

When deal depth doesn't matter: How handedness consistency influences consumer response to horizontal versus vertical price comparisons

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Abstract The current research introduces a new moderator to the price comparison literature by considering how the processing of regular and sale price information may be grounded in the degree to which consumers are consistent-handed (CHs) or inconsistent-handed (ICHs) in performing manual tasks. Because vertically presenting regular and sale price information facilitates calculation of savings, vertical price comparisons should be processed more fluently than horizontal comparisons. However, this fluency difference should asymmetrically affect ICHs and CHs. Prior research has indicated that ICHs are more cognitively flexible than CHs. Here, ICHs expressed more favorable purchase intentions with greater deal depth for both vertical and horizontal price comparisons, possibly because their greater cognitive flexibility enabled them to process price comparisons effectively regardless of presentation layout. Conversely, possibly due to lower cognitive flexibility, CHs exhibited purchase intentions that were sensitive to differences in deal depth when presented with more fluent vertical price comparisons, but not less fluent horizontal comparisons. These findings are replicated across two experiments relying on different participant populations.

Keywords Price promotions · Handedness consistency · Cognitive flexibility · Price comparisons · Deal depth · Embodied cognition

Marketing researchers have begun to explore how the cognitive, affective, and behavioral experiences of consumers may be embodied, that is, influenced by co-occurring

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sensory and physical states (e.g., Elder and Krishna 2012). Such work is motivated by research in psychology suggesting that how people think, feel, and act is rooted in life-long experiences with the physical environment (Meier et al. 2012). Thus, while traditional paradigms suggest a “mind → body” relationship in which cognitive and affective appraisals guide behavior, embodied frameworks reflect a “body → mind” link in which physical experiences influence judgments.

Of particular interest is work on embodied cognition involving handedness effects. Much of this research focuses on the *direction* of handedness, i.e., whether people engage in unimanual tasks primarily with their right or left hand. Such work demonstrates inflated evaluations of objects that are presented or oriented toward one's dominant or preferred hand (e.g., Casasanto 2009; Elder and Krishna 2012). These effects are presumed to arise via motor fluency effects whereby an object's placement near an individual's dominant hand facilitates mental simulations that correspond with one's past experiences with that object or similar ones.

In contrast, we focus on the *consistency* with which individuals use their dominant hand. Laterality researchers have long recognized the existence of wide inter-individual variability in handedness consistency (Annett 1970). Latent class analysis indicates that individuals can be parsimoniously categorized as consistent- or inconsistent-handed (Dragovic 2004). Consistent-handed individuals (CHs) use their dominant (right or left) hand for most unimanual tasks while inconsistent-handed individuals (ICHs) make greater use of their non-dominant hand. Genetic factors contribute to whether an individual is CH or ICH (Arning et al. 2013).

Psychological research has identified handedness consistency as an interesting individual difference factor because it is related to performance on many measures of cognition and personality (for a review, see Prichard et al. 2013). A unifying trend across many of these findings is that ICHs appear to be more cognitively flexible than CHs (e.g., Lyle and Grillo 2013). From an embodied cognition perspective, an intriguing possibility is that ICHs' greater manual flexibility leads to greater cognitive flexibility. In this light, we examine whether there are consistency-based differences in consumer response to price comparisons that contrast an item's sale price against its higher, regular price (Chandrashekar 2004).

Providing consumers with larger savings through greater deal depths (i.e., greater differences between the regular and sale price) should increase purchase probabilities (Grewal et al. 1998). The ability to effectively process deal depth information may depend, however, on the individual consumer's cognitive flexibility. Individuals with relatively low cognitive flexibility (i.e., CHs) may provide purchase intentions reflecting deal depth (i.e., more favorable intentions associated with greater price savings) given highly fluent, vertical price comparisons but not less fluent horizontal comparisons. In contrast, if individuals with relatively high cognitive flexibility (i.e., ICHs) can effectively process deal depth information regardless of comparison format, they should provide purchase intentions reflecting deal depth in response to both vertical and horizontal price comparisons.

These effects are replicated in two experiments and, as detailed in the “[General discussion](#)” section, cannot be accounted for via research in embodied cognition involving handedness (e.g., Casasanto's (2009) body-specificity hypothesis) or work examining spatial characteristics of price comparisons (e.g., Coulter and Norberg 2009). As such, the effects shown here represent a novel finding in the price

comparison literature and help establish handedness consistency as an embodied spatial cue that is relevant to consumer price judgments.

1 Theoretical framework

Researchers have long been interested in the impact of price comparisons on consumer perception and behavior (Choi and Coulter 2012). Typically, price comparisons display a product's sale price along with its higher, regular price (Chandrashekar 2004). Confirming the intuition that greater deal depth (i.e., greater disparity between regular and sale prices) should enhance purchase rates, the amount of savings conveyed in an offer has been identified as a critical determinant of consumer response to price promotions (Krishna 2009).

In presenting price comparisons to consumers, marketers may use two basic layouts (Coulter and Norberg 2009): horizontal (e.g., with the regular price on the left and the sale price on the right) and vertical (e.g., with the sale price displayed beneath the regular price). A robust finding in studies on price comparisons, which have utilized one presentation layout or the other, is that providing a regular price facilitates assessments of savings associated with the sale price (e.g., Grewal et al. 1998) and perceived value (Krishna et al. 2002). Of the two studies exploring differences between layouts, one (Choi and Coulter 2012, experiment 3) focused on response times, precluding an assessment regarding the ability of vertical and horizontal comparisons to impact price-related judgments. In the remaining study (Coulter and Norberg 2009, experiment 4), the discount amount exerted a positive influence on value perceptions and purchase intentions regardless of layout.

Nonetheless, horizontal and vertical price comparisons may differ along dimensions that have the potential to impact deal evaluations (e.g., intentions to purchase the promoted product). Our collective experiences as consumers suggest to us that regular and sale prices are often presented vertically to help one calculate the savings offered by the deal. This perception is unsurprising given that appraisals of price comparisons entail calculating differences between regular and sale prices (Choi and Coulter 2012; Thomas and Morwitz 2009). Using vertical layouts for price comparisons likely reflects childhood experiences learning multi-digit subtraction, which is facilitated when numbers are presented in a vertical (or columnar) format that helps align digits and improves accuracy in calculating absolute differences (Dehaene 1992).

To test our presumption, we conducted a pilot study ($N=30$) with adult participants recruited from Amazon's mTurk panel who were asked to reflect on their experience with price comparisons in the marketplace. These participants answered six questions assessing their familiarity with different price comparisons (e.g., "When I see advertisements like this, the prices are usually laid out: vertically/horizontally") and perceived ease of processing different price comparisons (e.g., "It is easier for me to compare prices if they are laid out: vertically/horizontally"). Familiarity and perceived ease of processing are two indicators of fluency (Reber and Schwarz 1999; Thomas and Morwitz 2009). Averaging across these items, a significantly higher ($Z=2.58$, $p<0.05$) percentage of participants attributed greater fluency to vertical (20/30 or 67 %) than horizontal (10/30 or 33 %) comparisons; the

greater fluency of vertical layouts was evident on each individual measure (all Z 's >2.00).

Given that vertical price comparisons should be more fluently processed than horizontal comparisons, we anticipate greater sensitivity to differences in deal depth when price comparisons are vertically versus horizontally presented. However, this advantage may depend on whether consumers are consistent- or inconsistent-handed. Identifying conditions under which evaluations of price comparisons may become insensitive to deal depth differences is important, given that such a result runs counter to the general finding that price judgments reflect the magnitude of discount associated with a price comparison.

1.1 Handedness consistency and its effect on the processing of price comparisons

As noted, a growing body of research demonstrates that ICHs and CHs differ on many measures of cognition and personality, converging on the notion that ICHs are generally more cognitively flexible. Given that this argument is made in detail elsewhere (Lyle and Grillo 2013; Prichard et al. 2013), only some particularly illustrative findings will be mentioned here. For example, ICHs produce more atypical uses for common objects and generate more alternate endings to hypothetical scenarios than do CHs (Jasper et al. 2008; Shobe et al. 2009). ICHs also score lower than CHs on indicators of authoritarian personality, which is characterized by cognitive inflexibility (Christman 2013; Lyle and Grillo 2013). Finally, ICHs are less rigid than CHs in their perception of ambiguous figures (Christman et al. 2009) and exhibit greater attitude change in response to a persuasive message (Christman et al. 2008).

All these findings indicate that ICHs possess a cognitive flexibility that mirrors their manual flexibility—that is, their tendency to manipulate objects sometimes with one hand and sometimes with the other. A consistency-based difference in cognitive flexibility has implications for whether consumer evaluations will reflect the variation in savings conveyed by vertical versus horizontal price comparisons. Based on the notion that more fluent stimuli are easier to process (Schwarz 2012), the ability of CHs to accurately compute and integrate deal savings into their judgments may be evident primarily when they are given more fluent vertical price comparisons. Under those conditions, CHs should provide more favorable purchase intentions in response to deals of greater depth. In contrast, the decreased cognitive flexibility of CHs may make them relatively insensitive to differences in deal depth for disfluent horizontal price comparisons. Given the greater cognitive flexibility of ICHs, they should provide evaluations that reflect deal depth variation regardless of price comparison layout.

Operationally, these expectations suggest a three-way interaction involving consumer handedness \times price comparison layout \times deal depth. Underlying this interaction are differential effects for CHs and ICHs. The evaluations provided by CHs are expected to reflect deal depth differences to a greater extent for vertical versus horizontal price comparisons, indicative of a price comparison layout \times deal depth interaction. However, ICHs are anticipated to provide evaluations that are sensitive to deal depth regardless of layout, suggesting a main effect of deal depth that is not qualified by a price comparison layout \times deal depth interaction. These expectations are tested and supported across two experiments. By introducing the concept of handedness

consistency as an individual difference factor capable of shaping deal evaluations, the present research meaningfully extends prior work on price comparisons.

2 Experiment 1

2.1 Participants and procedure

We randomly assigned 295 undergraduate students (37 % female) to a 2 (layout: horizontal vs. vertical) \times 2 (deal depth: high vs. low) \times 2 (handedness: consistent vs. inconsistent) between-subjects design with handedness measured. Using materials from Coulter and Norberg (2009), participants were asked to look at an ad for a product (a pizza cutter) that included the brand name (“Pro Pizza Cutter”) as well as an image and brief description of the product. More critically, the advertisements also included a price comparison listing the regular price of \$7 next to a sale price, with all information presented in 88-point font. In the horizontal (vertical) layout condition, the sale price was presented horizontally to the right of (vertically beneath) the regular price. The manipulation of deal depth involved varying the sale price as either \$5 (for a \$2 savings) in the high condition or \$6.75 (for a \$0.25 savings) in the low condition.

After viewing this information, participants indicated how likely they were to make a purchase at the sale price assuming they were in the market to buy a pizza cutter (1=not at all likely, 9=very likely). Purchase intention was the focal dependent variable because of its common usage in price comparison research (Grewal et al. 1998). Participants then reported whether the regular and sale prices were presented vertically or horizontally as a check on the layout manipulation and also responded to several demographic measures.

To assess handedness consistency, we used the hand preference inventory described in Lyle et al. (2008b), which queries the direction and consistency of handedness for ten activities. Scores range from -100 (exclusive left-handedness) to $+100$ (exclusive right-handedness) in 5-point intervals. We classified participants as either consistent or inconsistent in handedness regardless of left- or right-handedness, because many consistency-based differences appear to be independent of handedness direction (Prichard et al. 2013; Lyle et al. 2012). Furthermore, though one could treat consistency as a continuous variable, all of the studies we cite regarding handedness (which provide the primary motivation for the present investigation) have treated consistency as a categorical variable. Accordingly, we adopt a categorical approach in examining handedness.

In particular, an absolute value of 80 was employed to categorize CHs and ICHs. This value was first identified as a common median score among undergraduates (Christman et al. 2004; Lyle et al. 2008a, 2008b) and has subsequently been used as an a priori cutoff score that statistically discriminates between CHs and ICHs on many measures of cognition and personality (e.g., Edlin and Lyle 2013; Lyle et al. 2012; Lyle and Martin 2010). Using this value, scores of 80 or higher were coded as CHs and 75 or lower as ICHs, resulting in 67 % (171) of participants being classified as CHs. Seven percent (19) of all participants had raw scores lower than zero, which indicates left-handedness. Of those, 42 % (8) were CHs. We

excluded 39 participants who indicated English as their second language, leaving 256 participants for analysis.

3 Results

The layouts were perceived as intended, with 94 % (98 %) of participants correctly indicating the layout in the horizontal (vertical) condition. The anticipated interaction involving handedness, layout, and deal depth on purchase intentions was significant ($F(1, 248)=5.51, p=0.02$). We explored this interaction by assessing the layout \times deal depth interaction by handedness. We anticipated that participants would exhibit greater purchase intentions for high versus low deal depth in all conditions except when CHs processed a horizontal price comparison, suggesting a three-way interaction of handedness, layout, and discount size. To test this expectation, we conducted an analysis using a generalized linear model (see Fig. 1 for plots).

As anticipated, the intentions of CHs reflected a significant layout \times deal depth interaction ($F(1, 167)=7.03, p=0.01$). Contrasts indicated that, although intentions were insensitive to deal depth in the horizontal price condition ($M_{high}=6.27, M_{low}=5.50, t=1.65, p=0.10$), more favorable intentions were observed for larger discounts in the vertical comparison condition ($M_{high}=6.66, M_{low}=4.13, t=5.01, p<0.01$). A different pattern of effects emerged for ICHs. As expected, the analysis yielded a significant main effect of deal depth ($F(1, 81)=10.60, p<0.01$) that was not contingent on layout (i.e., the layout \times deal depth interaction was not significant: $F(1, 81)=1.05, p=0.31$), with more favorable intentions detected in response to higher ($M=5.98$) versus lower ($M=4.41$) deal depth.

Given that a critical result in our framework involves a lack of deal depth effects for CHs processing a horizontal price comparison, it is important to exclude the possibility that this null effect arose due to lack of power (Kim et al. 1996). Accordingly, we conducted post-hoc statistical power analyses (Cohen 1987). Using $\alpha=0.05, n=32$, and a maximum difference of 2.53 (SD=2.46), we found power=1.0000, which

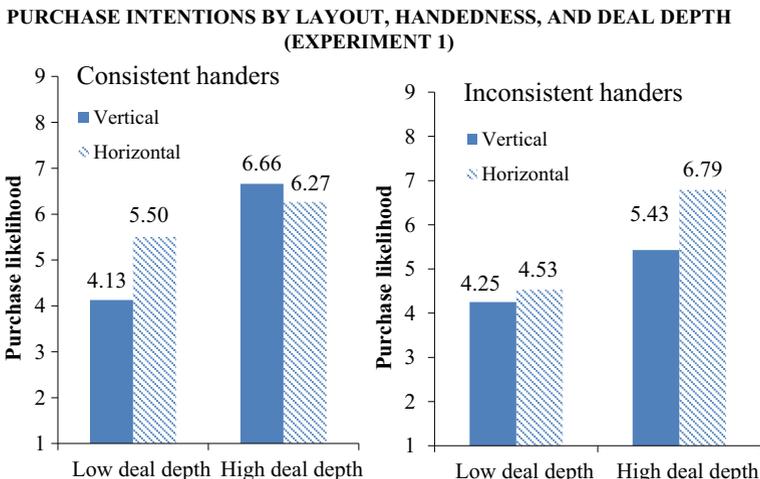


Fig. 1 Purchase intentions by layout, handedness, and deal depth (experiment 1)

exceeds Cohen's (1987) recommended criterion of 0.80, eliminating insufficient power as a cause of this null effect.

4 Discussion

These findings support our theorizing regarding handedness consistency-based effects and are compatible with the notion that CHs are less cognitively flexible than ICHs. As a result, CHs provided more favorable intentions to a deal with greater depth (i.e., offering higher savings) in response to fluent vertical comparisons versus disfluent horizontal comparisons. In contrast, the intentions of ICHs reflected differences in deal depth in both layout conditions. We argue that this finding reflects the greater cognitively flexibility of ICHs, which enables them to accurately discern and employ the price savings conveyed in a price comparison regardless of layout. To assess the generalizability of these findings, we conducted a second study with a different sample population (adult consumers) and stimuli with different font sizes (12-point Times Roman) than Experiment 1 (undergraduate students and 88-point Times Roman, respectively).

5 Experiment 2

5.1 Participants and procedure

Participants were 258 US members of Amazon's mTurk panel (58 % female; $M_{age}=34.84$, $SD=13.81$) participating for a nominal payment. We randomly assigned each participant to one of the conditions in a 2 (layout: horizontal vs. vertical) \times 2 (deal depth: high vs. low) \times 2 (handedness: consistent vs. inconsistent) between-subjects design, with handedness as a measured variable. The procedure followed that of Experiment 1 except that, as noted, the regular and sale prices in the current study were presented in 12-point italicized gray font. Using the same coding for handedness as in Experiment 1, 63 % (137) of participants were classified as CHs. Overall, 12 % (25) of participants were left-handed and 52 % (13) were CHs.

Finally, an instructional manipulation check asked participants to indicate how seriously they took the study. The question instructed participants to choose the “not at all seriously” option rather than indicating their true response (Oppenheimer et al. 2009). After excluding four participants indicating English was their second language and 38 who failed the instructional manipulation check, 216 participants remained for analysis.

6 Results

The layout manipulation operated as intended, as 89 % (96 %) of participants correctly indicated the layout in the horizontal (vertical) condition. The critical three-way interaction on purchase intentions was significant ($F(1, 208)=3.67$, $p=0.05$; see Fig. 2), prompting us to assess the comparison layout \times deal depth interaction on

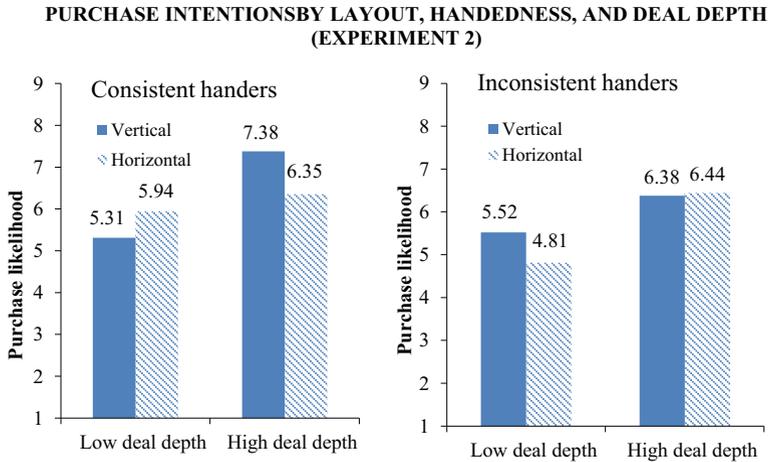


Fig. 2 Purchase intentions by layout, handedness, and deal depth (experiment 2)

intentions by handedness. As expected, for CHs, the two-way interaction was significant ($F(1, 133)=5.18, p=0.02$); while intentions were insensitive to the deal depth manipulation in the horizontal comparison condition ($M_{high}=6.35, M_{low}=5.94, t=0.77, p=0.44$), more favorable intentions were observed for larger discounts in the vertical comparison condition ($M_{high}=7.38, M_{low}=5.31, t=3.79, p<0.01$). In contrast, for ICHs, the two-way interaction was not significant ($F(1, 75)=0.50, p=0.48$); only a main effect of deal depth condition was observed ($F(1, 75)=5.20, p=0.03$), with more favorable intentions detected in response to higher ($M=6.39$) versus lower ($M=5.17$) deal depth.

As in Experiment 1, we performed post-hoc statistical power analyses (Cohen 1987), estimating the power based on our observed results for Experiment 2 using Minitab. For purchase intentions, with $\alpha=0.05, n=27$, and a maximum difference of 2.07 ($SD=2.78$), we found power=0.9996, which exceeds Cohen's (1987) recommended criterion of 0.80. Thus, it is unlikely that this null effect of deal depth was due to insufficient power.

7 General discussion

These experiments provide initial evidence that the effect of price comparisons on purchase intentions depends on a previously unappreciated factor with regard to the processing of horizontally versus vertically presented information: handedness consistency. In doing so, the present investigation helps establish handedness consistency as an embodied spatial cue that represents a potentially potent moderator of consumer judgments. These effects were robust and observed across two large-sample experiments using diverse sample populations.

Specifically, we found that ICHs reliably produced responses reflecting differences in discount magnitude for both vertical and horizontal price comparisons. Similar deal depth effects were obtained with respect to CHs evaluating price comparisons that were vertically presented. These results are compatible with a general result from the price

comparison literature indicating that consumer responses are positively related to differences in a product's regular and sale price. Counter to this finding, CHs were relatively insensitive to the magnitude of the price difference when presented with horizontal price comparisons.

Importantly, these findings cannot be accounted for via embodied cognition frameworks involving handedness such as Casasanto (2009) body-specificity hypothesis. Given that sale prices were presented on the right in horizontal layouts, a body-specificity account would lead one to anticipate CHs (most of whom were right-hand dominant) to exhibit higher intentions in the horizontal versus vertical layout condition, regardless of deal depth. In contrast to that expectation, results from both experiments showed that, in the high discount condition, CHs provided lower intentions in response to horizontal versus vertical price comparisons.

Our results also cannot be explained via research examining the physical aspects of price comparisons (e.g., the font size and physical distance associated with the presentation of the regular and sale price) on deal evaluations (e.g., Coulter and Norberg 2009). Within each study, font size was held constant across both layout conditions and therefore, is unable to explain the observed variation in purchase intentions. Moreover, because the same distance separated the regular and sale price within each layout condition, physical distance cannot account for the variability in purchase intentions found for CHs and ICHs processing horizontal price comparisons in each study.

Given that CHs, as defined in this research and elsewhere, outnumber ICHs (e.g., Lyle et al. 2012), it would appear that most of the population is consistent-handed. An important practical implication of our findings, then, is that when marketers are able to provide only small discounts, they may be able to maximize sales by using horizontal layouts that reduce sensitivity to deal depth for the consistent-handed majority. However, if marketers are able to offer a larger discount than a competitor, greater sales lift may be generated by using a vertical layout that maximizes sensitivity to deal depth. Thus, marketers would be advised to give greater consideration to the layout of price comparison information based on the deal depth.

One limitation of our work is that we examined purchase intentions for only one type of product. Future research could investigate a wider range of products. Another avenue for future research would be to manipulate handedness consistency experimentally rather than measuring it as a subject variable. Casasanto and Chrysiou (2011) provided evidence that embodied cognition depends on recent motor experiences. If this is correct, and if our effects are indeed a consequence of embodied cognition, then assigning some participants to complete laboratory tasks repeatedly with a single hand while assigning others to make use of both hands could experimentally induce consistency versus inconsistency, prompting differential responses to horizontal price comparisons for these two groups.

Finally, additional work is needed to obtain evidence germane to the fluency and processing assumptions underlying our framework, for example, the use of response times or other measures capable of detecting the presence of fluency-based heuristic processing versus the more analytical processing that occurs under conditions of disfluency. Findings from such research would provide additional insight to the marketing literature involving fluency effects in general (e.g., Tsai and McGill 2011) and research from this literature examining price judgments in particular (e.g. Chang 2013).

References

- Annett, M. (1970). A classification of hand preference by association analysis. *British Journal of Psychology*, *61*, 303–321.
- Arning, L., Ocklenburg, S., Schulz, S., Ness, V., Gerding, W. M., Hengstler, J. G., et al. (2013). PCSK6 VNTR polymorphism is associated with degree of handedness but not direction of handedness. *PLoS ONE*, *8*(6), e67251. doi:10.1371/journal.pone.0067251.
- Casasanto, D. (2009). Embodiment of abstract concepts: good and bad in right- and left-handers. *Journal of Experimental Psychology General*, *138*(3), 351–367.
- Casasanto, D., & Chrysikou, E. G. (2011). When left is 'right': motor fluency shapes abstract concepts. *Psychological Science*, *22*(4), 419–422.
- Chandrasekaran, R. (2004). The influence of redundant comparison prices and other price presentation formats on consumers' evaluations and purchase intentions. *Journal of Retailing*, *80*, 53–66.
- Chang, C. (2013). Price or quality? The influence of fluency on the dual role of price. *Marketing Letters*. doi:10.1007/s11002-013-9223-8.
- Choi, P., & Coulter, K. S. (2012). It's not all relative: the effects of mental and physical positioning of comparative prices on absolute versus relative discount assessment. *Journal of Retailing*, *88*(4), 512–527.
- Christman, S. D. (2013). Individual differences in personality as a function of degree of handedness: Consistent-handers are less sensation seeking, more authoritarian, and more sensitive to disgust. *Laterality: Asymmetries of Body, Brain, and Cognition*. In press.
- Christman, S. D., Propper, R. E., & Dion, A. (2004). Increased interhemispheric interaction is associated with decreased false memories in a verbal converging semantic associates paradigm. *Brain and Cognition*, *56*, 313–319.
- Christman, S. D., Henning, B. R., Geers, A. L., Propper, R. E., & Niebauer, C. L. (2008). Mixed-handed persons are more easily persuaded and are more gullible: interhemispheric interaction and belief updating. *Laterality: Asymmetries of Body, Brain, and Cognition*, *13*, 403–426.
- Christman, S. D., Sontam, V., & Jasper, J. D. (2009). Individual differences in ambiguous figure perception: degree of handedness and interhemispheric interaction. *Perception*, *38*, 1183–1198.
- Cohen, J. (1987). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Coulter, K. S., & Norberg, P. A. (2009). The effects of physical distance between regular and sale prices on numerical difference perceptions. *Journal of Consumer Psychology*, *19*, 144–157.
- Dehaene, S. (1992). Varieties of numerical abilities. *Cognition*, *44*, 1–42.
- Dragovic, M. (2004). Categorization and validation of handedness using latent class analysis. *Acta Neuropsychiatrica*, *16*, 212–218.
- Edlin, J. M., & Lyle, K. B. (2013). The effect of repetitive saccade execution on the attention network test: enhancing executive function with a flick of the eyes. *Brain and Cognition*, *81*, 345–351.
- Elder, R., & Krishna, A. (2012). The 'visual depiction effect' in advertising: facilitating embodied mental simulation through product orientation. *Journal of Consumer Research*, *38*(6), 988–1003.
- Grewal, D., Monroe, K. B., & Krishnan, R. (1998). The effects of price-comparison advertising on buyers' perceptions of acquisition value, transaction value, and behavioral intentions. *Journal of Marketing*, *62*(2), 46–59.
- Jasper, J. D., Barry, K., & Christman, S. D. (2008). Individual differences in counterfactual production. *Personality and Individual Differences*, *45*, 488–492.
- Kim, J., Allen, C. T., & Kardes, F. R. (1996). An investigation of the mediational mechanisms underlying attitudinal conditioning. *Journal of Marketing Research*, *33*(August), 318–326.
- Krishna, A. (2009). Behavioral pricing. In V. R. Rao (Ed.), *Handbook of pricing research in marketing* (pp. 76–90). Northampton, MA: Edward Elgar.
- Krishna, A., Briesch, R., Lehmann, D. R., & Yuan, H. (2002). A meta-analysis of the impact of price presentation on perceived savings. *Journal of Retailing*, *78*(2), 101–118.
- Lyle, K. B., & Grillo, M. C. (2013). Consistent-handed individuals are more authoritarian. *Laterality: Asymmetries of Body, Brain, and Cognition*. In press.
- Lyle, K. B., & Martin, J. M. (2010). Bilateral saccades increase intrahemispheric processing but not interhemispheric interaction: implications for saccade-induced retrieval enhancement. *Brain and Cognition*, *73*, 128–134.
- Lyle, K. B., Logan, J. M., & Roediger, H. L., III. (2008a). Eye movements enhance memory for individuals who are strongly right-handed and harm it for individuals who are not. *Psychonomic Bulletin and Review*, *15*, 515–520.

- Lyle, K. B., McCabe, D. P., & Roediger, H. L., III. (2008b). Handedness is related to memory via hemispheric interaction: evidence from paired associate recall and source memory tests. *Neuropsychology*, *22*, 523–530.
- Lyle, K. B., Hanaver-Torrez, S. D., Hackländer, R. P., & Edlin, J. M. (2012). Consistency of handedness, regardless of direction, predicts baseline memory accuracy and potential for memory enhancement. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *38*, 187–193.
- Meier, B. P., Schnall, S., Schwarz, N., & Bargh, J. A. (2012). Embodiment in social psychology. *Topics in Cognitive Science*, *4*(4), 1–12.
- Oppenheimer, D., Meyvis, T., & Davidenko, N. (2009). Instructional manipulation checks: detecting satisficing to increase statistical power. *Journal of Experimental Social Psychology*, *45*, 867–872.
- Prichard, E., Propper, R. E., & Christman, S. D. (2013). Degree of handedness, but not direction, is a systematic predictor of cognitive performance. *Frontiers in Psychology*, *4*(9).
- Reber, R., & Schwarz, N. (1999). Effects of perceptual fluency on judgments of truth. *Consciousness and Cognition*, *8*(3), 338–342.
- Schwarz, N. (2012). Feelings-as-information theory. In P. A. M. Van Lange, A. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (pp. 289–308). Thousand Oaks, CA: Sage.
- Shobe, E. R., Ross, N. M., & Fleck, J. I. (2009). Influence of handedness and bilateral eye movements on creativity. *Brain and Cognition*, *71*, 204–214.
- Thomas, M., & Morwitz, V. (2009). Hueristics in numerical cognition: implications for pricing. In V. R. Rao (Ed.), *Handbook of pricing research in marketing* (pp. 132–149). Northampton, MA: Edward Elgar.
- Tsai, C. I., & McGill, A. L. (2011). No pain, no gain? How fluency and construal level affect consumer confidence. *Journal of Consumer Research*, *37*(5), 807–821.