How Do We Nudge People to Choose Aesthetically Pleasing Products?

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Abstract

Background People often choose between two competing options: option A (aesthetically superior but functionally inferior) and option F (functionally superior but aesthetically inferior). We hypothesize that people like option A more when it is presented with option F (joint evaluation) than when presented alone (separate evaluation) because people find aesthetic attributes are hard to evaluate. We further hypothesize that this effect holds neither for option F nor among experts.

Methods We briefly reviewed two cases in the Korean automobile industry and then conducted two experiments in China. In the first experiment, we compared preferences about two USB drivers between two evaluation modes. In the second experiments, we compared preferences about two basketball shoes in the joint evaluation between novices and experts.

Results We found from the first experiment that participants increased their preferences for option A in the joint evaluation compared to the separate evaluation. Their preferences for option F did not differ between the two evaluation modes. In the second experiment, only novices preferred option A over option F in the joint evaluation. Experts did not prefer option A over option F.

Conclusions Our findings contribute to the scholarly discussions about form and function. They also provide practical implications to designers and marketers who need to sell aesthetically pleasing products. This work goes beyond design marketing interface to add evaluation mode as an intervention to nudge people to choose aesthetically pleasing products, which has been barely discussed in behavioral economics.

Keywords Aesthetic, Behavioral Economics, Function, Intervention, Knowledge, Marketing, Nudge

This research is based on the thesis written by the first author and revised and supplemented by the other two authors.

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1. Introduction

"Design can be art. Design can be aesthetics." – Paul Rand, logo designer, 1997 "Design is not just what it looks and feels like. Design is how it works." – Steve Jobs, 2003

Although attempting to define design has proven to be a controversial task in itself, and there has been substantial trouble to reach a single, commonly agreed-upon notion of good design, it is widely accepted that well-designed products meet two requirements: they are aesthetically pleasing form and good function (Bloch, 1995; Veryzer & Hutchinson, 1998). Globally known product design awards such as Reddot Design Award, IF (International Forum) Design Award, and IDEA (Industrial Design Excellence Awards) also use form and function as two major judging criteria.

Function has long attracted attention as a primary driver of sales. A general consensus is that people calculate the value of each functional attribute to evaluate and choose a product, though their calculation is often constructed on the spot (Bettman, Luce, & Payne, 1998). In contrast, form has gained relatively less attention (Bloch, 1995). However, extensive research has been conducted within a short time frame and it is now known that form plays a key role in the fate of a product (Creusen & Schoormans, 2005).

Although theorists view form as important as function, it has been found that people often undervalue form while overvalue function. For instance, Chitturi, Raghunathan, and Mahajan (2007) found that when people are provided with two products which have a trade-off relationship between form and function, they place greater weight on function than on form. Therefore, they avoid option A (aesthetically superior but functionally inferior option) and choose option F (functionally superior but aesthetically inferior option).

As such, the purpose of this paper is to propose an intervention to nudge people to like option A more. We aim to propose a novel intervention and, more importantly, experimentally test whether it leads people to choose aesthetically pleasing products. Our quest will benefit styling designers who invest their time and effort into color, material, and finishing of products. In other words, we aim to help people to appreciate styling designers' effort.

Note that interventions are designed to change people's decisions and heavily tested in behavioral economics. In public policy, they are found to be more cost-effective than traditional policy tools such as tax incentives (Benartzi et al., 2017). In marketing, they nudge consumers to choose specific options. Examples include showing the source of design to people (Nishikawa, Schreier, Fuchs, & Ogawa, 2017), forcing people to compare with others or making a promise in advance (Baca-Motes, Brown, Gneezy, Keenan, & Nelson, 2012), or asking people to answer yes/no questions (Putnam-Farr & Riis, 2016). In design, interventions guide designers develop better design outcomes. For instance, empathy helps designers understand people deeply and evaluate concepts accurately (Chung & Joo, 2017; Oh & Joo, 2012, 2015) and persona, method cards, design briefing, and crowd sourcing help designers generate creative ideas (Lee & Joo, 2017; Petersen & Joo, 2013, 2015; So & Joo, 2017). However, no intervention has been been studied to nudge people to buy aesthetically pleasing products. Our basic premise is that form is hard to evaluate independently whereas function is easy to evaluate independently (Hsee, 2000). An attribute is hard to evaluate independently when "the evaluator does not know how good a given value on the attribute is without comparisons" whereas an attribute is easy to evaluate independently when "the evaluator knows how good the value is" (Hsee 1996, pg. 249). Therefore, when option A is presented in isolation (separate evaluation mode), people do not know the value of form and therefore place little weight on form. However, when option A and option F are presented together (joint evaluation mode), people understand the value of form, place more weight on form, and like option A more. Further, we propose that this effect holds only for novices or people who have limited knowledge about function. We suspect experts will not like option A more even in joint evaluation mode (Alba & Hutchinson, 1987).

2. Theoretical background

2. 1. Form vs. function (aesthetic vs. functional)

A product is comprised of form and function. Form is a visual result, as a whole, created by designers who select and put some distinctive elements such as shape, tempo, scale, proportion, materials, reflectiveness, color, ornamentation, and texture (Bloch, 1995). Alternatively, form is viewed as a combination of the whole attributes related to the appearance of a product (Chitturi et al., 2007). In contrast, function is the work a product is designed to do. The functionality of the product is a central tenet by which it is defined and evaluated.

Although form and function are independent, researches are keen to examine the interaction of form and function, especially on the people's behavior and decision-making when they are faced with the conflict between form and function (Alba & Williams, 2013). Specifically, researchers are interested in which option people like or choose between two options: option A (aesthetically superior but functionally inferior) and option F (functionally superior but aesthetically inferior). A recent work shows that people choose option F when functional requirements are met. When the functions between two options are similar, form turns to be a decisive factor (Chitturi et al., 2007).

2. 2. Evaluation mode

Hsee (1996) coined Evaluability Hypothesis in late 1990s. This hypothesis is based on the assumption that people evaluate two options, A and B, both of which have two attributes, a and b, respectively. One attribute is hard-to-evaluate independently and the evaluator does not know how good a given value on the attribute is without comparisons, whereas the other attribute is easy-to-evaluate independently and the evaluator knows how good the value is. When evaluation mode is Separate Evaluation (SE) in which the two options are evaluated in isolation, the hard-to-evaluate attribute makes no difference in distinguishing the evaluations of the two options, and thus the easy-to-evaluate attribute becomes the main determinant of evaluations of the two options. However, when evaluation mode is Joint Evaluation (JE) in which the two options are evaluate attribute easier to evaluate; in some circumstances it may even have greater influence on people's decisions.

He conducted an experiment in which participants were asked how much they were willing to pay for the two second-hand music dictionaries. Dictionary A had 10,000 entries and it was like new, whereas dictionary B had 20,000 entries but the cover was torn. Participants had to resolve a trade-off relationship between the number of entries (10,000 vs. 20,000) and defect (No, it was like new vs. Yes, the cover was torn). The number of entries was hard to evaluate because people did not know how much a dictionary with 20,000 entries was better than a dictionary with 10,000 entries. In contrast, defect was easy to evaluate because people instantly knew whether a dictionary was good or bad when it has any defect. He found that willingness to pay for dictionary A was higher than for dictionary B (\$24 vs. \$20) in separate evaluation (SE). In joint evaluation (JE), participants indicated lower WTP (Willingness To Pay) for dictionary A than dictionary B (\$19 vs. \$27).

Several similar findings have been reported afterwards (Hsee & Zhang, 2010). To our research, one group of researchers compared people's preference between hedonic attributes and utilitarian attribute (Roy & Ng, 2008). The authors hypothesized that hedonic attributes are hard to evaluate and utilitarian attributes are easy to evaluate. They conducted an experiment in which participants evaluated a hedonic yogurt and a utilitarian one in two evaluation modes and found that participants exhibited more favorable attributes towards the hedonic yogurt in joint evaluation mode.

We combined the argument and the previous findings (Chitturi et al., 2007; Roy & Ng, 2008) and propose that form is hard to evaluate independently, whereas function is easy to evaluate independently. Following Evaluability Hypothesis, we hypothesize that people will evaluate option F favorably in separate evaluation mode (SE) because function becomes the main determinant of evaluations because it is an easy-to-evaluate attribute. However, in joint evaluation mode (JE), people will evaluate option A favorably because form becomes easier to evaluate.

H1: People like option A more in joint evaluation than in separate evaluation.

2. 3. Product knowledge

Product knowledge is the actual knowledge stored in the memory of people, i.e. whether people really have product knowledge, such as products' type, attributes, and other knowledge which can be used for evaluation (Brucks, 1985). Researchers often divide people into novices and experts on the basis of their product knowledge (Alba & Hutchinson, 1987). Compared to novices, experts use more characters or attributes to assess products; when choosing among different options, they focus on the performance of products and thus can avoid confusions with other information. This suggests that experts may be little influenced by evaluability. Instead, they may rely on function constantly regardless of evaluation mode. In contrast, novices are less capable of understanding the importance, implications, and determinacy of such information, making them more likely to give high evaluation for easily understandable attributes (Mitchell & Dacin, 1996). Further novices are more likely to follow the choices made by others (Brucks, 1985), implying that novices will be influenced by evaluation mode and may give greater weight on form in joint evaluation.

H2: Novices like option A more in joint evaluation than in separate evaluation. Experts do not.

3. Two cases in the automobile industry

When buying a car, people often compare several option including option A (aesthetically superior but functionally inferior option) and option F (functionally superior but aesthetically inferior option). We report two cases in the automobile industry which demonstrate that the relative preference between option A and option F depends on evaluation mode.

3. 1. Small Sports Utility Vehicle

As people's interest in leisure activities increases, demand for Sports Utility Vehicle (SUV) increases. Since people buy SUVs either for the first time or for the secondary vehicle designated for leisure activities, they consider buying a small SUV or SUV with its length smaller than 4300mm. The small SUV market in Korea is now under joint evaluation mode with high competition. We compared between two small SUVs, one made by S and the other made by R.

First, we compared their functions by using the evaluation score given by Auto Bild. Auto Bild is one of the biggest automobile magazines published in Germany. Since 1986, it has published articles in thirty European countries. In this magazine, professional drivers evaluate vehicles after their performing road tests and checking features. More specifically, they give scores to each vehicle (650 points in total) by considering body (150 points), comfort (150 points), power train (125 points), dynamics (125 points), connectivity (50 points) and environment (50 points). According to Auto Bild, the small SUV made by S brand scored 418 points and the other SUV made by R brand scored 453 points. Note that the difference between two vehicles is significant; the highly scored vehicle was placed in the top tier whereas the less scored vehicle was placed in the bottom This leads us to conclude that the former SUV is option A and the latter is option F. We can also infer that option F is an economically more viable option than option A for potential buyers.



Figure 1 Small Sports Utility Vehicle

However, differently from our expectation, option A was chosen by more buyers. According to the official sales score reported by Auto view, option A sold 4,479 units and option F sold 1,379 units in July 2017. What made option A was chosen by 76% while option F was chosen by only 24% of the whole small SUV buyers? Although there are several reasons why people chose the functionally inferior SUV, brand is not the right answer. The sales numbers between brand S and brand R in July 2017 did not differ significantly (S=10,535 vs. R=8,074). Instead, we attribute the sales difference between two vehicles to the relative difference between design and performance. In the media and online customer reviews, majority of customers and reviewers indicated that the attractive form is one of the strongest advantage for option A. Further, one of the authors conducted web crawling about option A between April 2017 and April 2018. For one year, he collected every single sentence containing the word of brand S from the three major Korean search engines including naver, daum, and google. His data revealed that design was one of the most frequently mentioned word following price and driving. Therefore, we conclude that form increased sales of option A.

3. 2. Fuel Cell Electric Vehicle

Our next question is whether form plays a critical role in separate evaluation mode as well. Although people are highly likely to make a choice from more than two options (joint evaluation mode), they sometimes indicate preference about each option separately (separate evaluation mode), in particular, when a single product is new to the market and competition has not kicked in yet.

Hyundai debuted its first Fuel Cell Electric Vehicle (FCEV) in 2012 Paris Motor show. Even though its appearance did not differ from the gasoline-powered vehicles, its superior function appealed to people (option F). However, in 2015, Toyota launched a new FCEV with a futuristic and distinguished appearance (option A). Newspaper reporters mentioned that "customers like futuristic design of the vehicle" (Seoul Economy 2015) and "the car is easy to recognize because of design" (e-daily 2014). During these two years, sales numbers between the two options changed dramatically.

Under separate evaluation mode in 2014 when there was only option F existed, option F sold 54 units in US, which occupied 95% of the market. However, when option A was introduced in the market and therefore evaluation mode changed from separate evaluation to joint evaluation in 2015, option F sold 46 units while option A sold 44 units, showing that option F occupied only 51% of the market. We suspect that if the new vehicle introduced in the market competed against option F with regards to performance or function, sales number of the existing option F might not have dropped significantly. This suggests that option F failed to appeal to buyers whereas option A successfully did so.



Figure 2 Fuel Cell Electric Vehicle

3. 3. Summary and discussion about the two cases in the automobile industry

The two cases demonstrate that option A was preferred over option F when it was available along with option F in the market simultaneously (joint evaluation mode). They suggest that when evaluation mode changes from separate evaluation mode to joint evaluation mode, people may increase their preferences for option A, which will be tested in the following experiments. Note that although the two cases were consistent with H1, they were not the results obtained from experiments. Therefore, we conducted multiple, carefully designed experiments to test our hypotheses.

4. Experiments

4.1. Experiment 1

4. 1. 1. Participants and experimental design

We recruited participants at a university in China (N=80). We employed a 3 (evaluation mode: SE about option A vs. SE about option F vs. JE) betweensubjects design. In total, twenty participants answered how much they liked option A (SE about option A), twenty participants answered how much they liked option F (SE about option F), and forty participants answered how much they liked option A and option F (JE) (1= not at all, 7= very much).

4. 1. 2. Stimuli

We selected USB drivers and conducted a pre-test in China to collect their form and function (N = 20). According to the pre-test results, the most frequently mentioned form was size (N=6) and the most frequently mentioned function was storage space (N=14). Following the result of the pre-test, we used size and storage space to create a pair of hypothetical options including option A (small size, small storage space 8GB) and option F (big size, large storage space (16 GB)).

We conducted another pre-test in China to check our manipulation by asking them how much superior, they think, form and function of each option are (N=21). Participants indicated that option A has superior form and inferior function ($M_{form} = 5.86$ vs. $M_{function} = 3.71$, t(20) = 5.23, p < 0.001) and option F has inferior form and superior function ($M_{form} = 3.38$ vs. $M_{function} = 5.86$, t(20) = 5.15, p < 0.001), confirming that our manipulation worked as intended.

4.1.3. Results and discussion

We conducted two t-tests to test H1. Results showed that participants preferred option A in JE over in SE ($M_{SE} = 3.65$ vs. $M_{JE} = 4.75$, t(58) = 3.09, p = .003). However, their preferences for option F was not influenced by evaluation mode ($M_{SE} = 3.85$ vs. $M_{JE} = 3.93$, t(58) = 0.22, p = .824), supporting H1. We found that participants liked option A more than option F in joint evaluation mode although their preferences for each option did not differ in separate evaluation

mode. In other words, we found evidence that joint evaluation mode can "increase" people's preferences for option A.

Then, does this effect hold for everyone? More specifically, do both novices and experts like option A more in JE? Alternatively, are experts not influenced by evaluation mode and therefore they do not like option A more in JE? In the next experiment, we tested this hypothesis under joint evaluation with the purpose to examine whether product knowledge moderates this effect.

4.2. Experiment 2

4. 2. 1. Participants and experimental design

We recruited participants (N=101) at a university in China. In this experiment, we employed 2 (knowledge: novice vs. expert) between-subjects design. In order to divide participants into two groups, we measured objective knowledge of individual participant by asking them to answer ten questions. We developed the ten questions by referring to three basketball magazines and interviews with three basketball athletes. The questions include eight multiple choice questions and two open-ended questions, and participants earned one point when answering each multiple choice question correctly (o-8) and earned up to ten points to answer each open-ended question (o-10). Therefore, their total scores were between 0 and 18.

Note that in this experiment, we did not manipulate evaluation mode. Instead, the whole participants evaluated the two options together (JE). Participants answered how much they liked option A and how much they liked option F side-by-side (1= not at all, 7= very much).

4. 2. 2. Stimuli

We used basketball shoes and conducted a pre-test to collect their form and function (N = 20). According to the pre-test results, the most frequently mentioned form was color (N=15) and the most frequently mentioned function was comfort (N=13). Following the pre-test results, we generated hypothetical option A (highly attractive blue color, somewhat comfortable) and option F (less attractive yellow color, very comfortable).

We conducted another pre-test to confirm our manipulation (N = 20). Participants indicated that option A has superior form and inferior function ($M_{form} = 5.35$ vs. $M_{function} = 3.00$, t(19) = 6.32, p < 0.001) and option F has inferior form and superior function ($M_{form} = 3.70$ vs. $M_{function} = 5.55$, t(19) = 3.67, p = 0.002), confirming our manipulation worked as intended.



Figure 3 Stimuli used in Experiment 2

4. 2. 3. Results and discussion

Since participants' objective knowledge scores were distributed between 0 and 16 ($M_{knowledge} = 8.49$, SD_{knowledge} = 3.91), we divided participants into two groups using median split. Experts scored higher than novices in terms of objective knowledge score ($M_{novice} = 5.48$ vs. $M_{expert} = 11.94$, t(99)=14.63, P < 0.001). Then, we conducted two t-tests about preference; one for novices and the other for experts. As hypothesized, novices liked option A more than option F ($M_{optionA} = 4.93$ vs. $M_{optionF} = 4.02$, F(1,99) = 6.72, p = .018), consistent with the findings obtained in the JE condition from experiments 1. However, experts showed opposite preferences ($M_{optionA} = 4.17$ vs. $M_{optionF} = 4.83$, F(1,99) = 6.72, p = .011).

Our findings support H2, that is, product knowledge moderates the effect of evaluation mode on preference. When participants are novices, we successfully replicated findings obtained in experiments 1. However, these patterns disappeared among experts.

5. General discussion

Two cases in the automobile industry and experiments 1 using USB drivers support H1. Participants did not prefer option A over option F when each option was presented separately but they preferred option A over option F when the two options were presented jointly. Further, experiment 2 showed that the effect of evaluation mode on preference disappears among experts, supporting H2. We attribute the findings obtained in experiment 2to the characteristics of product knowledge. Novices have limited functional knowledge and therefore evaluate products using nonfunctional attributes such as form, whereas experts have sufficient functional knowledge and therefore evaluate products using function regardless of evaluation mode.

This work contributes to the scholarly discussions on form and function in the context of evaluation mode. Prior research on form and function focuses on each attribute independently and has little discussed about when their preferences change (Chitturi et al., 2007). Our experiments demonstrated that when option A and option F are juxtaposed, form becomes easier to evaluate and therefore receives greater weight (Hsee, 1996). We also showed that this effect will be shown only when people have insufficient knowledge about function (Alba & Hutchinson, 1987).

Our findings that form matters more in certain contexts (joint evaluation) among certain people (novices) provide practical implications for designers and marketers. In particular, marketers should strategically display their products in order to maximize designers' investments into form. Our studies show that aesthetically pleasing products will become more attractive when they are compared with aesthetically less pleasing products and when their products are targeted toward novices. These findings suggest that design-oriented product manufacturers should go beyond their own stores (e.g., Apple and B&O) to display their products at retail stores (e.g., future shop or best buy) with other functional products side-by-side.

Most importantly, this work adds a new intervention for behavioral economics. Previously, interventions nudge people to choose specific options (Baca-Motes et al., 2012; Nishikawa et al., 2017; Putnam-Farr & Riis, 2016) or nudge designers to develop better design outcomes

(Chung & Joo, 2017; Lee & Joo, 2017; Oh & Joo, 2012, 2015; So & Joo, 2017). We propose in this work that evaluation mode as a new intervention nudges for novice people to increase their preferences for aesthetically pleasing products.

This work has several limitations. First, we used size and color as form attributes in the two experiments. Although we followed the pre-test results strictly, other product components such as shape, tempo, scale, proportion, materials, or reflectiveness are another important form factors (Bloch, 1995). Future researchers are suggested to use different form factors to test the same hypothesis. Second, we examined functional knowledge only in the second experiment. However, people may have different levels of form knowledge as well (e.g., Centrality of Visual Product Aesthetics (Bloch, Brunel, & Arnold, 2003)). Future researchers are suggested to examine whether people's knowledge about form also eliminates the effect of evaluation mode on preference.

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Appendix. Questionnaire for objective knowledge about basketball shoes

Please choose the answer you think right for the question. If you do not know the answer, please choose the option "I have no idea." Questions from 1 to 8 are multiple choice questions; Questions 9 and 10 are short answer questions.

1. Which of the following descriptions are right about the feature of Zoom Air?

- A. flat air cushion
- B. full of nylon fibers in the middle
- C. being able to keep 10mm thickness when in a tightened status
- D. made by the material of thermoelectric plastics
- E. I have no idea

2. The Hyperfuse technology includes:

- A. an Integrated vamp
- B. strengthened wing design with carbon fiber to support the feet
- C. external cover made by ebonite
- D. using torsion system technology
- E. I have no idea

3. Which of the following choices is the one without the effect of shock absorption?

- A. PU
- B. MD
- C. EVA
- D. Sticky Rubber
- E. I have no idea

4. Which of the following choices is the main influential factor to energy return?

- A. vamp
- B. cushion
- C. sole
- D. external cover
- E. I have no deia

5. What does NIKEiD mean?

- A. customized service of function and style
- B. unique shading design with hexagon checkered patterns
- C. I have no idea

6. As for the comparison between artificial mesh-fabric and leather vamp, which of the following descriptions is not correct?

A. mesh-fabric vamp is more breathable

- B. artificial mesh-fabric vamp is lighter than leather vamp
- C. artificial mesh-fabric vamp is less durable than leather vamp; The durability and solidity of leather is superior
- D. I have no idea

7. In basketball games, which kind of shoes is chosen by the majority of players?

- A. low top shoes
- B. middle top shoes
- C. high top shoes
- D. I have no idea

8. Which kinds of shoes is more suitable for strong attacking players?

- A. Shoes with outstanding shock-absorption and stability; with a heavy weight
- B. light low-top shoes with the function of protecting ankles, shock absorption and flexibility
- C. I have no idea
- 9. Please list some magazines which are related to basketball shoes.
- 10. Please list 5 brands of basketball shoes.