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## **The 'Even-Odd Effect' in Consumers' Reactions to Prices**

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Considerable research has been devoted to zero- and nine- price endings, but consumers encounter other digits as price endings 43% of the time. We propose that digits sharing evenness and oddness will demonstrate similar price-ending impacts. We find consumers responding thusly: it appears that an “Even-Odd Effect” exists.

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# The 'Even-Odd Effect' in Consumers' Reactions to Prices:

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## EXTENDED ABSTRACT

The purpose of this project is to contribute to understanding of consumers' reactions to different price-endings. Considerable behavioral research has been devoted to the impacts of zero- and nine- price endings. Among the findings are that prices ending in zero are associated with "higher quality," while those ending in nine are associated with "lower cost." However, consumers often encounter the other eight digits as price endings as well: it has been estimated that 43% of consumer prices in the U.S. end in one of the other digits (Schindler and Kirby 1997). How do consumers respond to these? Are there systematic responses that relate to those for zero and nine?

Recent psychological research shows systematic distinctions in automatic responses to odd versus even numbers (Wilkie and Bodenhausen 2012; 2015): building on spreading activation theory (Rumelhart, Hinton, and McClelland 1986), we propose that digits sharing 'even-odd' properties will demonstrate similar consumer price-ending impacts to zero and nine. In the present context, this means that representations of numbers that share the feature of oddness, for example, will overlap in memory. Representations of '9' will partially overlap with the representation of all other odd numbers. By virtue of this cognitive connection, meanings associated with one odd number can come to be shared with the other odd numbers. In this case, we propose that as zero-ending (nine-ending) prices have been associated with higher quality (lower cost) (Schindler and Kibarian 2001), similar perceptions of higher quality should extend to other (non-zero) even-ending prices, given the strong associative links in memory among all numbers sharing the property of evenness. Based on this reasoning, we hypothesize that prices ending in 2, 4, 6, and 8 will be associated with higher expense and higher quality perceptions than prices ending in 1, 3, 5, or 7.

The paper reports a series of three experiments in which we test the following hypotheses (note that we avoid using zero or nine as price-endings, thus providing more conservative tests of even vs. odd pricing):

*Hypothesis 1: Consumers associate even-ending prices with higher expense (H1a) and higher quality (H1b) than odd-ending prices*

*Hypothesis 2: Consumers who wish to expend as little money as possible respond more favorably to stores with odd-ending prices (H2a), while those seeking higher quality respond more favorably to stores with even-ending prices (H2b).*

Studies 1a and 1b used the Implicit Association Test (IAT), a widely used method for measuring relative strength of automatic associations in memory. 100 U.S. consumers were recruited to participate in each study via Amazon MTurk. Using standardized IAT procedures, participants were asked (Study 1a) to categorize words as being either "Good Quality" or "Bad Quality" and prices as either "Even Prices" or "Odd Prices" (Study 1b used "Expensive" or "Cheap" and "Even Prices" or "Odd Prices"). Seven trial blocks (practice and test) were undertaken in each study, with counterbalanced stimuli. Strength of association is determined by

participants' reaction times to different pairings: Greenwald, Nosek, and Banaji's (2003) improved scoring algorithm was used to create an IAT D-score for each participant, ranging from -2 to +2, here with positive direction and size reflecting stronger associations.

For study 1a, as predicted, the mean IAT D-score was +.79 (sd = .33),  $t(87) = 22.25$ ,  $p < .001$ . This shows that consumers do associate prices ending in 2, 4, 6, or 8 with "higher quality" than prices ending in 1, 3, 5, or 7. For study 1b, the mean IAT D-score was .23 (sd = .47),  $t(80) = 4.26$ ,  $p < .001$ , indicating that consumers do associate prices ending in 2, 4, 6, or 8 with greater expense than prices ending in 1, 3, 5, or 7.

Study 2 extended analyses to price-ending impacts on consumer predispositions, incorporating purchase motivation as a moderator. H2a proposes that consumers trying to spend as little as possible will respond more favorably to odd-ending prices, while H2b proposes that consumers seeking higher quality will respond more favorably to even-ending prices.

A 2 (price endings: odd, even) x 2 (shopping motivation: low expense, high quality) between-subjects design was employed, with 200 undergraduate participants told to imagine being in the market to buy a new car, currently gathering information, without a preference yet, and seeking to purchase a high quality/low expense automobile. Analysis of the shopping motivation manipulation indicated success, with each condition's consumers reflecting the differential goals of the instructions. Participants were then shown an automobile dealership advertisement displaying nine cars, with prices all even-ending (2, 4, 6, or 8) or odd-ending (1, 3, 5, or 7), and completed an array of responses.

First, a univariate ANOVA test for price affect for the dealer revealed the expected interaction between price-ending and shopper motivation,  $F(1,180) = 8.09$ ,  $p < .01$ . Consumers in the low price motivation condition evaluated the dealer's prices more favorably when seeing odd-ending prices than even-ending prices ( $t(179) = 2.11$ ,  $p = .02$ ), while consumers in the high quality condition evaluated the store's pricing more favorably when seeing even-ending prices than odd-ending prices ( $t(179) = -1.90$ ,  $p = .03$ ).

Would this price-specific reaction spread to the store overall? Consumers' affect toward the dealership was examined, with a univariate ANOVA yielding the anticipated interaction  $F(1,184) = 8.89$ ,  $p < .01$ . Consumers in the low expense condition were more positive about the dealership when seeing odd-ending prices than even-ending prices ( $t(184) = 2.43$ ,  $p < .01$ ), while consumers in the high quality condition were more positive about the even-priced dealership than the odd-ending price dealership ( $t(184) = -1.78$ ,  $p = .04$ ).

Moving to intentions, consumers' likelihood of patronizing the dealership supported the above results  $F(1,180) = 6.06$ ,  $p = .02$ . Within the low price condition, patronage intentions were higher for those who had seen odd-ending versus even-ending prices ( $t(186) = 1.71$ ,  $p = .04$ ), while in the high quality condition intentions were higher following exposure to even-ending than odd-ending prices ( $t(186) = -1.77$ ,  $p = .04$ ).

This research adds understanding to prior research on nine and zero price-endings, while also extending coverage to the other eight digits that consumers encounter in marketplace prices. It also

supports previous psychological research on people's qualitatively distinct themes for even and odd numbers. And, with respect to pricing, it introduces a new behavioral pricing phenomena; the "even-odd price-ending effect".

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