Is self always prioritised? Attenuating the ownership self-reference effect in memory

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TITLE: Is Self always Prioritised? Attenuating the Ownership Self-Reference Effect in Memory

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Abstract

The current study demonstrates the abolishment of the Ownership Self Reference Effect (OSRE) when elaborate details of a distant other-referent are provided. In a 2 (High versus Low information) x 2 (Self versus Other) experimental design, we tested the capacity for the SRE to be modulated with social saliency. Using a well-established ownership paradigm (Collard et al., 2020; Cunningham et al., 2008; Sparks et al., 2016), when the other was made socially salient (i.e. details and characteristics about the other were provided to the participant prior to encoding), no SRE emerged, such that self-owned and other-owned items were recalled with comparable accuracy. In contrast, when the other was not salient (i.e., no details about them were provided), participants accurately recalled a higher proportion of self-owned items, demonstrating a typical SRE in source memory. The degree of self- or other-referencing was not related to measured variables of closeness, similarity or shared traits with the other. Although the SRE is an established and robust effect, the findings of the current study illustrate critical circumstances in which the self is no longer prioritised above the other. In line with our predictions, we suggest that the self has automatic attributed social salience (e.g. through ownership) and that enhancing social salience by elaborating details of the other, prioritisation can expand to encapsulate an other beyond the self and influence incidental memory.

Keywords: Self, Salience, Memory, Ownership, Self-Reference Effect

Introduction

There is an extensive history of research examining how the self modulates our perceptions and cognitions (Humphreys & Sui, 2016; Symons & Johnson, 1997).The Self Reference Effect (SRE) refers to the tendency for people to remember information more accurately when that information has direct relevance to the self, compared with others (Cunningham et al., 2014; Klein et al., 1989; Symons & Johnson, 1997). Observing self-referencing biases in memory is important for understanding the extent to which individuals prioritise the self, and under what circumstances this prioritisation is enhanced, or attenuated.

1.1 Self Prioritisation Effects

There is evidence that the self not only affects memory processes, but other cognitions. The Self Prioritisation Effect (SPE) denotes a performance advantage (reaction times and accuracy) to self-relevant stimuli (e.g., one's own face, self-association with geometric shapes and auditory stimuli; Golubickis et al., 2017; Payne et al., 2021; Sui & Humphreys, 2015; Sui et al., 2014). However, more recently researchers have been using task modification to attenuate the SPE, demonstrating changes to task instructions can influence decision-making such that others are prioritised with comparable reaction times with self stimuli (Caughey et al., 2021; Falbén et al., 2020). For example, Caughey and colleagues (2021) found that in a shape-label matching task, the advantage for self-related information was attenuated when the self-label was not present in each trial. For trials where participants were only required to respond to the location or shape type, participants' self-bias diminished, indicating that automatic self-prioritisation is sensitive to the relative importance of the self for that task. Further, when self-cues compete with other cues that are temporarily goal-relevant, the attentional bias to self-cues can be reversed (Cunningham et al., 2021). Similarly, Woźniak and Knoblich (2021) found that participants did not exhibit an SPE when they were informed that the self-associations were task-irrelevant, meaning the SPE was only evident when established connections between the self and the stimuli were made apparent, and when the pairings were task relevant.

Moreover, there is evidence that information about others benefits performance for other-relevant stimuli but does not have a detrimental effect on self prioritisation. For example, Sui, Sun, Peng, and Humphreys (2014) found that increasing the frequency of presentation of matched associations during training (between labels 'mother' and 'stranger' with corresponding geometric shapes) increased accuracy and reduced response times for non-self stimuli. Notably, increasing the frequency of presentation self-shape pairings did not alter accuracy or response times. Consequently, the relative performance in identifying non-self stimuli could be enhanced, whereas the self exhibited automatic, robust effects regardless of the frequency of pairing with a corresponding stimulus.

The SPE is sensitive to prior expectations about the information prevalence. When the frequency of information is confirmed or disconfirmed (prior to the stimuli appearing) with the participant, prioritisation of prevalent information was observed regardless of the object owner (Falbén et al., 2020). For example, Falbén and colleagues (2020; Exp 2) found that

when it was confirmed to the participant that friend-relevant stimuli would be the predominant stimulus, a friend-prioritisation effect emerged demonstrating a reversal of the SPE. Moreover, Golubickis and colleagues (2020) also demonstrated that self-prioritisation is sensitive to identity cues. Specifically, stimulus enhancement (i.e. faster reaction times and higher accuracy) was greatest when geometric shapes were associated with identity-related information that was important (vs. unimportant) to participants.

Extensive research supports that the Self facilitates attention (Sui et al., 2009; Golubickis et al., 2017) and memory (Symons & Johnson, 1997), but to what degree these processes are related remains unclear. Humphreys and Sui (2016) proposed the Self Attentional Network (SAN) to explain the underlying mechanisms of cognitive processes favouring the self in attentional tasks. They argued that self-relevant cues are powerful enough to guide attention and processing on behavioural tasks in a relatively automatic manner. Additionally, they argued that perceptual and social saliency interacts with how much attention is directed toward the self. Self-relevant stimuli, however, modulate memory in a different way. Self-referential memory effects occur through a dual process of *elaboration* and *organisation* (Klein & Loftus, 1988), allowing better recall of self-referenced information than the semantic or structural encoding of the same material. Self-referencing differs from other encoding strategies because self-referenced information involves both item-specific and relational information. These mechanisms support the SRE, making self-referential encoding one of the most effective encoding strategies for episodic memory enhancement (Symons & Johnson, 1997).

Possibly however, attentional direction toward the self that occurs at an earlier stage of information processing fosters elaboration and organisation, intrinsically linking the SPE and SRE. Despite evidence that contextual factors promote other-salience for the SPE, it is not clear whether the memory SRE also can be attenuated in the same way, a gap the current investigation aims to address.

1.2 The Ownership Self Reference Effect

There are many ways to operationalise self-referencing, and one established way is through ownership. Ownership paradigms require participants to sort arbitrary familiar stimuli into self-owned and other-owned (or un-owned) categories, on the basis of a sorting cue like colour. A subsequent memory advantage for items encoded as self-owned is known as the *Ownership Self Reference Effect* (OSRE). The OSRE has been shown to be highly robust

regardless of whether the other person is a genuine participant tested in-person simultaneously (e.g., Cunningham et al., 2008, 2014) or a mock, computerised referent (e.g., Turk et al., 2008).

1.3 The Fluid Self

Despite the robustness of the SRE and OSRE, there is evidence that the effect of self on memory can be modulated to include others depending on contextual factors, such as culture, in-group out-group exclusion, and negative affect (Bentley et al., 2017; Fan et al., 2016; Sparks et al., 2016). Increasing evidence is pointing to a range of contexts in which the boundary that surrounds the self can be fluid. For example, the self is not always about an individual's ownership or directly self-related properties but can be extended to collectively include the groups in which an individual belongs. When participants are given cues that indicate in-group and outgroup memberships and identities, they are more likely to recognise information about others within their group compared to that associated with members of the out-group, demonstrating an extension of the self to adopt the group (Bentley et al., 2017; Johnson et al., 2002; Svirydzenka et al., 2010). Ownership paradigms have also been used to demonstrate that information (objects) associated with others is more memorable than information associated with no referent (i.e., control condition), showing that other-referent information can elicit some memory advantages (Cunningham et al., 2018).

One's family or culture can also directly influence the prioritisation of self-related stimuli in memory, with attenuation of self-reference effects reported in cultures in which collectivism takes prominence over individualism (Wagar & Cohen, 2003). For example, Sparks and colleagues (2016) found that participants of Asian descent had better memory accuracy for items owned by their mothers compared with themselves. However, this effect did not emerge for Western participants. The results suggested that those with an independent or individualistic self-construal may identify less closely with close or distant others; having a direct effect on cognitive processes, including memory (Zhang et al., 2020).

In these paradigms, participants are invited to imagine someone who may be close, or not close at all to the participant. This means that paradigms of this nature may not sufficiently capture the finer, idiosyncratic relationship boundaries that are experienced individually. Other referents who are considered close to the participant (i.e., a mother or best friend) may be intrinsically linked to one's self-concept, and this elicits shared autobiographical memories

and emotional responses (Vanderwal et al., 2008; Xiao-bing et al., 2020). Such representations will differ widely within a sample. Some participants may not identify closely with the 'other', and so controlling for this (creating a fictional other with elaborated characteristics, while maintaining them as a stranger) means that the other remains distant and does not have autobiographical representation. To our knowledge, this has not been previously researched.

In standard measures of the SRE, the other may be nameless (Collard et al., 2020), they may be the experimenter (Cunningham et al., 2018), another participant in the room (Cunningham et al., 2008; He et al., 2021) or they may be given a fixed identity (i.e. a stranger with a name, as opposed to an unnamed other; Sparks et al., 2016), or a celebrity who is not personally-known (Turk et al., 2011). These scenarios share a common feature of providing few details about the other person or providing a social context in which the participant should be motivated to attend to them. Given that monitoring for information relevant to the Self is a perpetual goal with established automaticity (Conway, 2005), it may be that self-reference is prioritised in the task because there is no competing goal of monitoring the other.

We speculate that the nature of information shared about the other may inadvertently trigger a shift within the self and other boundaries, creating a motivation to attend to the other person and attenuate the SRE. In other words, providing increased, detailed information about an individual, thereby increasing the social salience of this other, may have a direct effect on what information in allocation and encoding is prioritised.

1.4 The Current Study

The current study sought to investigate the OSRE where information about the other is elaborated. Participants were tested under two conditions. In the 'high social salience' condition, participants had a written conversational interaction with 'Sam' and learned information about them. In the 'low social salience' condition, no details of the other were given, and no details of the participants were collected besides demographic information. This study aimed to explore the effects of increasing the salience of the other-referent in an ownership task. We hypothesised that a direct result of salience enhancement of the other would result in an interaction, where salience would enhance source memory for other-owned items, but that self-owned item memory accuracy would remain consistent across both conditions. Additionally, we predicted that closeness and similarity measures would be

unrelated to the degree of self- or other- referencing in the high saliency condition. Although 'Sam' is salient, they are still a distant stranger with no personal relationship to the Self (i.e. the participant), and thus no in-group representation (Bentley et al., 2017). This means that any prioritisation of the other should not be due to the degree of personal relevance they have to the participant. Hence, we predict a non-significant relationship between the degree of both closeness and similarity with self-bias[1].

In contrast, should similarity and/or closeness negatively correlate with self-bias, then this supports a possible explanation that the other represents a personal relationship and thus an in-group to the participant (Bentley et al., 2017). In turn, it would imply that saliency promotes an increase in perceived closeness or similarity.

Method

This study was administered online using GORILLA Experiment Builder, and both experimental task versions are accessible via open materials on GORILLA (see supplementary materials) all data is available on OSF (https://osf.io/k92x5/). This study was approved by the Human Research Ethics Committee (HREC; #2019001659).

2.1 Design

A G*Power Analysis for a mixed ANOVA detected that for a medium effect size, and 95% power, a total sample size of 158 participants would be required. The experiment followed a 2 (Salience condition: High versus Low) x 2 (Ownership: Self and Other) mixed design. Salience was employed as a between-groups factor and ownership was a within-groups factor. Participants for both experiments were recruited through the University of Queensland's SONA Systems from first-year psychology courses.

In the high salience condition, 207 participants were exported from GORILLA, of which 195 completed allocation consisting of the raw data sample. After cleaning (see data screening criteria) the final sample included 119 participants (95 females, 24 males) between the ages of 18 and 53 years ($M_{age} = 21.70$). Sixty-two participants were excluded for not sorting items correctly in the object allocation trial (picking and choosing items with agency instead of being guided by the colour cue), four participants were excluded for not correctly

[1] Self-bias refers to a continuous measure in which we subtract the corrected hit rates for self-owned items from other owned items.

remembering their bag, eight participants were excluded for having negative hit rates, two were excluded for not completing the memory test. Seventy-five participants identified as White or Caucasian, 36 identified as Asian or Southeast Asian, four identified as Black or African American, and four identified as Other.

In the low salience condition, 167 were exported form GORILLA, of which 164 completed object allocation which consisted of the raw sample. After cleaning, the final sample included 129 participants (91 females, 38 males) between the ages of 16 and 50 years (M_{age} = 20.09). Seventeen participants were excluded for not allocating items properly during encoding, five participants were excluded for not remembering the correct bag, nine were excluded for negative hit rates, and four were excluded for not completing the memory test. Sixty-two participants identified as White or Caucasian, 58 participants identified as Asian, eight identified as Black or African American, and one identified as Other.

2.2 Procedure

All participants gave informed consent before participating and were told that they could withdraw at any time without penalty. In the high salience condition, participants were introduced to 'Sam' – a female university student who was 25 years old, a university student studying accounting. Participants exchanged their 'nickname' with Sam, and Sam shared that their nickname was 'Sammy'. Information about Sam was adapted from and unpublished paradigm in which participants learn details about an unknown other with a provided photo, including their hobbies and interests (Study 3: Sparks, 2020).

The conversational, 'written-exchange' format was as follows:

"Cool! Nice to meet you. I am a 25-year-old female, a third-year accounting student at University. I like going to Yoga on the weekends, and I enjoy drinking boutique beers. I enjoy listening to 80s rock music and my favourite food is pizza. Please, tell me more about yourself!"

Following this, participants provided details of their own interests and hobbies. Participants then also indicated how many traits they shared with Sam (by selecting all traits that they had in common). After responding to demographic questions, participants proceeded with the task. Before the task proceeded, participants were made aware that they would enter full-screen mode and their cursor would disappear. After entering full-screen mode, participants were shown an image of Sam in the centre of the screen and told to "Think of Sam for the

next 20 seconds". The screen changed after 20 seconds, and participants were presented with either a blue or red bag on either side of their screen (see Figure 1). Additionally, the name 'Yours' or 'Sam's' was given above the bags to indicate ownership. In the low salience condition, no details of the other referent were given. Participants were only told that the owner of the bag that was not theirs belonged to another participant. Additionally, participants were not asked to report details of their interests, hobbies or think about the other participant.

Participants in both conditions were then told that items would appear sequentially and that they had to sort the items according to subsequent coloured lines that appeared indicating which bag the item needed to be moved to, indicating ownership. This item set has been used in previous SRE research (Sparks et al., 2016; Van den Bos et al., 2010), and contained objects typically available in United Kingdom shopping centres. The bags appeared for 500ms on the left and right of the monitor. An object subsequently appeared in the centre of the monitor and between the bags for 500ms, after which coloured lines were presented above and below the object to indicate the owner of the item. Participants were instructed to use the left or right arrow keys to move the object to the left or right bag respectively. 2000ms was allocated to the participant to begin moving the item. If they made no action, the next trial would begin. If they began to move the item, participants had up to 5000ms to complete the trial and move the item completely into the bag using the left and right arrow keys (See Figure 1).

Figure 1. Representation of ownership allocation task.

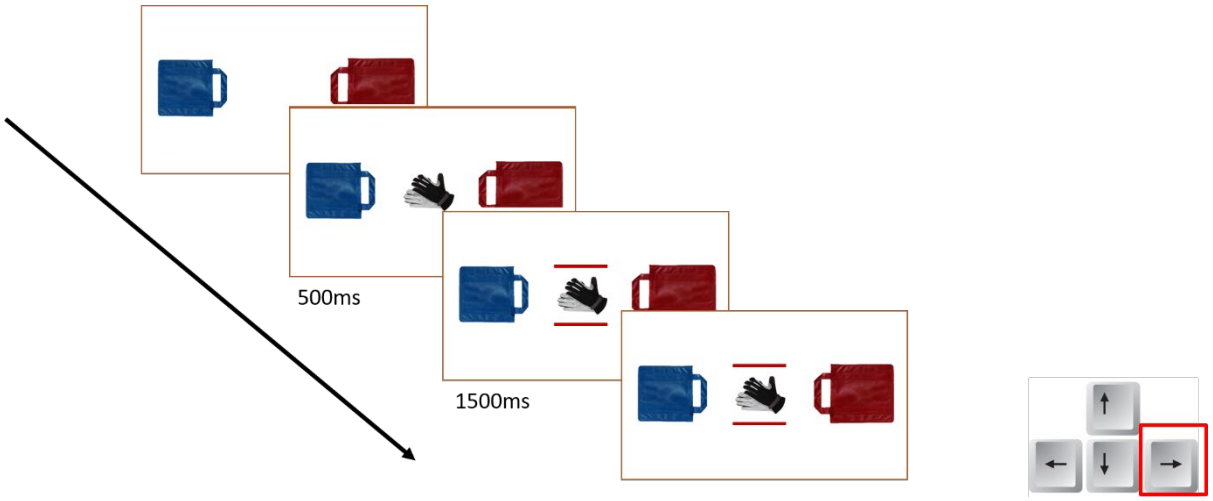
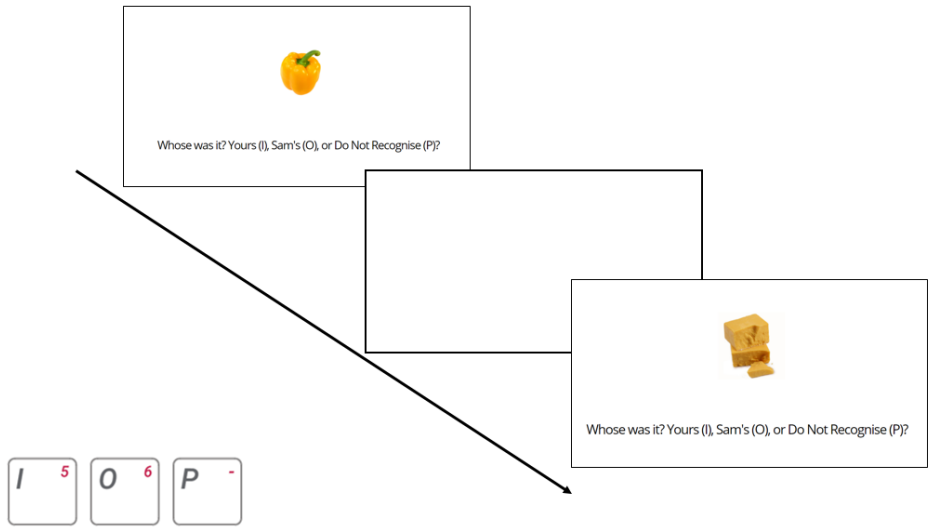


Figure 2. Representation of the surprise memory test.



At the end of the allocation component of the task, participants were directed to watch a 2:23 minute filler video containing images of space and satellites as a distractor task, to prevent any rehearsal of the material. The participant was then asked brief questions about the likeability of the video, and how much they thought 'Sam' would have liked the video (in the low salience condition, participants were only asked to provide their own rating). Participants were then directed to a surprise memory test. They were told that they were about to see the same items again, with additional items that they had not seen before. They were asked to identify if the item was theirs (I) Sam's/Other (O), or one they did not recognise (P). If they were unsure, they were told to take their best guess. This one-step memory test measures both recognition and source memory, replicated from Collard and colleagues (2020). Items were presented consecutively at random with all 100 items that they previously allocated to bags, with 50 new (foil) items that they had not seen before. After the memory test, they were asked to complete some questions about the task before being debriefed and dismissed.

Results

3.1 Data Screening

To be included in the group level analyses, participants had to meet the following criteria:

1. Correctly complete at least 95 out of 100 trials in the object allocation task (sorted the item to the correct colour indicative of the coloured cue).
2. Correctly identify their own and the other's bag before and immediately after object allocation.
3. Have an overall corrected memory hit rate at chance level or above (removal of all negative hit rates), and.

4. Respond to all 150 items in the memory test.

3.2 Calculation of Corrected Hit Rates for Source Memory and Self Bias

Corrected hit rates for source-specific recognition calculates the ability of a participant to not only identify an old item they had seen before but to correctly identify the owner of that item. Following Cunningham et al., (2014), we calculated source-specific separately for self and other owned items, with independent false alarms rates for each. Self-owned item recognition was any self-owned items responded to as being owned by the self, and the false alarm rate was the proportion of new foil items that were responded to as self-owned. Other owned item recognition was considered any other owned item, claimed as other owned and the false alarm rate was the proportion of new foil items that were responded to as other owned. For correlation analyses, we created a variable indicating the degree of bias towards the self or the other across both conditions (CHR Self – CHR Other; herein referred to as self-bias).

3.3 Analyses and Transparency of Openness

All analyses were conducted using JASP (JASP Team, 2020) and copies of the results, raw data and analyses are available at: https://osf.io/k92x5/. Exploratory analyses between Western and Asian participants were conducted, but no interactive effects in either condition were found (see supplementary materials). This study was not pre-registered.

3.4 Group Level Analyses

We submitted participants' corrected source-specific recognition rates to a 2 x 2 ANOVA with object owner (self-verses other) as a within-subjects factor, and salience condition (high salience versus low salience) as a between-subjects factor. Supporting our hypotheses, there was no significant main effect of object ownership $F(1, 246) = 0.428$, $p = 0.513$, $\eta_p^2 = .002$. There was a main effect of social saliency $F(1, 246) = 5.074$, $p = .025$, $\eta_p^2 = .020$. However, this effect was qualified by a significant salience condition × object owner interaction $F(1, 246) = 8.167$, $p = .005$, $\eta_p^2 = .032$. Followed up with independent samples t-tests, where the experimental type was submitted as the grouping variable, there was no significant difference in participants performance for self-owned items across salience condition, $t(246) = 1.012$, $p = .312$, $d = .13$. However, there was a significant difference between performance on other-owned items $t(246) = 3.105$ $p = .002$, $d = .40$, such that other-owned items were remembered better with high salience ($M = 32.57$, $SD = 17.07$) compared with low salience ($M = 26.05$,

323 *SD* = 16.02). Levene's test of equal variances were non-significant for self-owned source
324 memory (F = 2.536, p = .113), and other-owned source memory (F = 1.753, p = 0.187)
325 across both experimental conditions, indicating that variance was equal across both groups.

326 Simple comparisons revealed that in the high social salience condition, self-owned items (M
327 = 30.84) had comparable memory with other-owned items (M = 32.57), $t(118)$ = -1.573, p =
328 .118, d = -.14. In the low social salience condition, participants had superior memory for self-
329 owned items (M = 28.86) compared with other-owned items (M = 26.04), revealing a typical
330 SRE, $t(128)$ = 2.471, p = .015, d = .22.

331 **Figure 3.** Factorial ANOVA interaction plot demonstrating the modulation of source memory
332 for other-owned items when information about the other is provided (high salience) verses
333 not provided (low salience). Error bars represent +/- SEM.

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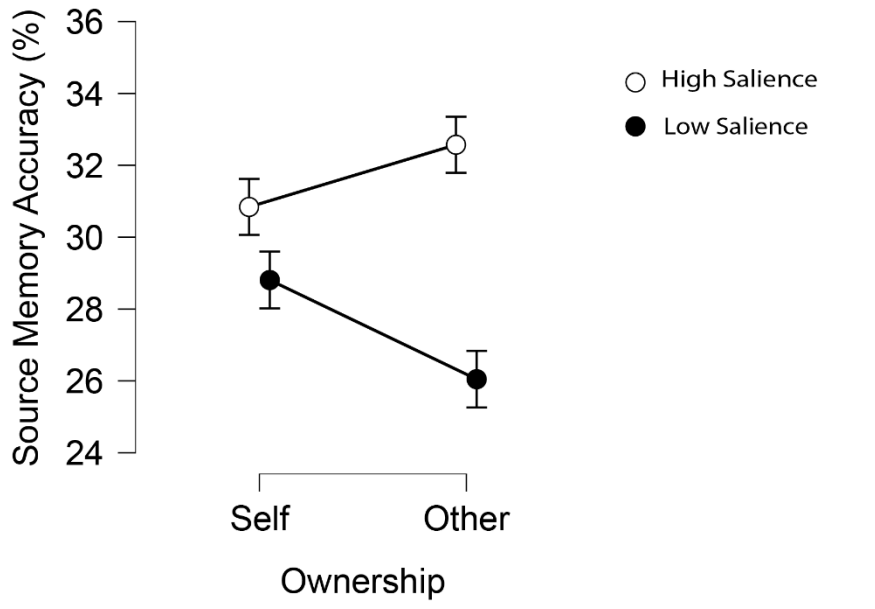

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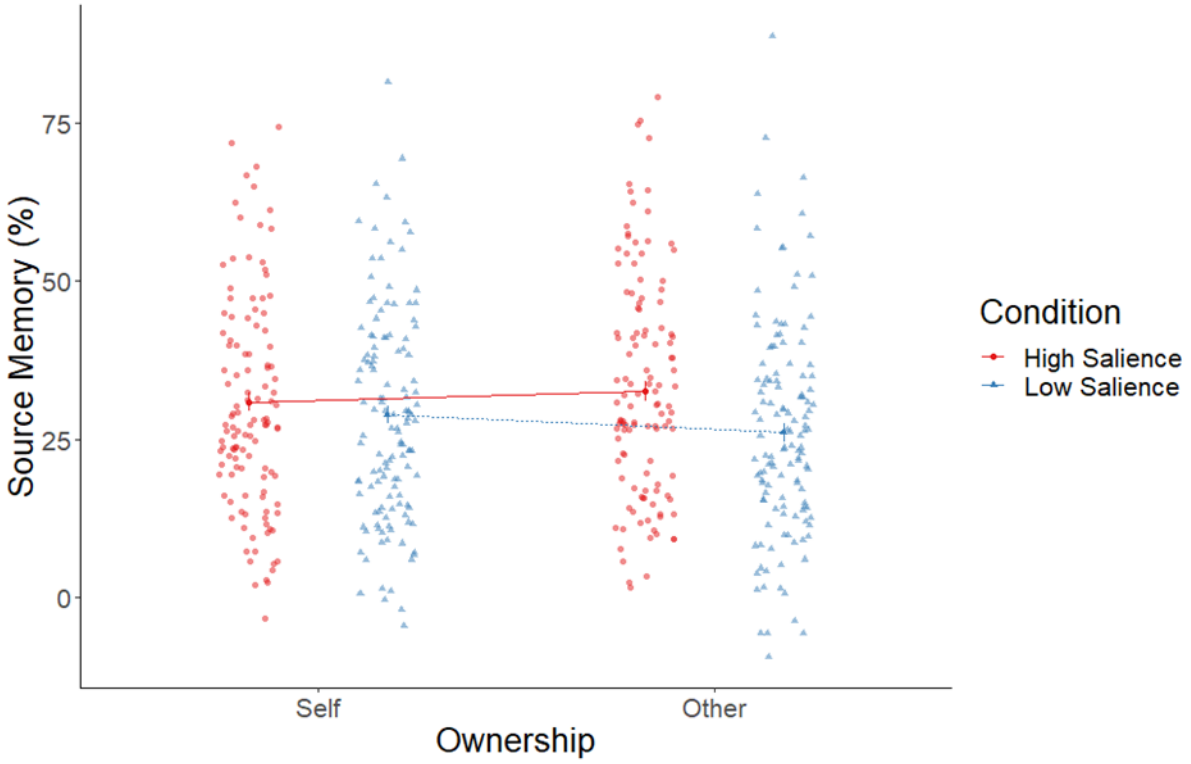
Figure 4. Factorial ANOVA interaction plot illustrating the full distribution of participants scores. Error bars represent +/- SEM.



3.5 Group Level Analyses (Bayesian)

A Bayes factor hypothesis test compares the predictive adequacy of two competing statistical models, thereby grading the evidence provided by the data on a continuous scale, and quantifying the change in belief that the data bring about for the two competing hypotheses (Wagenmakers et al., 2017). Our hypotheses concerning similarity and closeness predicted the lack of a relationship with the degree of self-bias. Because of this, we deemed it appropriate to conduct Bayesian correlations to measure how much evidence would support the lack of a relationship. To keep consistency, we conducted a Bayesian equivalent Repeated Measures ANOVA to give an additional perspective on the interactive effect across both experimental conditions. The Bayes factor (BF_{10}) provides an estimation of the strength of support a hypothesis receives relative to another competing hypothesis (the null). A BF_{10} of 1–3 is considered low evidence, a BF_{10} of 3–10 is considered moderate evidence and a BF_{10} above 10 is considered strong evidence. BF_{01} provides an estimation of the support for

the null hypothesis in an equivalent way. BF_{incl} refers to the support for a model that includes an interaction.

Using a Bayesian RM ANOVA, we analysed the main effects of salience and ownership, and the salience × ownership interaction. By submitting the data to an overall model and observing the analysis of effects table, we found that there was anecdotal evidence for the null hypothesis for a main effect of ownership ($BF_{incl} = 0.130$). We found anecdotal evidence for the alternative hypothesis for a main effect of condition ($BF_{incl} = 2.048$), and we found moderate evidence that the data is likely to have occurred under a model with a salience × ownership interaction ($BF_{incl} = 6.455$).

Furthermore, Bayesian independent samples t-tests were used to follow up the interaction, where condition type was submitted as a group factor, and we found moderate evidence for the null hypothesis ($BF_{01} = 4.423$) such that memory for self-owned items was not likely to differ between salience conditions. We did, however, find strong evidence ($BF_{10} = 12.556$) for a model that demonstrates memory for other-owned items changed, such that participants remembered more about the Other during the high salience condition, compared with the low salience condition.

Simple comparisons supported the null model for the high social salience condition in which self-owned items had comparable memory accuracy with Other owned items ($BF_{01} = 2.969$, $BF_{10} = .337$). In contrast, there was only weak evidence for the null and anecdotal evidence for the alternative hypothesis in the low social salience condition, suggesting that owned items have superior memory compared with Other owned items ($BF_{01} = 0.551$, $BF_{10} = 1.886$).

3.6 Pearson Correlations (High Salience)

Pearson's correlations show no significant association between the degree of bias towards the self (CHR Self – CHR Other) and perceived closeness, similarity, or the number of traits the participants shared with 'Sam' in the high salience condition. Although there was a trending result toward significance between perceived closeness and self-bias (see Table 1), equivalent Bayesian correlations showed weak evidence for the alternative hypothesis, and anecdotal evidence for the null, supporting the hypothesis that closeness and similarity were not related to the degree of self- or other-bias (Table 2).

Table 1. Pearson correlations for the high salience condition illustrating relationships between perceived measures of closeness, similarity, shared traits and the degree of self-bias.

Variable		Traits Shared	Closeness	Similarity
1. Traits Shared	Pearson's r	—		
	p-value	—		
2. Closeness	Pearson's r	0.309	—	
	p-value	< .001**	—	
3. Similarity	Pearson's r	0.614	0.477	—
	p-value	< .001**	<.001**	—
4. Self Bias	Pearson's r	0.009	0.175	0.125
	p-value	0.922	0.057	0.174

Table 2. Bayesian correlations for the high salience condition illustrating relationships between perceived measures of closeness, similarity, shared traits and the degree of self-bias.

Variable		Traits Shared	Closeness	Similarity
1. Traits Shared	Pearson's r	—		
	BF_{10}	—		
2. Closeness	Pearson's r	0.309	—	
	BF_{10}	36.996	—	
3. Similarity	Pearson's r	0.614	0.477	—
	BF_{10}	7.730e+10	329589.242	—
4. Self Bias	Pearson's r	0.009	0.175	0.125
	BF_{10}	0.115	0.687	0.286

3.7 Pearson Correlations (Low Salience)

Similarly in the low social salience condition, the degree of self-bias was not significantly associated with the degree of closeness or similarity as provided by participant individual ratings (Table 3). To complement the frequentist results, Bayesian correlations additionally provide greater support for the null hypothesis, such that the degree of self-bias and closeness/similarity are unlikely to be associated (Table 4).

Table 3. Pearson correlations for the low salience condition illustrating relationships between perceived measures of closeness, similarity, shared traits and the degree of self-bias.

Variable		Similarity	Closeness
1. Similarity	Pearson's r	—	
	p-value	—	
2. Closeness	Pearson's r	0.448	—
	p-value	< .001**	—
3. Self Bias	Pearson's r	-0.102	-0.123
	p-value	0.255	0.171

Table 4. Bayesian correlations for the low salience condition illustrating relationships between perceived measures of closeness, similarity and the degree of self-bias.

Variable		Similarity	Closeness
1. Similarity	Pearson's r	—	
	BF_{10}	—	
2. Closeness	Pearson's r	0.448	—
	BF_{10}	94867.324	—
3. Self Bias	Pearson's r	-0.102	-0.123
	BF_{10}	0.212	0.281

Discussion

This study investigated how increased social salience of a distant other-referent directly abolished the OSRE. Specifically, we aimed to explore the effects of putative heightened salience of the other, and assess if this information could abolish or attenuate the prioritisation of the self. Additionally, we assessed if the degree of bias toward the self or other was related to perceived indicators of similarity or closeness. Supporting our hypotheses, in the high salience condition, we found comparable memory for other-owned items compared with self-owned items, consistent with attenuation of the OSRE. In the low salience condition, we found higher source memory for self-owned items compared with other-owned items. We observed a significant interaction that showed that source memory for other owned items, but not self-owned items, changed depending on the level of social salience. In line with our predictions, we suggest that this interaction was due to the amount of information participants were given about the other (i.e. 'Sam') in the high salience condition, contrasted with the omitted other information in the low salience condition.

We found no association between reported similarity, shared traits (within the high salience condition) or closeness with the degree of self-bias in participants across both conditions. Variables of similarity, traits shared, and closeness were significantly correlated across both conditions. While it may have been difficult to disambiguate closeness and similarity in participants' self-report measures, leading to a lack of precision between these measures, we do suggest that the lack of a correlation with the degree of self-bias is an interesting find. Our findings do not support previous research that suggests a self-reference by proxy can occur when the self is highly similar to the other (Allan et al., 2017), or using stored representations of others to support other-referent memories (Klein & Loftus 1989). Instead, these non-significant associations support our hypotheses, suggesting that the shift in prioritisation from the self to the other was driven by the availability of information regarding the other, isolated from the effects of closeness, or shared similarity.

We suggest there are likely two possibilities for the modulation of the OSRE concerning the salience of the other. First, increased information about the other and therefore putative salience may have led to a shift in focus to other-owned items during encoding. With emphasis placed on 'Sam' at the beginning of the study, participants may have been more focussed on the other owned items, due to the perceived future relevance of 'Sam'. Secondly,

449 due to the personal nature of the other-relevant information (i.e. hobbies, career), the results
450 potentially illustrate an extension beyond the Self (Kim & Johnson, 2012) to adopt the
451 perspective of the other, and consequently encode relational information to the self while
452 processing the task from the perspective of a stranger.
453
454 **4.1 The Task Relevance of the Other**
455
456 With regard to our first suggestion, human memory systems have evolved to prioritise
457 information that may be relevant again for a future scenario (Klein et al., 2002, 2012).
458 Therefore, it is possible that information about the other was retained more successfully when
459 detailed information about the other was provided, because the other may have been
460 processed as potentially future-relevant, enhancing their salience. Research has shown that
461 memory for objects is sensitive to task instructions (Tatler & Tatler, 2013) and that
462 specifically, enhanced task relevance improves memory for visual objects (Williams &
463 Henderson, 2005). With Sam appearing as a dominant focal point at the beginning of the task,
464 participants may attribute any future information provided about Sam to be task-relevant,
465 enhancing the subsequent memory for other owned items. Moreover, in the encoding phase
466 of the shopping task used in this study, the self, as well as the other, are continuously
467 represented on the monitor by coloured bags. Given the putative increased salience,
468 monitoring the other may have become a task goal, producing a redirection of attention from
469 the self to additionally include the other (see Cunningham et al., 2021). Notably, this
470 prioritisation does not compromise the memory for self-owned items, complementing the
471 findings from SPE research that demonstrate enhancement of others in shape-label matching
472 tasks does not weaken the prioritisation of self stimuli (Falbén et al., 2020; Sui et al., 2014).
473
474 **4.2 Relational Binding of the Other**
475
476 Previous research has modulated the SRE by enhancing the closeness or by modulating the
477 degree of overlap of self- and other-representation: mother, best friend, and in-group member
478 (Bentley et al., 2017; Fan et al., 2016; Sparks et al., 2016). Additionally, self-other merging
479 can increase the degree of perspective-taking which may facilitate the binding of other-
480 referenced information. For example, Cialdini and colleagues (1997) found that feelings of
481 “oneness” between the self and other were enhanced during perspective-taking. While we did
482 not find support for similarity, closeness, or the number of shared traits as being associated

with the degree of self or other referencing, we suggest that enhanced other-referencing can be modulated *without* the merging of a self-other boundary. That is, participants did not need to feel close or similar to the other to encode information from the other's perspective. While items were encoded as being self or other owned at random, participants may have been formulating a schema that facilitated memory (Ghosh & Gilboa, 2014; Van Kesteren et al., 2012). For example, if Sam likes pizza, and a doughnut appears to belong to Sam, then a degree of relational binding can occur in which the participant identifies that Sam enjoys junk food, further cementing a knowledge schema of Sam. Moreover, information could be evaluated as something that Sam would like, or dislike, based on the information provided at the start of the task. When other-owned information was omitted, there was no prior information that the other-owned stimuli could be bound to, resulting in a typical SRE.

4.3 Limitations and Future Directions

One key limitation of our current investigation is that we are unable to determine precisely which element of the information received about the other referent was effective at abolishing the SRE. We manipulated several elements (e.g. shared hobbies, a photographic image, exchanging nicknames, thinking about Sam) to create the most salient other-referent possible, but a key single item of information may have been sufficient, while others may have been ineffective. Consistent with the present findings, Sparks (2020; see also Sparks & Kritikos, in preparation), in a similar ownership task, found that including information about the other (stranger or mother) found that participants prioritised the stranger other over the self for source memory. However, the degree of interaction with the other was greater in the current investigation, in that participants engaged conversationally. This methodological difference coupled with the comparable pattern of results indicates that a reduction in memory SRE may be achieved without direct conversational engagement with the other prior to encoding. Future research should endeavour to explore which specific features of information drive the other to become prioritised.

Another possibility is that, given individual differences in performance (see Figure 4), this information is differentially important. Future research should investigate individual differences and which participants are more subject to prioritising others over the self. Related to this, is the possibility of individual differences in the perceived 'likeability' of the other, as distinct from the social salience which was the focus of this study. Whilst the focus

of this study was observing the effect of social saliency on the SRE, our research findings are limited to the description of the other (i.e. 'Sam') that we provided. Future research should seek to manipulate the other's emotional valence through positive or negative qualities (likeability).

Finally, our supporting non-significant correlational findings are associations only, and while we found moderate evidence for null associations with similarity and closeness, it is possible that they do not capture social identification aspects that may play a role in facilitating self-referential processes. These findings are therefore limited since there was no active manipulation of closeness or similarity or shared traits, however, we think that such measured variables add value to the field given that continuous measures are seldom used within the SRE literature, and these measures allow us to capture what natural variation of closeness and similarity may exist in the sample population.

Despite the current limitations, we conclude that the current investigation adds value to the field of self-reference effects given the novel approach to test social saliency with the OSRE. The novelty of enhancing the traits and characteristics of a stranger demonstrates that self-referential processing may attenuate based on task salience alone, with the other being held at a constant social distance (i.e., not varying in closeness or similarity). In contrast to other SRE work, where the other may vary of a level of closeness (mother, best friend, in-group member), our results illustrate that we can modulate such processes through information salience. Participants were not provided with a rich network of information which could be activated to support other-referent encoding through elaboration and organisation, processes that support the encoding of self information (Klein & Loftus, 1988). However, the other was rendered important and task-relevant by the prominent inclusion of person information. This complements current findings within the SPE literature (Caughey et al., 2021; Cunningham et al., 2021; Golubickis et al., 2020; Falbén et al., 2020; Woźniak & Knoblich, 2021) and expands the current theoretical work on the SRE literature, at least in the context of ownership tasks.

4.4 Conclusion

The current study tests the boundary effects of self-referential processing through ownership, exploring the effects of increasing the salience of an unfamiliar other. We elicited prioritisation of the other in source memory, abolishing the SRE. These findings did not

appear to be related to the degree of closeness or shared similarity with the other. While a robust self-referenced benefit in memory has been established, this study points to the complexities of the SRE and suggests that future work should explore under what circumstances the other becomes prominent.

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