Categorization and willingness to pay for new products: the role of category cues as value anchors

Abstract

This study focuses on textual category cues and their influence on consumers' willingness to pay for new products. It examines whether an anchoring effect occurs when consumers are provided with textual category cues that refer consumers towards a particular product category. This article argues that consumers' willingness to pay for a product under consideration will tend towards the average price of products in the category in which it is positioned. This average price acts as a reference point that influences consumers' willingness to pay. We hypothesize that the more innovative the product is, the less certain the consumer is about its properties. Therefore, the proposed anchoring mechanism will influence consumers' willingness to pay strongly when the product is radically innovative, while the willingness to pay for an incrementally innovative product will not be affected by the proposed anchoring mechanism. Our hypotheses are tested by means of four experiments using online auctions in which consumers actually pay when they win an auction. The findings provide support for the role of category cues as 'semantic anchors'. More specifically, giving the cues of categories in which the products had higher average monetary value compared to cues of categories in which the average monetary value was lower, resulted in an increased consumers' willingness to pay for radically new products. As expected, this effect was not found in the case of incrementally new products. The article concludes with theoretical and managerial implications.

Keywords: Category cues, Willingness to pay, Anchoring effect

Practitioner Points

- Textual category cues such as category labels not only guide consumers in their understanding of the product but also influence their willingness to pay when products are radically new.
- In the case of incrementally new products, providing category cues, as semantic anchors, will not influence consumers' willingness to pay.
- When selecting the category cue to use for positioning a radically new product, one of the key selection factors should be the average value of the products in the different categories in which the product could potentially be positioned.

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Introduction

Successful new product introduction is dependent on consumers' understanding of the value the new product brings (e.g. Gregan-Paxton et al, 2002; Gourville, 2006). When the product is very new, consumers might be less able to make sense of the product (Rindova, and Petkova, 2007), which in turn may result in a negative effect on consumers' product evaluation (e.g., Gregan-Paxton et al., 2002; Hoeffler, 2003; Moreau, Lehmann and Markman, 2001). An example of a very innovative product that was difficult to understand and classify for consumers is the Segway. When introduced on the market in 2001, this two-wheeled, self-balancing electric vehicle was radically new, combining elements from a walking scooter, bicycle and unicycle. Expectations for this new product were high, being presented as a means that would radically change personal transportation (Heilemann, 2001). In the end, the Segway did not live up to expectations, being adopted only in small niche markets such as guided tours and law enforcement. While there are more factors that explain why the Segway did not live up to expectations, consumers' challenge to classify this product and determine the value of this new method of personal transportation was certainly one of them (e.g., Sørensen, 2013).

Consumers learn about a new product by transferring knowledge from a familiar domain to a new product (Moreau, Lehmann and Markman, 2001; Mugge and Dahl, 2013; Goode, Dahl and Moreau, 2013). To help in this learning process, consumers can be provided with cues that give information about the categorical membership of the product. Consumers can then transfer knowledge from the existing category to the new product and form judgments about the value of the new product relative to the other products in the product category (e.g., Talke et al. 2009; Rindova and Petkova, 2007; Moreau, Markman and Lehmann, 2001). A category cue can be a textual (e.g. brand name, label) or visual (e.g.

product form, color) element that guides consumers in their categorization efforts (Yamauchi and Markman, 2000).

Research suggests that category cues may be particularly effective for radically innovative products (Moreau, Markman and Lehmann, 2001; Mugge and Dahl, 2013). Radically new products require of consumers considerable cognitive efforts to understand the new product, with subsequent negative effects on new product adoption (Gourville, 2006; Rindova, and Petkova, 2007). To reduce these consumer-learning costs, category cues can be used (Mugge and Dahl, 2013; Moreau, Lehmann and Markman, 2001). These category cues may refer the consumer to well-established product categories. However, since radically new products by definition defy straightforward classification (Moreau, Markmann and Lehmann, 2001), organizations may use cues that direct consumers towards a new, emerging category (Grodal, Gotsopoulos and Suarez, 2014; Pontikes 2012). For example, when cars were first introduced on the market, one of the early category labels used for this radically new product was 'horseless carriage'. Although this label did not become the dominant category label, the cues in the label provided information about the functionality and therefore the category of the product (in this case a carriage). Also, the label 'auto-mobile' came into use during the emergence of the category of cars. The word 'auto' in that time referred to an emerging product category, namely a category of products that are automatic. By using word 'auto', cars were positioned in a specific group of new products with - for that time - advanced technology and having relatively high value.

Categorization research has focused in particular on how category cues influence consumer's learning costs, with subsequent effects on consumers' product evaluation. There is some research on the influence of category cues on consumers' inferences about product quality (e.g., Moreau, Markmann and Lehman, 2001), but there is little empirical work that

has examined whether consumers are actually willing to pay more depending on how the product is labeled. This research is designed to address this gap.

This article suggests and finds evidence that category cues can elicit an ‘anchoring effect’ that affects consumers’ willingness to pay for really new products. This ‘anchoring’ mechanism, introduced by Tversky and Kahneman (1974), assumes that when people are uncertain about the value of an object, they will rely on an ‘anchor’ when making a value judgement. Consumers use this anchor to adjust their value judgment by moving away (up or down) from that anchor until they reach a value that is acceptable for them. Typically, the anchoring effect is elicited by providing a number. For example, a reference price when auctioning off a house. However, this article examines whether textual category cues can allow ‘semantic anchoring’ to take place. That is, the textual category cue will lead to the observed product being anchored to the category that is cued and, as far as expected monetary value is concerned, to the average price of products in that category. For example, by placing the Segway within the category of ‘walking scooters’, a consumer is likely to use the average price of walking scooters as a baseline to determine an ‘acceptable price’ for the Segway, whereas when the product is placed within the category of ‘electric bikes’, the consumer is likely to use the average price of electric bikes as a baseline. Although the presence of an anchoring effect has been identified in research on, for example, reference pricing (e.g., Nunes and Boatwright, 2004; Dholakia and Simonson, 2005), this effect has not yet been studied in the context of category cues.

The first major contribution of this article to extant literature is thus to propose and find evidence that category cues act as semantic anchors that guide consumers in their value perception of a new product. The second major contribution is extending prior research that suggests that category cues have a differential effect depending on the type of innovation involved - more radical or incremental (in particular Mugge and Dahl, 2013). As opposed to

previous research that has used visual category cues, we use textual category cues to demonstrate that the effect of category cues is particularly present in the case of radical innovations. Consumers will have less knowledge and much greater uncertainty about the product features of radical innovations and the value of these features to them. In turn this will make it more likely that they will use the category cue to infer further information associated with the category. The third contribution of this article is to demonstrate the effects of categorization on consumers' actual willingness to pay. Previous research on categorization and consumers' evaluation of new products tend to use hypothetical measures such as consumers' attitudes towards a product (e.g., like/dislike; positive/negative). In this article, the proposed relationships were tested by using online auctions in which consumers placed a bid and had to pay with their own money if they won the auction. This increases the validity of the findings.

In terms of practical implications, this research provides suggestions on how to position new products in the market to enhance monetary value perceptions. Managers can do so by investigating which categories are suitable for positioning the new product and choosing the category, and its relevant category cues, that has products with the highest average selling price.

In the next section of the article, a review is given of relevant literature on category cues and consumer evaluation. On the basis of this review, hypotheses are formulated. This is followed by four studies in which the method is described and the results are presented. A discussion of the theoretical contributions, managerial implications, and future research possibilities rounds off this article.

Theoretical Framework

Categorization and Innovation

Categorization is the process of identifying the similarities among alternatives within the category and identifying the dissimilarities among alternatives across categories (Medin and Schaffer 1978; Rosch and Mervis 1975). Previous research in marketing and management demonstrated that when consumers are not able to easily categorize a product, product evaluation is negatively affected (e.g., Noseworthy and Trudel, 2011; Mugge and Dahl, 2013; Negro, Hannan and Rao, 2010; Hsu, 2006; Meyers-Levy and Tybout, 1989). To reduce this risk, producers can guide consumers in their categorization efforts by providing category cues along with the product.

This article especially focusses on how textual rather than visual category cues affect consumers' evaluation of the product. Yamauchi and Markman (2000) show that in particular textual category cues play a crucial role for consumers to make sense of new products compared to other information such as product features and shape. Successful labels have cues that signal the novelty and distinctiveness of the product but also provide enough clarity about what the product is and does (Grodal et al., 2014).

When producers communicate a category cue for a product, consumers will try to identify similarities between the alternatives in the proposed category and the new product (Yamauchi and Markman 2000). By comparing the new product to products in a category they are already familiar with, consumers try to understand this new product (e.g., Talke et al., 2009; Rindova and Petkova, 2007; Moreau, Markman and Lehmann, 2001). Category cues thus affect the comprehension of the value of the innovation, which in turn enhances new product adoption (Gourville, 2006).

Research suggests that category cues are especially useful if the product is radically new (Mugge and Dahl, 2013; Moreau, Markman and Lehmann, 2001). Radically new products (or really new products) substantially deviate from existing products on the market in terms of design and/or technology and may require significant behavioral changes, offering new

functionality that enables consumers to do things that cannot be done with extant products (Veryzer, 1998; McDermott and O'Conner, 2002; Hoeffler, 2003). Category cues provide consumers direction as to the product category in which the new product can be positioned. Once a product is categorized, consumers can judge how different the product is from the alternatives in that category (Yamauchi and Markman 2000; Goode, Dahl and Moreau, 2013). Goode, Dahl and Moreau (2013), for example, demonstrated that only when consumers were able to establish a product's category membership, they could assess and appreciate the novelty of a product's design.

As noted above, consumers use their prior knowledge of a category to understand a product that is positioned in that specific category. The more knowledge consumers have, the better they are able to compare the product with the prototypes of a category. Incremental new products— in contrast to radically new products— are products that provide minor improvements or modifications to existing products. This type of products tends to reveal relatively easily their benefits compared to extant products (Goode, Dahl and Moreau, 2013). Thus, for incrementally innovative products, category cues are less necessary or even superfluous to assist consumers in their (monetary) value assessment (Goode, Dahl and Moreau, 2013; Mugge and Dahl, 2013).

Category Cues and Anchoring

As discussed above, category cues help consumers in determining what it is and what it does. Prior research also suggests that category cues can influence consumers' performance

expectations. Moreau, Markman and Lehman (2001), for example, find that when a digital camera is classified as a camera, consumers' quality expectations are different than when a digital camera is classified as a scanner. In a similar vein, in this article it is proposed that category cues provide consumers an *anchor* regarding the plausible monetary value of this product. More specific, this article proposes that consumers' judgment of plausible product value will be inferred from the (average) price of products in the category into which the new product is categorized.

Tversky and Kahneman (1974) were one of the first to discuss the anchoring heuristic. This heuristic assumes that, under uncertainty, people rely strongly on the provided piece of information, that is, an 'anchor', when making judgments of the value of an object. People use this anchor to adjust their judgment by moving away (up or down) from that anchor until they reach a value they find acceptable. During the auction of a house, for example, a seller sets a reference price, normally relatively high, to influence the value perception of the buyer. An anchor is particularly effective in influencing consumers' monetary value perceptions when consumers do not yet have a specific value in mind. This seems to be particularly the case for radically new products for which consumers will not yet have an internally stored reference price (i.e., memory-based price standard; see, e.g., Shirai, 2003; Winer, 2005).

Previous marketing research demonstrated the importance of the anchoring effect in hypothetical buying settings (e.g., Adaval and Wyer, 2011; Simonson and Drolet, 2004) and non-hypothetical field settings (Nunes and Boatwright, 2004; Jung, Perfecto, and Nelson, 2016). An example is the research of Simonson and Drolet (2004) who demonstrate that anchoring is not only present in consumers' judgments about their willingness to pay (when they buy something), but also when determining their willingness to accept (when they sell something, for example, second hand items). Prior research focused in particular on the effect of mentioning an actual numerical value as an anchor on consumers' evaluation of a product.

However, anchors influencing consumer judgment on (monetary) value do not necessarily have to be expressed numerically but can also be expressed textually (Mussweiler and Strack 2001; Chernev, 2011). For example, Chernev (2011) shows that semantic anchors (related to the degree of healthiness, such as 'light' and 'fat-free' versus 'rich' and 'creamy') affect consumers' judgment about the number of calories in food items.

This study investigates whether category cues act as *semantic* anchors, influencing consumers' monetary value assessments of new products. As discussed above, category cues refer consumers to a specific product category. Consumers will use their knowledge of the alternatives in this product category to establish a reference price range that will influence how much they are willing to pay for the new product (Hofstetter et al., 2013). For example, if an innovative means of personal transport is positioned as an 'electric bike', consumers will use their knowledge of prices for electric bikes as a point of reference. Thus, it is hypothesized that in the case of radically innovative products the category cue will allow value to be anchored in that category and the average price of products in that category will become the reference point. However, in the case of incrementally innovative products, consumers are much more likely to be aware of similar extant products and their average price and therefore will not need the category to construct such a reference point. It is thus expected that category cues will not act as semantic anchors for this type of products. Based on the discussion above, the following is hypothesized:

H1: Compared to providing a category cue from a low-valued category, providing a category cue from a high-valued category will enhance consumers' willingness to pay for a radically new product (H1a). The type of category cue (i.e. low-valued versus

high-valued) does not impact consumers' willingness to pay for an incrementally new product (H1b).

Method

General Procedure and Participants

In all four studies, an online experimental auction is conducted using a platform (named Veylinx, www.veylinx.com) that combines a sealed bid second price auction – also called a Vickrey auction (Vickrey, 1961) – with a short survey. In the online auction respondents were shown one of the two advertisements that were developed – each advertisement being allocated to respondents in an ad random fashion. The respondents then placed one sealed bid that others cannot see. Subsequently, they answered a few questions.

The highest bidder wins the auction but pays an amount that is equal to the bid of the second highest bidder. It should be emphasized that the auctions were not conducted in a laboratory but took place in an online field setting. In addition to that, the auctions were real, which means that consumers received an invoice and had to pay for the product if their bid was the winning one. When consumers are asked to express their willingness to pay in a setting in which the answer has real consequences (e.g. in terms of actually having to pay), this answer may better reflect actual buyer behavior than when asking consumers to express their opinion. When asking about 'opinions' or hypothetical willingness to pay, respondents are less incentivized to show actual behavior and thus it is more difficult to predict actual buying behavior (e.g. List and Gallet, 2001; Lusk, Alexander and Rousu, 2007; Hofstetter, et al., 2013).

Panel members were recruited by acquiring them from two existing panel agencies. The members of those agencies were asked to sign up at a website in return for a number of points

that they collect at those panel agencies. Those points can be exchanged for products or coupons. Once those members signed up at the website, they become part of the panel. The panel members did not receive any incentive (e.g. points or money) for their participation in the actual auctions. In total, over 5000 panel members have been recruited of which around 1800 became 'active' (i.e. respondents who have participated in at least one auction in the last 30 days). In the three studies, only 'active' panel members were invited for two reasons. Firstly, for the active panel members demographic data (such as gender, age, and education) were already gathered. Secondly, the active panel members are familiar with this type of auction. The average age of the active panel members is 42 years and on average 51% is female. 62% indicated to be highly educated (i.e. Bachelor degree or higher).

Respondents were invited by email. By clicking on the link in the invitation email, respondents were directed to the auction website. Respondents were able to participate in the auction after clicking the link within 12 hours. Before showing the advertisement, respondents had to agree that: 1) they could place only one bid, 2) their bid is legally binding, 3) their bid is including tax and shipping cost, 4) winners need to pay within 48 hours after receiving the invoice. The respondents were furthermore informed that within one week after their payment the winner would receive the product. In addition, the closing date and time of the auction was mentioned. By clicking 'continue' they agreed to the rules and the randomly assigned advertisement was shown. Respondents could place their bid in a field below the advertisement. After confirming their bid, they were asked to fill out the survey questions. They round off their participation by clicking 'Complete participation'. Upon closing the auction, the respondents received an email with the outcome of the auction. The email to the winner mentioned his/her own bid amount and the amount he/she had to pay. Also, the payment details were provided. The respondents who did not win the auction received an email that reported the amount they had bid and the amount the winner had to pay.

Study 1

This study examined whether category cues that referred to a category of products with a higher average monetary value compared to one with a lower average monetary value, had a positive effect on consumers' willingness to pay for a radically new product (H1a).

Study Design, Respondents, Stimuli, and Measures

For this experiment, a total of 800 active respondents were invited from the consumer panel described above. A total of 226 respondents actually participated (response rate of 28.25%) by placing a bid and answering all the survey questions. The average age of the participating respondents in this first experiment was 44 years and 47% was female.

In this first study, a radically new product was auctioned off containing an innovative technology. The chosen product was a hand-held device that can identify the nutrients in food by means of a spectrometer. Upon scanning food with the spectrometer, the device sends the data via a smartphone to a database. Subsequently, via an app on a smartphone, results are shown related to, for example, calories, fats, proteins, and carbohydrates.

Two advertisements were created that differed in terms of the category cues used. The advertisements used in this experiment are included in Appendix 1. The first advertisement included a category cue that suggested that the product was a 'calorie counter' and the second advertisement suggested that the product was a 'smart food analyzer'. The latter category was the higher-valued category and referred to the growing group of 'smart products', such as smart watches and smart phones, that offer IT-supported connectivity (Rijsdijk and Hultink, 2009; Porter and Heppelmann, 2014).

Pre-tests were performed to examine whether the chosen category cues indeed referred to categories that differed in terms of the value of the products in those categories, and to test whether the chosen product was perceived as radically new. A first pre-test was performed

among a group of 12 innovation experts. This group consisted of six investors that invest in high-tech startups and six experts who work as innovation consultants. The experts were shown a visual image of the actual product and asked them to indicate on a 5-point scale ($1 = \text{fully disagree}$, $5 = \text{fully agree}$) whether this product was radically new ($m = 4.75$), and whether they found it difficult to categorize the product in an existing category ($m = 4.42$). In addition, the experts were asked to indicate which of the provided category cues were associated with a relatively high-value, emerging product category or with a mature, low-value product category. Eleven out of twelve experts agreed with us on which category cue was associated with a high-value, emerging category and which one with a mature, low-value category cue. A pre-test was also performed among 43 consumers. To test the value perceptions that consumers have of the two categories, the respondents were asked to state their perception about the average price (in Euros) of products in the two provided categories (i.e. calorie counter ($m = 18.14$ Euros) and smart food analyzer ($m = 38.91$ Euros)). A t -test indeed showed that the respondents perceived the category smart food analyzer of higher value compared to the category calorie counter ($t = -5.30$, $p < 0.01$). In addition, the respondents were shown a visual image of the actual product and asked them to indicate how new they perceived the product to be, on a 5-point scale ($1 = \text{not new at all}$, $5 = \text{very new}$; $m = 4.56$), and whether they found it difficult to categorize the product in an existing category ($m = 3.58$). To summarize, the results of this pre-tests show that the product is perceived as really new and that the used categories differ in terms of perceived value of the products in those categories

In the experimental auction, the two advertisements, using either the category cue ‘calorie counter’ or ‘smart food analyzer’, were randomly assigned to the respondents. To measure respondents’ *willingness to pay* they were asked to place a bid during the real second price auction (see above).

Age, gender, whether or not the respondent was a student, consumers' innovativeness, and consumers' newness perception were used as control variables. Age and gender were used as controls because prior research suggests that younger people tend to appreciate new products more (De Bont et al, 1992; Schmidt, Zayer, and Calantone, 2012; Celhay and Trinquécoste, 2015) and that women may be potentially more open to new products (e.g., Moss and Colman, 2001; Moss, Gunn, and Heller, 2006; Schmidt, Zayer, and Calantone, 2012). Whether or not the respondent was a student was used as a control variable because students, in general, have less money to spend, which might affect their willingness to pay for the product. Respondents' gender, age, and whether or not they were students were known beforehand because all of them participated in at least one auction before participating in this auction. Consumers' innovativeness was used as a control variable because prior research suggests that consumers differ in the degree to which they appreciate and adopt new products (e.g. Foxall, 1995; Manning, Bearden, and Madden, 1995; Midgley and Dowling, 1993; Celhay and Trinquécoste, 2015). Consumers' innovativeness was measured using a 4 item 5-point (1 = *Strongly disagree*, 5 = *Strongly agree*) scale ($\alpha = .78$). This scale was adapted from Roehrich (1994, 2004). The scale was originally published in French in Roehrich (1994). For this research, items were adapted from Roehrich (2004) – where the scale was translated in Dutch since the survey was administered in The Netherlands. The respondents were provided with statements to assess the extent to which they are attracted to innovative products (statements: “I am interested in innovative products”, “I like to buy new and innovative products”, “I am usually among of the first to try new products”, and “In general, I am more aware of new products than the people around me”). Consumers' newness perception was used as control variable because prior research suggests that the degree to which consumers perceive a product as new can affect their evaluation of this product (e.g., Hekkert et al, 2003; Micheli and Gemser, 2016; Schoormans and Robben, 1997; Talke et al., 2009). However, it is

unclear to what extent consumers value newness. There is, for example, research suggesting that consumers value technological and design newness (e.g., Talke et al, 2009; Micheli and Gemser, 2016). On the other hand, there is also research in the field of product and packaging design suggesting that consumers prefer design that is innovative, yet familiar (e.g., Hekkert et al, 2003; Schoormans and Robben, 1997) or actually may prefer more familiar design (Celhay and Trinquécoste, 2015). Respondents’ *newness perception* was measured using a 5-point scale which asked respondents to indicate whether they thought the product was new/not new, innovative/not innovative, and original/not original ($\alpha = .88$; adapted from Goode, Dahl and Moreau, 2013).

Table 1 shows the definitions and means of the variables in this study. The ANCOVA analysis only considered the respondents who actually decided to participate in the auction (i.e., a bid higher than zero) (Lusk et al., 2001; Noussair, Robin, and Ruffieux, 2002). The bids were normalized by taking the square root.

Insert Table 1 about here

Results

The results of the ANCOVA analysis show that of the control variables, both consumer innovativeness significantly affects consumers’ willingness to pay ($F(1, 224) = 15.162, p < .01$) as well as consumers’ newness perception ($F(1, 224) = 36.457, p < .01$). In addition, the hypothesized effect of providing a category cue from a higher-value category compared to a

category cue from a lower-value category on consumers' willingness to pay shows a positive and significant effect ($F(1, 224) = 4.170, p < .05$) for the radically new product.

Thus, the results of this study suggest that, in support of H1a, providing a category cue from a higher-value category (i.e. 'smart food analyzer') enhances consumers' willingness to pay for a radically new product, compared to a category cue from a lower-value category (i.e. 'calorie counter').

Study 2

In the first experiment, a radically new product was used that was 'smart' in terms of embedded IT that supports 'connectivity' (e.g. data exchange) between the product and its environment (Porter and Heppelmann, 2014; Rijdsdijk and Hultink, 2009). The product was similar to other products that normally would be labeled smart, such as smart phones or smart watches. In the second experiment, it was tested whether the findings could be replicated if a radically new product was labeled as the 'smart' version of a category, while the new functionality offered was not related to technology-supported connectivity. In other words, this way the boundaries of the use of the category cue were tested by examining whether using the category cue 'smart' still elicits an anchoring effect, influencing consumers value perceptions, while the product was not 'smart' in terms of offering IT-supported connectivity – even though still being radically new.

Study Design, Respondents, Stimuli, and Measures

This study follows the same experimental setup as used in Study 1, to test H1a (on types of category cues that refer to either a higher or a lower value category having a differential effect on consumers' willingness to pay for a radically new product).

In total 500 active respondents from the consumer panel described above were randomly invited. A total of 160 respondents actually participated (response rate of 32%) by placing a bid and answering all the survey questions. The average age of the participating respondents in this experiment was 42 years and 49% was female.

In this second study, a product that was radically new in terms of functionality and aesthetics, but had no IT-supported connectivity, was auctioned off. The chosen product was a combination of a pillow and a nightcap that can be fully pulled over people's head so that they can isolate themselves from the outside world and to get some sleep. In addition, the holes on top of the nightcap allows people to put their hands in the cap in order to sleep on their arms in case they want to sleep behind their desk.

In the experimental auction, two advertisements were tested that were randomly assigned to the respondents. The first advertisement included 'nightcap' as a category cue, which was used to refer to a category that is mature and which consists of products of lower value compared to the category that will be discussed next. In the second advertisement, the textual category label 'smart isolator' was used to refer to a category that is emerging and which consists of products of higher value compared to the category 'nightcap'. The advertisements used in this experiment are included in Appendix 2.

A pre-test was performed with the same group of 12 innovation experts as used in Study 1. The experts indicated that this product was radically new ($m = 4.25$) and found the product difficult to categorize in an existing category ($m = 4.33$). All twelve experts indicated that the label 'smart isolator' was associated with a relatively new, high-value category, and that 'nightcap' was associated with a relatively mature, low-value product. A similar pre-test among consumers as in Study 1 ($N = 37$) was performed. A t -test showed that the respondents perceived the category smart isolator ($m = 53.98$ Euros) as higher value compared to the category nightcap ($m = 8.30$ Euros) ($t = -4.04$ $p < 0.01$). The respondents perceived the

product to be new ($m = 4.11$), and they found it difficult to categorize the product in an existing category ($m = 4.03$). To summarize, the results of this pre-test show that the product is perceived as really new and that the used categories differ in terms of value.

The same control variables as in Study 1 were used and they were measured in the same way (newness perception, $\alpha = .86$; consumer innovativeness, $\alpha = .74$). Table 2 shows the definitions and means of all variables included.

Insert Table 2 about here

Results

The results of the ANCOVA analysis show that of the control variables, only consumer innovativeness significantly affected consumers' willingness to pay ($F(1, 158) = 9.65, p < .01$). The hypothesized effect of providing a category cue from a high-value category compared to a category cue from a low-value category on consumers' willingness to pay showed a positive and significant effect ($F(1, 158) = 5.55, p < .05$) for the radically new product.

Thus, the results of Study 2 indicate that, in support of H1a, the use of a higher-value category (smart isolator) resulted in higher willingness to pay – compared to a lower-value category cue (nightcap). In this experiment, the product was labeled to be 'smart' while the product did not contain any technology that would allow data to be exchanged between the object and its environment, as is characteristic of other products that are normally labeled 'smart'. Still, a positive effect of the category cue on consumers' willingness to pay was found. These findings suggest that, when a product category is relatively emergent, this may

provide the organization some leeway to position a new product in this category since category boundaries are still rather fluid.

Study 3

In Study 1 and Study 2 radically new products were used because it was expected that guiding consumers in their categorization efforts and understanding of the product is especially important when consumers have little prior knowledge of the products. Incrementally innovative products are relatively easy to categorize and understand for consumers and thus category cues will not play any significant role in determining willingness to pay (H1b). To test this, in this third experiment, an incrementally innovative product was auctioned off. In addition, for this product, the word 'smart' was used in the category that refers to a high-value category. This allowed, once more, to test whether the category cue 'smart' would work as an anchor, influencing consumers value perceptions, while the product was not 'smart' in terms of offering IT-supported connectivity, nor radically new in terms of functionality or aesthetics.

Study Design, Respondents, Stimuli, and Measures

For this experiment, in total 800 active respondents were invited. A total of 151 respondents actually participated (response rate of 18.86%) by placing a bid and answering all the survey questions. The average age of the participating respondents in this experiment was 44 years and 45% was female. The procedure of this study was the same as that of Studies 1 and 2.

In this study, a set of three plastic cutting boards were auctioned off. Each cutting board had a different symbol – that can be used as index – allowing the user to quickly see if the cutting board is used for cutting meat, fish, or vegetables.

In the experimental auction, two advertisements that were randomly assigned to the respondents were tested. In the first advertisement, a category cue of a lower-value category, namely ‘plastic cutting boards’, was provided. For the higher-value category, the word ‘smart’ – in line with the other experiments – was used. The word smart was combined with the index system of the cutting boards, which resulted in the category cue ‘smart index cutting boards’. The advertisements used in this experiment are included in Appendix 3.

A pre-test was performed with the same group of 12 innovation experts used in Study 1 and Study 2. The experts indicated that this product was not radically new ($m = 2.08$) and found the product easy to categorize in an existing category ($m = 1.83$). In addition, ten out of the twelve experts indicated that the label ‘smart index cutting board’ was associated with an emerging, relatively high-value category, and that ‘plastic cutting boards’ was associated with a mature, relatively low-value product.

Similar to Studies 1 and 2, a pre-test among consumers was performed ($N = 35$). A t -test showed that consumers perceived the category smart index cutting boards ($m = 22.50$) of higher value compared to the category plastic cutting boards ($m = 10.68$) ($t = -3.50$ $p < 0.01$). Consumers perceived the product to be not new ($m = 2.17$), and they found it not difficult to categorize the product in an existing category ($m = 1.40$). To summarize, the results of these pre-tests show that the product is not perceived as really new and that the used categories differ in terms of average product value.

The same control variables as in Study 1 and Study 2 were used and they were measured in the same way (newness perception, $\alpha = .84$; consumer innovativeness, $\alpha = .85$).

Table 3 shows the definitions and means of all variables included.

Insert Table 3 about here

Results

The results of the ANCOVA analysis show that of the control variables both age ($F(1, 149) = 4.40, p < .05$) as well as newness perception ($F(1, 149) = 7.86, p < .01$) have a significant effect on willingness to pay. Furthermore, the results of the ANCOVA analysis did not reveal a significant effect of providing a category cue on consumers' willingness to pay for an incrementally new product ($F(1, 149) = 0.30, p = .58$).

Thus, the results of this third study suggest that in the case of an incrementally new product providing category cues does not have a significant effect on the monetary value assessment of consumers. Therefore, support is found for Hypothesis 1b. If a product is easy to understand, providing this kind of additional information has no effect on consumer behavior compared to products that are not easy to understand. These findings replicate the findings of Mugge and Dahl (2013) who found similar results examining consumers' attitudes to new products and studying product design as a visual category cue.

Study 4

In the previous experiments, the cue 'smart' was chosen to refer to a relatively new product category with a higher value compared to a 'non-smart' category. To further test the robustness of the findings, this fourth study will refrain from using smart as a category cue. Instead, this final experiment will test whether category cues of two mature categories that differ in terms of the average price of the products in those categories, affect consumers' willingness to pay. Two mature categories will be used to make sure that consumers will know enough extant products in the two categories in order to estimate an average price, which, as argued, acts as an anchor.

Study Design, Respondents, Stimuli, and Measures

This study follows the same experimental setup as used in Study 1, 2 and 3. In total 800 active respondents were randomly invited from the consumer panel described above. A total of 255 respondents actually participated (response rate of 32%) by placing a bid and answering all the survey questions. The average age of the participating respondents in this experiment was 45 years and 51% was female.

In this study, a product that was radically new in terms of the combined functionality was auctioned off. The chosen product was a combination of a floor wiper and a vacuum cleaner. One side of the device is a floor wiper and the other side is a vacuum cleaner. As this product is not yet available on the market, it was decided to mention that the winner of the auction had to pay for the product, and actually receive it, only when it enters the market within three months after the auction. This way, respondents still had an incentive to bid truthfully.

In the experimental auction, two advertisements were tested that were randomly assigned to the respondents. The first advertisement included 'floor wiper' as a category cue, which was used to refer to a category that consists of products of lower value compared to the category that will be discussed next. In the second advertisement, the textual category label 'vacuum cleaner' was used to refer to a category that consists of products of higher value compared to the category 'floor wiper'. The advertisements used in this experiment are included in Appendix 4.

A pre-test with the same group of 12 innovation experts used in Study 1, 2 and 3 was performed. The experts indicated that this product was radically new ($m = 4.17$) and found the product difficult to categorize in an existing category ($m = 3.92$). All twelve experts indicated that the label 'vacuum cleaner' was associated with a higher-value category, and that 'floor wiper' was associated with a lower-value product. A pre-test similar to the ones in Studies 1, 2 and 3 was performed among consumers ($N = 31$). A t -test showed that respondents

perceived the category vacuum cleaner ($m = 121.81$ Euros) as of higher value compared to the category floor wiper ($m = 18.15$ Euros) ($t = -9.36$ $p < 0.01$). Respondents perceived the product to be new ($m = 4.06$), and they found it somewhat difficult to categorize the product in an existing category ($m = 3.29$). To summarize, the results of these pre-tests show that the product is perceived as really new and that the used categories differ in terms of value.

The same control variables as in Study 1 were used and they were measured in the same way (newness perception, $a = .91$; consumer innovativeness, $a = .71$). Table 4 shows the definitions and means of all variables included.

Insert Table 4 about here

Results

The results of the ANCOVA analysis show that of the control variables, only consumers' newness perception significantly affected consumers' willingness to pay ($F(1, 253) = 16.47$, $p < .01$). The hypothesized effect of providing a category cue from a higher-value category compared to a category cue from a lower-value category on consumers' willingness to pay showed a positive and significant effect ($F(1, 253) = 6.11$, $p < .05$) for the radically new product.

Thus, in support of H1a, the use of a higher-value category (vacuum cleaner) resulted in higher willingness to pay – compared to a lower-value category cue (floor wiper). These findings support the value anchoring effect of category cues on radically new products that was found in the previous studies, now using two mature product categories.

Discussion

Summary

The adoption rate of new products tends to be relatively low, particularly when products are radically different from existing products (Gourville, 2006). As a result, the way consumers evaluate these type of products has received increasing interest from researchers. Prior research has suggested that the use of category cues that reduce consumers' learning costs may help in consumers' efforts in ascribing value to these new products. This article further examined how category cues influence consumer value assessments. More specifically, it proposes that category cues can act as semantic anchors: the average value of the alternatives in the product category the cue refers to will influence consumers' judgment of the monetary value of the radically new product. It also proposes that the category cue will not act as a semantic anchor for incrementally innovate products since consumers will already have a well-developed, memory-based 'price standard' for this type of products.

To test the hypotheses, four experiments were conducted using online auctions in which consumers actually pay if they win an auction. It was found that consumers' willingness to pay is dependent on the type of category cue, as was hypothesized. Consumers are willing to pay significantly more if a cue positions the new product in a category that contains products with on average a higher price compared to cues that position the product in a category that contains products with on average a lower price. Furthermore, when auctioning off an incrementally new product, no significant effect of category cues on consumers' willingness to pay was found, as hypothesized.

Theoretical contributions

This study extends prior categorization literature in three significant ways. Firstly, this study suggests a role for category cues that thus far has not yet been fully recognized in extant categorization literature. In prior research on consumers' evaluation of radically new

products, the role of category cues to reduce consumers' learning costs has been emphasized. As radically new products are by definition substantially different from extant products, consumers need to engage in considerable cognitive efforts to understand the benefits of these products. This has a negative effect on the adoption of these products. This article suggested that category cues can also play a different role, next to reducing learning costs: category cues can act as semantic anchors. More specifically, in this article it was proposed and demonstrated that the average value of the alternatives in the product category the cue refers to, can influence consumers' judgment of the monetary value of the radically new product.

Secondly, this article contributes to the literature by demonstrating that the effects of textual category cues is different depending on the type of innovation involved - more radical or incremental. More specifically, the results of this article suggest that the use of category cues may not be effective in the case of incrementally innovative products. While prior research demonstrated this in the context of visual category cues (in particular Mugge and Dahl, 2013), this article demonstrates the same results but now with textual category cues.

Thirdly, this article contributes to extant literature on categorization by demonstrating the effect of category cues on consumers' actual willingness to pay. Prior studies on categorization and consumer evaluation predominantly used attitudinal measures to measure the effect of category cues on product evaluation (e.g., Mugge and Dahl, 2013; Goode, Dahl and Moreau, 2012; Moreau, Markman and Lehmann, 2001) and/or asked consumers about their intent to use the product (e.g. Moreau, Markman and Lehmann, 2001). In this article, the proposed relationships were tested by means of online auctions in which consumers actually pay if they win an auction. Since consumers placed a bid and had to pay with their own money if they win, they were incentivized to be more honest compared to, for example, filling in survey questions that asked about their attitude toward a product (e.g., like/dislike; positive/negative). This increases the validity of the findings.

Managerial implications

The findings have important implications for companies that want to introduce new products into the market. First, the results suggest that when organizations introduce radically new products on the market, the use of textual category cues will help to ensure that consumers attribute sufficient (monetary) value to these products. The results also suggest that the use of textual category cues may not be effective in the case of incrementally innovative products.

Second, the results give insight in the type of category cue that organizations may want to use when introducing radically new products on the market. Since radically new products are by definition difficult to categorize, organizations have some leeway in the type of category cue they can use to position such products. While research on consumer learning costs suggest that organizations may want to position radically new products in a product category familiar to consumers, there may also be benefits to take into account the average price of the products in the product categories in which the new product can be positioned. In particular, if the products in the different categories differ in terms of the average price. As the results show, consumers are willing to pay more if the new product is positioned in a 'higher-value' versus 'lower-value' product category. Overall, based on the results it is recommended that organizations of radically new products use category cues to enhance product adoption. When choosing a category cue, they need to take into account that consumers' monetary value assessments are inferred from the value of the products in the category in which the radically new product is categorized.

Limitations and future research

This study only tested the influence of textual category cues on willingness to pay for innovative products. As demonstrated by Yamauchi and Markman (2001), textual cues are

particularly effective for consumers to make sense of new products, compared to, for example, product features or product form. Still it would be interesting to examine how visual category cues, or even a combination of textual and visual category cues have an effect on consumer's willingness to pay, in particular as prior research suggests visual category cues do influence consumers' attitude towards new products (Mugge and Dahl, 2013; Radford and Bloch, 2011).

Future research could also investigate more in depth the type of textual category cues that are most effective for enhancing product evaluation. Grodal et al. (2014) discussed that cues can be created through compounding, derivation, or completely anew. Compounding means that a category cue is created by means of combining two or more words (e.g. smartphone). Derivation is the transformation of an existing word (e.g. computer is derived from to compute). Completely new cues have no link with an existing word or category. It would be interesting to see the effects of these different types of category cues on consumers' willingness to pay.

Another, related, avenue for future research would be to conduct a semiotic analysis of textual category cues, as this would provide insight into the denoted and connoted meanings associated with these cues. This, in turn, would enhance the understanding of what a change in a textual category cue implies for the consumer in terms of product value. For example, the word 'smart', as used in three of the experiments, denotes a product's functionality (offering IT-supported connectivity) but may also connote 'modernity' or 'trendiness'. Indeed, due to this type of connotations, the term smart seems currently (over) used in all different kinds of contexts, even for products that do not offer IT-supported connectivity (as was done in Study 2).

Previous research suggest that consumers may be highly influenced by each other or by third parties when determining the value of a product, in particular in the case a product is

radically new (e.g., Wijnberg and Gemser, 2000; Wijnberg, 2011; Micheli and Gemser, 2016). These social influences were not taken into account but future research might do so, for example, by adding quotes from reputed experts in the advertisements.

This study used online auctions to assess consumers' willingness to pay for new products. The auctions were designed in such a way that consumers who won the auction actually had to pay for the product. While this method increased the validity of the findings, it also put some restrictions on what could be manipulated in the experiments. More specific, the design of the auction was such that respondents first had to provide the price they were willing to pay for the product and then they had to fill in a short questionnaire to assess their perceptions on the newness of the product and their appreciation for innovative products in general. However, the monetary value they provided for the object could have influenced the answers given to the survey questions. To control for such a 'halo-effect', it was, however, not possible to reverse the order for a subset of respondents because the auction system did not allow such changes.

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Table 1. Study 1, variable definitions and summary statistics

Variable	Definition	Treatment means	
		Calorie counter (N = 116)	Smart food analyzer (N = 110)
Willingness to pay	The bid amount in Euro's	12.97 (12.43)	19.09 (20.65)
Newness perception	Newness of the product as perceived by the respondent	4.32 (0.69)	4.39 (0.63)
Age	Age of respondents in years	45.22 (14.59)	39.62 (13.86)
Gender	0 if male; 1 if female	0.55 (0.50)	0.41 (0.49)
Student	0 if no; 1 if yes	0.13 (0.34)	0.25 (0.43)
Consumer innovativeness	Extent to which consumers are attracted to innovative products	3.24 (0.88)	3.26 (0.79)

Note: standard deviations in parentheses.

Table 2. Study 2, variable definitions and summary statistics

Variable	Definition	Treatment means	
		Nightcap (N = 83)	Smart isolator (N = 77)
Willingness to pay	The bid amount in Euro's	6.07 (5.63)	8.17 (7.77)
Newness perception	Newness of the product as perceived by the respondent	4.40 (0.87)	4.02 (1.08)
Age	Age of respondents in years	43.96 (14.10)	39.95 (13.52)
Gender	0 if male; 1 if female	0.47 (0.50)	0.52 (0.50)
Student	0 if no; 1 if yes	0.12 (0.33)	0.21 (0.41)
Consumer innovativeness	Extent to which consumers are attracted to innovative products	3.80 (0.88)	3.79 (0.85)

Note: standard deviations in parentheses.

Table 3. Study 3, variable definitions and summary statistics

Variable	Definition	Treatment means	
		Plastic cutting boards (N = 70)	Smart index cutting boards (N = 81)
Willingness to pay	The bid amount in Euro's	10.64 (9.94)	10.96 (7.03)
Newness perception	Newness of the product as perceived by the respondent	2.17 (1.03)	2.32 (1.03)
Age	Age of respondents in years	44.07 (15.01)	44.48 (14.71)
Gender	0 if male; 1 if female	0.44 (0.50)	0.46 (0.50)
Student	0 if no; 1 if yes	0.20 (0.40)	0.15 (0.36)
Consumer innovativeness	Extent to which consumers are attracted to innovative products	3.18 (0.87)	3.08 (0.915)

Note: standard deviations in parentheses.

Table 4. Study 4, variable definitions and summary statistics

Variable	Definition	Treatment means	
		Floor wiper (N = 131)	Vacuum cleaner (N = 125)
Willingness to pay	The bid amount in Euro's	20.94 (18.09)	28.91 (25.65)
Newness perception	Newness of the product as perceived by the respondent	3.60 (0.91)	3.74 (0.99)
Age	Age of respondents in years	44.34 (12.86)	44.86 (14.16)
Gender	0 if male; 1 if female	0.54 (0.50)	0.48 (0.50)
Student	0 if no; 1 if yes	0.10 (0.30)	0.21 (0.41)
Consumer innovativeness	Extent to which consumers are attracted to innovative products	3.38 (0.81)	3.35 (0.85)

Note: standard deviations in parentheses.

Appendix 1: stimuli Study 1

Calorie checker

Dit product scant de moleculaire samenstelling van je eten en geeft informatie over de calorieën, voedingsstoffen en andere ingrediënten. Via een app zie je de bevindingen op je smartphone.

Smart food analyzer

Dit product scant de moleculaire samenstelling van je eten en geeft informatie over de calorieën, voedingsstoffen en andere ingrediënten. Via een app zie je de bevindingen op je smartphone.

Translation:

Calorie checker / Smart food analyzer

This product scans the molecular composition of your food and provides information with regards to calories, nutrients and other ingredients. Via the app, you will see the results on your smartphone.

Appendix 2: stimuli Study 2

Translation:

Night cap / Smart isolator

With this nightcap, you can sleep when and wherever you want. Pull the nightcap over your head, put your arms in the holes and retreat yourself completely. Fits everybody and is very soft inside.

Appendix 3: stimuli Study 3

KUNSTSTOF SNIJPLANKEN

Afmetingen: L 34 x B 24 cm
Materiaal: Kunststof
Vaatwasserbestendig
Met index systeem

SMART INDEX SNIJPLANKEN

Afmetingen: L 34 x B 24 cm
Materiaal: Kunststof
Vaatwasserbestendig
Met index systeem

Translation:

Plastic cutting boards / Smart index cutting boards

Measurements: L 34 x B 24 cm

Material: plastic

Dishwasher resistant

With index system

Appendix 4: stimuli Study 4

VLOERWISSER

Dit product heeft aan één kant een stofzuigermond waarmee je de vloer stofvrij maakt. Als je het apparaat omdraait kun je de vloer dweilen. Het water en het losgeweekte vuil worden door de machine weer geabsorbeerd.

STOFZUIGER

Dit product heeft aan één kant een stofzuigermond waarmee je de vloer stofvrij maakt. Als je het apparaat omdraait kun je de vloer dweilen. Het water en het losgeweekte vuil worden door de machine weer geabsorbeerd.

Translation:

Floor wiper / Vacuum cleaner

This product has on one side a vacuum cleaner, which can be used to make the floor dust free. If you turn the device around you can swipe the floor. The water and the loosened dirt are absorbed by the machine again.

Dear Professor Barczak,

We are very grateful that our paper is conditionally accepted for publication in the *Journal of Product Innovation Management*. The comments of both yourself as well as those of the reviewers have helped us to significantly improve our paper. Thank you!

To address the comments as provided to us in your email (dated 26th of July 2017) and in the email as received by the Editorial Office (dated 26th of July 2017), we changed the following in our paper:

1. We improved and extended the abstract;
2. We added practitioner points;
3. We have updated the references and reference list according to the guidelines of the journal;
4. In the introduction Section, we better explain the concepts of 'anchoring effect' and 'semantic anchor';
5. In the Introduction Section, we better explain our theoretical contribution;
6. We have rewritten the subsection 'Theoretical contributions' in the Conclusion Section, also to streamline it better with the adjusted Introduction Section.

With kind regards,

Bram Kuijken

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