A Psychophysical Approach to Assessment of Relationship Between Vehicle Color and Purchase Price

Keiko Powers, J. D. Power and Associates

This study investigates the relationship between vehicle color, an emotionally appealing attribute, and purchase price of new vehicles applying the psychophysics concept. Using point-of-sales data with over two million transactions collected from automobile dealers in California, comparisons of prices with different colors were made while controlling for other attributes, such as engine type. Results based on over one thousand vehicle comparisons demonstrated differential effects of color. In particular, sporty cars, which are considered to have high emotional appeal, resulted in 13% of comparisons showing significant differences. The results demonstrated that consumers' emotional evaluation of color plays such an important role in decision making that it has a significant influence on consumer's evaluation about the vehicle price.

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Discussion

These findings suggest that inaction inertia is less likely when an OSA facilitates subsequent choice. Moreover, when an OSA causes a great sale to be missed in the first place, the overall likelihood of inaction is lower than when the consumer causes the miss. Different explanations may explain this occurrence. It may be that the OSA recommendation provides a positive contextual comparison that reduces focus on the past. Alternatively, the OSA may function as a scapegoat freeing the consumer to take any action, good or bad. Future research will seek to identify the mechanisms by which this reduction occurs.

References


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Keiko I. Powers, J. D. Power and Associates, USA

Psychological research on consumer behavior has shown that the emotional state of consumers can affect their purchase decision making in various ways. An interesting topic that has been the focus of these studies is the psychological or emotional impacts of various non-functional attributes of the products or the purchase environment that are not directly linked to their core properties. For example, Milliman (1982) found that the type of music played in a grocery store affects the consumers’ shopping behavior, spending a longer time at the store when slow music is played. Other studies have also shown differential effects by color (e.g., Bellizzi and Hite, 1992; Gimba, 1998; O’Neill and Lambert, 2001). Gimba (1998) emphasized the importance of color in the marketing environment and stated that color affects the mind and body in different ways, and certain colors convey a different meaning not only to different cultures but also within a single culture.

The past studies have shown that in today’s consumption environment with abundant and various products, such as seen in the United States, emotionally appealing attributes have a substantial impact on consumer’s attitude toward a brand. Naturally, the level of impact of these ‘emotional’ attributes is expected to be high when the consumer purchasing experience is highly involved, such as an automobile. Powers (2006) demonstrated that when consumers are purchasing new automobiles with a high emotional appeal, such as sporty coupes or convertibles, the price they pay for the car is affected by its color. Though limited in its scope with only a selected group of vehicle types, the study was the first attempt to empirically assess the impact of color on vehicle purchase decisions in the real-world setting.

This paper presents an empirical study that further investigates the relationship between vehicle color and purchase decision making on an automobile, expanding its scope with respect to the number of vehicle types and segments being tested (i.e., midsize cars, pickup trucks, etc in addition to sporty cars). All the vehicle models sold in the US market were analyzed to assess the prevalence rate of price differences associated with vehicle color. The approach allows us to understand the generalizability of the color-price relationship found in the previous study by Powers (2006). In addition to examining the prevalence rate, the price ‘elasticity’ due to color differences is quantitatively assessed by applying the psychophysics concept. Analyses are based on point-of-sales data of new vehicles collected from automobile dealers in the California market. Utilizing the large historical database with over two million transactions from 1999 to 2003 that includes all the vehicle models sold in the United States, exhaustive statistical analyses were conducted to assess the differential impacts of vehicle color on purchase price. Statistical comparisons with analysis of variance (ANOVA) were performed while controlling for other attributes, such as engine type, door type, etc., to ensure that observed price differences were in fact due to the vehicle color. Approximately 400 vehicle models (e.g., Ford Taurus, Dodge Dakota, etc.) with a sufficient number of transactions were retained for analysis (n=100 for each cell count when considering the attributes). Out of these 400+ models, over 1000 comparison sets were created to control for these various attributes that could contribute to price differences.

Analysis results based on the 1000+ comparisons demonstrated statistically significant differences due to color at a respectable prevalence rate of 7.6% when all the tests were conducted at the alpha level of 0.05. The prevalence rate varied from segment to segment, showing results consistent with expectation. In particular, sporty cars, which are considered to have a high emotional appeal, indicated 13.2% of comparisons showing significant differences. The price ‘elasticity’ or the price difference ratio (i.e., % difference between highest-color mean price and lowest-color mean price) was found to be fairly consistent from segment to segment. The overall ratio across segment was 5.3% with the lowest and the highest being 4.1% (SUV) and 6.7% (Sporty Cars), respectively. This means, for a $30,000 sports car, a car buyer could pay approximately $2,000 more (i.e., $30,000 times 6.7%=$2,010), when the vehicle color is an important and emotionally appealing decision making criterion for the buyer.