LOOKING FORWARD, LOOKING BACK: A CONFIRMATORY STUDY OF AFFECTIVE PRIMING AND EVENT-RELATED POTENTIALS

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Background/rationale: During affective forward priming, a prime stimulus presented before a response-relevant target facilitates faster responses when both share the same emotional valence (i.e., are congruent). In 2011, Daryl Bem introduced a controversial variation of this paradigm by examining whether the effect could also operate in reverse-specifically, whether a prime presented in the future could influence the processing of a current target, a phenomenon termed affective backward priming, in essence, a psi effect.

Research questions: We combined an affective forward priming experiment with a backward priming experiment in order to conduct (1) a behavioral and (2) an EEG study, the latter for assessing priming-related neural correlates, in case of the backward priming experiment assessing the brain correlates of precognition.

Methods: *Behavioral Study*. In the forward priming experiment, a prime word (positive or negative) was presented for 500 ms. After an inter-stimulus interval (ISI) of either 150 ms or 450 ms, a target image was presented for 2000 ms. Participants categorized the valence of the image as either positive or negative via key press. The backward priming experiment was almost the same, with the only difference being that the prime word followed the target image and the respective key press. *EEG Study*. We introduced slightly modified versions of the two behavioral experiments, using a single ISI of 300ms. EEG data were cut into trials covering the target presentation time window, separated by experiment and congruency condition. EEG-trials with correct responses were averaged to compute event-related potentials (ERPs).

Analysis: These are the final results of (1) a confirmatory behavioral (n = 100 participants) and (2) a confirmatory EEG study (n = 40 participants), following a previous exploratory study (Wilson et al., 2025: PLoS One 20, e0322930). Median reaction times for each participant, experimental condition, congruency, and ISI were analyzed with mixed-model ANOVAs. To isolate condition-specific effects in the EEG data, ERP waveforms from congruent trials were subtracted from those of incongruent trials separately for the two priming conditions, resulting in difference ERPs.

Results: *Behavioral Study*. We found a significant interaction between the congruency condition and experiment. This interaction effect was due to a significant congruency effect in the forward priming experiment, which was not seen in the backward priming experiment. That is, we did not detect a significant behavioral psi effect. *EEG Study*. In the forward priming experiment, the difference waveforms (congruent minus incongruent) at occipital and parietal electrodes showed a negative deflection between 586 ms and 889 ms after target onset, with a tendency toward right lateralization. In the backward priming experiment, we were able to replicate a centro-parietal ERP

congruency effect (approximately 250 ms after target onset), which we had previously observed in our exploratory EEG study.

Discussion: We confirmed previous forward priming results of a reaction time advantage for congruent compared to incongruent priming stimuli. We did not find a comparable congruency reaction time effect for backward priming. Remarkably, in the EEG backward priming experiment, we were able to replicate a left centro-parietal ERP congruency effect. As an important next step, this anomalous confirmatory ERP finding needs to be replicated by other labs.

Keywords: Affective priming, Backward priming, Anomalous cognition, Event-related potentials

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