



# The self-other asymmetry: Old/new effects in source memory and destination memory during social interaction

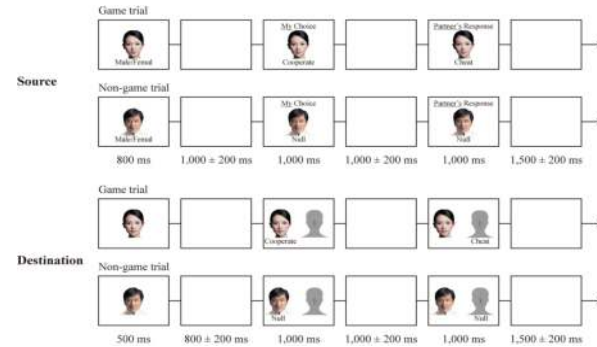


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## Background

The abilities to remember by whom what have been done to us (i.e., **source memory**) (Moscovitch et al., 2016) as well as to whom what we have done (i.e., **destination memory**) (Gopie & MacLeod, 2009) are imperative. **Social dilemma games**, including dual players cooperating with or cheating each other (Bell et al., 2010; Bell et al., 2016), provide a proper way to explore these two kinds of memory simultaneously. For source memory, previous behavioral research has identified either enhanced memory for cheaters versus cooperators (i.e., a negativity bias) or no difference between valence categories (Bell et al., 2010; Bell et al., 2016). Despite no former evidence for the modulation of cooperation and cheating on destination memory, a self-positivity bias might be expected (Fields et al., 2015).

## Methods



**Figure 1:** Face samples and schematic illustration for the experimental procedures of the encoding phases. For game trials, dual parts' cooperative and cheating behaviors were evenly distributed. Non-game trials were set as the neutral condition.

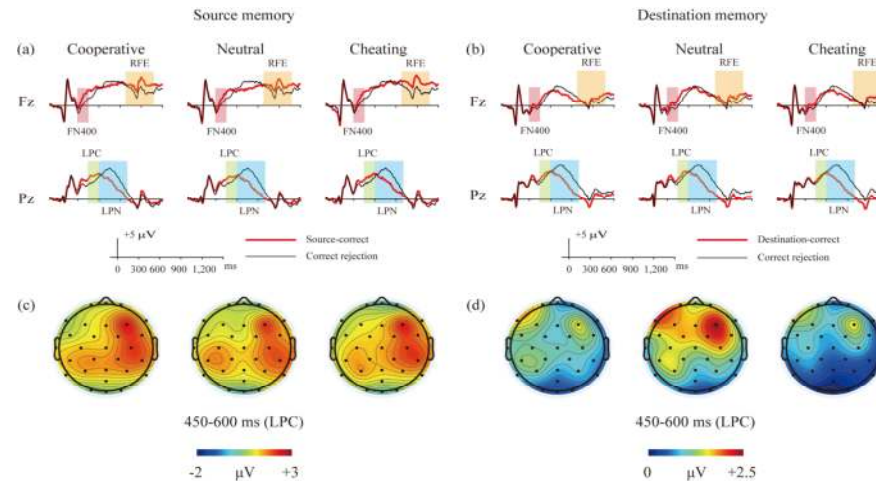
A **social dilemma game** with facial images of celebrities serving as the participants' virtual interactive partners was applied in two ERP experiments, testing **source memory** and **destination memory** respectively, in order to compare the neural index of retrieval (i.e., **old/new effects**) for source memory and destination memory, and to further investigate the modulations of cooperation and cheating on them.

## Results

Four components of old/new effects (the waveform difference between source-correct/destination-correct items and the correctly rejected novel items), FN400, LPC, LPN and RFE, were recorded in both experiments.

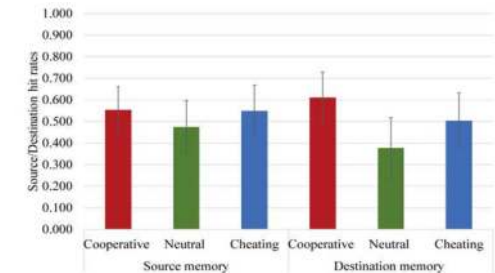
FN400, LPN and RFE were insensitive to cooperation and cheating, while **the recollection-based LPC was asymmetrically modulated.**

Regarding ERP results, significant LPC was recorded under all three encoding statuses (i.e., cooperative, neutral, cheating) for **source memory**, indicating **no valence bias.** As to **destination memory**, the effects were only recorded in cooperative and neutral cases, showing **a self-positivity bias.**



**Figure 3:** Grand-average waveforms for (a) source memory (source-correct faces with the correctly rejected novel faces) and destination memory (destination-correct faces with the correctly rejected novel faces) with different encoding statuses (cooperative, neutral, cheating), together with the topographic maps of LPC for (c) source memory and (d) destination memory, with different encoding statuses (cooperative, neutral, cheating).

Behaviorally, hit rates of source memory were significantly higher for cooperative and cheating behaviors vs. neutral behaviors. By contrast, hit rates of destination memory decreased from cooperative, cheating to neutral conditions.



**Figure 3:** Hit rates for source memory and destination memory with different encoding statuses (cooperative, neutral, cheating). Error bars represent the standard deviations.

## Summary

Current data revealed **four-stage retrieval processes** via distinct old/new effects (i.e. FN400, LPC, LPN, and RFE) **in both source memory and destination memory.**

**Asymmetric modulations** of cooperation and cheating **on the recollection-based LPC** were revealed **in source memory and destination memory**, suggesting these two kinds of memory as disassociate systems. No valence bias in source memory challenged the social contract theory. The self-positivity bias in destination memory could be due to one's will to construct a more positive self-schema.

## Contact

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