Left-Right, Left-Right: the Effects of Digit-Direction on Eye Movement Bias and Price Encoding Strategy

Keith S. Coulter, Clark University

In this paper we suggest that consumers are either consciously or non-consciously aware of the left-right (forward/backward) orientation of numeric digits. We show that digit orientation can create eye movement bias - that is, consumers’ attention is directed toward or away from surrounding visual stimuli. If these surrounding visual stimuli are other numbers within a multi-digit price, then differing degrees of attention can result in greater or lesser recall, and hence price-rounding behavior. Price rounding behavior ultimately impacts level of demand.

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A number of studies in the behavioral pricing literature have examined the “greater-than-expected” demand associated with 9-ending prices (e.g., Schindler and Kirby 1997; Schindler and Kibarian 1996). Researchers have argued that this greater-than-expected demand is due to the use of a truncation (i.e., “rounding-down”) price encoding strategy, which involves representing a price in memory in terms of its left-most digits only. The left-most digits are more likely to be remembered than the right-most digits because they are encountered first as prices are read from left-to-right, and because they represent the more valuable parts of the price information.

We argue that the rounding down of prices may depend not only upon the left-to-right processing of numeric digits, but also upon the “directionality” of digits. Directionality refers to the left or right-facing orientation of particular numbers—that is, consumers perceive these numbers as “pointing” or “facing” in a particular direction. We show that the digits 1, 2, 3, 4, 7, and 9 are perceived as “left-facing,” 5 and 6 are perceived as “right-facing,” and 0 and 8 are perceived as “neutral.”

We further demonstrate that the perception of digit directionality may create eye-movement bias, which can lead consumers to direct their attention to the left or to the right of the specific digits employed. Eye movement bias is established through the use of a classic visual (optical) illusion (i.e., the Mueller-Lyer illusion). The M-L illusion consists of two lines which are equal in length—one of the lines has outward-facing “tails” on its ends, the other has inward-facing tails. The line with the outward (inward) facing tails is perceived as longer (shorter) than the one with the inward (outward) facing tails, because the eye tends to be pulled in the direction of the extraneous stimuli (i.e., tails), resulting in an over-(under-)estimation of length.

Research has demonstrated that the extraneous stimuli (tails) in the M-L illusion need not be inwardly or outwardly sloped lines; the effect is possible as long as the configuration of elements making up the characters exhibit non-symmetrical left-right variation (Coren 1986). Thus, in Experiment 1 we utilize combinations of left and right-oriented digits to correspond to the extraneous stimuli. A left-facing digit on the left and a right-facing digit on the right (e.g., $7-5) are substituted for the two outward facing extraneous stimuli, whereas a right-facing digit on the left paired with a left facing digit on the right (e.g., $5-7) are substituted for the inward facing stimuli. We find that the perceived physical distance between outward-facing prices is greater than the perceived physical distance between inward-facing prices. Our results lead us to conclude that digit direction creates eye movement bias, which influences physical distance estimations.

In the case of multi-digit prices, we expected that the eye movement bias resulting from digit directionality should influence the degree to which contiguous digits are attended to and encoded, thereby impacting price rounding behavior. We argue that bias toward (or to the right of) a particular digit should increase the likelihood that the digit is processed and encoded, whereas bias away from (or to the left of) a particular digit should decrease the likelihood that the digit is processed and encoded. As the likelihood of processing a particular digit increases, the likelihood of rounding that digit to the nearest whole number decreases. Results from a second Experiment confirm our expectations. The important practical implication of our findings is that digit direction can result in greater-than-expected demand for an item at a particular price.

We suggest that future research efforts should be directed toward investigating the effects of digit directionality on other price combinations; future research efforts might also employ eye-tracking devices to more directly confirm the theoretical eye-movement bias → attention → price truncation linkage.

References are available upon request.