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Judging me and you: Task design modulates self-prioritization

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ABSTRACT

An extensive literature has revealed the benefits of self-relevance during stimulus processing. Compared to material associated with other persons (e.g., friend, mother), self-relevant information elicits faster and more accurate responses (i.e., the self-prioritization effect). Probing the boundary conditions of this effect, recent research has sought to identify whether the advantages of self-relevance can be attenuated (or even eliminated) under certain circumstances. Continuing in this tradition, here we explored the extent to which basic aspects of the task design modulate self-prioritization. The results of two experiments demonstrated just such an effect. During both simultaneous (i.e., Expt. 1) and sequential (i.e., Expt. 2) versions of a standard shape-label matching task, self-prioritization was reduced when stimulus presentation was blocked (i.e., self- or friend-relevant items) compared to intermixed (i.e., self- and friend-relevant items). These findings highlight both the persistence of self-prioritization and its sensitivity to task-related variation.

1. Introduction

Recent years have witnessed a resurgence of interest in how self-relevance influences thinking and doing (Sui & Humphreys, 2015, 2017). Providing much of the impetus for this work was the development of an experimental paradigm that eliminated a troublesome stimulus confound (i.e., own face/name familiarity) inherent in early research on the topic (Bargh & Pratto, 1986; Keyes & Brady, 2010; Shapiro et al., 1997; but see Woźniak & Knoblich, 2019). Adopting an elegant procedure, Sui et al. (2012) showed that — once linked with the self (vs. friend or stranger) — the benefits of personal-relevance extend to the processing of even inconsequential material. Specifically, after coupling geometric shapes with various person labels (triangle = you, square = best friend, circle = stranger), subsequent shape-label matching judgments (i.e., do shape-label stimulus pairs match the previously learned associations?) were fastest and most accurate for stimulus pairs associated with the self, a phenomenon dubbed the *self-prioritization effect* (SPE). Replicated across different tasks, stimuli, and sensory modalities (e.g., Constable et al., 2019; Frings & Wentura, 2014; Golubickis et al., 2018; Macrae et al., 2018; Mattan et al., 2015; Moradi et al., 2015; Payne et al., 2017; Schäfer et al., 2015; Sui et al., 2014), self-prioritization is believed to derive from the mind's exquisite receptivity to personally relevant inputs (Humphreys & Sui, 2016; Sui & Humphreys, 2015, 2017). As Sui and Rotshtein, (2019) have put it, "…self-related information acts as a global modulator of attentional processing" (p. 148).

Beyond demonstrations of self-prioritization during decisional processing, researchers have recently sought to ascertain the boundary conditions of this effect. Acknowledging the malleability of most social-cognitive outcomes, emphasis has fallen on identifying circumstances under which the SPE can be attenuated or even abolished. To date, findings have been mixed and dependent on the specific paradigm under investigation (i.e., shape-label matching vs. ownership tasks; Caughey et al., 2021; Constable et al., 2019; Falbén et al., 2019, 2020; Golubickis et al., 2017, 2020; Reuther & Chakravarthi, 2017; Schäfer et al., 2017; Sui et al., 2012, 2014; Qian et al., 2020). At least in the context of shape-label matching tasks in which attention is explicitly drawn to the self-relevance (or otherwise) of the stimuli, results have affirmed the potency of self-prioritization effects.[1] For example, prior to the performance of a shape-label matching task, Reuther and Chakravarthi (2017) introduced a training phase in which error-free learning was equated for all the shape-label stimulus pairs. Despite this extensive pre-task preparation, self-prioritization endured. Similarly, even when self-relevant (vs. friend or stranger) stimuli are perceptually degraded or presented

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[1] When the self-relevance (or otherwise) of the stimuli is not an explicit component of the experimental instructions, self-prioritization is reliably eliminated (Caughey et al., 2021; Dalmaso et al., 2019; Siebold et al., 2015; Stein et al., 2016; Wade & Vickery, 2017).

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on only a minority of experimental trials, self-prioritization effects continue to emerge (Sui et al., 2012, 2014). Collectively, these findings demonstrate the persistence of self-bias during shape-label matching tasks, the methodology that has dominated work on this topic. What has yet to be considered, however, is the extent to which basic aspects of the task design may modulate the emergence and magnitude of self-prioritization. Accordingly, we explored this issue in the current investigation.

Elsewhere, characteristics of the task design have been shown to exert notable influence on information processing and response selection. Of particular significance is the manner in which stimuli are encountered (Schmidt, 1991; Smith et al., 1994). For example, in the memory domain, when participants are required to remember items from two distinct classes (e.g., high- vs. low-frequency words, typical vs. distinctive faces), memory for salient items (e.g., distinctive faces) is boosted when stimuli are intermixed rather than blocked by item type (e.g., Dewhurst & Parry, 2000; Hosie & Milne, 1996; Hunt & Elliot, 1980; Watkins et al., 2000). Underpinning this effect is the contextual distinctiveness of material (Wallace, 1965), such that mixed lists enhance the salience (i.e., primary distinctiveness), hence memorability of certain items (Schmidt, 1991). Of greater relevance to the current investigation, beyond memorial performance, comparable effects have also been observed in sequential priming tasks probing the automaticity of person construal via the speed of responses to compatible (vs. incompatible) prime-target stimulus pairs. Notably, compared to the presentation of mixed category-related primes (e.g., female & male faces), when blocked by group (e.g., only male or female faces), priming stimuli eliminate (or attenuate) stereotype activation (Macrae & Cloutier, 2009; Rees et al., 2020). Thus, across a range of measures, task design modulates stimulus processing.

Similar effects, we suspect, may influence self-prioritization during decision-making. As is standard methodological practice in both the simultaneous and sequential versions of the shape-label matching task, target-related items (i.e., self-shapes vs. friend-shapes vs. stranger-shapes) are mixed during stimulus presentation (Sui et al., 2012, 2014). This therefore raises an interesting possibility. Perhaps self-prioritization is sensitive to the task design in which participants encounter to-be-judged stimuli. Specifically, self-bias may be amplified when stimuli are mixed rather than blocked during decisional processing. That is, repeatedly swapping the shape of interest (vs. continually judging a single shape) will likely exploit, on a trial-by-trial basis, differences in the strength of the shape-label associations in working memory that underpin self-prioritization (Janczyk et al., 2019; Reuther & Chakravarthi, 2017; Symons & Johnson, 1997; Wang et al., 2016; Yin et al., 2019). As such, it is conceivable that, when stimuli are blocked (vs. mixed) during shape-label matching tasks (Schäfer et al., 2020; Sui et al., 2012, 2014), self-prioritization may be attenuated or potentially eliminated.

Extending previous research, here we explored the extent to which a basic characteristic of shape-label matching tasks (i.e., blocked vs. mixed stimulus presentation) moderates self-prioritization during decisional processing. Using both simultaneous (i.e., Expt. 1) and sequential (i.e., Expt. 2) variants of the standard shape-label matching task (Sui et al., 2012, 2014), participants reported whether shape-label stimulus pairs (e.g., self & triangle, friend & square, stranger & circle) matched or mismatched previously learned target-shape associations.[2] Crucially, however, the presentation of stimulus pairs was either mixed or blocked. It was expected that, at the very least, self-prioritization would be reduced under conditions of blocked compared to mixed stimulus presentation.

2. Experiment 1: simultaneous shape-label matching task

2.1. Method

2.1.1. Participants and design

To detect a significant three-way repeated measures interaction, sample size estimation was based on a conventional large effect size. PANGEA (v0.2; $d = 0.80$, $\alpha = 0.05$, power = 95%) revealed a requirement of 22 participants. An additional ~30% were recruited to allow for counterbalancing and online drop out. Thirty participants (9 male, $M_{age} = 22.67$, $SD = 3.11$) were recruited using Prolific (www.prolific.co), with each receiving compensation at the rate of £7.50/h. Informed consent was obtained from participants prior to the commencement of the experiment and the protocol was reviewed and approved by the Ethics Committee at the School of Psychology, University of Plymouth. The experiment had a 3 (Shape Association: self vs. friend vs. stranger) × 2 (Presentation: mixed vs. blocked) × 2 (Trial Type: matching vs. nonmatching) repeated measures design.

2.1.2. Stimulus materials and procedure

Participants were informed the study comprised a decision-making task featuring geometric shapes and labels. Following Sui et al. (2012), the experiment had two phases. First, participants were told the computer would randomly assign a geometric shape to signify them (i.e., self), another shape to denote their friend, and a third shape to represent a stranger. They then pressed spacebar on the keyboard and were shown a screen indicating which geometric shapes (displayed simultaneously) designated self, friend, and stranger, respectively (e.g., you = square, friend = triangle, stranger = circle) and asked to learn these associations. The shapes were not presented at this stage. The assignment of shapes to self, friend, and stranger was counterbalanced across the sample. During the second phase, participants were told they would be presented with a series of shape-label pairings (i.e., simultaneous shape-label matching task, Sui et al., 2012) on the computer screen and their task was to indicate, via a button press as quickly and accurately as possible, whether the shape and label matched or mismatched the previously learned associations. Responses were given using two keys on the keyboard (i.e., N and M) and key-response mappings were counterbalanced across participants.

A trial commenced with a central fixation cross for 500 ms, followed by the pairing of a shape (i.e., square, triangle, circle) and label (i.e., you, friend, stranger) above and below the fixation cross, respectively, for 100 ms. The screen then turned blank and participants reported the accuracy of the association by pressing the appropriate response key. After each response, feedback (i.e., correct or incorrect response) was given on the screen for 500 ms. The stimuli comprised three grey images, 138 × 138 pixels in size, of geometric shapes (i.e., triangle, square & circle) on a white background. Participants initially performed 12 practice trials, followed by 6 blocks of 60 experimental trials. Critically, whereas in 3 blocks the target-related stimuli were mixed, in the remaining 3 blocks they were blocked. The order of presentation of the blocks was randomized.[3] In the mixed-presentation blocks, shapes were displayed in a randomized order and were equally likely to appear (Sui et al., 2012). In contrast, during the blocked presentations, only a single shape was shown within each block (i.e., 1 block of trials contained only the self-shape, 1 block of trials only the friend-shape, and 1 block of trials only the stranger-shape). Across all blocks, half of the trials displayed a matching association and half a nonmatching shape-label pairing. On completion of the task, participants were debriefed and thanked.

[2] Data from both experiments are available at the OSF at the following link: https://osf.io/8bktn/.

[3] Complete counterbalancing was not feasible because of the large number of counter-balanced permutations in the current design. As such, random counterbalancing was adopted (e.g., Schäfer et al., 2020).

2.2. Results and discussion

Responses faster than 200 ms were excluded from the analysis (Sui et al., 2012), eliminating approximately 4% of the overall trials. A multilevel model analysis was used to examine the correct response time (RT) and accuracy data. Analyses were conducted using the R package ‘lmer4’ (Pinheiro et al., 2015). Shape Association, Presentation, and Trial Type were treated as contrast coded fixed effects, and participants as a crossed random effect (see Appendix A). A complete listing of the treatment means is provided in Appendix B.

2.2.1. Response time

Analysis of the correct RTs yielded main effects of Shape Association ($b = -17.67$, $SE = 2.15$, $t = -8.23$, $p < .001$), Presentation ($b = 92.19$, $SE = 1.76$, $t = 52.29$, $p < .001$), and Trial Type ($b = -31.59$, $SE = 1.16$, $t = -17.98$, $p < .001$), and significant Shape Association × Trial Type ($b = -9.58$, $SE = 2.14$, $t = -4.47$, $p < .001$), and Shape Association × Presentation × Trial Type ($b = -8.19$, $SE = 2.14$, $t = -3.82$, $p < .001$) interactions. To explore further the 3-way interaction, separate Shape Association × Presentation analyses were conducted for matching and nonmatching trials. On matching trials, this revealed main effects of Shape Association ($b = -27.06$, $SE = 3.04$, $t = -8.89$, $p < .001$) and Presentation ($b = 90.48$, $SE = 2.50$, $t = 36.23$, $p < .001$) and the critical Shape Association × Presentation ($b = -10.80$, $SE = 3.04$, $t = -3.55$, $p < .001$) interaction (see Fig. 1, panel A). During the mixed-presentation blocks, an effect of Shape Association was observed ($b = -38.38$, $SE = 4.75$, $t = -8.09$, $p < .001$, $R^2 = 0.025$). Further comparisons revealed a significant self-advantage over both friend ($b = -58.56$, $SE = 9.15$, $t = -6.40$, $p < .001$, $R^2 = 0.023$) and stranger ($b = -37.87$, $SE = 4.52$, $t = -8.39$, $p < .001$, $R^2 = 0.037$). A comparable, though attenuated, effect also emerged during the blocked presentations ($b = -16.74$, $SE = 3.70$, $t = -4.52$, $p < .001$, $R^2 = 0.007$). Additional comparisons indicated a significant self-advantage over friend ($b = -31.95$, $SE = 7.10$, $t = -4.50$, $p < .001$, $R^2 = 0.010$) and stranger ($b = -16.56$, $SE = 3.58$, $t = -4.63$, $p < .001$, $R^2 = 0.010$). On nonmatching trials, the analysis yielded only main effects of Shape Association ($b = -8.37$, $SE = 3.00$, $t = -2.79$, $p = .005$) and Presentation ($b = 93.92$, $SE = 2.47$, $t = 38.03$, $p < .001$).

2.2.2. Accuracy

multilevel logistic regression analysis on the accuracy of responses revealed main effects of Shape Association ($b = 0.10$, $SE = 0.04$, $z = 2.59$, $p = .009$) and Presentation ($b = -0.40$, $SE = 0.03$, $z = -13.28$, $p <$

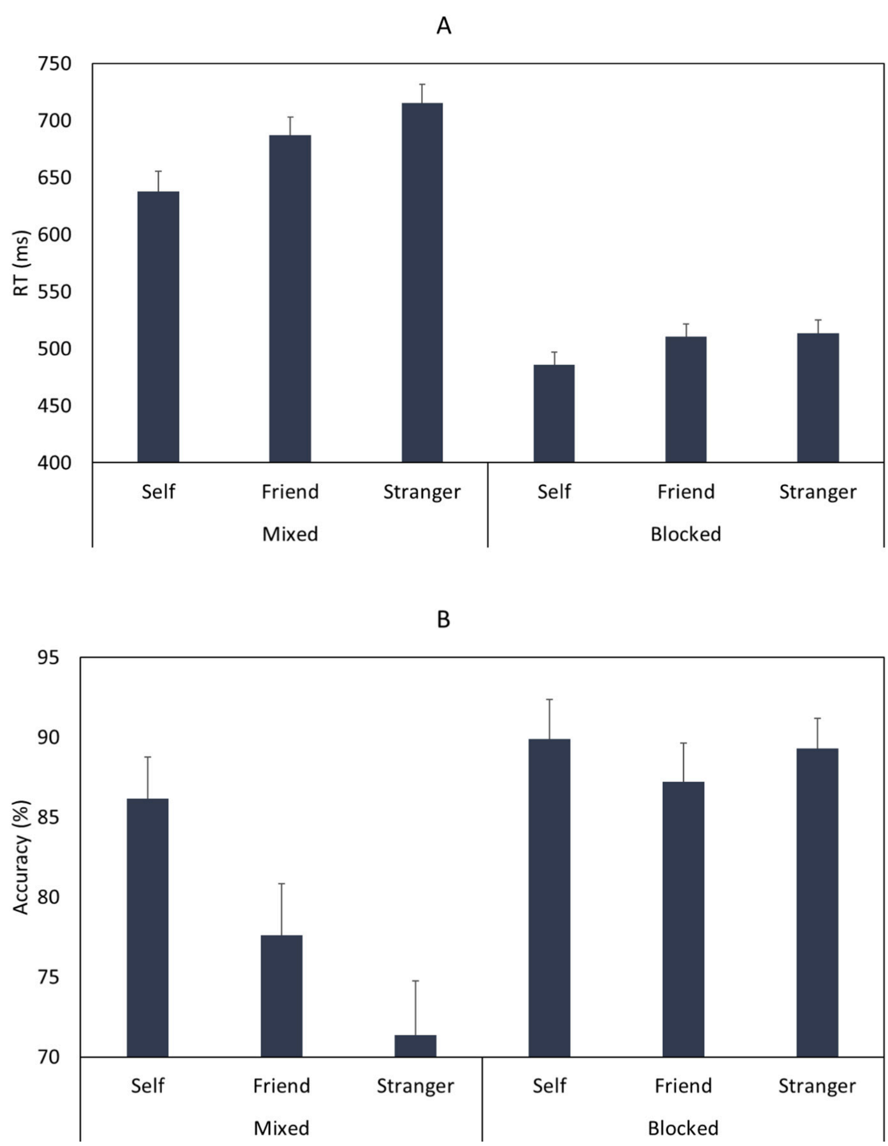

Fig. 1. Mean reaction time (RT; panel A) and accuracy (panel B) as a function of Shape Association and Presentation during matching trials (Expt. 1). Error bars represent +1 SEM.

.001), and significant Shape Association × Trial Type ($b = 0.18$, $SE = 0.04$, $z = 4.91$, $p < .001$), Shape Association × Presentation ($b = 0.12$, $SE = 0.04$, $z = 3.33$, $p = .001$), and Shape Association × Presentation × Trial Type ($b = 0.11$, $SE = 0.04$, $z = 3.09$, $p = .002$) interactions. To explore further the 3-way interaction, separate Shape Association × Presentation analyses were conducted for matching and nonmatching trials. On matching trials, this revealed main effects of Shape Association ($b = 0.27$, $SE = 0.05$, $z = -5.32$, $p < .001$) and Presentation ($b = -0.42$, $SE = 0.04$, $z = -9.88$, $p < .001$), and a significant Shape Association × Presentation ($b = 0.24$, $SE = 0.05$, $z = 4.66$, $p < .001$) interaction (see Fig. 1, panel B). During the mixed-presentation blocks, an effect of Shape Association was observed ($b = 0.53$, $SE = 0.07$, $z = 7.93$, $p < .001$, $R^2 = 0.043$). Further comparisons revealed a significant self-advantage over both friend ($b = 0.70$, $SE = 0.14$, $z = 4.99$, $p < .001$, $R^2 = 0.028$) and stranger ($b = 0.54$, $SE = 0.06$, $z = 7.92$, $p < .001$, $R^2 = 0.066$). During the blocked presentations, this effect was not significant ($b = 0.04$, $SE = 0.08$, $z = 0.49$, $p = .63$). On nonmatching trials, the analysis yielded only a main effect of Presentation ($b = -0.39$, $SE = 0.04$, $z = -8.99$, $p < .001$).

2.2.3. Additional analysis

To further explore the reduction of the SPE during blocked compared to mixed presentations, an additional analysis commonly adopted in work of this kind was conducted (e.g., Schäfer et al., 2015, 2017, 2020, in press). Specifically, the SPE was calculated as the difference between mean RTs/accuracy for the self-relevant shapes during matching judgments and the averaged matching RTs/accuracy for the other-relevant stimuli (i.e., shapes associated with friend & stranger). Based on this calculation, a positive SPE value indicates the prioritization of self-relevant compared to other-relevant material. On RTs, a paired samples *t*-test (one-tailed) revealed that the SPE was significantly reduced during blocked ($M = 26$ ms, $SD = 73$ ms) compared to mixed ($M = 63$ ms, $SD = 72$ ms) presentations, $t(29) = 2.12$, $p = .021$, $d = 0.39$. Similarly, on response accuracy, the SPE was smaller during blocked ($M = 2\%$, $SD = 11\%$) than mixed ($M = 12\%$, $SD = 11\%$) presentations ($t(29) = 4.01$, $p < .001$, $d = 0.73$).

The results of Experiment 1 provide first evidence that the SPE is sensitive to differences in the manner in which target-related stimuli are encountered during a simultaneous shape-label matching task. Although a standard SPE (i.e., self < friend < stranger) emerged on the speed of responses both in the mixed- and blocked-presentation conditions, this effect was substantially reduced when the stimuli were blocked (vs. mixed), as indexed by the diminished effect size and beta coefficient of Shape Association and the additional SPE analysis. With regard to the accuracy of responses, a SPE only emerged when the presentation of target-related shapes was mixed. Having revealed that basic aspects of the task design moderate the magnitude of self-prioritization, the goal of our next experiment was to attempt to replicate this effect. In so doing, to probe the generality of the observed effects, we adopted the sequential version of the shape-label matching task (Janczyk et al., 2019; Sui et al., 2014; Wang et al., 2016).

3. Experiment 2: sequential shape-label matching task

3.1. Method

3.1.1. Participants and design

To detect a significant three-way repeated measures interaction, sample size estimation was as in Experiment 1. Thirty participants (10 male, $M_{age} = 23.13$, $SD = 3.22$) were recruited using Prolific (www.prolific.co), with each receiving compensation at the rate of £7.50/h. Informed consent was obtained from participants prior to the commencement of the experiment and the protocol was reviewed and approved by the Ethics Committee at the School of Psychology, University of Plymouth. The experiment had a 3 (Shape Association: self vs. friend vs. stranger) × 2 (Presentation: mixed vs. blocked) × 2 (Trial Type: matching vs. nonmatching) repeated measures design.

3.1.2. Stimulus materials and procedure

The procedure was as in Experiment 1, but with the modification that on this occasion shape-label stimulus pairs were presented sequentially (Sui et al., 2014). A trial commenced with a central fixation cross for 500 ms, followed by a centrally presented shape (i.e., square, triangle, circle) which remained on screen for 100 ms. After a blank interval of 200 ms, a label appeared in the center of the screen (i.e., you, friend, stranger) and participants had to report if the stimulus pairing matched or mismatched the previously learned associations. On completion of the task, participants were debriefed and thanked.

3.2. Results and discussion

Responses faster than 200 ms were excluded from the analysis (Sui et al., 2012), eliminating approximately 2% of the overall trials. In addition, five participants (2 males) were omitted because of excessive error rates (>50%). A multilevel model analysis was used to examine the correct RT and accuracy data. Shape Association, Presentation, and Trial Type were treated as contrast coded fixed effects, and participants as a crossed random effect (see Appendix A). A complete listing of the treatment means is provided in Appendix C.

3.2.1. Response times

The analysis yielded main effects of Shape Association ($b = -13.33$, $SE = 1.86$, $t = -7.16$, $p < .001$), Presentation ($b = 48.91$, $SE = 1.53$, $t = 31.99$, $p < .001$), and Trial Type ($b = -25.69$, $SE = 1.53$, $t = -16.81$, $p < .001$), and significant Shape Association × Presentation ($b = -5.64$, $SE = 1.86$, $t = -3.03$, $p = .002$), Shape Association × Trial Type ($b = -7.59$, $SE = 1.86$, $t = -4.08$, $p < .001$), Presentation × Trial Type ($b = -5.83$, $SE = 1.53$, $t = -3.81$, $p < .001$) and Shape Association × Presentation × Trial Type ($b = -7.05$, $SE = 1.86$, $t = -3.79$, $p < .001$) interactions. To explore further the 3-way interaction, separate Shape Association × Presentation analyses were conducted for matching and nonmatching trials. On matching trials, this revealed main effects of Shape Association ($b = -20.72$, $SE = 2.56$, $t = -8.10$, $p < .001$) and Presentation ($b = 43.14$, $SE = 2.10$, $t = 20.59$, $p < .001$) and, most importantly, a significant Shape Association × Presentation ($b = -12.53$, $SE = 2.56$, $t = -4.90$, $p < .001$) interaction (see Fig. 2, panel A). During the mixed-presentation blocks, an effect of Shape Association was observed ($b = -33.10$, $SE = 4.33$, $t = -7.64$, $p < .001$, $R^2 = 0.025$). Further comparisons yielded a significant self-advantage over both friend ($b = -41.18$, $SE = 8.32$, $t = -4.95$, $p < .001$, $R^2 = 0.015$) and stranger ($b = -32.87$, $SE = 4.33$, $t = -7.59$, $p < .001$, $R^2 = 0.035$). A comparable, though reduced, effect also emerged during the blocked presentations ($b = -8.27$, $SE = 2.74$, $t = -3.03$, $p = .003$, $R^2 = 0.004$). Additional analysis revealed a significant self-advantage over stranger ($b = -8.29$, $SE = 2.74$, $t = -3.02$, $p = .003$, $R^2 = 0.006$) but not friend ($b = -6.30$, $SE = 5.35$, $t = -1.18$, $p = .240$). On nonmatching trials, the analysis yielded only main effects of Shape Association ($b = -5.91$, $SE = 2.68$, $t = -2.20$, $p = .028$) and Presentation ($b = 54.89$, $SE = 2.21$, $t = 24.89$, $p < .001$).

3.2.2. Accuracy

A multilevel logistic regression analysis on the accuracy of responses revealed main effects of Shape Association ($b = 0.22$, $SE = 0.05$, $z = 4.51$, $p < .001$), Presentation ($b = -0.32$, $SE = 0.04$, $z = -8.12$, $p < .001$), and Trial Type ($b = 0.12$, $SE = 0.04$, $z = 3.05$, $p = .002$) and a significant Presentation × Trial Type ($b = -0.11$, $SE = 0.04$, $z = -2.75$, $p = .006$) interaction (see Fig. 2, panel B). Further analysis of the interaction revealed that, during the blocked presentations, accuracy was higher for matching compared to nonmatching responses ($b = 0.26$, $SE = 0.06$, $z = 3.59$, $p < .001$). During the mixed presentations, no significant difference in accuracy was observed ($b = 0.01$, $SE = 0.05$, $z = 0.10$, $p = .92$).

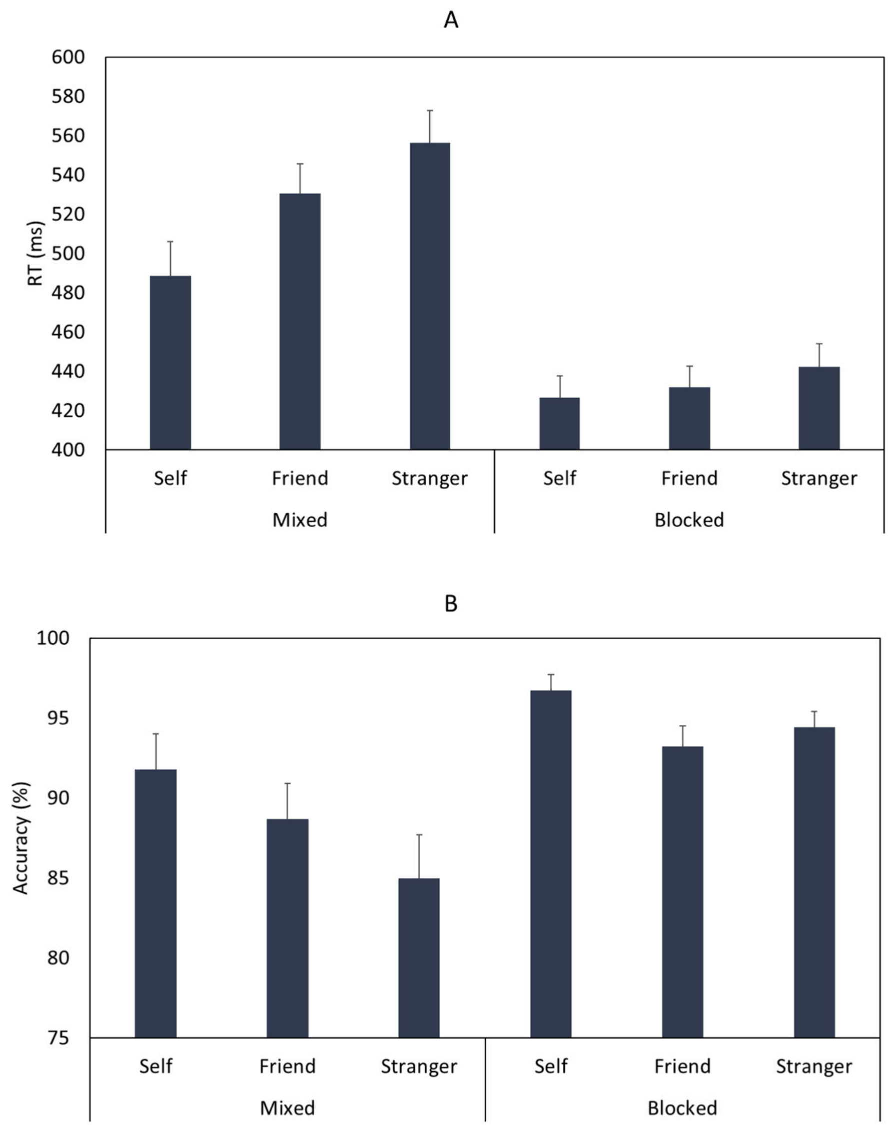

Fig. 2. Mean reaction time (RT; panel A) and accuracy (panel B) as a function of Shape Association and Presentation during matching trials (Expt. 2). Error bars represent +1 SEM.

3.2.3. *Additional analysis*

As in Experiment 1, to further explore the reduction of the SPE as a function of presentation type (i.e., blocked vs. mixed), SPE difference scores were calculated (Schäfer et al., 2015, 2017, 2020, in press). On RTs, a paired samples *t*-test (one-tailed) revealed that the SPE was significantly reduced during blocked ($M = 11$ ms, $SD = 42$ ms) compared to mixed ($M = 55$ ms, $SD = 66$ ms) presentations ($t(24) = 2.82$, $p = .005$, $d = 0.56$). Analysis of the accuracy SPE scores yielded no difference between blocked ($M = 3\%$, $SD = 4\%$) and mixed ($M = 5\%$, $SD = 13\%$) presentations ($t(24) = 0.75$, $p = .230$).

Using the sequential version of the shape-label matching task (Sui et al., 2012, 2014), on the critical measure of the speed of responses during matching trials, the current results replicated those observed in Experiment 1. Although a SPE (i.e., self < friend < stranger) emerged in both the mixed- and blocked-presentation conditions, the benefits of self-relevance were markedly reduced when the stimuli were blocked (i.e., attenuated effect size and beta coefficient of Shape Association and significant difference in the SPE score). Unlike Experiment 1, accuracy was greater for self-related (vs. friend-related/stranger-related) items regardless of the manner in which the stimuli were presented. These findings provide further evidence that basic aspects of the task design moderate the magnitude of self-prioritization.

4. General discussion

Across both simultaneous and sequential versions of the shape-label matching task (Sui et al., 2012, 2014), a consistent pattern of results emerged. Basic aspects of the task design moderated self-prioritization, such that the benefits of self-relevance were less pronounced when stimuli were blocked compared to intermixed. As such, the current results highlight both the persistence of self-bias and its sensitivity to task-specific variation during decision-making.

Although the pliability of self-prioritization has been demonstrated elsewhere, this work has predominantly employed ownership tasks in which participants respond to objects that ostensibly belong to the self and others (Constable et al., 2019; Falbén et al., 2019, 2020; Golubickis et al., 2021). Collectively, these studies have revealed that self-prioritization can be reduced — or even abolished — by a variety of factors, including people's processing goals, the frequency of stimulus presentation, and the valence of objects. While a diminution of self-prioritization has also been observed during shape-label matching tasks, (Constable & Knoblich, 2020; Golubickis et al., 2017, 2020; Sui & Humphreys, 2015; Sui et al., 2016), typically self-prioritization effects persist under conditions hypothesized to lessen the benefits of personal relevance (Reuther & Chakravarthi, 2017; Schäfer et al., 2017; Sui et al., 2012, 2014). However, Sui et al. (2016) demonstrated a reduction in self-prioritization when participants were in a negative (vs. neutral) mood. Similarly, probing the effects of temporal construal and identity-relevance on self-bias, Golubickis et al. (2017, 2020) reported attenuated self-prioritization effects when shapes were associated with the future-self (vs. current-self) and inconsequential (vs. consequential) personal identities. Adding to this line of inquiry, here we showed that self-bias was diminished when to-be-judged items were mixed rather than blocked during stimulus presentation.

Several candidate explanations may account for the observed modulation of self-prioritization. For example, given the mind's propensity to focus on novel or changeable (i.e., informative) inputs (Johnston & Hawley, 1994), invariant target-related shapes may be processed only minimally, thereby reducing self-prioritization. Alternatively, blocked (vs. mixed) stimuli may be encoded thoroughly, repetition however may attenuate the impact these items exert on decision-making. Through satiation or habituation, it has been reported that frequent exposure to an item can weaken the influence of the stimulus (Balota & Black, 1997; Harris & Pashler, 2004; Smith, 1984; Smith & Klein, 1990). Such an effect has obvious benefits as, by filtering out repetitive (i.e., redundant) material, it biases attention toward new information. It is possible that a mechanism of this kind may have contributed to the emergence of a reduced SPE when to-be-judged items were blocked rather than intermixed during stimulus presentation.

The current findings suggest a number of interesting avenues for future research. First, and foremost, do differences in the task design modulate self-prioritization when more nuanced accounts of the self-concept are adopted and operationalized? When exploring the dynamics of the self-prioritization effect, researchers have taken (at least implicitly) the self to be a unitary structure that guides information processing and response generation (Humphreys & Sui, 2016; Sui & Humphreys, 2015, 2017). This viewpoint, however, fails to capture the complexity of the self-concept and its operational characteristics during social-cognitive functioning. From moment-to-moment, stimuli are associated, not with a monolithic representation of the self, but rather with temporary context and goal-dependent sub-components of the self-concept (e.g., personal identities), the so-called working self (Conway & Pleydell-Pearce, 2000; McConnell, 2011; Oyserman, 2007, 2009). This identity-specific processing is vital as it affords social cognition the flexibility that is needed to successfully navigate everyday life (Berger & Heath, 2007; Coleman & Williams, 2015). As such, while blocked versus mixed stimulus presentations modulate self-prioritization, it remains to be seen whether the effects of task design would extend to processing episodes in which material is paired with identities that vary in their immediate relevance and importance for people (see Golubickis et al., 2020).

Exploring the stability of self-bias, here we showed that changes in task design attenuated but did not abolish self-prioritization during decisional processing. What has yet to be established, however, is whether comparable effects emerge when self-relevance is manipulated and probed in different ways. Just as characteristics of the perceiver and stimulus materials influence self-prioritization, so too it would appear does the structure of the task in which information is encountered.

Declaration of competing interest

No conflict of interest to declare.

Appendix A. Additional information regarding multilevel model analysis

In Experiments 1 and 2, linear mixed effects models were fitted to predict RT and accuracy performance in order to account for repeated measures (Meteyard & Davies, 2020). Analyses were conducted using the R package 'lmer4' (Pinheiro et al., 2015) and complemented with the 'lmerTest' package (Kuznetsova et al., 2017). Restricted maximum likelihood estimation was used for all performed models. Each participant had up to 360 accuracy-related data points (minus RT-based exclusions, see Results). The number of RT-related data points varied across the sample as models were fitted only for correct responses (total $N_{Expt1} = 8755$ & $N_{Expt2} = 8031$ valid observations). The model comprised of Shape Association (self vs. friend vs. stranger), Presentation (mixed vs. blocked), and Trial Type (matching vs. nonmatching) as fixed effects and all possible interaction terms. All fixed effects were contrast coded and the model contained random intercepts for participants. Random slopes were not estimated. The R script for the MLM analysis is available online (https://osf.io/8bktn/).

Appendix B. Mean reaction time (RT) and accuracy as a function of Trial Type, Presentation, and Shape Association (Experiment 1)

Presentation	Trial type			
	Matching trials		Nonmatching trials	
	Mixed	Blocked	Mixed	Blocked
Shape association				
RT (ms)				
Self	638 (90)	486 (80)	737 (112)	529 (108)
Friend	687 (115)	511 (84)	741 (121)	573 (108)
Stranger	715 (135)	513 (100)	744 (108)	566 (115)
Accuracy (%)				
Self	86 (14)	90 (13)	80 (17)	89 (14)
Friend	78 (17)	87 (13)	80 (15)	86 (14)
Stranger	71 (19)	89 (10)	82 (16)	92 (8)

Note. Standard deviations appear within parentheses.

Appendix C. Mean reaction time (RT) and accuracy as a function of Trial Type, Presentation, and Shape Association (Experiment 2)

Presentation	Trial type			
	Matching trials		Nonmatching trials	
	Mixed	Blocked	Mixed	Blocked

(*continued on next page*)

(*continued*)

Presentation	Trial type			
	Matching trials		Nonmatching trials	
	Mixed	Blocked	Mixed	Blocked
Shape association				
RT (ms)				
Self	488 (88)	426 (55)	574 (100)	468 (70)
Friend	530 (77)	432 (53)	601 (92)	473 (67)
Stranger	556 (81)	442 (60)	581 (87)	483 (73)
Accuracy (%)				
Self	92 (11)	97 (5)	91 (8)	94 (6)
Friend	89 (11)	93 (6)	87 (8)	89 (10)
Stranger	85 (14)	94 (5)	87 (12)	94 (7)

Note. Standard deviations appear within parentheses.

References

Balota, D. A., & Black, S. (1997). Semantic satiation in healthy young and older adults. *Memory & Cognition, 25*, 190–202.

Bargh, J. A., & Pratto, F. (1986). Individual construct accessibility and perceptual selection. *Journal of Experimental Social Psychology, 22*, 293–311.

Berger, J., & Heath, C. (2007). Where consumers diverge from others: Identity-signaling and product domains. *Journal of Consumer Research, 34*, 121–134.

Caughey, S., Falbén, J. K., Tsamadi, D., Persson, L. M., Golubickis, M., & Macrae, C. N. (2021). Self-prioritization during stimulus processing is not obligatory. *Psychological Research, 85*, 503–508.

Coleman, N. V., & Williams, P. (2015). Looking for my self: Identity-driven attention allocation. *Journal of Consumer Psychology, 25*, 504–511.

Constable, M. D., & Knoblich, G. (2020). Sticking together? Re-binding previous other-associated stimuli interferes with self-verification but not partner-verification. *Acta Psychologica, 210*, Article 103167.

Constable, M. D., Welsh, T. N., Huffman, G., & Pratt, J. (2019). I before U: Temporal order judgements reveal bias for self-owned objects. *Quarterly Journal of Experimental Psychology, 72*, 589–598.

Conway, M. A., & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review, 107*, 261–288.

Dalmaso, M., Castelli, L., & Galfano, G. (2019). Self-related shapes can hold the eyes. *Quarterly Journal of Experimental Psychology, 72*, 2249–2260.

Dewhurst, S. A., & Parry, L. A. (2000). Emotionality, distinctiveness, and recollective experience. *European Journal of Cognitive Psychology, 12*, 541–551.

Falbén, J. K., Golubickis, M., Balseryte, R., Persson, L. M., Tsamadi, D., Caughey, S., & Macrae, C. N. (2019). How prioritized is self-prioritization during stimulus processing. *Visual Cognition, 27*, 46–51.

Falbén, J. K., Golubickis, M., Wischerath, D., Tsamadi, D., Persson, L. M., Caughey, S., … Macrae, C. N. (2020). It's not always about me: The effects of prior beliefs and stimulus prevalence on self-other prioritization. *Quarterly Journal of Experimental Psychology, 73*, 1466–1480.

Frings, C., & Wentura, D. (2014). Self-prioritization processes in action and perception. *Journal of Experimental Psychology: Human Perception and Performance, 40*, 1737–1740.

Golubickis, M., Falbén, J. K., Cunningham, W. A., & Macrae, C. N. (2018). Exploring the self-ownership effect: Separating stimulus and response biases. *Journal of Experimental Psychology. Learning, Memory, and Cognition, 44*, 295–306.

Golubickis, M., Falbén, J. K., Ho, N. S., Sui, J., Cunningham, W. A., & Macrae, C. N. (2020). Parts of me: Identity-relevance moderates self-prioritization. *Consciousness and Cognition, 77*, Article 102848.

Golubickis, M., Falbén, J. K., Sahraie, A., Visokomogilski, A., Cunningham, W. A., Sui, J., & Macrae, C. N. (2017). Self-prioritization and perceptual matching: The effects of temporal construal. *Memory & Cognition, 45*, 1223–1239.

Golubickis, M., Ho, N. S., Falbén, J. K., Schwertel, C. L., Maiuri, A., Dublas, D., … Macrae, C. N. (2021). Valence and ownership: Object desirability influences self-prioritization. *Psychological Research, 85*, 91–100.

Harris, C. R., & Pashler, H. (2004). Attention and the processing of emotional words and names: Not so special after all. *Psychological Science, 15*, 171–178.

Hosie, J. A., & Milne, A. B. (1996). The effect of experimental design on memory for typical and distinctive faces. *Memory, 4*, 175–198.

Humphreys, G. W., & Sui, J. (2016). Attentional control and the self: The self-attention network (SAN). *Cognitive Neuroscience, 7*, 5–17.

Hunt, R. R., & Elliot, J. M. (1980). The role of nonsemantic information in memory: Orthographic distinctiveness effects on retention. *Journal of Experimental Psychology: General, 109*, 49–74.

Janczyk, M., Humphreys, G. W., & Sui, J. (2019). The central locus of self-prioritisation. *Quarterly Journal of Experimental Psychology, 72*, 1068–1083.

Johnston, W. A., & Hawley, K. J. (1994). Perceptual inhibition of expected inputs: The key that opens closed minds. *Psychonomic Bulletin & Review, 1*, 56–72.

Keyes, H., & Brady, N. (2010). Self-face recognition is characterized by "bilateral gain" and by faster, more accurate performance which persists when faces are inverted. *Quarterly Journal of Experimental Psychology, 63*, 840–847.

Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. (2017). lmerTest package: Tests in linear mixed effects models. *Journal of Statistical Software, 82*, 1–26.

Macrae, C. N., & Cloutier, J. (2009). A matter of design: Priming context and person perception. *Journal of Experimental Social Psychology, 45*, 1012–1015.

Macrae, C. N., Visokomogilski, A., Golubickis, M., & Sahraie, A. (2018). Self-relevance enhances the benefits of attention on perception. *Visual Cognition, 26*, 475–481.

Mattan, B., Quinn, K. A., Apperly, I. A., Sui, J., & Rotshtein, P. (2015). Is it always me first? Effects of self-tagging on third-person perspective-taking. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 41*, 1100.

McConnell, A. R. (2011). The multiple self-aspects framework: Self-concept representation and its implications. *Personality and Social Psychology Review, 15*, 3–27.

Meteyard, L., & Davies, R. A. (2020). Best practice guidance for linear mixed-effects models in psychological science. *Journal of Memory and Language, 112*, Article 104092.

Moradi, Z., Sui, J., Hewstone, M., & Humphreys, G. W. (2015). In-group modulation of perceptual matching. *Psychonomic Bulletin and Review, 22*, 1255–1277.

Oyserman, D. (2007). Social identity and self-regulation. In A. W. Kruglanski & E. T. Higgins (Eds.), Social psychology: Handbook of basic principles (2nd ed., pp. 432–453). New York: Guilford Press.

Oyserman, D. (2009). Identity-based motivation and consumer behavior. *Journal of Consumer Psychology, 19*, 276–279.

Payne, S., Tsakiris, M., & Maister, L. (2017). Can the self become another? Investigating the effects of self-association with a new facial identity. *Quarterly Journal of Experimental Psychology, 70*, 1085–1097.

Pinheiro, J., Bates, D., DebRoy, S., Sarkar, D., & Development Core Team, R. (2015). *nlme: Linear and nonlinear mixed effects models*. Vienna, Austria: The Comprehensive R Archive Network (CRAN).

Qian, H., Wang, Z., Li, C., & Gao, X. (2020). Prioritised self-referential processing is modulated by emotional arousal. *Quarterly Journal of Experimental Psychology, 73*, 688–697.

Rees, H. R., Ma, D. S., & Sherman, J. W. (2020). Examining the relationships among categorization, stereotype activation, and stereotype application. *Personality and Social Psychology Bulletin, 46*, 499–513.

Reuther, J., & Chakravarthi, R. (2017). Does self-prioritization affect perceptual processes? *Visual Cognition, 25*, 381–398.

Schäfer, S., Wentura, D., & Frings, C. (2015). Self-prioritization beyond perception. *Experimental Psychology, 62*, 415–425.

Schäfer, S., Wentura, D., & Frings, C. (2017). Distinctiveness effects in self-prioritization. *Visual Cognition, 25*, 399–411.

Schäfer, S., Wentura, D., & Frings, C. (2020). Creating a network of importance: The particular effects of self-relevance on stimulus processing. *Attention, Perception, & Psychophysics, 82*, 3750–3766.

Schäfer, S., Wesslein, A. K., Spence, C., & Frings, C. (2021). When self-prioritization crosses the senses: Crossmodal self-prioritization demonstrated between vision and touch. *British Journal of Psychology* (in press).

Schmidt, S. R. (1991). Can we have a distinctive theory of memory? *Memory & Cognition, 19*, 523–542.

Shapiro, K. L., Caldwell, J., & Sorensen, R. E. (1997). Personal names and the attentional blink: A visual "cocktail party" effect. *Journal of Experimental Psychology: Human Perception and Performance, 23*, 504–514.

Siebold, A., Weaver, M. D., Donk, M., & van Zoest, W. (2015). Social salience does not transfer to oculomotor visual search. *Visual Cognition, 23*, 989–1019.

Smith, L., & Klein, R. (1990). Evidence for semantic satiation: Repeating a category slows subsequent semantic processing. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 16*, 852.

Smith, L. C. (1984). Semantic satiation affects category membership decision time but not lexical priming. *Memory & Cognition, 12*, 483–488.

Smith, M. C., Besner, D., & Miyoshi, H. (1994). New limits to automaticity: Context modulates semantic priming. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 20*, 104–115.

Stein, T., Siebold, A., & van Zoest, W. (2016). Testing the idea of privileged awareness of self-relevant information. *Journal of Experimental Psychology: Human Perception and Performance, 42*, 303–307.

Sui, J., He, X., & Humphreys, G. W. (2012). Perceptual effects of social salience: Evidence from self-prioritization effects on perceptual matching. *Journal of Experimental Psychology: Human Perception and Performance, 38*, 1105–1117.

Sui, J., & Humphreys, G. W. (2015). The integrative self: How self-reference integrates perception and memory. *Trends in Cognitive Sciences, 19*, 719–728.

Sui, J., & Humphreys, G. W. (2017). The ubiquitous self: What the properties of self-bias tell us about the self. *Annals of the New York Academy of Sciences, 1396*, 222–235.

Sui, J., & Rotshtein, P. (2019). Self-prioritization and the attentional systems. *Current Opinion in Psychology, 29*, 148–152.

Sui, J., Sun, Y., Peng, K., & Humphreys, G. W. (2014). The automatic and the expected self: Separating self- and familiarity biases effects by manipulating stimulus probability. *Attention, Perception, & Psychophysics, 76*, 1176–1184.

Sui, J., Ohrling, E., & Humphreys, G. W. (2016). Negative mood disrupts self-and reward-biases in perceptual matching. *Quarterly Journal of Experimental Psychology, 69*, 1438–1448.

Symons, C. S., & Johnson, B. T. (1997). The self-reference effect in memory: A meta-analysis. *Psychological Bulletin, 121*, 371–394.

Wade, G. L., & Vickery, T. J. (2017). Self-relevance effects and label choice: Strong variations in label-matching performance due to non-self-relevant factors. *Attention, Perception, & Psychophysics, 79*, 1524–1534.

Wallace, W. P. (1965). Review of the historical, empirical, and theoretical status of the von Restorff phenomenon. *Psychological Bulletin, 63*, 410–424.

Wang, H., Humphreys, G., & Sui, J. (2016). Expanding and retracting from the self: Gains and costs in switching self-associations. *Journal of Experimental Psychology: Human Perception and Performance, 42*, 247–256.

Watkins, M., LeCompte, D. C., & Kim, K. (2000). Role of study strategy in recall of mixed lists of common and rare words. *Journal of Experimental Psychology. Learning, Memory, and Cognition, 26*, 239–295.

Woźniak, M., & Knoblich, G. (2019). Self-prioritization of fully unfamiliar stimuli. *Quarterly Journal of Experimental Psychology, 72*, 2110–2120.

Yin, S., Sui, J., Chiu, Y.-C., Chen, A., & Egner, T. (2019). Automatic self-prioritization of self-referential stimuli in working memory. *Psychological Science, 30*, 415–423.