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Psychological studies have shown that when individuals move their gaze between two alternative objects, they tend to choose the object that holds their gaze for longer (the gaze-manipulation effect). This effect is especially evident when both alternatives appeal to the viewer. We hypothesized that if individuals have an interest in sports and/or fashion, and thus view varieties of sportswear favorably, then gaze manipulation would influence their choice. Japanese university students participated in our experiments. The participants made preference choices between two uniforms of European football teams, which were presented alternately across the left and right sides of a computer screen six times for different durations (900 ms vs. 300 ms). They were required to compare the uniforms with or without fixing their gaze directly on them. They also completed questionnaires designed to assess their interest in football and fashion. The results showed that the gaze-manipulation effect was not significant across all participants or across those participants who merely liked fashion, or who merely watched football or casually played it. However, the effect was significant in participants who had been members of football teams. Our results suggest that application of the gaze-manipulation technique would be more effective for visual advertisement of sports items if it was focused on sports players.

Keywords: preference decision, gaze, gaze cascade effect, sports experience, football shirt

1. Introduction

We often find ourselves looking at a thing and then are aware that it is because the thing appeals to us. However, Shimojo et al. (2003) reported an opposite phenomenon, i.e., we look at a thing and then the thing comes to appeal to us. They used a gaze manipulating technique: two faces were presented alternately on a computer screen for a number of repetitions (e.g., 6 times). One was presented on the right side and the other was presented on the left side for different durations (900 ms vs. 300 ms). After participants looked at the faces shifting their gazes toward the presented face, the 900 ms faces were preferred over the 300 ms ones (the gaze-manipulation effect, GME).

Armel et al. (2008) showed that when one was required to make a binary preference choice between a pair of appetitive food items, one frequently chose the item on which his/her gaze stayed for a longer time (positive GME); conversely, when both items were aversive, the negative effect occurred: one frequently chose the item on which his/her gaze stayed for a shorter time. Thus, liking rates of the items influence the effects. When we think of a realistic situation such as choosing sports equipment, the items are attractive depending on one’s interest: football shirts, for example, are attractive in general for football players, football fans or fashion lovers. We hypothesized that any of such individual factors affects the GME on preference choices of football shirts. If we can identify the factor(s), it will open
new doors to advertising methods targeting specific groups of people. To test the hypothesis, we compared the GMEs on football shirts between two groups of participants depending on the interest in football and fashion. In other words, we focused on the background of each participant though previous research had focused on the attractiveness of each alternative item (Armel et al., 2008). As a result, the GME was significant only in participants who had been members of football teams.

2. Materials and Methods

2.1. Participants

We tested 24 naïve Japanese university students (12 males) aged 19-28 (mean 22.0) years with normal or corrected-to-normal vision. This study was approved by the Ethics Committee on Human Research of Waseda University. Written informed consent was obtained from all participants prior to the initiation of the experiments.

2.2. Procedure

Participants viewed stimuli on a 17” cathode-ray-tube monitor in a darkroom, with their heads stabilized on a chin rest. After presentation of a central fixation cross for 2 s, two football shirts were presented alternately six times. One shirt was presented on the right side of a screen for 900 ms (or 300 ms) and the other shirt was presented on the left side for 300 ms (or 900 ms). The pairs of shirts were randomly sampled from 208 made-to-order illustrations of European professional football team shirts in each trial. No illustration was used in other trials. Participants were required to shift their gazes onto the shirts in the main condition (Fig. 1a) or to fixate their gazes on the central cross in the control condition (Fig. 1b). At the end of each trial, the participants reported which of the two shirts was more attractive by pressing a key. Each condition consisted of 100 trials. The order of conditions was counterbalanced among participants. After all trials, the participants completed questionnaires designed to assess their interest in football and fashion (for details, see 3.2-3.5 and Table 1).

3. Results

3.1. Reaction time

The reaction time (RT) across participants was 650 ± 67.0 (mean ± SEM) ms and 655 ± 75.4 ms under the main and control conditions respectively. There was no difference in the RTs between both conditions ($t_{10} = 0.91, P = 0.39$), indicating there is no difference in processing costs or efforts among the conditions. In the case that RTs were out of the range of each participant’s mean ± 3 SDs, the trials were excluded from the analyses. The mean number of excluded trials was 2.42 (min-max: 0-4) and 2.25 (0-5) under the main and control conditions respectively ($t_{10} = 0.20, P = 0.85$).

3.2. Preferences for longer-presented shirts

We calculated the percentage of trials in which participants chose the shirt presented for 900 ms out of the total number of trials. They were 51.5 ± 0.85% and 49.9 ± 1.11% under the main and control conditions, respectively (Fig. 2a). Both values were not significantly different from the chance level ($t_{23} = 1.81, P = 0.08$ under the main condition and $t_{23} = 0.05, P = 0.96$ under the control condition). The index of the GME was calculated by subtracting the percent values under the control condition from those under the main condition. There was no significant GME ($1.59 ± 1.33, t_{23} = 1.20, P = 0.24$).

3.3. Preferences in fashion and football

The results from the questions related to the preferences in fashion and football are summarized in Table 1. We separated the participants into two groups for each question: the participants whose ratings were larger than the mean among all participants and the participants whose ratings were not. For each question and each group, we again calculated the percent preference for longer-presented shirts.
### Table 1  Summary of the quantification of individual factors.

<table>
<thead>
<tr>
<th>Category</th>
<th>Question</th>
<th>Mean ± SE (t value, P value)</th>
<th>Group</th>
<th>n</th>
<th>Main (%) ± SE (t value, P value)</th>
<th>Control (%) ± SE (t value, P value)</th>
<th>Index of GME ± SE (t value, P value)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fashion</strong></td>
<td>How much are you interested in fashion? (scale 1 = not at all to 7 = very much)</td>
<td>5.42 ± 0.29 (5.15 ± 0.27)</td>
<td>mean &lt; =</td>
<td>12</td>
<td>51.52 ± 0.85 (1.26, 0.23)</td>
<td>49.61 ± 1.15 (0.24, 0.81)</td>
<td>1.91 ± 1.13 (1.19, 0.26)</td>
</tr>
<tr>
<td></td>
<td>How much do you pay attention to fashion when you play sports? (scale 1 = not at all to 7 = very much)</td>
<td>4.75 ± 0.24 (5.18 ± 0.20)</td>
<td>mean &lt; =</td>
<td>9</td>
<td>49.93 ± 0.72 (0.06, 0.96)</td>
<td>49.21 ± 1.23 (0.39, 0.7)</td>
<td>0.72 ± 1.1 (0.4, 0.7)</td>
</tr>
<tr>
<td></td>
<td>How much do you pay attention to uniforms when you watch sports? (scale 1 = not at all to 7 = very much)</td>
<td>3.92 ± 0.32 (3.88 ± 0.27)</td>
<td>mean &lt; =</td>
<td>12</td>
<td>51.79 ± 1.11 (1.15, 0.28)</td>
<td>50.61 ± 1.03 (0.42, 0.68)</td>
<td>1.18 ± 1.24 (0.67, 0.52)</td>
</tr>
<tr>
<td></td>
<td>How much is the design of uniforms important to decide the team to cheer for? (scale 1 = not at all to 7 = very much)</td>
<td>2.17 ± 0.23 (2.19 ± 0.24)</td>
<td>mean &lt; =</td>
<td>15</td>
<td>51.6 ± 1.04 (1.22, 0.24)</td>
<td>50.99 ± 1.15 (0.06, 0.95)</td>
<td>1.51 ± 1.44 (0.83, 0.42)</td>
</tr>
<tr>
<td><strong>European football</strong></td>
<td>How much do you like to watch football games? (scale 1 = not at all to 7 = very much)</td>
<td>5.04 ± 0.32 (4.69 ± 0.33)</td>
<td>mean &lt; =</td>
<td>13</td>
<td>51.55 ± 0.77 (1.18, 0.26)</td>
<td>50.31 ± 1.2 (0.19, 0.85)</td>
<td>1.24 ± 1.35 (0.67, 0.51)</td>
</tr>
<tr>
<td></td>
<td>How much do you like to play football? (scale 1 = not at all to 7 = very much)</td>
<td>4.08 ± 0.39 (3.52 ± 0.29)</td>
<td>mean &lt; =</td>
<td>14</td>
<td>51.04 ± 0.76 (1.04, 0.32)</td>
<td>50.5 ± 1.27 (0.3, 0.77)</td>
<td>0.55 ± 1.43 (0.29, 0.78)</td>
</tr>
<tr>
<td></td>
<td>How much do you like to play TV games of football? (scale 1 = not at all to 7 = very much)</td>
<td>3.13 ± 0.39 (2.50 ± 0.29)</td>
<td>mean &lt; =</td>
<td>16</td>
<td>50.91 ± 0.76 (0.98, 0.34)</td>
<td>49.55 ± 1.3 (0.28, 0.78)</td>
<td>1.36 ± 1.42 (0.79, 0.44)</td>
</tr>
<tr>
<td></td>
<td>How much do you like anime or comic books featuring football? (scale 1 = not at all to 7 = very much)</td>
<td>3.71 ± 0.35 (3.38 ± 0.32)</td>
<td>mean &lt; =</td>
<td>13</td>
<td>52.05 ± 0.96 (1.57, 0.14)</td>
<td>51.12 ± 1.26 (0.66, 0.52)</td>
<td>0.92 ± 1.56 (0.44, 0.67)</td>
</tr>
<tr>
<td></td>
<td>How much do you like to read football news? (scale 1 = not at all to 7 = very much)</td>
<td>4.17 ± 0.37 (3.69 ± 0.35)</td>
<td>mean &lt; =</td>
<td>13</td>
<td>51.68 ± 0.75 (1.65, 0.12)</td>
<td>48.77 ± 1.2 (0.75, 0.47)</td>
<td>2.91 ± 1.36 (1.57, 0.14)</td>
</tr>
<tr>
<td></td>
<td>List the names of the European football teams you know.</td>
<td>5.29 ± 1.1 (7.13 ± 1.01)</td>
<td>mean &lt; =</td>
<td>16</td>
<td>51.04 ± 0.82 (1.04, 0.31)</td>
<td>49.16 ± 1.2 (0.57, 0.58)</td>
<td>1.88 ± 1.37 (1.12, 0.28)</td>
</tr>
<tr>
<td></td>
<td>Of how many teams do you know the shirts?</td>
<td>3.25 ± 0.86 (5.88 ± 0.97)</td>
<td>mean &lt; =</td>
<td>8</td>
<td>50.82 ± 0.8 (0.83, 0.42)</td>
<td>48.97 ± 1.2 (0.7, 0.49)</td>
<td>1.85 ± 1.37 (1.1, 0.29)</td>
</tr>
</tbody>
</table>
shirts and the index of the GME (see 3.2). The percent preference for longer-presented shirts from only the group of participants who reported that they pay more attention to fashion when they play sports compared to the all participants’ average was significantly above chance level under the main condition. However, we found no significant GME in either of the groups for any questions. All statistical data is on Table 1.

3.4. European football familiarity

The participants listed $5.29 \pm 1.10$ team names and remembered the uniforms of $3.25 \pm 0.86$ teams. We separated the participants into two groups: the participants who knew more teams or uniforms than the mean number among all participants and the participants who did not. In both groups, the percent preference for longer-presented shirts was not above chance level under both conditions. We found no significant GME in both groups. All statistical data is on Table 1.

3.5. Comparison between groups with and without football experience

Eight participants (male: 7) had $7.87 \pm 1.59$ (min-max: 1-14) years of football experience. The residual 16 participants (male: 5) reported that they had never belonged to any football teams. In the experienced participants, the percent preference for longer-presented shirts under the main condition was above chance level (Fig. 2b; $55.2 \pm 0.87\%$, $t_7 = 3.45$, $P = 0.01$ for the main condition; $49.6 \pm 0.73\%$, $t_7 = 0.28$, $P = 0.79$ for the control condition). The GME was significant ($5.56 \pm 0.85$, $t_7 = 3.75$, $P = 0.01$). In the inexperienced participants, the mean percent preference for longer-presented shirts was not above chance level in both conditions ($49.7 \pm 0.55\%$, $t_{15} = 0.44$, $P = 0.66$ under the main condition; $50.1 \pm 1.28\%$, $t_{15} = 0.06$, $P = 0.95$ under the control condition). The gaze-shift effect was insignificant ($-0.39 \pm 1.36\%$, $t_7 = 0.24$, $P = 0.82$). A two-way repeated measure ANOVA revealed the significant effect of the interaction between the football experience and the conditions on the percent preference for longer-presented shirts ($F_{1,22} = 5.30$, $P = 0.03$). Football experience had a simple main effect in the main condition ($F_{1,22} = 15.01$, $P < 0.01$). There was also a simple main effect of the condition in the experienced participants ($F_{1,7} = 14.10$, $P < 0.01$). There was no significant difference between the experienced and inexperienced groups in the questionnaire questions except for the question ‘How much do you like to play football?’ (Table 1).

4. Discussion

In this study, we measured the effect of gaze manipulation (Shimojo et al., 2003) on the preference decisions of football shirts after grouping participants into two groups based on the questionnaire results. We found significant effect only in the participants who had experienced playing football as a team member. This result suggests that football experience affects the GME. Meanwhile, another possibility remains. Because all experienced participants except one were male, gender can probably be assumed to have caused the GME in the experienced group. However, the index of GME of male inex-
Football Players Come to Like Uniforms as They Look at Them

Experienced participants was not larger than those of female inexperienced participants ($t_{8.79} = 0.17$, $P = 0.87$), and so we can exclude the second possibility.

What in football experience would have affected the GME? When playing a football game, it is important to move gazes to determine where team mates are located in relation to opposing players. Also, sports players may pick up visual information more effectively compared to novices (Overney et al., 2008). The players could have been provided with evidence of preference effectively by their gazes on uniforms. Krajbich et al. (2010, 2011) have explained the mechanism of GME using a theoretical model in which gaze duration works as evidence to make a binary choice of preference. Based on this study, football players might accumulate the evidence more quickly with the gaze duration compared to the ones who merely liked fashion, or who merely watched football.

Our study may be a pilot for possible future applications in sports markets. Our study suggests that the gaze-manipulation is particularly important in visual advertisement focused on players. However, this would remain simply speculation until we carry out further experiments with larger numbers of participants, enough to clarify the correlation between the GME and experience or accomplishment. We also need to test the GMEs in preference decisions of sportswear of other sports. Our results can simply suggest football experience as an individual factor in the effect of gaze when choosing the sport items.

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