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Aesthetic appeal impacts sales and can be measured objectively.

Gut Liking for the Ordinary: How Product Design Features Help Predict Car Sales

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Product Design, Processing Fluency, Aesthetic Liking, Car Sales, Visual Prototypicality, Visual Complexity, Image Morphing

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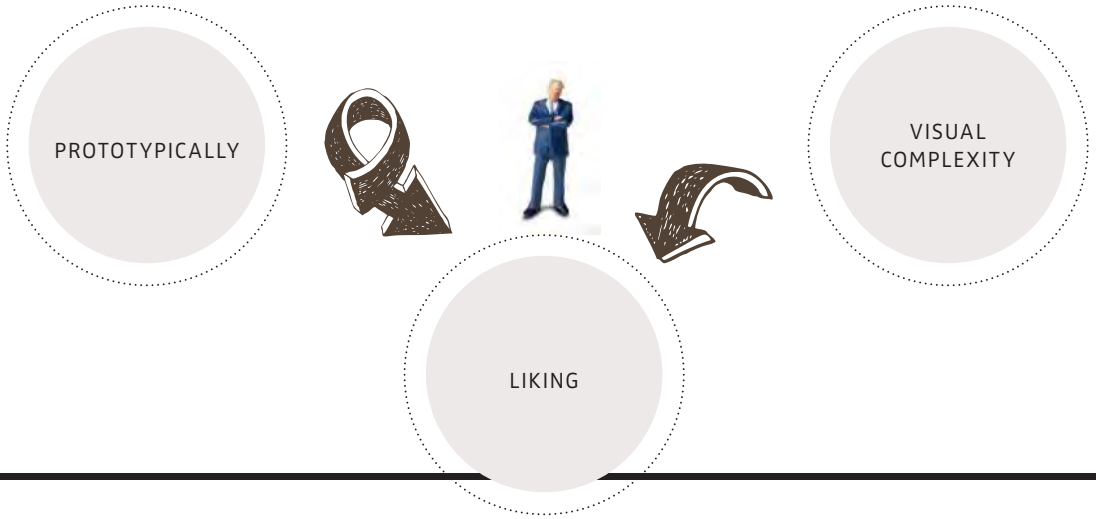
Design makes the difference /// It is virtually impossible not to mention Apple when talking about design. Apple has become one of the most profitable companies in the world, with current cash assets of approximately US$ 100 billion (April 2012). It is beyond dispute that the company has developed excellent products with groundbreaking features and a brilliant marketing strategy – but hardly anybody would question that the distinctive design of Apple's products plays a major or even the principal role in this story. Starting with the iMac G3 in 1998, Apple fundamentally changed the seemingly unwritten rule that consumer electronics, and particularly personal computers, do not need an appealing design. The first iPod in 2001, the first MacBook in 2006, the first iPhone in 2007, and recently the first iPad in 2010 consistently pursued this strategy of a competitive advantage based on aesthetics.

The success of design is not limited to consumer electronics; it seems to also work for more expensive goods such as cars. The German car manufacturer Audi moved from a focus on its superior technological competencies ("Vorsprung durch Technik") towards a design orientation. It is now the most profitable brand in the Volkswagen group, generating profits considerably above € 1 billion per year continuously since 2006. Interestingly, managers at Audi estimate that up to 60 % of a consumer's decision to buy a particular car is determined by the aesthetic appeal of the car's design. Consequently, Audi not only invested in the advancement of its car designs, but also made design an integral part of their marketing strategy. This became especially salient when Audi launched the second series of their Audi TT sports car

FIGURE 1:
What matters when design is evaluated



in 2006. The car was not presented to the public at one of the leading motor shows (as is common practice in the automotive industry) in Tokyo, Detroit, Geneva, or Frankfurt, but at a design fair (''The Design Annual'' in Frankfurt).

... but what makes designs aesthetically appealing? ///
Imagine: you see a face you somehow find familiar and you try to remember their name. You can sometimes literally feel how hard your mind is working to find the right name and you perceive this process as difficult. By contrast, when you have intensively learned new vocabulary in a foreign language and you are tested on the well-learned material later, you may feel the ease with which the foreign words come into your head. This is a good example of processing ease or fluency.

Research shows that the perception of ease or difficulty in such mental processing determines the feelings we have towards the object that triggered the mental process. Such ''processing fluency'' has been found to be especially relevant in the evaluation of attractiveness. A common finding in this research stream is that ordinary-looking faces are rated as more attractive than extraordinary faces. This is explained by the general insight that fluent processing is perceived as pleasant. As typical or familiar objects can be processed fluently, they feel pleasant and are therefore better liked. For physical products, the prototypicality of general shape, the symmetry, or the clarity of its elements are expected to determine how easy or difficult the evaluation is perceived.

Another dimension of aesthetic liking is visual complexity. A higher complexity and a certain amount of stimulating elements are preferred to low levels of stimulation. Whereas ease of processing triggers positive emotions or a favorable gut feeling, content or complexity evaluations are instead cognitive or mind-centered and inhibit feelings of boredom or tedium. That is, visual complexity adds to the positive evaluation of an object by inhibiting negative feelings and cognitions.

KEY INSIGHTS

> Prototypical and complex designs are more successful

> Both design characteristics can be measured objectively

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Ordinary-looking faces are perceived as more attractive – but what about cars? /// in a recent study of car models, visual prototypicality and visual complexity had a positive impact on sales. The results of a sales forecasting analysis showed that visual design played a major role in a product's success in the market. Just two visual design aspects were sufficient to significantly improve traditional sales forecasting models. Sales were especially high when prototypicality and complexity co-occurred. Figure 2 provides a simplified summary of these results. As can be seen, sales were highest when a design was both high in complexity and high in prototypicality (rightmost red bar).

Moreover, when compared to a traditional sales-forecasting model that only included price, advertisement spending, quality, product life cycle position and brand, the design variables improved the predictive strength by up to 19 %. Hence, a substantial amount of sales variance could be traced back to the visual design of a car.

FIGURE 2:

Sales are highest when a design is both high in complexity and high in prototypicality

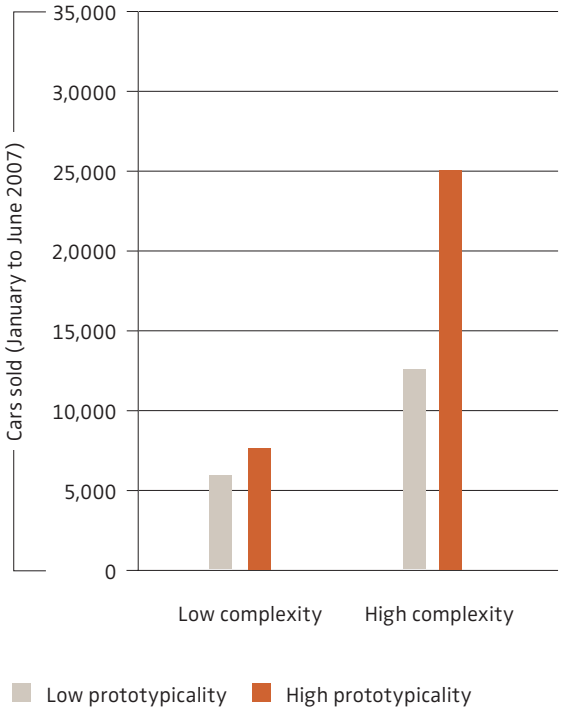

FIGURE 3:
Morphing of 12 midsize-executive cars

Prototypicality and complexity in car design can be measured objectively /// Whereas most design evaluation is based on subjective measures, prototypicality and complexity can also be measured objectively. While the latter can be detected by the disk space needed by the compressed image file, the researcher team also developed a new approach for measuring prototypicality. It relies on the technique of image morphing as described in Box 1, first in a general way and second for cars in particular. Once a car morph is developed, the visual similarity of different car models to the morph can be determined, in order to obtain its prototypicality. The measure contains the sum of the Euclidean distances between each feature point of a particular car and the corresponding feature point in the morphed (prototypical) car.

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When companies try to predict
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they should include design variables
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{ Box 1 }

IMAGE MORPHING: BUILDING A PROTOTYPICAL REPRESENTATION

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Morphing refers to a method for building a prototypical representation out of a number of individual stimuli. In other words, morphing allows the construction of a visual synthesis from a number of individual pictures.

When working with human faces, morphing consists of blending several into an average face. This is achieved through defining a number of feature points that are common to all faces (e.g., position of eyes, nose and lips), calculating the mean position for each feature point across all faces, and warping the individual faces to the average, "typical" proportions. After this, all faces are of average shape and proportions but still differ in their colors. Therefore, the final step of morphing involves computing the average color value of each pixel. This procedure can be compared to holding all individual warped pictures simultaneously in front of a traditional slide projector. The resulting final image is a face of average shape, proportions and color.

This approach can be easily adapted to fit the current context. To create a morph out of the car fronts, completely standardized pictures of all cars are needed. For these car fronts characteristic design elements need to be marked by feature points (e.g., headlights, grille, windshield, etc.) and the morphing procedure can start. Figure 3 shows the 12 midsize executive cars considered in the present study and the feature points used to construct an average midsize executive car by the described morphing procedure.

Insights for Product Design Management

> **Design variables help to predict sales of new products** /// The results of the sales forecasting analysis suggest that visual design plays a major role in a product's success in the market. Just two visual design aspects are sufficient to significantly improve traditional sales forecasting models. When companies try to predict the success of a product, they should therefore include design variables into their forecasting models so that their estimation can be improved. The predictive power of design quality might even be raised when additional design aspects are considered.

> **Designs should be visually prototypical and complex at the same time** /// Product designs that are visually prototypical and complex at the same time proved to be more successful than others. However, even if visual prototypicality and visual complexity are very important design characteristics, there are numerous others such as symmetry, clarity, unity etc. to be considered. Future research is necessary to further analyze the interplay of all these design facets.

> **The objective measurement of design characteristics simplifies the measurement process** /// The tremendous advantage of using visual prototypicality and complexity compared to conventional procedures is that they are not based on subjective, and hence potentially biased, ratings. In principle, the procedure to assess a design's quality can be automated completely. It allows for the inclusion of a large number of products as well as regular updates, once new products are introduced into the market. Therefore, these measures seem suitable for supporting design decision processes in practice.

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