

## Disengagement and Memory

### Theoretical Background

While group membership does provide certain functional benefits for mankind (cite), it can also be a source of conflict and social strife (cite). We are primarily interested in the relation of attentional and memory biases to empathic concern that exist within the context of intergroup relations. Individuals have been shown to display greater levels of recognition for faces of perceived in-group members versus perceived out-group members (cite). Further, extensive research has also shown that people will empathize more greatly with a perceived in-group member while responding more apathetically to perceived out-group members in distress (cite). To our knowledge, there are currently no intergroup relations studies that link attentional control with memory biases and empathic concern. We are keen on bridging this gap by exploring the neural processes that underlie how our constructs, attentional control and recognition memory, vary between individuals faced with photographs depicting members of their perceived in-group in physical pain or distress as opposed to those of their perceived out-group.

**Task & ERP Components.** In the past, in-group biases have been measured within the context of already existing social groups; thus, we will use participants who racially identify as Black or White. First, they will be presented with an attentional disengagement task, which assesses selective attention. According to the cognitive-motivational perspective, players are quicker to react to the dot when it occurs in the previous location of a negative/threatening stimulus. Such an attentional bias could be interpreted as vigilance to a threat. We will then measure P2 activation (an ERP associated with attentional orientation <sup>[4]</sup>) and N2 activation (an ERP associated with attentional conflict <sup>[5]</sup>).

Next, we will evaluate recognition memory, which can be broken down into both familiarity and recollection. Familiarity is thought to be a quicker, more automatic process while recollection is thought to be slower and a more controlled retrieval process. For example, presentation of a random scenic photo may elicit either 1) familiarity, the feeling that you know you've seen this pictured place before or 2) recollection, remembering where you've seen this place and retrieving other distinct information attached to it. We are curious to see if intergroup dynamics bias individuals towards familiarizing (liberal definition) themselves with their identified racial group versus the perceived "other" racial group. Following the disengagement task, participants will undergo the recognition memory testing session and be shown a subset of old (presented) stimuli, similar (mirror image to presented) stimuli, and completely new stimuli. They will then be asked to indicate whether or not they encountered the stimuli during the previous presentation period. Measurement of ERP components will occur during the test period, starting at presentation of stimulus and lasting for at least 1000 ms after. According to previous literature, when participants are shown novel as opposed to previously encountered images, the FN400 ERP (associated with familiarity) component will display a greater negative amplitude and the LPC (late positive component) parietal 400-800 ERP (associated with recollection) will display a less positive amplitude. We believe the mechanisms underlying these effects are stimulus discrimination. Because familiarity is a quick process, more neural resources should be used as

the brain discriminates between a novel stimulus versus one previously presented (i.e. more familiar). In contrast, recollection is a slower process, and more neural resources should be used as the brain is actively discriminating whether they had previously encountered it.

### **Specific Aims and Hypotheses**

**Specific Aim 1:** Given that disengagement in highly emotional, stressful situations cause longer reaction times,<sup>[6]</sup> participants will show **longer reaction times when attempting to disengage from in-group members** in distress compared to out-group members in distress.

**Specific Aim 2:** We will **examine the differential neural chronometry of attentional control mechanisms** by examining P2 and N2 activation within the context of in-groups and out-groups.

**Specific Aim 3:** During the recognition portion of the task, we expect individuals to display **greater accuracy** in recalling images of in-group members in distress as opposed to out-group members.

**Specific Aim 4:** We will examine the differential responses of the FN400 and LPC parietal 400-800 within the context of intergroup relations.

### **Predicted Results.**

Previous studies on attentional disengagement that have used similar tasks, like the dot probe,<sup>[7]</sup> have found that participants have a harder time orienting their attention away from negative vs. neutral stimuli. We will examine the phenomenon of in-group empathy bias within the context of attentional disengagement under the expectation that participants will show slower reaction times for, and thus greater difficulty in disengaging from, racial in-group members in distress. Furthermore, based upon previous research in our lab, we will examine the underlying neural chronology of the bias via P2 and N2 activation. More specifically, P2 activation would show neural efficiency related to participants' abilities to orient away from violent images, and N2 activation would show degree of attentional conflict between the violent images and the desired cue. Thus, smaller P2 and N2 activation in the context of out-groups would represent neural arousal brought about by a diminished intergroup empathy bias.

Also, we believe individuals will more accurately recall photographs of same-race individuals in distress than of different-race. Within the context of these intergroup dynamics, we believe individuals will show more recognition memory in terms of familiarity (FN400: more negative amplitude) and recollection (LPC parietal 400-800: less positive amplitude) to novel photos of people in pain or distress towards their perceived in-group.

### **Significance and Novelty**

To date, most neuroscientific research on intergroup empathy bias has focused on relatively static patterns of activation. Since our methodology allows us to unpack the neuromechanisms across time in a ms timescale, we can examine the cortical chronometry underlying intergroup empathy bias in a way that has not yet been done. More specifically, given that this approach is

mechanism specific and does not rely on outcome measures, such as questionnaires, that can easily be disingenuous, this approach might be useful for identifying existing intergroup empathy biases before they manifest themselves in individuals as harmful behaviors against perceived out-group members or societies.

//This result would bridge the gap in the literature by linking higher recognition memory to more emotionally distressing stimuli for in-group versus out-group. In lay terms, one could interpret such a finding by saying individuals will show more empathic concern as evidenced by higher recognition memory to distressing stimuli to other in-group (or same race) members as compared to out-group (different race) members. This study adds an interesting piece to the literature and possibly highlights neural underpinnings and brain changes that prior and likely subconscious to behavior. This study is extremely novel as no one has used an intergroup discrimination task and resulting recognition memory combined.//

### References

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