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Right-side Bias in Choosing an Item from Identical Objects: Two Field Studies

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Abstract

When identical or psychologically non-differential objects are horizontally aligned, people are said to show either middle- or right-position bias in choosing one of the objects. This paper consists of two field studies conducted to examine which of these position biases is more probable in each case. In Study 1, consumers in a campus cafeteria took pairs of chopsticks from three horizontally arranged bins. In Study 2, a researcher visited supermarkets and counted the number of identical products that were horizontally stocked, in at least two adjacent rows of the shelves, to explore the effect of the rows on the products taken by shoppers. These two field studies revealed a reliable right-side bias in each case. We discuss the possible reasons for this right-side bias found in our studies.

Key words: position bias, choice, consumer behavior, shelf management

The choice of an item from identical or psychologically non-differential objects may be affected by its local position (see Bar-Hillel, 2011, for a review). When objects are horizontally aligned, two types of position biases have been reported in the literature: middle-position bias (i.e., edge avoidance) and right-side bias. A series of studies conducted by Christenfeld (1995) demonstrated a strong middle-position bias in choosing an item from identical objects. For example, in a field study executed at supermarkets (Study 1), he found that 52% (exceeding the chance probability of

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33%) of the items were chosen from the middle row of store shelves when identical products were displayed in three rows. In the case of a four-row display, 71% (exceeding the chance probability of 50%) of the items were chosen from the middle two rows. The middle-position bias was replicated in his another field study (Study 2) that targeted the choice of restroom stalls and toilet paper dispensers at a public beach.

Shaw, Bergen, Brown, and Gallagher (2000) also reported middle-position bias in two experiments when participants chose one object from each of the following selections: highlighter pens, survey piles, chairs, or graphic posters. Similar middle-position biases have been reported when people chose an object from a selection of similar pictures (Rodway, Schepman, & Lambert, 2012), fictitious brand names (Atalay, Bodur, & Rasolofoarison, 2012), chewing gum or pretzels (Valenzuela, & Raghubir, 2009), human faces (Rodway, Schepman, & Lambert, 2013), contemporary artwork images (Kreplin, Thoma, & Rodway, 2014), and options of questionnaire items (Attali & Bar-Hillel, 2003; see also Christenfeld, 1995, Study 3).

On the other hand, Nisbett and Wilson (1977) reported a strong right-side bias in choosing one of four pairs of identical pantyhose. According to Wilson and Nisbett (1978), the percentages of choices made by passersby were 12%, 17%, 31%, and 40%, from the leftmost to rightmost pantyhose (see also Kühberger Kogler, Hug, & Mösl, 2006, for a replication with mixed results). Kruglanski, Chun, Sleech-Keppler, and Friedman (2005) replicated the right-side bias study in choosing athletic socks, but only when passersby were under a time pressure. Nakajima, Tajiri, and Ohira (2009) also demonstrated a strong right-side bias of student participants in choosing consumer items that were horizontally arranged on the shelves in three experiments conducted in a mock shopping room. Similar right-side biases were observed in choosing a seat in an imaginary movie theater printed on a chart (Karev, 2000; Okubo, 2010; Weyers, Milnik, Muller, & Pauli, 2006). The right-side bias is also mentioned in popular books for retailing (e.g., Hasty & Reardon, 1997; Underhill, 1999), although some shelf-management studies reported a null horizontal position bias in actual stores (Drèze, Hock, & Purk, 1994) and in a simulated environment (Chandon, Hutchinson, Bradlow, & Young, 2009).

This research study was conducted to provide another set of data concerning position bias in making choices from horizontally located identical objects. Two field studies were executed in Japan. The first study was conducted in cooperation with a campus cafeteria to tally pairs of chopsticks taken by consumers from three bins. In the second study, we attempted to replicate the supermarket study of Christenfeld (1995), as independent replications are critical in confirming the reliability and generality of findings in psychological studies (e.g., Koole & Lakens, 2012).

Study 1: Chopstick choice at a cafeteria

Method

A campus cafeteria of the authors' university had three stacking racks (Versa Organizers, Cambro Manufacturing Company, Huntington Beach, CA) for cutlery and chopsticks in separate locations of the serving area. Each rack held eight dark-brown plastic bins ($13 \times 30.5 \times 11$ cm, $w \times l \times h$) in a two by four arrangement, and pairs of disposable wooden chopsticks were placed in three adjacent bins of the bottom tier. The bins were restocked by the cafeteria staff in the morning and also after lunchtime. In order to avoid disturbing the customers and the cafeteria operation, the second author obtained permission from the cafeteria staff to photograph the chopstick bins. Chopstick bins were photographed one by one from the front before the end of lunchtime during five weekdays, for later scoring.

An exact count of the pairs of chopsticks in each bin photo was impossible, because dozens of pairs were hidden under other pairs, or behind the front wall of the bin. Thus, we followed a guessing-then-averaging procedure to obtain a good estimate of the number (Treynor, 1987), as follows. A group of 13 college students (ages ranged from 20-22 years old; nine females and four males) in a small seminar room was initially given an anchor photo of a bin full of chopsticks that was projected onto a 42-inch plasma display. After the instruction that the maximum number of pairs of chopsticks held in the bin was 241, the students were asked to guess and write down the number of pairs of chopsticks in each of the forthcoming bin photos by watching the still image projected on the display. The total number of photographed bin images was 45, consisting of three (left, center, and right positions in each tier) $\times$ three (separate racks) by five (days) combinations. A quasi-randomized series of these images was presented one by one to the students. Notably, the students were unaware of which bin photos were from the left, middle, or right positions in the rack, because they were close-up shots. After all photos were presented, the numbers on the scoring sheets were averaged to obtain the estimated number of pairs of chopsticks for each bin photo. By subtracting the obtained estimate from 241 (the maximum number of pairs in a bin), we obtained the approximate number of consumers' choices for each bin.

Results

The mean approximate number of choices ($\pm$ standard errors) as a function of bin positions is as follows: 66.4 ± 7.4, 86.0 ± 10.1, and 129.0 ± 12.2 for the left, middle, and right positions ($n = 15$ each), respectively. A one-factor repeated measures analysis of variance (ANOVA), with the 15 (three racks by five days) sets of data regarding the three positions, supported the position bias ($F[2, 28] = 9.56$, p

$<.001$, $MSe = 1607.31$, $\eta_p^2 = .41$); subsequent pairwise comparisons by Ryan's procedure with adjusted alpha levels revealed significant differences between the left and right positions ($t[28] = 4.28$, $p < .001$, $r = .63$), and between the middle and right positions ($t[28] = 2.94$, $p = .004$, $r = .49$), but not between the left and middle positions ($t[28] = 1.34$, $p = .224$, $r = .25$).

Study 2: The choice of shelves at supermarkets

Method

The targets of the research study included a store (Store 1) from a nationwide large supermarket chain, and two stores (Stores 2 and 3) from a regional supermarket chain. Our survey focused on identical products (i.e., those of the same size, weight, color, flavor, etc.), which were horizontally stocked in at least two adjacent rows of the shelves, of packaged preserved foods (e.g., pastas, soup cans, bottled seaweed, and instant noodles) and seasonings (e.g., salt, sugar, spice, sauce, oil, dressing, ketchup, and mayonnaise). The third author visited Stores 1 and 2 twice each, and Store 3 once, for approximately 90 min each at around noon. He counted the number of product items that had presumably been removed by the shoppers from the rows of the shelves. Notably, the items were restored and displayed neatly by the store workers before the opening and during the opening hours periodically. Thus, as in Christenfeld (1995), the collected data reflect whether shoppers had removed items since the last restocking.

Results

Table 1 presents the total number of times shoppers chose an item from each row stocked, as a function of the number of rows. The maximum number of rows shown here was four, because the items were rarely arranged in five or more rows in our target stores. Shoppers chose more items from the right position than the left position when identical items were stocked in two rows (binomial test, $p = .002$). The position effect was also evident in the three- and four-choice settings ($\chi^2[2] =$

Table 1 Number of times supermarket shoppers chose an item from each row stocked, categorized by how many rows of that item were arranged

Number of rows stocked	Row from which the item was chosen				
	1	2	3	4	total
2	620	738	−	−	1358
3	422	476	501	−	1399
4	127	143	165	181	616

6.99, $p = .030$; $\chi^2[3] = 11.04$, $p = .012$). Subsequent pairwise comparisons by Ryan's procedure revealed a significant difference between the left and right positions in the three-choice setting ($p = .010$, *nominal* $\alpha = .017$), and a significant difference between the leftmost and rightmost positions in the four-choice setting ($p = .003$, *nominal* $\alpha = .008$). The other contrasts failed to reach the adjusted significance levels.

Discussion

The two field studies that were executed in daily life situations (i.e., campus cafeteria and supermarkets) showed right-side biases when choosing items from identical objects. The right-side bias observed in the second study is particularly remarkable because it is a replication of the supermarket study conducted in southern California by Christenfeld (1995), which found a middle-position bias in choosing items from the rows of identical products. Unfortunately, we have no simple explanation for this discrepancy. Factors that might have affected the results include differences in the targets recorded (products), store layouts, and streams of shoppers in the stores. It is noteworthy that buying behaviors (or shopping styles) in supermarkets differ between Japan and the US. For example, the average Japanese city dweller visits supermarkets 2.8 times per week and spends 3,300 yen per visit in Japan (Tatsuzawa, 2012), while the average American visits grocery stores (including supermarkets) 2.2 times per week and spends 47.68 dollars per visit (Food Marketing Institute, 2012). Thus, it is very probable that the number of purchases per visit is smaller in Japan compared with the US. As a result of this shopping style, the majority of shoppers use baskets rather than shopping carts in Japan. Picking behavior might be affected by this difference.

Another factor that may contribute to the discrepancy between our results and those of Christenfeld (1995) is a possible difference between Japanese and American attitudes regarding the horizontally lined items. In the study conducted in the U.S., Valenzuela and Raghubir (2009) argued that people believe that items placed in the middle position are the most popular, and that this belief yields the middle-positon bias in choosing items. If such a belief is not (or is weakly) shared by Japanese shoppers, the middle-position bias disappears in Japanese supermarkets. However, this explanation alone is not sufficient to account for the right-side bias observed in the present study.

As noted in the introduction of this article, Kruglanski et al. (2005) have demonstrated that the right-side bias occurs only when people are under a time pressure. This argument might be applicable to the present research. Many customers in the target campus cafeteria hurry to find a seat to complete their meals during their

short lunch period of 50 min. Married women, who are the majority of supermarket users in Japan, shop in supermarkets for less than 30 min per visit (24 min on weekdays and 29 min on weekends) on average (Macromill, 2009). By contrast, the average American women shop in grocery stores for 46 min per visit (Hamrick, Andrews, Guthrie, Hopkins, & McClelland, 2011).

Some researchers have claimed that the direction and flow of one's eyes (Atalay et al., 2012; Kreplin et al., 2014; Kruglanski et al., 2005; Nisbett & Wilson, 1977), hemisphere dominance (Karev, 2000; Okubo, 2010; Weyers et al., 2006), and the left-small, right-large stereotype (Romero & Biswas, 2014; Valenzuela & Raghubir, 2010) are critical for position bias. Although these factors might contribute to the bias in individual cases, we prefer the hypothesis that states that hand laterality is critical (Underhill, 1999) for the right-side bias reported here and in some other cases. Notably, about 90% of Japanese are right-handed (e.g., Hatta & Kawakami, 1995).

Our argument is based on the research of Nakajima et al. (2009). In one of the experiments, participants were unknowingly prompted to use their right or left hand to pick items from the shelves in a mock shopping room. Specifically, the aim of the experiment was disguised by administering a personality test and wrapping a blood-pressure cuff around one of each of the participant's arms for mock online monitoring, before requiring him/her to pick six out of the eight types of products on the shelves in a separate room; each of the eight shelves had four specific identical objects (merchandise sold at 100-yen shops, such as scissors and pens). No specific instruction was given by the experimenter, but all participants assumed that the aim of the study was to investigate any relationship between the types of merchandise they chose and their psychophysiological states. The use of the right or left hand was unconsciously manipulated by the cuff side. The percentages of items taken from the leftmost to rightmost rows were 8%, 8%, 22%, and 62% for the right-hand users, while the corresponding scores were 63%, 17%, 13%, and 7% for the left hand users.

The two field studies reported here have some practical implications. For example, if there is a limited number of chopsticks, then restocking them in the right bin rather than the other bins is probably more convenient for cafeteria customers. This is also the case with products on the shelves for supermarket shoppers. Notably, the right-side bias observed here is in agreement with one of the shelf-management tips mentioned in popular books for retailing (e.g., Hasty & Reardon, 1997; Underhill, 1999). These applications, however, should be carefully considered because the middle position, rather than the right, is preferable in some situations (e.g., Christenfeld, 1995).

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