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Size Does Matter: The Effects of Magnitude Representation Congruency on Price Perceptions and Purchase Likelihood

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The numerical cognition literature suggests that numerical stimuli (and hence prices) are represented and encoded in memory as magnitude representations (i.e., judgments of relative "size"). The magnitude representation associated with the numerical value of a price may be the same as (congruent) or different from (incongruent) the magnitude representation associated with some other related dimension. We conducted 3 experiments to examine the effects of congruent versus incongruent magnitude representations on price perceptions and purchase intentions. We find that congruent magnitude representations result in more favorable price knowledge (i.e., greater value perceptions and lower price judgments) and increased purchase likelihood. Our findings suggest that consumers are not consciously aware of the role of magnitude representations in influencing price perceptions.

For more than a century, researchers have considered the manner in which consumers process price information. An assumption of classical economic theory is that comparative price information is processed in a conscious, deliberate, and rational manner (Marshall, 1890). Consumers are presumed to have perfect information about the prices for a set of products, as well as the utility received from those products. Such may be the case in retail point-of-purchase settings, in which prices can be directly observed and compared. However, recent studies have demonstrated that buyers do not always process pricing stimuli in a conscious, deliberate manner, but instead frequently rely on the nonconscious, automatic processing of price information (Coulter, 2003; Xia, 2003). These consumers make decisions based on what they implicitly know, rather than what they explicitly remember (Krishnan & Chakravarti, 1999; Monroe & Lee, 1999).

When price information is processed at a nonconscious level it receives minimal attention. Consumers typically demonstrate a lack of price awareness and are unable to recall the exact price of the product at a later time. Nonetheless those same consumers who are unable to consciously remember and report the exact price of the product may still judge the product as "expensive," a "bargain," or "a good deal." In other words, implicit estimates regarding the price and value of the product can still be made. These assessments may drive purchase decisions in the absence of more concrete empirical information (Roediger & McDermott, 1993).

In practice, consumers' processing of price information typically involves both conscious and nonconscious processes. Consumers may attend to a pricing stimulus and process the comparative price information in a conscious, deliberate, and rational manner, yet nonconscious processes may operate simultaneously at encoding to influence price and value assessments, and hence purchase choice. For example, buyers might attend to the $99 sale price of an item and consciously attribute a certain "value" to that item based upon the amount it is discounted from the stated "regular" price. However that valuation might also be (nonconsciously) influenced by some other aspect of the stimulus. In the case of a comparative price advertisement, those aspects of the stimulus influencing value perceptions could involve any number of peripheral cue elements such as color, spokesperson, or layout (Babin, Hardesty, & Suter, 2003; Coulter, 2002). If no such executional cues are present, research on numerical

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cognition suggests that certain properties of the numbers themselves may influence the manner in which a price is perceived (Xia, 2003).

Recent studies suggest that numerical stimuli are nonconsciously and automatically represented and encoded in memory as magnitude representations. Magnitude representations are judgments of relative "size" arrayed in analog format along a left-to-right oriented mental number line, and may reflect either the exact value (e.g., 8), or an approximation of the exact value (e.g., "large") of the number (Dehaene, 1992; Dehaene, Bossini, & Giraux, 1993). Studies have demonstrated that consumers accomplish the encoding and retrieval of magnitude representations effortlessly, automatically, and apparently without awareness (Pavese & Umiltà, 1998; Tzelgov, Meyer, & Henik, 1992). Research further suggests that the magnitude representation that sustains the processing of numeric value may be highly related to the underlying magnitude code that sustains the processing of physical stimuli (Dehaene & Akhavein, 1995). Thus, interference may ensue if the magnitude representation associated with the numeric value of a number (e.g., large) is inconsistent with the magnitude representation associated with the physical size or appearance of that number (e.g., small).

In this article, we report on three experiments designed to examine the effects of certain size-related dimensions on price perceptions in a comparative price context. In Experiments 1 and 3, these dimensions involve numeric value and physical font size. In Experiment 2, the dimensions involve numeric value and a size-related verbal product description. Our research contributes to the literature on the processing of price information in several important respects. First, we examine whether the same size–value congruency effects that have been demonstrated to occur in the case of immediate reactions to simple numeric digits (Dehaene, 1989; Dehaene & Mehler, 1992) also occur with regard to the encoding and retrieval of price information. Second, we investigate these effects not only in terms of price and value assessments, but also in terms of purchase likelihood and brand choice. Third, we examine whether the same interference effects that occur as a result of physical font size also occur as a result of another, less closely related dimension (i.e., verbal description).

We investigate and compare size–value congruency effects under conditions of both low (Experiments 1 and 2) and high (Experiment 3) involvement, and in the context of high versus low prices for both a single brand (Experiments 1 and 2) and multiple brands (Experiment 3). The involvement manipulation allows us to examine such practical issues as whether the retailer desiring to draw attention to his or her low-price advantage needs to sacrifice consumer awareness in order to take advantage of numeric size—value congruency effects. The single versus multiple price manipulation allows us to examine whether individual item price and value assessments may generalize to an entire product line. Thus, our findings proffer a significant contribution toward the understanding of consumer processing of price information.

BACKGROUND AND THEORETICAL DEVELOPMENT

Numerical Cognition

As noted previously, the numerical cognition literature suggests that numerical stimuli are represented and encoded in memory as magnitude representations (i.e., "size" determinations; Tzelgov et al., 1992). To perform quantitative comparisons between numbers, people must retrieve these referent quantities. One type of quantitative comparison of particular interest to the present study involves distinguishing between the numerical size of digits (Dehaene, 1989). The procedure typically employed in investigating this type of comparison is to have participants view target numerals on a computer screen, and to register comparative judgments (i.e., discern which of the two numerals is "largest," "smallest," "highest," or "lowest") by pressing either a right- or left-hand key on a computer keyboard (Pavese & Umiltà, 1998). Reaction time in milliseconds is then recorded.

Research has demonstrated that when participants are attempting to determine the larger (smaller) of two numerals, response time is shorter if the larger (smaller) of the compared numerals is displayed in larger (smaller) font size (Dehaene, 1989). Conversely, if the opposite condition applies (i.e., if the larger of the two numerals is displayed in smaller font, or the smaller of the two numerals is displayed in larger font), the size dimension appears to interfere with participants' judgments of numerical magnitude, resulting in longer response times. This has been termed the "size congruency effect" (Dehaene, 1989).

Interference paradigms have been widely employed to investigate the manner in which magnitude representations are activated when nonrelevant or interfering visual objects are displayed (Dehaene & Akhavein, 1995). Research has demonstrated that the degree of interference depends on the strength of the semantic association between the category of the non-relevant dimension (e.g., physical size), and the category of the response (e.g., numerical value; Fox, Shor, & Steinman, 1971; Pansky & Algom, 1999). Because numerical magnitude (value) and physical magnitude (size) are highly related dimensions, interference occurs in the case of size incongruency (Dehaene & Mehler, 1992). However, evidence of the existence of a "semantic gradient" effect (Dehaene, Dupoux, & Mehler, 1990) raises the possibility that other, perhaps less closely related dimensions, may cause this same type of interference.

Processing Comparative Price Information

Consumers make comparative price judgments when they are exposed to high versus low pricing stimuli for an individual product or brand. One of the most common contexts in which this occurs is a comparative price advertisement (Biswas & Blair, 1991; Biswas, Pullig, Krishnan, & Burton,