in decision-making tasks (Chatterjee & Heath, 1996; Fennema & Kleinmuntz, 1995). Anticipated identification costs were assessed with three items (α=.86): "In this assortment, finding the precise differences between the chips is [very easy – very difficult]," "The effort that I need to put into determining the differences between the chips is [very little – very much]," and "It seems difficult to determine which type of chips is in which bag [completely disagree – completely agree]." Anticipated decision-making costs were assessed with four items (α=.90): "In this assortment, trading off the pros and cons between the chips is [very difficult – very easy]," "The effort that I need to put into trading off the pros and cons of the different chips is [very little – very much]," "Choosing between the chips from this assortment seems [very easy – very difficult]," and "If I would be asked to make a choice from this assortment, I would have to [think little – think much]." Based on a random computerized procedure, participants provided anticipated identification or decision-making costs first.[1] Assortment evaluation was measured with five items (α=.96): "I am [not pleased – pleased] with this assortment," "I am [unfavorable – favorable] about this assortment," "To me this assortment is [totally unattractive – very attractive]," "I am [disappointed – happy] with this assortment," "To me this assortment is [horrible – fantastic]." Means and standard deviations are provided in Table 2.

4.2. Results and discussion

Our reasoning implies that the two types of costs are separate constructs, and that both mediate the effects of extrinsic attributes on assortment evaluation. To assess the validity of our measures of anticipated identification and decision-making costs, we conducted confirmatory factor analyses using LISREL 8.5 (Jöreskog & Sörbom, 1993). As indicated in Table 3, the overall fit of the two-factor model, with separate constructs for the two types of costs, is good. Convergent validity is established when the average variance extracted for each factor exceeds .50 (Fornell & Larcker, 1981), which is indeed the case (average variance extracted is .68 for anticipated identification costs and .70 for anticipated decision-making costs). We assessed discriminant validity by fitting two models to the data. Model 1 estimated separate factors for the two costs that were allowed to correlate freely, whereas Model 2 fixed the correlation between costs to be 1 (unity). Discriminant validity is established if Model 2 performs worse than Model 1, which was exactly the result: Model 1 clearly outperformed Model 2: $\Delta\chi^2(1)=187.7$, $p<.001$. The results are summarized in are Table 3, and the fit indices of the two-factor solution are clearly better than recommended cut-off values (Hu & Bentler, 1999).

Thus, although anticipated identification and decision-making costs were correlated (.52, $p<.001$), there is strong support for their discriminant validity. Their correlation was significantly lower than unity, several factor loadings for the alternative one-factor model were unsatisfactory small (around .50 or smaller; Bagozzi & Yi, 1988), and the squared correlation between the two factors is less than the average variance extracted for each of the factors (Fornell & Larcker, 1981).

Next, and in support of Hypothesis 1, an ANOVA for anticipated identification costs showed a main effect of

Table 3
Confirmatory factor analysis on anticipated identification and decision-making costs

	Experiment 1		Experiment 2	
	Selected 2-factor model	Alternative 1-factor model	Selected 2-factor model	Alternative 1-factor model
Factor loadings				
IC 1	.83 –	.53	.81 –	.81
IC 2	.89 –	.52	.81 –	.80
IC 3	.75 –	.44	.85 –	.84
IC 4			.89 –	.88
IC 5			.85 –	.84
DC 1	– .86	.85	– .90	.58
DC 2	– .85	.83	– .87	.51
DC 3	– .85	.85	– .81	.48
DC 4	– .77	.78	– .86	.54
Fit indices				
χ^2	18.59	206.32	38.25	522.38
df	13	14	26	27
p	.14	<.001	.06	<.001
CFI	.99	.74	.99	.80
RMSEA	.05	.29	.04	.33
Difference test				
$\Delta\chi^2(1)$	187.74		484.13	
p	<.001		<.001	

IC=anticipated identification costs; DC=anticipated decision-making costs; – indicates factor loading set to zero.

[1] This was done to explore whether the influence of identification costs on assortment evaluation was due to measurement order. None of the effects of item order were significant (all F-values<1).

diagnosticity, $F(1, 177)=24.5$; $p<.001$, indicating that assortments with attribute-level or item-level diagnostic colors (sets III and IV) promoted lower anticipated identification costs ($M=4.51$) than assortments with uniform or differentiated colors (sets I and II) ($M=5.98$). Consistent with this, an ANOVA for assortment evaluation showed a main effect for diagnosticity as well, $F(1, 177)=8.7$, $p<.01$, showing that assortments with attribute-level or item-level diagnostic colors (sets III and IV) attained more positive evaluations ($M=5.33$) than assortments with uniform or differentiated colors (sets I and II) ($M=4.50$). The correlation between anticipated identification costs and assortment evaluation was $-.37$.

An ANOVA for anticipated decision-making costs showed a significant main effect for diagnosticity, $F(1, 177)=12.7$, $p<.001$. Assortments with attribute-level or item-level diagnostic colors (sets III and IV) promoted lower anticipated costs to make a decision ($M=5.46$) than assortments with uniform or differentiated colors (sets I and II) ($M=6.36$). Neither the influence of differentiation nor the interaction between diagnosticity and differentiation was significant (all F-values<2). In other words, only the diagnosticity of the extrinsic attribute affected costs and assortment evaluation.

Finally, mediation analyses (Baron & Kenny, 1986) showed that anticipated identification costs did, but anticipated decision-making costs did not mediate between diagnosticity and assortment evaluation. Specifically, because the ANOVA's revealed an influence of only diagnosticity, this variable was used to represent the influence of extrinsic attributes (dummy coded: set I and II$=0$, set III and IV$=1$). Fig. 2 summarizes the results. We first regressed assortment evaluation on diagnosticity, which reaffirmed the influence of diagnosticity ($\beta=.22$, $t=2.97$, $p<.01$). Next, we regressed separately anticipated identification costs ($\beta=-.35$, $t=-4.92$, $p<.001$) and anticipated decision-making costs ($\beta=-.26$, $t=-3.58$, $p<.001$) on diagnosticity, with similar results. Finally and crucially, we regressed assortment evaluation on diagnosticity, anticipated identification costs, and anticipated decision-making costs. If the two anticipated costs would fully mediate, their influence would remain significant, whereas the influence of diagnosticity would reduce to zero, which is essentially what we found. Diagnosticity was not significant anymore ($\beta=.10$, $t=1.32$, $p=.19$), whereas anticipated identification costs significantly influenced assortment evaluation ($\beta=-.33$, $t=-4.05$, $p<.001$). Interestingly and quite unexpectedly, the influence of anticipated decision-making costs was insignificant as well ($\beta=-.02$, $t=-.23$, $p=.82$). This demonstrates, even more than expected, the importance of anticipated identification costs in assortment evaluation, and further supports its distinction from anticipated decision-making costs. A potential reason for the absence of an effect of decision-making costs is the lack of variation in intrinsic product attributes, because except for package color, alternatives were identical across all conditions. Experiment 2 will therefore compare assortments with different alternatives, to examine if decision-making costs affect assortment evaluation in that case.

Taken together, the results reveal that anticipated identification and decision-making costs are empirically distinct. More importantly, they indicate how extrinsic attributes that quickly communicate the identity of options improve consumers' evaluation of assortments, by lowering anticipated identification costs. Both item-level and attribute-level diagnosticity are advantageous compared to uniform attributes or meaningless differentiation. Experiment 2 built on this by examining situations in which either item-level or attribute-level diagnosticity has a larger effect. To generalize the results of Experiment 1, Experiment 2 used a different product category,

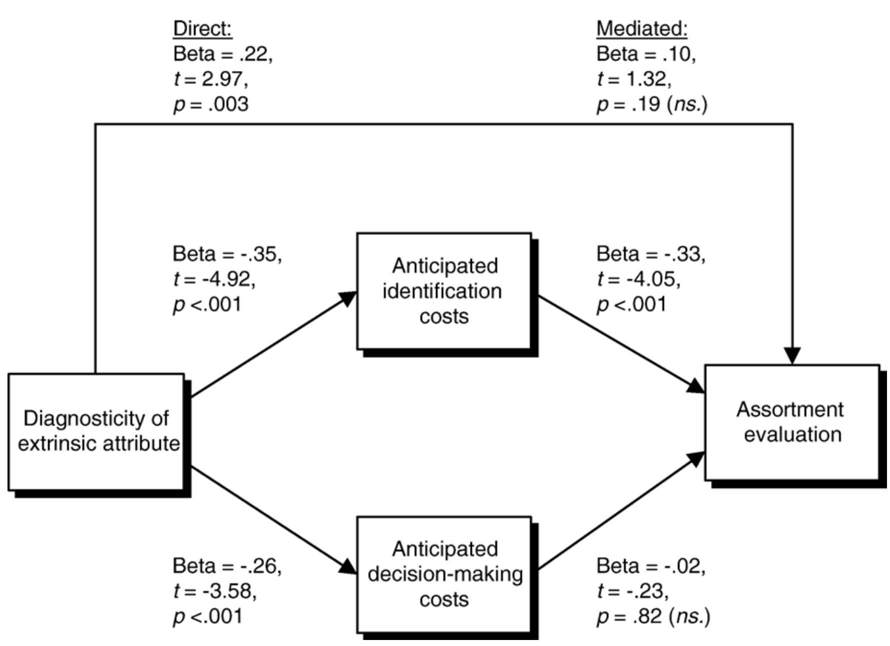

Fig. 2. How diagnostic, extrinsic attributes improve assortment evaluation: the mediating role of anticipated identification costs, Experiment 1.

added a different extrinsic attribute, and experimentally manipulated assortment complexity. It tested Hypothesis 2 that the impact of the diagnosticity of extrinsic attributes is contingent on assortment complexity.

5. Experiment 2: The influence of assortment complexity

5.1. Method

5.1.1. Participants and design

One-hundred-and-twelve participants (students and staff members; 42 men and 70 women, mean age was 22.3 years) were randomly assigned to either complex (24 products, with four chocolate types and six fillings) or simple (6 products, with two chocolate types and three fillings) assortments of chocolate candies.

5.1.2. Procedure

Complexity of the assortments was manipulated by altering both the number of products and the number of attribute-levels. To assess the success of the complexity manipulation, a separate test was conducted with a sample of 30 students, who evaluated both the simple and the complex assortment on a six-item nine-point complexity scale with endpoints “completely disagree” and “completely agree.” Items were “This assortment is … complex/overwhelming/difficult/easy/complicated/simple” ($\alpha=.86$). A one-way ANOVA (within-subjects) established the success of the manipulation, with the larger assortment deemed much more complex ($M=5.62$) than the smaller one ($M=2.61$), $F(1, 29)=86.5$; $p<.001$.

Participants in the main experiment evaluated either the simple or the complex chocolate assortment. They evaluated both attribute-level and item-level diagnosticity of the wrappers, in random order, to increase power. This resulted in a 2 (assortment complexity)×2 (type of diagnosticity) mixed design. As extrinsic attributes we chose “wrapper color,” because of color's effectiveness in aiding object identification (Christ, 1975) and “wrapper shading” to increase the generalizability of our results. Wrapper color was diagnostic for chocolate type and wrapper shading was diagnostic for filling (attribute-level diagnosticity), or both were unique for each product (item-level diagnosticity). Because colors and shadings can influence consumer judgments and differ in their attention-drawing properties (Gorn, Chattopadhyay, Yi, & Dahl, 1997), the extrinsic attribute-levels were randomly assigned to the options (see Fig. 3 for examples).

5.1.3. Measures

Measures were similar to the first experiment. Anticipated identification costs were assessed with five items ($\alpha=.91$), adding two to the items used in Experiment 1 (“Discovering which chocolate candy is in each of the wrappers seems [very easy – very difficult]” and “I think it is difficult to see which chocolate candy each of the wrappers contains [completely disagree – completely agree]”), anticipated decision-making costs with four items ($\alpha=.92$), and assortment evaluation with four items ($\alpha=.94$). Means and standard deviations are in Table 4.

5.2. Results and discussion

Confirmatory factor analyses show parallel results to the first experiment. The average variance extracted is .71 for anticipated identification costs and .74 for anticipated decision-making costs, both above the criterion of .50 necessary for convergent validity. The correlation between the two costs is .51. Hence, both variances extracted are larger than the squared correlation between the factors (.26), establishing discriminant validity as well. Moreover, several loadings for the alternative one-factor model are too low. Finally, overall model fit is good for the two-factor model, but significantly worse for the alternative one-factor model, as shown by the measures provided in Table 3, which again supports the distinction between anticipated identification and decision-making costs.

A repeated measures ANOVA for anticipated identification costs showed a main effect of type of diagnosticity, $F(1, 110)=29.3$; $p<.001$, a main effect of assortment complexity, $F(1, 110)=17.0$; $p<.001$, and the predicted interaction effect of assortment complexity x type of diagnosticity, $F(1, 110)=6.8$; $p<.05$. In support of Hypothesis 2, for complex assortments, anticipations of identification costs were *higher* for item-level diagnosticity ($M=7.47$) than for attribute-level diagnosticity ($M=5.38$), $F(1, 54)=42.5$; $p<.001$. Moreover, for simple assortments, anticipated identification costs did not significantly differ between the two types of diagnosticity, $F(1, 56)=3.2$; n.s. In other words, participants appear to have felt overwhelmed with item-level diagnosticity in the complex assortment, but were better able to cope with item-level diagnosticity when the assortment was simple.

In further support, we found a significant interaction between assortment complexity and type of diagnosticity for assortment evaluation as well, $F(1, 110)=7.7$; $p<.01$. When complexity was high, participants evaluated assortments with item-level diagnosticity ($M=5.95$) significantly less than they did assortments with attribute-level diagnosticity ($M=6.59$), $F(1, 54)=4.1$; $p<.05$. When complexity was low, the effect of type of diagnosticity did not reach significance, $F(1, 56)=3.6$; *n.s.*

In addition, a repeated measures ANOVA for anticipated decision-making costs showed main effects for type of diagnosticity, $F(1, 110)=13.0$, $p<.001$, and assortment size, $F(1, 110)=8.4$, $p<.01$, but no significant interaction between assortment complexity and type of diagnosticity, $F(1, 110)=3.0$, *n.s.* In support of the proposed framework, the interaction effect was significant for anticipated identification costs, but not for anticipated decision-making costs, thereby substantiating the difference between the two cost types.

Whereas in the first experiment anticipated identification costs but, surprisingly, not anticipated decision-making costs influenced assortment evaluations, in this experiment both costs influenced assortment evaluations. To account for the fact that each participant evaluated both assortments with item-level and attribute-level diagnosticity, difference scores were used for the two costs and for assortment evaluation by subtracting the score of the assortment with item-level diagnosticity from the one with attribute-level diagnosticity. Regressing the difference score of assortment evaluation on the difference scores of both costs showed the

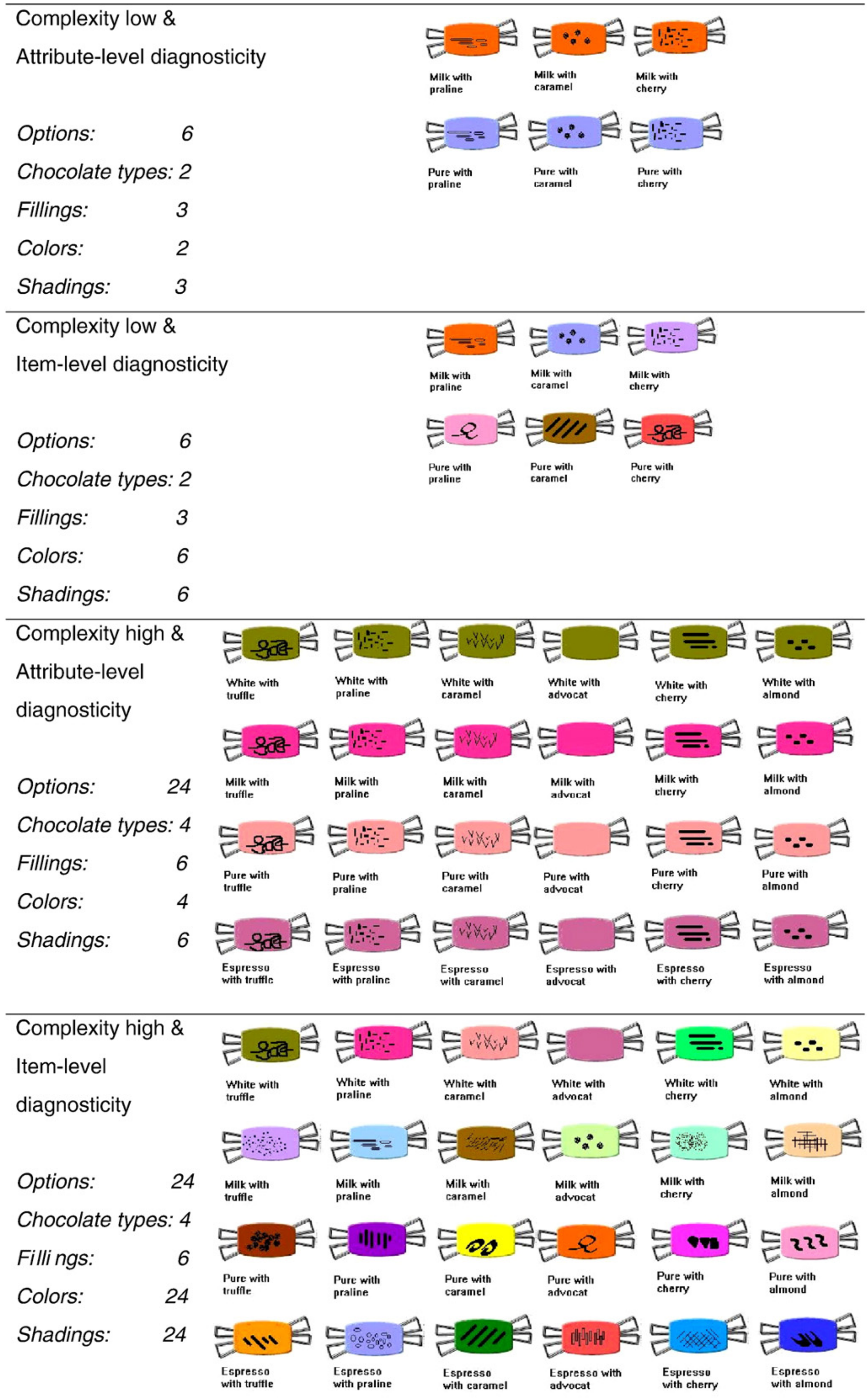

Fig. 3. Example of experimental stimuli in Experiment 2.

predicted significant negative effects for both ($\beta=-.34$, $t=-3.88$, $p<.001$ for anticipated identification costs and $\beta=-.37$, $t=-4.19$, $p<.001$ for anticipated decision-making costs).

These results demonstrate that in certain, clearly defined, situations consumers prefer (partial) attribute-level diagnosticity to (full) item-level diagnosticity, which demonstrates the

Table 4
Anticipated identification costs, decision-making costs, and assortment evaluation: experiment 2

	Simple assortment (n=57)			Complex assortment (n=55)		
Choice set diagnosticity	Identification costs	Decision-making costs	Assortment evaluation	Identification costs	Decision-making costs	Assortment evaluation
III:	4.99	4.13	5.50	5.38	4.69	6.59
Attribute-level	(2.00)	(1.81)	(1.70)	(2.04)	(1.95)	(1.56)
IV:	5.72	4.49	5.98	7.47	5.72	5.95
Item-level	(2.12)	(1.86)	(1.64)	(1.52)	(2.07)	(2.09)

Measures are on a 1–9 low to high scale. Means are presented with standard deviations in parentheses.

context-dependency of diagnosticity effects. When assortments were complex, item-level diagnosticity became demanding, and attribute-level diagnosticity was preferred.

6. General conclusions and discussion

Extrinsic, perceptual attributes of products, which do not add consumption utility to any of the products in an assortment, can still contribute to a systematic improvement of the overall utility of the assortment. Such attributes may raise assortment evaluation by lowering anticipated identification costs, that is, the costs of determining what the nature of each of the options in the assortment is. They do so by communicating about the full product, which is more helpful in simple than in complex assortments, or by revealing product differences on a single intrinsic attribute. In this way, extrinsic product attributes increase consumers' evaluation of an assortment merely by accentuating existing product differences, without changing the intrinsic utility of any of the products themselves. Put differently, the present research has shown that assortment utility is not the mere sum of individual product utilities, but that factors at the assortment level can improve assortment utility as well.

Identification costs are non-trivial in many market situations, because of the hidden character of various attributes, rising competition, increase in me-too products and brand-extensions. The present findings make a case for increased attention to the communicative value of extrinsic product attributes in order to improve market transparency and they provide suggestions for improved assortment management, depending on the complexity of the assortment. For example, in complex assortments it seems better to establish color codes or similar codes based on perceptual attributes such as shape, shading, or size, rather than to differentiate individual products by giving each a different color, shape, shade, or size.

The findings also demonstrate how anticipated identification costs and decision-making costs are conceptually and empirically distinct. Decision-making costs, such as the emotional conflict of having to choose between two close options, are well studied and we know much about their determinants and consequences for choice and post-choice evaluation. However and remarkably, we know very little about the costs of identifying the options in the ever-expanding assortments that consumers are facing in the market place. It is not just the cost of choice that may overwhelm consumers, but also and sometimes even more so, the cost of identifying the relevant choice options in the first place. Our findings indicate that anticipated identification costs and decision-making costs are distinct, that lowering anticipated identification costs raises assortment evaluation, and that this process is driven by external perceptual attributes that are under marketing management's control. We believe that the current findings call for more focus in marketing theory and practice on the determinants and implications of identification costs. The fact that identification costs for consumers are high and rapidly rising in many markets (Schwartz, 2004) adds to the urgency.

The importance of identification costs in assortment evaluation and product choice processes is likely to depend on several conditions. First, identification should gain importance in the evaluation process when relevant product differences are hidden, either intrinsically as when attributes are of the experience or credence kind or because of market forces, due to me-too products and the like. Second, identification costs are probably of greater importance when multiple products are provided simultaneously, for example in stores, product catalogues, or on Internet pages, rather than sequentially. The consumer in the former case needs to grasp a possibly overwhelming set of options at once. Third, identification costs are likely to form a larger part of the evaluation process when other costs are low or absent. Factors that decrease decision-making costs, such as the presence of dominant options and the completeness of information (Bettman et al., 1998), should therefore increase the relative importance of product identification. This implies that identification and decision-making costs need not be correlated in marketing practice, and in fact they were only moderately correlated in the current studies. For example, when consumers have an *a priori* favorite product, decision-making costs are absent, but identification costs can still be substantial. Conversely, when relevant attribute differences between products are very salient and identification takes little effort, decision-making costs may remain high.

7. Future research

This research focused on cost anticipations, rather than on cost experiences, because consumers base their decisions to attend to or ignore assortments of options on the former. The distinction between anticipated and experienced costs is subtle, however, and deserves follow-up research. In our experiments, participants were free to examine the assortments for as long as they wanted and were not required to make an actual choice.

How did they arrive at the anticipated identification costs? Perhaps, and not unlikely, they identified several products from the assortment and used this sample to make a reasonable estimate for the total assortment. Because they did not need to engage in an actual choice process, and were asked to report their first impressions, their responses most likely capture more anticipated than experienced identification costs, but some actual costs may already have been incurred. Future research on anticipated costs may consider further limiting the possibility that participants advance in product identification by, for example, restricting the exposure time to the assortment to a few seconds or even less, so that participants only get the gist of the assortment but not the finer details, or by shrinking the font size of textual information so that identification is hampered. Consumers may be able to quickly and almost effortlessly form an anticipation of the identification costs involved in an assortment, and to infer later experiences from these snap judgments. Related to this issue, anticipated costs need not match later experienced costs (Fennema & Kleinmuntz, 1995). For example, attribute-level diagnosticity may lower anticipated identification costs until consumers realize that not all intrinsic differences are equally salient. Or, item-level diagnosticity may appear overwhelming in complex assortments until consumers realize that they only need to identify one favorite product. Future research may explore these and other differences between anticipated and experienced costs, and may examine the process of mapping extrinsic attributes to intrinsic product differences in more detail.

There are several other opportunities for future research as well. The proposed conceptual framework is a first step towards synthesizing marketing activities aimed at clarifying intrinsic product differences through extrinsic attributes (diagnosticity) with activities to increase differences between products that may or may not be intrinsically similar (differentiation), but it needs further work. Although it allowed us to disentangle identification from decision-making costs, more work is needed to understand when differentiation receives more weight than diagnosticity does. For example, one might look at sets with options that are identical on intrinsic but distinct on extrinsic attributes. Then, diagnosticity of the extrinsic attributes would be absent, but their (meaningless) differentiation would be maximal, and it is useful to understand when what is better. Other combinations of intrinsic and extrinsic attributes are possible as well.

Additionally, consumers had no prior preferences for one or more options in the assortment, because only new products were used. Yet, assortment evaluation may sometimes be predominantly based on the presence of one or a few preferred options, rather than on the ease of identifying all options, including those that may never be chosen. When consumers have a preferred product in mind, they are more likely to engage in search for this particular product than attempting to identify all products in the assortment. The anticipated and incurred costs of this matching process will probably differ from the identification costs that our research has examined. Perhaps, item-level diagnosticity, in which a product "pops out" in the display, is preferred, as future research may explore.

Furthermore, extrinsic attributes may not only be important for the identification of alternatives that are provided in a display, as we have shown, but may also influence the generation of alternatives when these are not specified, as future research may examine. The generation of alternatives is determined by the salience of the alternatives in the context and their accessibility in memory (Posavac, Sanbonmatsu, & Fazio, 1997), and extrinsic attributes may affect both.

In conclusion, this research sheds new light on assortment evaluation by showing that the utility of assortments can be improved without improving the utility of any of the individual products in the assortment, namely by reducing the costs it takes to identify the various options in the assortment. It revealed how the diagnosticity of extrinsic attributes is the source of these reduced identification costs and improved assortment evaluation. It demonstrated that item-level diagnosticity for the full product can backfire, namely when assortments are complex, in which case attribute-level diagnosticity may be preferable. In this way, this research demonstrates the importance of the costs to identify the options in the assortment and how these can be managed for improved consumer welfare and marketing effectiveness.

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