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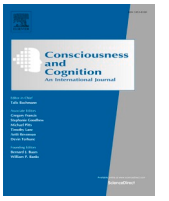

Self-prioritization effect in the attentional blink paradigm: Attention-based or familiarity-based effect?

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ABSTRACT

The self-prioritization effect (SPE) refers to the advantage in processing stimuli associated with oneself. Here, we addressed the SPE in an attentional blink (AB) task. In Experiment 1, shapes associated to you, friend, or stranger served as T1, and letter X as T2. The AB effect was larger for you than the other label conditions, and larger for friend condition than for stranger condition. We suggest that self-associated shape increased its perceptual salience, producing greater attentional capture. In Experiment 2 participants trained with a shape-label matching task to increase familiarity with the shape-label associations before performing the AB task. The difference between friend and stranger conditions disappeared, suggesting that the difference between the two conditions observed in Experiment 1 was mainly due to differences in familiarity or frequency of use. Importantly, the advantage of you over friend and stranger conditions remained, suggesting that the SPE is a genuine effect.

1. Introduction

The self-prioritization effect (SPE) is defined as the performance advantage of any information related or associated with oneself (i.e., faster and more accurate responses) when compared to others, either close or distant from the self. The SPE has been observed in a variety of cognitive tasks involving several cognitive domains (Arnell et al., 1999; Cunningham et al., 2008; Cunningham & Turk, 2017; Dalmaso et al., 2019; Desebrock et al., 2018; Liu et al., 2016; Macrae et al., 2018; Shapiro et al., 1997; Sui et al., 2012; Sui, Enock, et al., 2015; Sui & Han, 2007; Sui & Humphreys, 2015), and has been assessed with different self-referential tasks (for a review, see Sui & Gu, 2017). For example, people respond faster and more accurately when they are presented with their own face/name than with the faces/names of others (Keyes & Brady, 2010; Shapiro et al., 1997; Sui et al., 2009; Wood & Cowan, 1995), an effect that reminds us the well-known "cocktail party" phenomenon. This phenomenon shows that the probability of identifying one's own name is higher than that of identifying other people's names when such task-irrelevant stimuli are presented auditorily through an unattended channel (ear), as in Cherry's (1953) shadowing paradigm (see Moray, 1959).

To demonstrate the perceptual nature of the SPE, Sui et al. (2012) developed a rather simple associative learning procedure, the *shape-label matching task*. Participants were told to associate a particular shape with a specific referential label. Familiar shapes such as a circle, a square, or a triangle were associated with a label referring to the self (e.g., you), a close person (e.g., friend), or an unknown person (e.g., stranger). Participants responded more efficiently (faster and/or more accurately responses) when the shape-label pair

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referred to the self in comparison to when it referred to either a close person or an unknown person, and often more efficiently when it referred to a close person than to an unknown person. The authors accounted for the benefits of newly formed self-related associations to enhanced perceptual saliency of objects (e.g., shapes) that were associated with the self, similar to the advantages of perceptually salient stimuli (Humphreys & Sui, 2015; Sui, Liu, et al., 2015).

To demonstrate the attentional nature of the SPE, Shapiro et al. (1997) used the participant's own name versus others' names in an attentional blink (AB) paradigm. The attentional blink is a cognitive phenomenon that occurs when a rapid serial of visual presentation (RSVP) is presented (Raymond et al., 1992). In this situation, there is a noticeable decrease in the ability to respond correctly to the second target (T2) presented between 200 and 500 ms after the first target (T1), which is usually required to be detected. This decrease in performance is the result of a temporary limitation of attentional resources for processing subsequent stimuli in the rapid visual presentation sequence, giving rise to the AB effect. Shapiro et al. (1997) showed that the AB effect was reduced when the participant's own name was presented as T2 compared to someone else's name, suggesting that the proper name is a highly relevant stimulus whose processing requires fewer attentional resources. However, they failed to find any difference between the participant's own name condition and the stranger's name condition when the names were presented as T1.

In a recent study, Nijhof et al. (2020) replicated the experiment in which Shapiro et al. (1997) presented the critical names as T1. Two weaknesses of the original study were considered. The sample size was increased from 8 participants in the original study to a final sample of 34 participants in the replication study. They also controlled for a possible confounding effect of familiarity on the advantage of processing one's own name compared to processing a stranger's name, the advantage being defined in terms of fewer attentional resources required. Nijhof et al. (2020) argued that any difference between the AB effect in the own-name condition compared to the other's name conditions could be attributed to a general familiarity effect. To control for this potentially confounding factor, the authors took special care to select the name of someone close to someone with whom the participant claimed to be very familiar. They then argued that any difference between the AB effect in the own-name condition and the close other's name condition should be attributed to a genuine SPE, while it cannot be discarded that the difference between the own-name condition and the others' name conditions may be attributed to differences in familiarity. The results showed that the own-name condition produced a smaller AB effect than the close other's and the stranger's name conditions, and a difference was also observed between the two latter conditions. In a second experiment the authors also included a shape-label matching task supposed to involve perceptual-based SPE, but pairs were composed of the three critical names instead of the standard referential labels used by Sui et al. (2012). The lack of correlation between the SPE on the shape-label matching task and the SPE on the AB task led the authors to conclude that the self-prioritization effects found in various cognitive domains are rather independent phenomena.

However, the results of Nijhof et al. (2020) in the AB-control tasks make it difficult to rule out any familiarity-based effects mainly in the observed AB differences between the own-name condition and the close other's name condition. In the AB-control tasks, participants were asked to report only the critical names presented either as T1 or as T2 depending on the experiment. When the critical names were presented as T1, the AB-control task showed no differences between the two conditions (own name and close other's name), likely due to high accuracy in both conditions (above 95 %). In other words, a ceiling effect could have prevented differences between the two conditions from being observed. It is worth noting that a ceiling effect suggests that the task may not have been sensitivity enough to detect subtle differences in performance between these conditions. When the critical names were presented as T2, the AB-control task showed a statistically significant difference in detecting the own name and the close other's name. Therefore, despite the authors' efforts to equalize the familiarity of the two conditions (self and close other names), familiarity differences might have still played a role in the pattern of the observed AB effects. Therefore, we consider that the results of Nijhof et al. (2020) do not provide unequivocal evidence that differences in familiarity between the self and the friend conditions do not play a significant role. Note that familiarity differences may also explain why the AB effect was smaller in the own-name condition compared to the close other's and stranger's name conditions. Familiar stimuli are processed more efficiently than unfamiliar stimuli and therefore fewer attentional resources should be recruited.

Regarding the perceptual matching task developed by Sui and colleagues, familiarity and psycholinguistic differences between the referential labels may also play an important role in the SPE (García et al., 2015; Schäfer et al., 2017). For example, the word "you" is more frequent and thus more familiar than the words "friend" and "stranger", and the word "friend" is more familiar than the word "stranger". Also, the label associated with the self is a pronoun while the labels associated with others are nouns. Thus, further research is needed to better control for potential confounding factors that may influence the SPE in general and to determine the specific role of familiarity in the different ways the SPE has been approached.

In the present research, we used the AB paradigm with stimuli associated with the self, a close other (best friend), or a stranger. To prevent differences in familiarity or other psycholinguistics properties of the stimuli from influencing the SPE, we used three regular shapes (a triangle, a square and a circle) associated with the self, the best friend or a stranger as T1 instead of the traditional verbal referential labels or proper names, and participants were asked to identify the shape (T1) first and then to detect the presence of T2 (letter "X"). The aim of Experiment 1 was to determine whether the shape that had been previously associated with the self produces differential AB effects compared to the shapes that had been previously associated with the best friend or a stranger. Verbal instructions established to-be-learned associations before participants completed the AB task. The aim of Experiment 2 was twofold. First, we replicated the procedure of Experiment 1, but participants performed a block of the shape-label matching task designed by Sui et al. (2012) before performing the AB task. We anticipated that if the differential AB effects observed in Experiment 1 were due to differences in familiarity with the learned associations, such AB differences should be reduced after participants had equivalent perceptual experience with the three learned associations in the shape-label matching task. Second, Nijhof et al. (2020) argued that the lack of correlation between the observed self-prioritization effects in perceptual and attentional tasks points to a conceptual distinction of the SPE across cognitive domains (see also Amodeo et al., 2021). Here, we addressed that dissociation by correlating SPE effects on

the shape-label matching task and the AB task in the same group of participants (Experiment 2).

2. General methods

2.1. Participants

Thirty-six participants (29 female, age range = 18–29 years, mean age = 20.19, SD = 2.48) took part in Experiment 1, and 32 participants (27 female, age range = 17–28 years, mean age = 20.25, SD = 1.98) took part in Experiment 2. A *post-hoc* sensitivity analysis was performed using G*Power 3.1.9.7, with alpha = 0.05 and 1-β = 0.8, and showed that the minimum effect size that could be detected with the current sample (N = 32) was f = 0.25 for the critical lag × condition interaction. Participants were undergraduate students from the University of Murcia and received course credits for their participation. All participants reported normal or corrected-to-normal vision and no chronic medical conditions.

2.2. Stimuli and materials

The stimuli consisted of three shapes: a circle, a square, and a triangle, which were associated with the self, the best friend, or a stranger. In the AB tasks (both experiments), the shapes served as T1 and letter X as T2. Fillers were symbols that were neither Latin letters nor shapes (β, Σ, Ø, §, Ч, ε, ʔ, μ, Ξ, Љ, ω, α, Ꮁ, π, Ʊ), and were chosen to make the letter X neither too similar nor too different to them. In the shape-label matching task (Experiment 2 only), shapes were associated with the Spanish referential labels TU (you), AMIGO (friend), and EXTRAÑO (stranger).

The tasks were programmed using the software E-Prime 3 (Psychology Software Tools). Stimuli were presented on a 22″ TFT monitor with a screen resolution of 1920 by 1080 pixels. A Chronos device (Psychology Software Tools) was used to collect the responses.

2.3. Procedure

In both experiments, participants were first verbally instructed to learn the shape-label associations without using any visual stimuli. The specific shape-label associations were counterbalanced across participants.

In Experiment 1, once participants reported having learned each shape-label association, they performed the AB task (no control task was used in the present study). In Experiment 2, participants performed the shape-label matching task before performing the AB task (see below).

In the AB task, we presented a stream of 15 stimuli in each trial (see Fig. 1). Each stimulus was displayed for 80 ms, with an inter-stimulus interval of 17 ms. The T1 shape was presented either at the third, fourth or fifth position in the stimulus stream. T2 (letter X) was presented right after T1 (lag 1), in the second slide after T1 (lag 2), in the fifth slide after T1 (lag 5) or in the eighth slide after T1 (lag 8). T2 was presented in half of the trials and was absent on the other half. At the end of each trial, participants were asked two

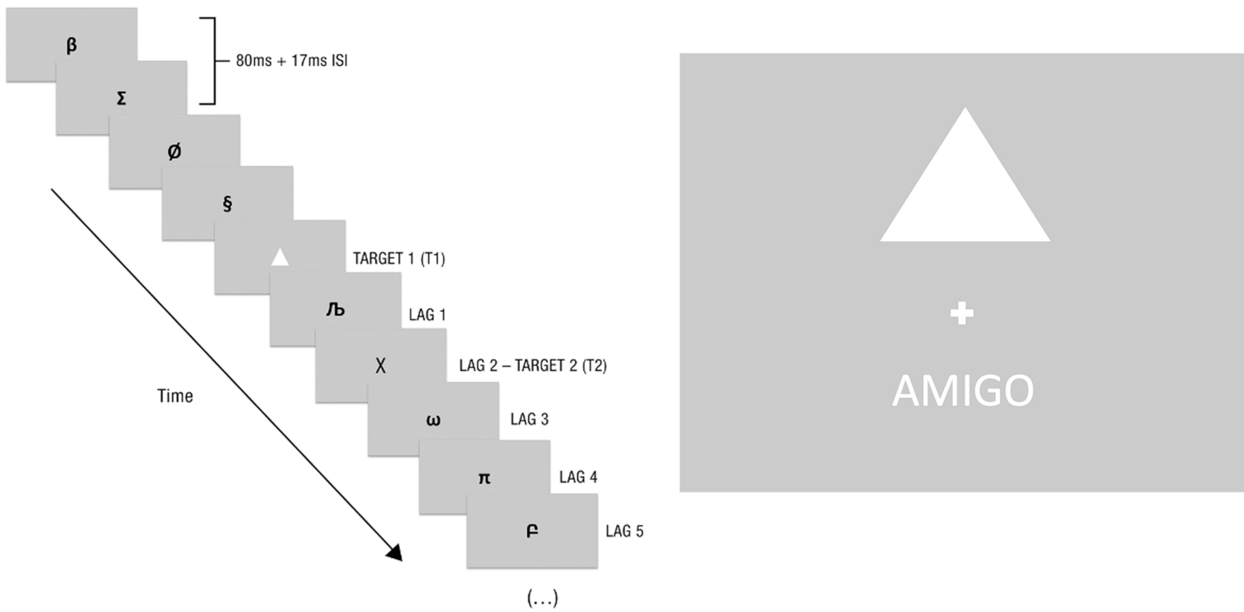

Fig. 1. Sequence of stimuli in the AB task. In the example, T1 (a triangle) is presented at the fifth position of the stream, and T2 is presented at lag 2 (left side). Example of a trial in the shape-label matching task (right side).

questions. The first question was "With whom was the geometric shape associated?", where TU (you), AMIGO (friend), and EXTRAÑO (stranger) were the possible answers; participants had to push the corresponding button in the response box. The second question was "Did letter "X" appear in the stream?", with SI (yes) or NO (no) as the possible answers; again, participants had to press the corresponding button. The specific buttons associated with each response were counterbalanced across participants. Stimuli were centrally presented on the screen and subtended 1.34 degrees of visual angle at a view distance of 60 cm. Stimuli were presented in black color on a grey background, except the T1 shape that was presented in white color. Participants completed a practice block of 20 trials followed by 216 experimental trials.

In the shape-label matching task (Experiment 2 only), after the verbal instructions were given, participants completed the task. Each shape-label pair was randomly presented for 100 ms. After a blank screen of 1100 ms, participants had to press the corresponding button as quickly and accurately as possible, indicating whether the shape-label pair presented in that trial matched according to the learned association. A feedback message informing whether the answer was correct appeared for 500 ms. At a view distance of 60 cm, the shapes subtended 4 degrees of visual angle and were presented above the fixation cross. The Spanish words TU (you), AMIGO (friend), and EXTRAÑO (stranger) were displayed below the fixation cross, and subtended 1.7 × 1.4, 1.7 × 4 and 1.7 × 4.2 degrees of visual angle, respectively.

Participants completed 240 trials divided into five blocks of 48 trials each. Each block contained 8 repetitions of the 6 possible shape-label combinations (self-matched, self-nonmatched, friend-matched, friend-nonmatched, stranger-matched, and stranger-nonmatched). Previously, participants completed a practice block of 48 trials that had the same distribution as those of the experimental blocks.

3. Results

Statistical analyses were conducted using JASP 0.16 and a significance level of $\alpha = 0.05$ was adopted. Response accuracy was calculated as the proportion of trials in which T2 was correctly detected given that the response to T1 was also correct. Therefore, the analyses were performed exclusively on T1 hit trials. Data were collected for each lag (1, 2, 5 or 8) and each label response (you, friend, or stranger). Accuracy data were submitted to a repeated measures 4 × 3 repeated measures ANOVA with lag (1, 2, 5, 8) and condition (you, friend, stranger) as within-participants factors. The results of the AB tasks in Experiments 1 and 2 are shown in Fig. 2.

3.1. AB task - Experiment 1

The analysis conducted on accuracy data showed a significant main effect of lag ($M_{Lag1} = 0.49$, $M_{Lag2} = 0.41$, $M_{Lag5} = 0.71$, $M_{Lag8} = 0.76$), $F(3, 105) = 40.28$, $p < .001$, $\eta^2 = 0.39$. We observed the typical AB effect, that is, T2 detection proportion was lower at lag 2 than at lag 1, lag 5, and lag 8 (all $ps < 0.05$). The main effect of condition was also significant ($M_{you} = 0.56$, $M_{friend} = 0.60$, $M_{stranger} = 0.62$), $F(2, 70) = 4.40$, $p = .016$, $\eta^2 = 0.011$. We observed the typical SPE; that is, the proportion of T2 detection was lower in the you condition than in the stranger condition ($p = .013$). No other comparisons were statistically significant ($ps > 0.10$). Importantly, we observed a significant lag × condition interaction, $F(6, 210) = 3.31$, $p = .004$, $\eta^2 = 0.015$. The interaction was due to significant differences between the three label conditions only at lag 2 (you vs. friend, $p = .032$; you vs. stranger, $p = .001$; and friend vs. stranger, $p = .04$).

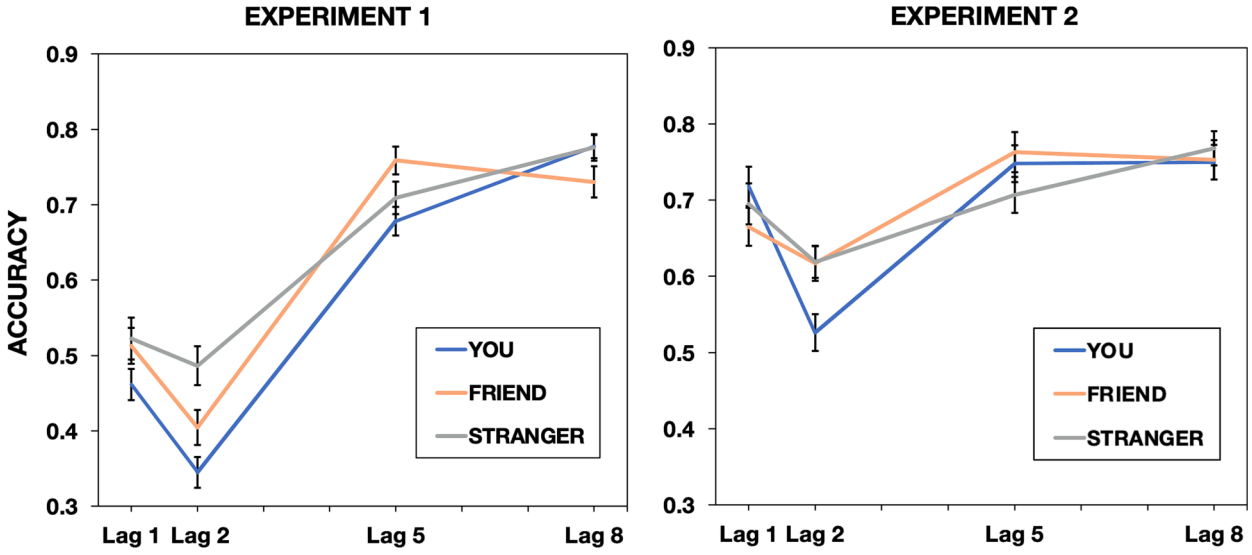

Fig. 2. Attentional blink effects in Experiments 1 (left) and 2 (right).

3.2. AB task – Experiment 2

The analysis conducted on accuracy data showed a significant main effect of lag ($M_{Lag1} = 0.69$, $M_{Lag2} = 0.58$, $M_{Lag5} = 0.74$, $M_{Lag8} = 0.76$), $F(3, 93) = 4.74$, $p = .004$, $\eta^2 = 0.094$. We observed the typical AB effect, that is, the proportion of T2 detection was lower at lag 2 than at lag 5 and lag 8 (all $ps < 0.01$). The difference between lag 1 and lag 2 was not significant ($p = .15$). The main effect of condition did not reach statistical significance ($M_{you} = 0.68$, $M_{friend} = 0.68$, $M_{stranger} = 0.69$), $F(6, 186) = 0.307$, $p = .727$, $\eta^2 < 0.001$. More importantly, we again observed a significant lag × condition interaction, $F(6, 186) = 2.52$, $p = .023$, $\eta^2 = 0.015$. As in Experiment 1, the interaction was due to differences between the label conditions at lag 2 only. The you condition ($M_{you} = 0.53$) yielded lower accuracy than the friend ($M_{friend} = 0.68$) and stranger ($M_{stranger} = 0.69$) conditions, being the comparison between the former and the combination of two latter statistically significant ($p = .026$).

3.3. Shape-label matching task – Experiment 2

Mean RTs of correct responses and the proportion of correct responses (accuracy) were submitted to 2 × 3 repeated measures ANOVAs with match (matching, non-matching) and label condition (you, friend, stranger) as within-participant factors. The results are depicted in Fig. 3.

For the RTs analysis, there was a main effect of match, $F(1, 31) = 212.85$, $p < .001$, $\eta^2 = 0.36$, showing shorter RTs in matching (491 ms) than in non-matching (557 ms) trials. The main effect of condition was also significant, $F(2, 62) = 55.81$, $p < .001$, $\eta^2 = 0.27$. Responses for the you condition (M = 512 ms) were faster than those for both the friend and the stranger conditions ($ps < 0.001$), while we found no differences between the friend condition (M = 568 ms) and the stranger condition (M = 580 ms) ($p = .11$). The match × condition interaction reached statistical significance, $F(2, 62) = 17.33$, $p < .001$, $\eta^2 = 0.062$. The interaction analysis revealed significant simple main effects of condition in both matching trials, $F(2, 62) = 57.66$, $p < .001$, $\eta^2 = 0.65$, and non-matching trials, $F(2, 62) = 13.12$, $p < .001$, $\eta^2 = 0.297$. For matching trials, post-hoc comparisons showed that the you condition (M = 460 ms) produced shorter RTs than both the friend (M = 533 ms) and the stranger (M = 563 ms) conditions ($ps < 0.001$), and the friend condition produced shorter RTs than the stranger condition ($p = .004$). For non-matching trials, post-hoc comparisons showed that the you condition (M = 564 ms) produced shorter RTs than both the friend (M = 603 ms) and the stranger (M = 597 ms) ($ps < 0.001$) conditions, but the difference between the friend and stranger conditions was not significant ($p = .40$).

For the accuracy data analysis, the main effects of match and condition were significant, $F(1, 31) = 13.79$, $p < .001$, $\eta^2 = 0.05$ and $F(2, 62) = 9.66$, $p < .001$, $\eta^2 = 0.09$, respectively. Matching trials (M = 0.88) produced higher accuracy than non-matching trials (M = 0.84). Also, the proportion of correct responses was higher for the you condition (M = 0.89) than for the friend (M = 0.84) and the stranger (M = 0.83) conditions ($ps < 0.01$). However, the difference between the friend condition and the stranger condition was not significant ($p = .45$). As with RTs, the match × condition interaction was statistically significant, $F(2, 62) = 18.92$, $p < .001$, $\eta^2 = 0.18$. The interaction analysis revealed significant simple main effect of condition in both matching trials, $F(2, 62) = 24.71$, $p < .001$, $\eta^2 = 0.44$, and non-matching trials, $F(2, 62) = 3.91$, $p = .025$, $\eta^2 = 0.112$. For matching trials, post-hoc comparisons showed that the you condition (M = 0.94) produced higher accuracy than both the friend (M = 0.88) and the stranger (M = 0.80) conditions ($ps < 0.001$), and the friend condition produced higher accuracy than the stranger condition ($p = .002$). For non-matching trials, only the difference in accuracy between the friend condition (M = 0.81) and the stranger condition (M = 0.87) was significant ($p = .021$). The proportion of correct responses in the you condition (M = 0.84) did not differ from the other two conditions ($ps > 0.23$).

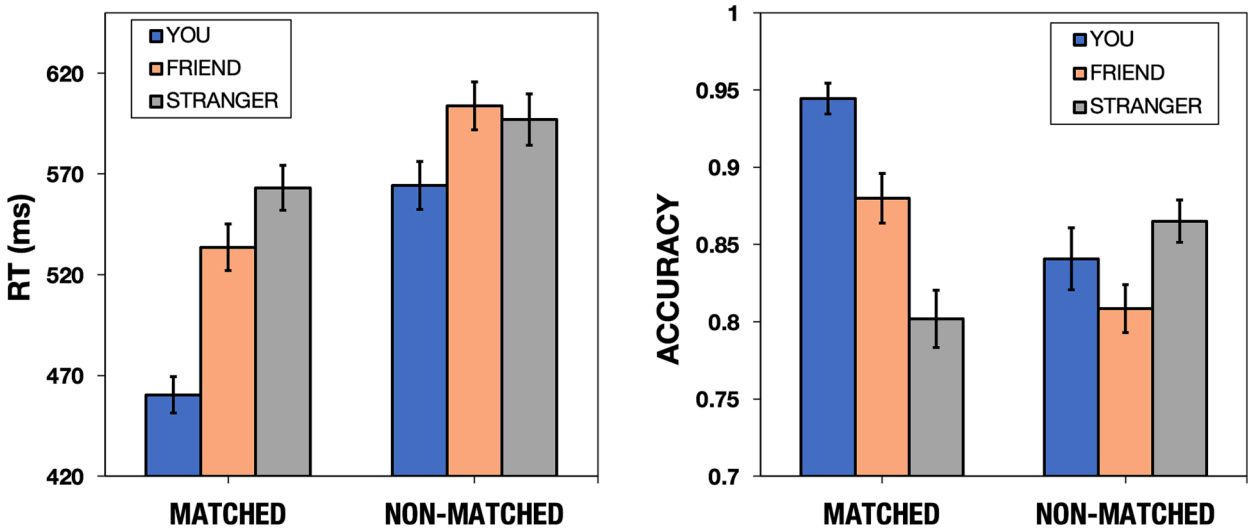

Fig. 3. RTs (left) and accuracy (right) in the shape-label matching task (Experiment 2).

3.4. Experiment 1 vs Experiment 2

In further analyses, we assessed whether the SPE (you vs stranger) at lag 2, where the AB effect is usually observed, and the AB effects (lag 2 vs. lag 8, see Nijhof et al., 2020) for each label condition changed across experiments. Regarding the SPE, the you condition showed lower accuracy than condition stranger. However, the differences in accuracy between the two label conditions did not change across experiments, as indicated by the non-significant Experiment × condition interaction, $F(1, 66) = 0.783$, $p = .379$, $\eta^2 = 0.001$. Regarding the AB effects, we observed a significant Experiment × lag interaction, $F(1, 66) = 6.6$, $p < .013$, $\eta^2 = 0.023$. The difference between lag 2 and lag 8 was larger in Experiment 1 than in Experiment 2, and that was true for all label conditions, a result that is further supported by the lack of a significant Experiment × lag × condition interaction, $F(1, 66) = 0.792$, $p = .377$, $\eta^2 < 0.001$.

3.5. Correlations between SPE in the shape-label matching task and the AB task

In a final analysis, we assessed whether differences in performance between the label conditions in the shape-label matching task and the AB task (in lag 2 only) correlated within the same group of participants (Experiment 2). Correlations did not reach statistical significance for the differences between conditions you and friend ($r = 0.07$, $p = .69$), between conditions you and stranger ($r = 0.06$, $p = .75$), and between conditions friend and stranger ($r = 0.20$, $p = .27$).

4. Discussion

In the present study, we assessed the self-prioritization effect (SPE) by using an innovative version of the shape-label matching task in an attentional blink (AB) paradigm. The main objective was further to explore the role of familiarity in the SPE, and to overcome some potentially confounding factors, such as frequency of use or psycholinguistic characteristics of the labels, that may have affected self-bias effects in previous studies. Nijhof et al. (2020) also combined the matching task with the AB paradigm. However, the authors used proper names as T1 and supposedly controlled for differences in familiarity between the names associated with the self and close other's names with whom the participant was supposed to be very familiar. Thus, the difference in AB effects between the proper name and the close other's name was attributed to a genuine SPE, whereas the differences with a stranger's name were attributed to differences in familiarity. However, we claimed that the high accuracy (above 95 %) in reporting the one's name and the close other's name in the AB-control task may reflect a ceiling effect, which could have obscured any difference in familiarity between the two conditions.

In our view, a more appropriate way of addressing the role of familiarity in the combination of both paradigms is to use the shapes, instead of the referential stimuli (labels, names, faces) as T1. As the shape-label pairs were counterbalanced between participants, no differences in familiarity between the shapes are expected to affect the results in Experiment 1. In this experiment, we investigated whether the typical shape-label associations involved in the shape-label matching task produced differential AB effects when the shapes appeared as T1. The results showed that the T1 shape associated with oneself produced a larger AB effect than those observed with the shapes associated either with the best friend or a stranger, and larger when associated with the best friend than with a stranger. Importantly, these differences were restricted to lag 2, the interval between T1 and T2 in which the processes that lead to AB effects are operating.

These results contrast with those observed in the Nijhof et al. (2020) study. The authors observed that the AB effect when T1 was the own's name was smaller than when it was other's names. In contrast, in the current study, we observed the opposite pattern of AB effects. Detection of T2 was more deteriorated (i.e., greater AB effect) when the T1 shape was associated with the self than when it was associated with others. Nijhof et al. (2020) accounted for the AB effects in terms of attentional resources. They argued that fewer resources are necessary to process the own's name compared with other's names, and therefore, more spare resources would be available for processing T2. However, an alternative explanation is that the written name of oneself, presented as T1, may have greater familiarity and, consequently, fewer attentional resources are engaged. Therefore, the effect of familiarity cannot be discarded in their study. In our design, the fact that AB effects were larger when associated with oneself than with others calls for a different account. T1 shapes, when associated with oneself, may have increased their perceptual salience compared with when associated with others. Our results are more in line with the view that when an arbitrary stimulus (e.g., a shape) is associated with oneself, it generates greater attentional capture and engagement, reducing the chance of processing T2 in comparison with when the arbitrary stimulus is associated with either a friend or a stranger. This new finding fits well with the metaphor that views attention as a "camera" (Zivony & Lamy, 2016). If the exposure of a photograph is too long, equivalent to greater attention engagement by self-associated stimuli and to a lesser extent by friend-associated stimuli, subsequent objects are blurred into one, equivalent to a higher proportion of failures to detect T2. This view may account for why, in Experiment 1, the self-associated shape produced a larger AB effect compared with other-associated shapes, and the friend-associated shape larger than the stranger-associated shape.

Experiment 2 helps explain the role of familiarity in the present study. In this experiment, participants performed a perceptual shape-label matching task prior to the AB task. After training with the perceptual task, we observed that the overall accuracy in lag 2 (T2 detection) improved compared to that observed in Experiment 1, regardless of the shape-label association. This advantage in the AB effects observed in Experiment 2 suggests that the overall increase in familiarity with the shape-label associations led to more efficient processing of the T1 shapes, and therefore fewer attentional resources were recruited. The results also showed that after training, the differences in the AB effects between the you condition, and the friend and stranger conditions were maintained. In contrast, the difference in the AB effect between condition friend and condition stranger disappeared. These results suggest that the differences in AB effect between self and others observed in both experiments are due to a genuine SPE. However, the difference in AB

effect between friend-associated and stranger-associated shapes observed in Experiment 1 may be due to differences in familiarity or frequency of use between the two labels, differences that vanished after completing the classical shape-label matching task. Even if we assume that the shape-label matching task undoubtedly increased the familiarity of the stimuli, it is still possible that the SPE itself observed in this task also contributed to the pattern of results observed in the AB task of Experiment 2. However, the lack of interaction in the pattern of SPE observed when comparing the two experiments led us to conclude that this was not the case. While the difference between the friend and stranger conditions disappeared in Experiment 2, a result that we attribute to the increase in familiarity, the difference between the you and others condition (the SPE) did not differ between the two experiments. Thus, we conclude that the SPE observed in the present study is a genuine effect that is not altered despite the increase in familiarity in Experiment 2 compared to Experiment 1. Also, the lack of differences between self- and friend-related AB effects between the two experiments, despite T2 detection accuracy being higher in Experiment 2 than in Experiment 1, suggests that training affected only the efficiency with which attentional resources were administered to detect T2, but not the level of attentional engagement produced by the oneself-associated shape in T1.

Finally, as in the Nijhof et al. (2020) study, we failed to find any correlation between the results of the shape-label matching task and the AB task, supporting the notion that self-biases across cognitive domains are distinct.

5. Conclusions

In the present study, we have developed an innovative procedure to investigate the SPE in the context of an AB task. In contrast to previous studies, the use of shapes as T1 instead of labels/proper names prevents the observed effects from being due to differences in familiarity or other psycholinguistic factors. Our results showed that increasing the frequency of use (familiarity) of the shape-label associations by performing a shape-label matching task maintained the advantage of self-related associations, while the differences between others-related associations disappeared. This pattern of results leads us to conclude that the SPE is a genuine effect, which manifests itself even after controlling for confounding factors that may have influenced more traditional procedures.

Ethical approval

The study was approved by the Ethics Committee of the University of Murcia and was conducted in accordance with the ethical standards laid down in the Declaration of Helsinki.

Informed consent

Informed consent to participate in the experiments was obtained from all participants.

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CRediT authorship contribution statement

Víctor Martínez-Pérez: Conceptualization, Methodology, Investigation, Software, Formal analysis, Data curation, Writing – original draft, Visualization. **Alejandro Sandoval-Lentisco:** Conceptualization, Methodology, Investigation, Writing – original draft. **Miriam Tortajada:** Methodology, Investigation, Writing - review & editing. **Lucía B. Palmero:** Investigation, Methodology. **Guillermo Campoy:** Conceptualization, Supervision, Writing – review & editing. **Luis J. Fuentes:** Conceptualization, Writing – original draft, Writing – review & editing, Supervision, Visualization, Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

All materials and raw data are openly available at https://osf.io/tsvxy/?view_only=4314d303addf4dff9f443bea774a465a

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