THE NEURAL CORRELATES OF CATEGORICAL AND INDIVIDUATED IMPRESSIONS

by

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ABSTRACT

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The Neural Correlates of Categorical and Individuation Impressions

Thesis directed by Associate Professor Tiffany A. Ito

This research explores the neural correlates of categorical and individuated impressions. Categorical impressions are based on social categories, such as gender, race, and age. For category impressions, stereotypes and prejudices inform the gestalt impression. Individuated impressions are those based on personal and unique information. Impression formation models posit that individuated impressions require attention to the individual, but this attention is thought to occur in a deliberative fashion overtime. Although attention overtime facilitates individuation, attention within a split second of an encounter may also contribute to individuated impressions. This research seeks to link early selective attention to individuals, as indexed by neurological electrical activity, with both category-based and individuated impressions. To assess this, two studies were conducted. The first assessed the relationship between individual differences in spontaneous attention to individuals and spontaneous use of individuating information. Replicating previous work, category-based attention differences were observed within 120 ms of viewing a target. At the N200, an electrical component indexing deeper encoding of a stimulus, there was a trend for the more individuals attend to ingroup members then outgroup members, the more they use race when making predictions about behavior. Additionally, there was a trend for the more attention to targets at the N200 in general, the more individuals use individuating information when making predictions about behavior. A second study aimed at increasing depth of encoding at the N200 to outgroup targets, by asking participants to put themselves in the shoes of an outgroup and an ingroup member (first-person perspective) or to think about an ingroup and outgroup member from a third-person perspective. When encoding individuals from a first-person perspective, depth of encoding, as indexed by N200s, of ingroup and outgroup members was similar. When encoding individuals from a third-person perspective, depth of encoding was greater for an ingroup member than for an outgroup members. Consequents and interpretations are discussed.

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CHAPTER 1: GENERAL INTRODUCTION

Forming impressions of others is a ubiquitous element of human interaction. When first encountering an individual, a perceiver is immediately hit with an array of visual features. These features function as visual clues to characteristics about targets. From these observable physical cues a perceiver can form an immediate impression. The inferences derived from these cues inform the types of judgments about that individual and behaviors towards that individual.

Visual cues often form the basis of category distinctions. For example, an individual's skin color, facial features, and hair texture provide clues to racial origin. Though not all category distinctions that describe an individual are gleaned from visual cues, many are, for example age, gender, and race. Impressions based on category membership (sometimes referred to as category-based impression) are on average superficial and based on category-related information derived from prejudices and stereotypes. Category-based processing is often automatic and occurs within milliseconds of an encounter (Brewer, 1988; Fiske & Neuberg, 1990; Ito & Urland, 2003).

Although the foundation of an initial impression is based on categorical aspects of an individual, personalized information can temper and alter the impression formed. Personalized impressions (referred to as individuated impressions) require time, energy, and motivation (Brewer, 1988; Fiske & Neuberg, 1990). As a simplification, impression formation falls into two categories, category-based and individuated. A perceiver engages first in efficiency-based processing of an individual by processing category-based information, but if the individual is of high personal relevance, if the initial impression process fails, if a perceiver is motivated to be accurate, or if the perceiver has time to engage in an attribute-by-attribute analysis, individuation is likely to occur (Brewer, 1988; Fiske & Neuberg, 1990).

These two types of person perception fall into the framework of dual-process models of impression formation. Category-based processing is a top-down, automatic, and rapid process (Brewer, 1988; Fiske & Neuberg, 1990). Individuated processing is thought to involve bottom-up processing of attributes of an individual that then in an effortful and often extended process tempers category-based impressions. Mechanisms underlying each process are thought to be distinct and have been shown to involve separate underlying neural structures (Freeman, Schiller, Rule, & Ambady, 2009).

While many aspects of categorical and individuated processing have distinct mechanisms, this research focuses on overlap between categorical and individuated processing. Specially, to what degree does early automatic selective attention to targets relate to categorical and individuated impressions? This will be done in one study by measuring both neural responses to and impressions of target individuals, and looking at the relationship between the two. In a second study, individuation will be manipulated through impression goals, and the effect of this manipulation will be observed on neural responses.

Dual-Process Models Of Impression Formation

Dual-process models of impression formation distinguish between top-down and bottom-up processing (Fiske & Neuberg, 1990). Perceivers quickly and automatically assign individuals to a category in a top-down fashion and then apply the features of the category to the individual. Research in neuroscience has found that categorical processing begins within milliseconds of an encounter (Ito & Urland, 2003). Figure 1 represents a simplified and amalgamated version of the stages of impression formation derived from current models of impression formation.

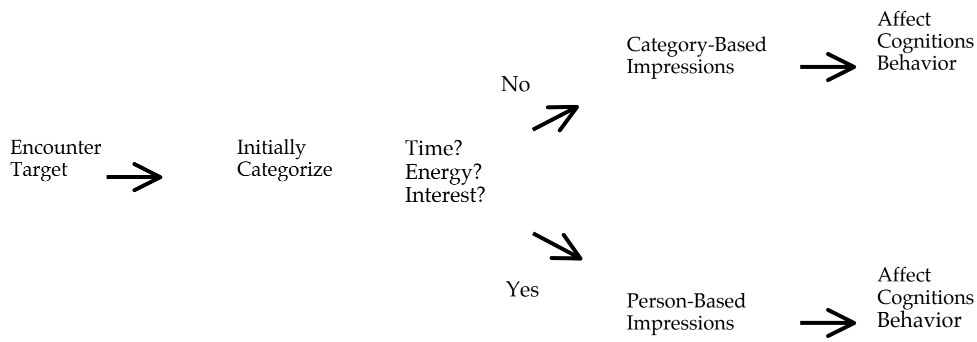

FIGURE 1. Stages of impression formation (Brewer, 1988; Fiske & Neuberg, 1990). Model is a simplified amalgam of two models of impression formation. It should be noted that person-based impressions are more time-consuming and the arrows do not represent processing time or effort. In addition, there are a number of additional factors that influence category-based or person-based impressions that are not outlined.

One assumption of dual-process models of impression formation is that perceivers default to category-based impressions (Fiske, Lin, & Neuberg, 1999). Reliance on category-based information when forming an impression can lead to inaccuracies, bias, and negative behaviors towards an individual (e.g. Tajfel & Wilkes, 1963; Word, Zanna, Cooper, 1974). Category knowledge stimulates dispositional attributions of others, attributions that are viewed as stable and entitative (Jones & Nisbet, 1972). When additional information is revealed an impression can then be updated, in a bottom-up fashion, to include more personalized impressions of the target.

Locksley, Hepburn, and Ortiz (1982) found that even small amounts of individuating information are sufficient to counter reliance on category information.

On average and without additional individuating information, men are judged to be more assertive then women. However, when men and women were described with similar assertive traits by Locksley and colleagues, men and women were judged to be equally assertive. According to extant theories of impression formation, individuation is not assumed to occur for all targets (Bodenhausen & Macrae, 1998; Brewer, 1988; Fiske & Neuberg, 1990). More generally, this process is reserved for people that a perceiver would benefit from gathering more information about.

Category and individuated judgments of others are thought to recruit two distinct cognitive processes. Extant research in social psychology suggests that categorical judgments are automatic and occur implicitly (e.g. Greenwald & Banaji, 1995). In contrast, individuated judgments rely primarily on conscious effortful processes (Macrae & Bodenhausen, 2000). Though individuation is thought to involve effortful, relatively complex attribute analysis that occurs over an extended period of time (Brewer, 1988), there exists foundationary processes that support individuation. In particular, focusing more attention on a target can bolster encoding of personalized information (Brewer, 1988; Fiske & Neuberg, 1990).

Attention that underlies category cue processing can also support attention to individualized characteristics of that person. If, for example, a target is categorized as part of the perceiver's ingroup, attention shifts to support deeper encoding of the target. This shift in attention should support the degree-to-which that target is individuated. A shift in attention to deeper encoding allows perceivers the cognitive resources necessary to individuate the target from countless others in the same category.

Recently, researchers have focused on the divergent neural correlates of categorical and individuated processing. Some of this work has focused on identifying the specific neural structures associated with category-based and individuated processing. For example, Freeman and colleagues (2009) find that category-based judgments recruit the amygdala while more complex individuated judgments require a network of neural structures related to mentalizing about others (Freeman et al., 2009). These structures include, but are not limited to temporo-parietal junction (TPJ) and medial prefrontal cortex (mPFC). Mentalizing refers to interpreting behavior in terms of a target's intentions that are derived from the target's needs, reasons, feelings, and beliefs. While processing of category information and interpreting a target's intentions may rely on distinct neural structures, there may exist overlap in the psychological processes that support each.

Other studies focus on examining mechanisms associated with the process of impression formation. Many of these studies incorporate event-related brain potentials (ERPs) to measure brain activity during cognitive processing. Each component reflects brain activation during a particular psychological process. This measure can be used to differentiate and identify mechanisms involved in a psychological process. Moreover, ERPs inform the degree to which processing is relatively fast and automatic. Although getting to know someone in a personalized fashion is an extended process, there might exist aspects of this process that are relatively implicit and shift impressions from category-based to individuated. In addition, ERPs allow for an investigation of the psychological processes that relate to this shift.

Previous ERP research in face processing finds that within 100 ms of viewing a face individuals attend to category cues (Ito & Urland, 2003; Kubota & Ito, 2007). Recall that dual process models of impression formation place category-based impressions as the initial stage of processing; ERP effects also support this structural outline and provide evidence that attention to cues occurs extremely early and also automatically when encountering an individual.

Although work in this area primarily focuses on category cues, there has been research on the contribution of early selective attention to individuation. Ito and Urland (2005) found that even when participants perform individuating tasks such as making a personality judgment or judging an individual's food preference, race and gender of the target still influence encoding. This suggests that category-based processing occurs even when individuating others. However, this research does not fully explore to what extent the processes that support category-based processing contribute to individuation. The motivation for this research was to determine how split second attention to unfamiliar individuals relates to individuation. This type of attention might be easier to influence compared with attention later in time. If early selective attention relates to individuation then encouraging greater selective attention to individuals may facilitate individuated impressions.

The questions addressed here are (1) whether early encoding processes that relate to selective attention to category cues also contributes in some way to individuation and (2) if this relationship exists, can it be modified to encourage deeper encoding of targets that are typically less individuated?

Chapter 2: Event-Related Brain Potentials

Event-related brain potentials reflect cortical electrical activity measured at the scalp, resulting from the synchronous and summated postsynaptic firing of neurons (Fabiani, Gratton, & Coles, 2000). When an individual views a stimulus, the focus of this research, or makes a response, groups of neurons fire and it is the electrical activity associated with these events that is quantified. The resulting waveform is comprised of positive- and negative-going deflections that occur across time, yielding a voltage x time function. The deflections in the waveform, referred to as components, are thought to reflect discrete information processing operations (Gehring, Gratton, Coles, & Donchin, 1992). Researchers quantify the amplitude of a component, thought to reflect the extent to which a psychological process has been engaged. Amplitude variations are correlated with behavioral data to assess how individual variation in processing relates to variation in the psychological operation. ERPs can be used to gauge the time point at which a process is occurring and the degree to which an individual is engaged in this process, for example devoting more attention to one social cue versus another.

N100 and P200: Timing and Psychological Correlates

This research focuses on three main ERP components that are involved in encoding of facial cues: the N100, P200, and N200. The N100 is a negative-going component occurring around 100 ms, and the P200 is a positive-going component occurring around 180 ms after viewing a face. Past research finds that these components are larger to Black than White faces for White participants and larger to angry than happy faces (Ito & Urland, 2003; 2005; Kubota & Ito, 2007). These findings have persuaded researchers to posit that these components reflect sensitivity to threatening and or distinctive stimuli, reflecting rudimentary vigilance processing (for example see Ito & Urland, 2003; 2005; Kubota & Ito, 2007). Studies find that a variety of social cues, such as race, gender, expression, and eye-gaze are processed at this early stage (Correll, Urland, & Ito, 2006; Eimer & Holmes, 2002; Eimer, Holmes, & McGlone, 2003; Ito & Urland, 2003; 2005; Kubota & Ito, 2007; Puce & Perrett, 2003; Watanabe, Miki, & Kakigi, 2002; Willadsen-Jensen & Ito, 2006). Of importance, category processing occurs both when participants explicitly categorize by a cue (e.g. determine the race of an individual) and when participants are directing attention to categorizing a different cue type (i.e. differences as a function of race still occur when participants are categorize the gender of a face), suggesting both explicit and implicit processing of these cues (Ito & Urland, 2003). Therefore, participants will encode these cues, for example race, regardless of whether they are explicitly asked to categorize targets based this category.

The timing of these early components supports the impression formation literature that suggests category-based processing occurs extremely early and is integral to impression formation. But at what point in time is attention directed to deeper encoding of targets, encoding that can support an attribute analysis? For this researchers have turned to the N200.

N200: Timing and Psychological Correlates

The N200, a negative-going component, occurring around 250 ms after viewing a stimulus, is larger, for White participants, to White faces compared with Black faces (Ito & Urland, 2003, 2005; Kubota & Ito, 2007). N200s are larger to pictures of one's own face than to other's faces (Tanaka, Curran, Porterfield, & Collins, 2006), and to famous as compared with unfamiliar faces (Bentin & Deouell, 2000). These findings led researchers to conceptualize the N200 as reflecting deeper encoding of a stimulus (Ito & Bartholow, 2009; Kubota & Ito, 2007). This deeper encoding occurs more often for familiar targets and targets that a perceiver might benefit from individuating. These findings prompt the posit that this deeper processing might serve as a likely neural correlate of attention that supports individuation (Kubota & Ito, 2007).

This review suggests that N200s relate to deeper encoding of targets that are often more individuated (e.g. familiar targets and ingroup members). Consequently, N200s might serve as a selective attention foundation for individuation, whereby deeper encoding and devotion of attention resources to a target should allow for deeper attribute analysis of targets. This posit is the first step in this investigation and is the focus of Study 1. Do N200s, by some means, relate to individuation?

CHAPTER 3: THE NEURAL CORRELATES OF INDIVIDUATION

Study 1 is an investigation of the neural correlates of processes that support individuation. This will be accomplished by looking at the relation between individual differences in individuation and individual differences in ERP amplitudes. Early ERP components, namely the N100 and P200, are shown to relate to vigilance processing of threatening and distinctive stimuli (Ito & Bartholow, 2009). This vigilance processing results in an initial focus on outgroup targets (Willadsen-Jensen & Ito, 2008). Category-membership is attended to, but then processing shifts to encoding of targets that one might benefit from individuating, such as ingroup members (Ito & Urland, 2003). Because N200s have been implicated in deeper encoding of familiar stimuli and targets that a perceiver might benefit from individuating, this component seems particularly likely as a correlate of individuation. Therefore, it is hypothesized that larger N200s should covary with greater use of individuating information. Importantly, both processes are implicit and occur relatively quickly, both rely on selective attention, but in one case processing is predicted to continue in a categorical manner and in the other processing is predicted to continue in an individuated manner.

To assess the neural correlates of individuation, participants were given four pieces of information about the past behavior of Black and White individuals (individuating information) and asked to predict each individual's behavior in a fifth situation (see Beckett & Park, 1995; Blair, Chapleau, & Judd, 2005). In a second task, participants viewed pictures of Black and White faces that were different from those viewed in the individuation task. The passive-viewing task allows for an estimate of spontaneous neural activity to the processing of faces that is completely independent of the individuation task.

The second task, referred to as the passive-viewing task, served as the main assessment of selective attention as measured by ERPs. This task was included as a clean index of how selective attention to targets relates to individuation. There are meaningful individual differences in how people process social targets. If early selective attention, as measured by ERPs, that occurs simply during passive viewing reflects processes that support individuation, then individual differences in selective attention should relate to differences that emerge when participants are asked to make an individualized judgment.

Correlations were calculated between ERPs during the passive viewing task and use of individuating information (i.e. use of the four pieces of information given about each target) and use of race (i.e. use of visual category information over and above individuating information) in the individuation task. Three hypotheses were examined:

1. In the social judgment task, individuals should use the individuating information provided (see Locksley et al., 1982). That is, a target described as having frequently been aggressive in the past should be rated as more likely to be aggressive in the future than someone who is described as never behaving aggressively in the past.
2. In the passive viewing task, because categorical processing occurs quickly and automatically, differentiation as a function of race should be observed at the mean level for the N100, P200, and N200. White participants should

show larger N100s and P200s to Black faces and larger N200s to White faces.

3. Of primary interest is the relation between individual differences in use of individuating information in the social judgment task and ERPs in the passive viewing task. Differences in the way perceivers encode individuals, as indexed by ERPs, should relate to use of individuating information. Because N200s relate to deeper encoding of targets, it is predicted that this relationship should occur for the N200 specifically, with larger N200s associated with greater individuation, as operationalized by larger overall amplitudes.

Chapter 4: Study 1 Methods

Participants

Forty non-Black (29 Caucasian, 6 Asian, 4 Hispanic, and 1 non-Black multi-race) undergraduates enrolled in introductory psychology at the University of Colorado Boulder participated in return for partial credit toward their experiment participation requirement.

Outgroup members are typically less spontaneously individuated. One particular focus of this work was on differences in individuation and attention to ingroup and outgroup targets. To investigate ingroup and outgroup effects specifically, only Caucasian participants were included in the analyses. Of those participants, all had lived in the United States for more than 10 years and spoke English as their first language. Most were freshman (M_{age} = 19.41, SD = 1.80). Twenty-one were female and eight were male.

Materials

Faces. For the individuation task, one hundred and sixteen yearbook photos (54 African American faces and 62 Caucasian faces) were piloted by 53 participants and rated for their aggressiveness, ethnicity, and perceived attractiveness (see Appendix A for specific piloting instructions and scales). Faces were cropped to eliminate clothing, shown in color, and presented from the neck up.

Of the faces piloted, sixty-four faces were selected for use in the individuation task (32 African American faces and 32 Caucasian faces). Pilot test participants categorized the ethnicity of each face from the options of *African American, Asian American, Hispanic/Latino, White/Caucasian, Middle Eastern (e.g. from Iran, Saudi Arabia), Native American, Southeast Asian (e.g. from India, Pakistan), Polynesian,* and *Other* then rated their confidence in their chosen option on a 1 to 9 Likert scale (1 = *Not At All Confident* to 9 = *Very Confident*). These faces were judged to be Black or White by over 90% of the participants (M_{Black} = 97.73% and M_{White} = 97.68%) and this did not differ by race ($t(62) = .03$, $p = .97$). Pilot participants were more confident in ratings for the Black faces than the White faces ($M_{Black} = 8.55$ and $M_{White} = 8.33$; $t(62) = 3.22$, $p < .01$), although confidence was high for targets of both races. The faces were rated as equal in attractiveness ($M_{Black} = 3.86$ and $M_{White} = 3.87$; $t(62) = .06$, $p = .95$) and judged to be low and equal in appeared aggressiveness ($M_{Black} = 2.87$ and $M_{White} = 2.93$; $t(62) = .47$, $p = .64$).

In the individuation task, all photos were shown in color, presented at 640 x 480, and presented from the neck up.

In the second task, the passive-viewing task where estimates of attention were measured, participants viewed pictures of 10 Black faces, 10 White faces, and a picture of themselves. The participant's picture was taken when they first arrived to the laboratory. The photo was edited to match the photos in the passive-viewing task and uploaded into the program. Self faces were included for exploratory reasons and a discussion of self and other processing can be found in Appendix F.

Pictures of the Black and White individuals for the passive-viewing task were selected from photos of 23 Black and 25 White males that were collected from a metropolitan college and university in Colorado. Participants gave written consent to have their pictures used in research and were paid \$5.00. Each pose was taken from a frontal orientation.

Twenty-one pilot participants rated the pictures for attractiveness, ethnicity, appeared aggressiveness, and their confidence in their chosen ethnicity rating. When asked to select the face's race from a number of racial categories (see those categories above), these faces were judged to be Black or White by over 85% of the participants (M_{Black} = 86.80% and M_{White} = 90.00%) which did not differ by race ($t(18) = .61$, $p = .57$). Participants also categorized the facial expression in each photo from the options of *Happy*, *Sad*, *Angry*, *Disgusted*, *Surprised*, *Fearful*, *Threatening*, and *Neutral*. Selected photos were categorized as neutral by the majority of participants (M_{Black} = 79.04% and M_{White} = 71.16%) and this did not differ by race ($t(18) = 1.34$, $p = .20$). The faces were rated as equal in attractiveness ($M_{Black} = 3.97$ and $M_{White} = 3.96$; $t(18) = .05$, $p = .96$)[1] and equal in appeared aggression ($M_{Black} = 4.83$ and $M_{White} = 4.25$; $t(18) = 1.80$, $p = .09$).

Scenarios. Participants were introduced to five scenarios at the beginning of the experiment (see Appendix B for instructions for the individuation task)[2]. Scenarios are identical to those used by Blair, Chapleau, and Judd (2005).

Scenario #1: Driving

In this situation, a person has to decide how to respond to another driver while driving on a busy road. He wants to pass the other car but the driver refuses to let him pass.

At this point, the person can either:

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[1] Attractiveness was rated on a 1 to 9 Likert scale in this pilot with 9 being the most attractive.
[2] I would like to thank Irene Blair for sharing the instructions for the individuation task and the scenarios.

1. Tailgate the other car and lay on the horn (*an aggressive response*)
2. Just let it go and give up trying to pass (*a non-aggressive response*)

Scenario #2: Basketball[3]

In this situation, a person has to decide how to react to another person on the basketball court. In a pick-up game of basketball on the neighborhood court, the game gets a little rough. As they are playing, a guy from the other team continually matches him up and tries to shove him around. At one point, the other guy pushes him so hard that he falls backward and hurts his ankle. He doesn't know any of the other players and none of them seem to notice what is going on. He has already said a couple of things to the other guy and he knows that if he stays in the game, they are going to get into a fight.

He has a choice of:

1. Getting into a fight with this guy *(an aggressive response*)
2. Walking away from the game (*a non-aggressive response*)

Scenario #3: Girlfriend

In this situation, a person has to decide how to deal with his girlfriend's flirtatious behavior. He and his girlfriend are at a friend's party. The music is cool and everyone is dancing and having a great time. The only problem is that

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[3] Please note that Blair and colleagues (2005) used the basketball scenario as the prediction scenario. The bar scenario was used as the prediction scenario in this experiment to avoid the possibility of inflating the use of race over and above the four pieces of information. In addition, a basketball scenario, more than a bar scenario, can prime two opposing African American stereotypes, that of athletic and aggressive, that each could contribute to the prediction response. It was thought that the bar scenario was less stereotype laden and best for use as the prediction scenario.

his girlfriend keeps dancing and flirting with another guy. Nothing serious, but he doesn't like her ignoring him and he thinks that she's drinking too much. When he makes a sarcastic remark to her, she asks him what his problem is.

He can:

1. Grab her by the arm and drag her out of the party (*aggressive response*)
2. Do nothing and talk with her about it later (*a non-aggressive response*)

Scenario #4: Apartment

In this situation, a person has to decide how to respond to a friend who destroyed some of his property. The friend was staying at his apartment while he was gone for the weekend. When he returns, a neighbor complains to him about the noisy party over the weekend, and the apartment itself is a mess. There is a large stain on the carpet —which is going to cost him a good chunk of his deposit —and an expensive print has been ripped. When he asks his friend about it, the friend tells him that it's not a big deal and refuses to pay for the damages, claiming that the stain is an old one.

He can:

1. Blow up at his friend and threaten him (*an aggressive response*)
2. He can let it go and 'soak up' the damages (*a non-aggressive response*)

Scenario #5: (***Scenario for prediction)*** Bar[4]

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[4] Please note that in Blair, Chapleau, and Judd (2005) this scenario was referred to as the nightclub scenario. The word nightclub and club was changed to bar. It was thought that for this sample the term nightclub might bring to mind urban connotations that might automatically call to mind racial stereotypes about African Americans. Again, the intention was to avoid unnecessary priming of African American stereotypes beyond those under investigation.

In this situation, a person has to decide how to react to a rude person in a bar. It is late in the evening and the bar is crowded. Going anywhere is difficult and he has to carefully edge around people to get to the bathroom. He is almost there when another guy passes, intentionally bumping into him as he goes by and sloshes his drink all over him. The guy smirks and gives him a look as if saying, 'what are you going to do about it?'

He can:

1. Shove the guy back (*an aggressive response*)
2. Just keep walking (*a non-aggressive response*)

TRIAL NUMBERS

In the main experiment, participants saw a picture of the target and then read how the target ostensibly behaved in each of the four scenarios. Each scenario had two possible behavioral reactions: an aggressive reaction or a non-aggressive reaction. This allowed for 16 unique combinations of behaviors across the four scenarios. For example, a participant could have seen four pieces of aggressive information:

- Driving: Tailgated the other car and laid on the horn
- Basketball: Got into a fight with the guy
- Girlfriend: Grabbed her by the arm and drug her out of the party
- Apartment: Blew up at his friend and threatened him

Each combination of scenarios (e.g. passive, passive, aggressive, aggressive) was presented with a new face and each was presented twice, once with a Black target and once with a White target. This allowed for 16 combinations of aggressive/non-aggressive reactions that were shown twice, once with a Black target and once with a White target. There were 32 Black targets and 32 White targets, leading to 64 total trials. The same target was paired with the same four pieces of information for all participants. All trials were intermixed and randomized without replacement.

Following this task, participants viewed a set of 10 Black and 10 White faces (they were different faces from those used during the individuation task), as well as a picture of themselves. Black faces were shown 40 times (i.e. each unique face was shown four times), White faces were shown 40 times, and the participant's face was shown 40 times, leading to 120 total trials.

Procedures

When participants first arrived they were told that the purpose of the project was to understand how impressions are formed and how this occurs in the brain. They were told that the project pertained to various aspects of person judgment, but specifically, how individuals use past information about how someone behaved when predicting how they behaved in a subsequent situation. These instructions were followed by a brief introduction to ERP setup and recording.

After participant consent, their picture was taken for the passive-viewing task and they were fitted for ERP recording. Following ERP fitting, participants were introduced to the individuation task. See Appendix C for the instructions participants read at the beginning of the task to familiarize them with the scenarios.

As in Blair and colleagues (2005), there were four particularly important pieces of information that the participants were told before the individuation task. First, that the targets had participated in a prior study and in that study they reported how they actually behaved in scenarios similar to the ones described. Participants were further told that their (the participant's) prediction of aggression for the bar scenario would be compared to the target's actual reported behavior, and finally, that the participant should be as accurate as possible.

During the individuation task, participants first saw a photo of the target (either a Black male or a White male) for 350 ms that was presented on the left side of the screen. Then, the four scenario responses would appear on the right side of the screen. The photo and the responses were shown together for 2 seconds. The four responses and photo remained on the screen and below them appeared a prompt: *Estimate the likelihood that this individual behaved aggressively in the BAR scenario on a* ***0 (Non-Aggressive) to 99 (Aggressive)*** *scale.* The picture, four pieces of aggressive information, and the scale remained on the screen until the participant responded. A one second inter-trial interval (ITI) followed their response.

Next, participants completed the passive-viewing task. Participants were told that they would view pictures of different individuals and themselves one at a time. They were asked to attend to each face. Participants viewed each face for 350 ms followed by a 1000 ms ITI. Participants did not have to respond to the face in anyway.

ERP Data Collection and Reduction

ERP data were recorded with 64 electrodes imbedded in a stretch-lycra cap (Electro-Cap International, Eaton, OH), positioned according to the 10-20 international system (Jasper, 1958). The ground electrode was imbedded in the midline between the frontal pole and the frontal site. Electrodes were also placed over the left and right mastoid, with scalp data referenced online to the left mastoid. To assess vertical and horizontal eye movement, electrodes were placed on the supra- and sub-orbit of the left eye, and on the outer canthi of both the left and right eye, respectively. Electrode impedances were below 10 KΩ. Electrode gel was used as the conducting medium. ERP recordings were amplified with a gain of 500 by NeuroScan Synamps (Sterling, VA), with a bandpass of .15-30 Hz, and digitized at 1000 Hz. Offline, data were re-referenced to a computed average of the left and right mastoid.

The ERP data were submitted to a regression procedure for correction of eyeblink artifact. Epochs were then created starting at 100 ms pre-stimulus onset and continuing for 1000 ms after stimulus onset and baseline corrected to the mean voltage of the pre-stimulus period. Each trial was then visually inspected for remaining blink or muscle artifact. When artifact was detected the trial was removed from analyses. These artifact free trials were then filtered at 30 Hz.

Waveforms derived from these artifact free trials were averaged for each participant for each trial type in each task. For the passive-viewing task, three averages were computed for the Black faces, the White faces, and the self.[5]

To explore attention to the Black and White (in the passive-viewing task) all components were analyzed with separate 2 (Target: Black, White) x 3 (Lateral Sites: Right, Midline, Left) x 3 (Sagittal Site: Frontal, Central, Parietal) repeated measures GLMs. All effects for each model with more than one degree of freedom were evaluated using a Greenhouse-Geisser (1959) correction although uncorrected degrees-of-freedom for these contrasts are reported in the text (Jennings, 1987). Any effects that

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[5] ERPs were recorded during the individuation task as well. ERPs in this task reflect attention to individuals when the goal was to individuate the targets. This task does not reflect spontaneous attention to race. Effect in the individuation task are discussed in Appendix E.

do not involve target and instead reflect the scalp distribution of the components are reported in Appendix F.

Analyses are reported in three main sections. First I will examine the aggression estimates during the individuation task. Next I will examine the ERP effects in the passive-viewing task. I will then examine correlations between the aggression estimates and the ERPs in the passive-viewing.

CHAPTER 5: STUDY 1 RESULTS

DO PARTICIPANTS USE INDIVIDUATING INFORMATION?

Before examining neural processes associated with individuation, it must first be established that there was individuation in the form of making different predictions about the behavior of someone based on how they behaved in the past. The first question of interest is: Do participants use individuating information (i.e. the four pieces of past aggressive information) when predicting how the target behaved in a fifth situation? Each participant provided a probability estimate for each target, yielding 64 estimates of aggression (32 Black and 32 White). In a multilevel model, each probability estimate was regressed on the target's amount of past aggressive behavior for each participant. For the first model, aggressiveness in past behavior was coded using a single predictor reflecting number of aggressive behaviors across the four scenarios (i.e. ranging from 0 to 4). The second model included separate predictors for each scenario, coded as four separate categorical predictors, each with two levels (i.e. situation one, 1 aggressive and -1 nonaggressive)[6]. The first model that treats past aggression as a

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[6] Please note that for brevity, the focus will be on the model representing past aggressive behavior as a single continuous predictor. In this case, the continuous predictor represents the number of aggressive behaviors. Results of the model in which each type of scenario is coded by a separate predictor are presented in Appendix D. This model is referred to as the categorical model. The focus is on the continuous model because there was no specific a priori interest in how participants weighted particular situations but instead in whether overall participants use individuating information. There is no explicit prediction that any particular scenario should contribute more to aggression ratings than any other. Please note though that in Blair et al. (2005), the second scenario (the bar scenario) had larger

single continuous variable results in a parameter estimate for the 'weight' given to the targets' behavior, collapsing across scenario type. Those weights were used to determine the average use of the amount of aggressive information across participants. To be clear, these models were run for each subject, then the resulting beta weights were used as the unit of analysis in a second regression model. This is the measure of individuation when race is not a factor and represents Model 1 (see Figure 2).

Model 1

Regression model for each probability estimate for each participant:

Aggression Rating = b_o +

b_1 Amount of Aggressive Information$_k$ (0 to 4 possible aggressive behaviors) +

b_4 Normative Aggressiveness Rating$_k$ (7 extremely aggressive) +

b_5 Normative Attractiveness Rating$_k$ (7 extremely attractiveness)

Overall Question: Does mean $b_1 = 0$ (Do participants use the past information)?

FIGURE 2. Regression model 1: Do participants use individuating information when predicting future behavior?

Please note that these models were run to establish that the participants in fact used the individuating information when predicting aggression as a replication of Locksley and colleagues (1982). Although care was taken to choose faces that had similar normative aggressiveness and attractiveness ratings, there was still variability in these ratings across stimuli. Therefore, normative ratings of aggressiveness and attractiveness were added as covariates. Comparing mean b_1 to 0 tests whether past information regarding aggressive behaviors contribute to making predictions of

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predictive power. It could be that the bar scenario is particularly informative or it could be that in comparison to the driving scenario (the first scenario) the bar scenario seems extreme. For this study, the bar scenario is the prediction scenario.

aggression. Supporting hypothesis 1 and replicating past work, participants rely on the target's past behavior when predicting aggression ($M = 22.18$; $t(28) = 26.46$, $p < .01$). As number of aggressive past behaviors increased, predicted aggression in the fifth scenario increased by 22 points. On average, the target's past behavior accounted for 64% of the variance in aggression probability estimates.

This first analysis demonstrates that participants in fact use the individuating information provided when predicting aggression. But, do participants also use race when making these judgments? Because previous research demonstrates that individuals use racial cues when making individuated judgments (Blair et al., 2005), it is important to determine whether this is true in a task where participants make aggression judgments for both Black and White targets. In Blair and colleagues, participants made aggression judgments of African American targets that varied in Afrocentric features, features that function as cues to group membership. They found that participants use Afrocentric features when predicting aggression for the African American targets over and above the individuating past information about aggressive behavior.

African Americans are stereotyped as aggressive, but it is unclear whether participants will apply these stereotypes when predicting aggression when targets are both White and Black, particularly in a task where it is clear that the race may matter in these judgments. Having both racial categories can signal participants that the study is about racial stereotyping and trigger control processes, reducing the likelihood of race effects given unlimited response time. To test whether participants use racial category when predicting aggression, both target race and the interaction between number of aggressive behaviors and race were included in a new model. Normative ratings of each target's perceived aggression and attractiveness of the target were also controlled in this later analysis. Figure 3 is the complete regression model.

Model 2

Regression model for each probability estimate for each participant:

Aggression Rating = b_o +

b_1 Amount of Aggressive Information$_k$ (0 to 4 possible aggressive behaviors) +

b_2 Race$_k$ (-1 White, 1 Black) +

b_3 Amount of Aggressive Information$_k$ x Race$_k$ +

b_4 Normative Aggressiveness Rating$_k$ (7 extremely aggressive) +

b_5 Normative Attractiveness Rating$_k$ (7 extremely attractiveness)

Overall Questions:

Does mean $b_1 = 0$?
Does mean $b_2 = 0$?
Does mean $b_3 = 0$?

FIGURE 3. Regression model 2: Do participants use race over and above individuating information when predicting future behavior? $B_1 = 0$ is the test of whether participants use past behavior when predicting subsequent behavior, controlling for normative aggression and attractiveness ratings, race, and the interaction between race and amount of aggressive information.

The results of Model 2 are shown in Table 1. As when past aggressive behavior is modeled in isolation, participants rely on the target's past behavior when predicting aggression ($M = 22.15$, $t(28) = 26.32$, $p < .01$), controlling for race of the target, the interaction between race and aggression, normative aggressiveness ratings, and normative attractiveness ratings. As number of aggressive past behaviors increased, predicted aggression in the fifth scenario increased by 22 points. Adding race to the model did not change the variance accounted for. On average, the target's behavior accounted for 64% of the variance in aggression probability estimates. Target race did not influence aggression judgments above and beyond individuating information. This is true at all levels of number of aggressive behaviors (i.e. when there is no aggressive information provided, when there are 2 pieces of aggressive information provided, and when all the information provided is aggressive).

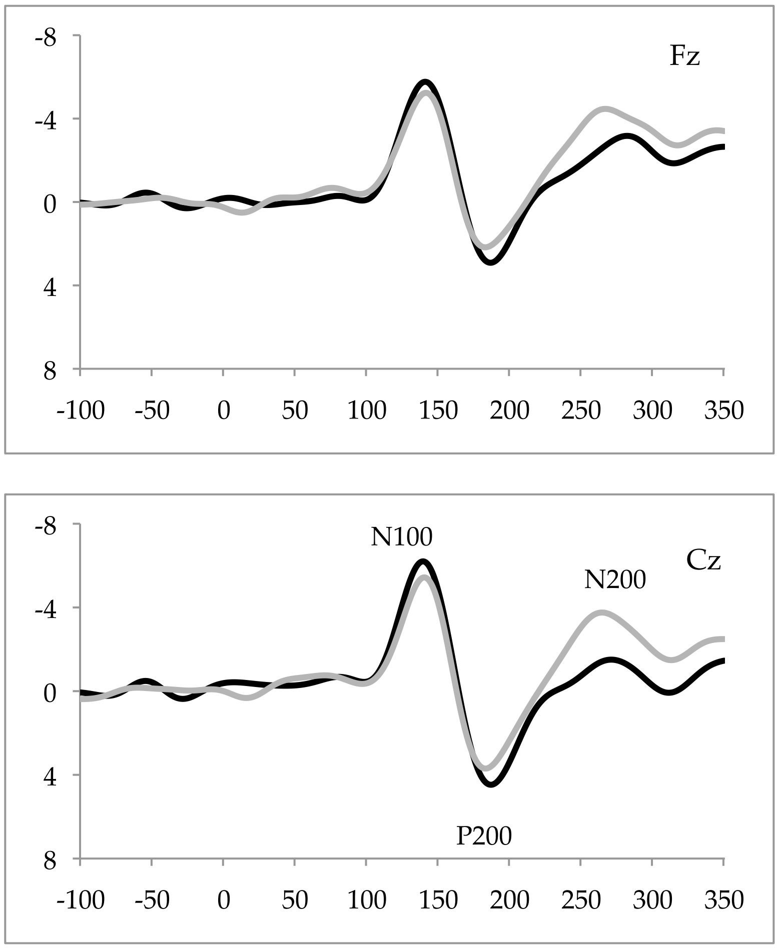
	M	*SD*	*t*-value
Mean of Aggressive Information	22.16	4.53	26.32*
Race	.45	2.11	1.16
Race x Aggression	.47	1.44	1.75
Rated Appeared Aggression	1.35	3.53	2.06
Rated Attractiveness	-.43	2.78	-.83

Table 1. Predicting use of individuating information. Mean slopes, standard deviations, and t-tests for probability of aggression estimates. * $p < .01$.

From this analysis of the behavioral data it is clear that participants use the information provided when predicting how the target behaved in a similar situation. For this investigation where both Black and White targets were included in the task, participants did not rely on race when making those judgments. The next question is how encoding of faces generally relates to use of the individuating and racial information. To answer this question, the ERP effects found in the passive-viewing task were explored.

ERPs During The Passive-Viewing Task

For the passive-viewing task, three distinct deflections were revealed from visual inspection of the averages: the N100 ($M_{latency}$ = 136 ms), P200 ($M_{latency}$ = 186 ms), and N200 ($M_{latency}$ = 255 ms). Peak component amplitudes were scored for each participant in each condition at 9 scalp sites (Fz, F3, F4, Cz, C3, C4, Pz, P3, and P4) by locating the maximal negative deflections between 70 - 180 ms (N100) and 180 - 280 ms (N200) and the maximal peak positive deflection between 120 - 220 ms (P200). Component latency windows closely matched previous research (see Ito & Urland, 2003).[7]



[7] Self other target effects (Black, White, Self) were analyzed at the maximal component location to investigate difference in processing of self and others more closely. Effects do not depend on participant gender. Please see Appendix E.

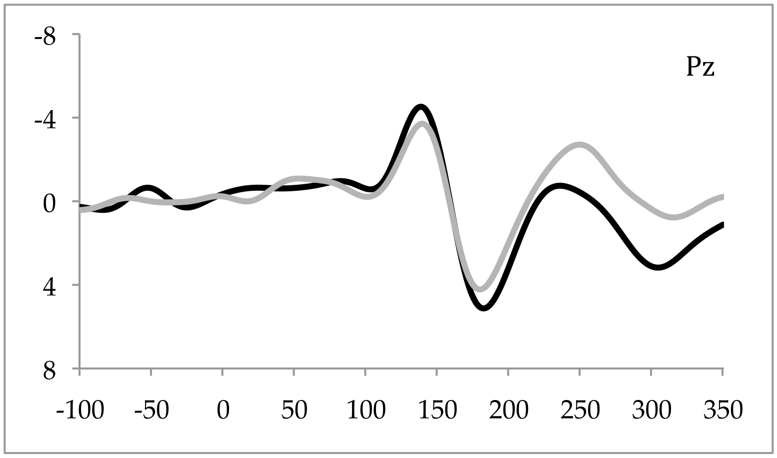


FIGURE 4. ERPs during the passive-viewing task. Black lines represent Black faces and gray lines represent White faces. Electrodes from the midline are shown at frontal (Fz), central (Cz), and parietal (Pz) locations. Component locations in the waveform are displayed on Cz. X-axis represents time in ms and Y-axis represents amplitude in μV.

N100 Amplitude. In the passive-viewing task, the N100 had a mean latency of 136 ms (see Figure 4). N100 amplitudes were maximal at Cz. Effects involving the scalp distribution of the electrical activity for all ERP components that do not involve target in the passive-viewing task are shown in Appendix F.

When considering the differences between processing of Black and White faces, there was a marginal main effect of Target ($F(1, 28) = 2.76$, $p = .11$, $PRE = .09$). Supporting hypothesis 2, N100s were marginally larger (more negative) to Black faces than White faces ($M = -5.60$ μV, and $M = -5.01$ μV, respectively). This effect was qualified by a marginal Laterality x Target interaction ($F(1, 28) = 3.33$, $p = .06$, $PRE = .11$). Amplitudes to Black faces were only marginally larger than White faces over the left hemisphere ($F(1, 28) = 4.35$, $p < .05$, $PRE = .13$). This direction of the target effect replicates past work that finds more attention to negative or distinctive stimuli at the N100, in this case greater amplitudes to Black faces compared with White faces for an all White sample (Ito & Urland, 2003, 2005; Kubota & Ito, 2007).

P200 amplitude. The P200 can be seen as the positive-going deflection with a mean latency of 186 ms that was maximal at Pz (see Figure 4).

When considering the differences between processing of Black and White faces, there was a significant main effect of Target ($F(1, 28) = 8.48$, $p < .01$, $PRE = .23$). Replicating previous work and supporting hypothesis 2, P200s were larger to Black faces than White faces ($M = 5.55$ μV, and $M = 4.57$ μV, respectively).

N200 amplitude. The N200 can be seen as the negative-going deflection with a mean latency of 255 ms that was maximal at Fz (see Figure 4).

Past race effects were replicated in the N200 (Ito & Urland, 2003; 2005; Ito, Thompson, & Cacioppo, 2004) with larger (more negative) N200s to White than Black faces ($M = -4.52$ μV and $M = -2.95$ μV, respectively, $F(1, 28) = 8.84$, $p < .01$, $PRE = .24$). Supporting hypothesis 2, more attention was paid to the ingroup targets at this point in processing.

Hypothesis 2 was supported in the passive-viewing task. Participants differentiate targets by race at the N100, P200, and N200. As in previous research, at the N100 and P200 participants attend more to Black faces than White faces (Ito & Urland, 2003; 2005). Similarly, as in previous research, participants attend more to White faces than Black faces at the N200 (Ito & Urland, 2003).

The Relationship Between Attention to Ingroup and Outgroup Targets and Individuation

It was hypothesized that implicit selective attention to individuals, as indexed by ERPs, should relate to use of individuating information. It was predicted that this should exist when depth of encoding processes are engaged. Therefore, this relationship should exist specifically for N200s, with larger N200s associated with greater individuation across target race. There was a trend for this relationship in these data.

Recall that the individuation task produced a parameter estimate for the degree to which each participant used the behavioral information and relied on the target's racial category. Correlations among the participant's estimates and the participant's ERPs (serving as an index of early attention) were conducted.

Parallel contrasts were computed in the ERP components at the electrode site where component amplitudes were maximal. First, the race main effect contrasts in the N100, P200, and N200 were calculated as the difference in processing to Black and White targets during the passive-viewing task. Also included in the correlations were the absolute amplitudes across targets at the N100, P200, and N200. The absolute amplitude was used to determine whether processing at these components relates, in general, to individuation. ERPs amplitudes should be thought of as an index of early differential and overall attention to the targets.

In terms the individuation task, the average slope for the use of individuating information (the parameter estimate for overall use of the pieces of aggressive information), the average slope for use of the target's race when predicting aggression, and the interaction slope between use of individuation information and race were included in the correlation analyses (produced from Model 2, see Figure 3). The estimates are derived from the regression models run at the level of the participant that included normative aggressive ratings and normative attractiveness ratings. See Table 2 for correlations.

From these correlations three main findings appear. First, there was a trend for the larger N200s overall the more participants used individuating information (*r*(29) = -.35, *p* = .06). In addition, there was also a trend for the more participants differentiated by race at the N100 and the N200, the more participants used race when predicting aggression (*r's*(29) = -.31, *p's* =.10).[8]

[8] Analyses yield similar results when individuation is modeled as the average of the mean slopes from each situation (N200 overall: *r*(29) = -.38, *p* < .05) and when considering the correlation between N200s and use of race in the categorical predictors model (N200 overall: *r*(29) = -.31, *p* = .10). See Appendix G for an outline of these correlations.

When considering the relationship between ERPs recorded during the individuation task and use of individuating information, there were no correlations.

Slopes For Individuation Task

		Use of Individuating Information	Use of Race	Race by Individuation Interaction
N100				
	N100 Overall Amplitude	.02 (.93)	-.31 (.10)$^{+}$	-.03 (.88)
	N100 (White – Black)	.13 (.51)	.01 (.96)	.09 (.65)
	N100 Black	-.10 (.62)	-.30 (.11)	-.01 (.95)
	N100 White	.11 (.57)	-.26 (.17)	-.04 (.84)
P200				
	P200 Overall Amplitude	-.03 (.89)	.03 (.86)	-.01 (.97)
	P200 (Black – White)	-.03 (.86)	.08 (.66)	.04 (.84)
	P200 Black	-.03 (.86)	.06 (.78)	.004 (.98)
	P200 White	-.02 (.94)	.01 (.96)	-.02 (.92)
N200				
	N200 Overall Amplitude	**-.35 (.06)***	.03 (.88)	.16 (.41)
	N200 (Black – White)	-.07 (.73)	-.31 (.10)$^{+}$	-.30 (.12)
	N200 Black	-.30 (.12)	-.06 (.74)	.07 (.73)
	N200 White	-.28 (.14)	.08 (.68)	.23 (.26)

Table 2. Estimating the relationship between visual attention and individuation. Correlations and (p-values). Recall that the N100 and N200 are negative-going components so negative correlations represent larger amplitudes. * $p < .10$ $p < .15$.

CHAPTER 6: STUDY 1 DISCUSSION

To assess the neural correlates of individuation, participants were given four pieces of information about the past behavior of Black and White individuals (individuating information) and asked to predict each individual's behavior in a fifth situation. In a second task, participants viewed pictures of different Black and White faces while ERPs were recorded. Correlations were calculated between ERPs during the passive-viewing task and use of individuating information (i.e. use of the four pieces of information given about each target) and use of race (i.e. use of visual category information over and above individuating information). Replicating previous research, participants relied on the provided past behavior when predicting future behavior for all targets (Beckett & Park, 1995; Blair et al., 2005; Locksley et al., 1982). Additionally, replications of past race effects were observed at the N100, P200, and N200 in the passive-viewing task (Ito & Urland, 2003; 2005). N100s and P200s were larger to Black faces than White faces and N200s were larger to White faces than Black faces in this Caucasian sample.

Interestingly, there was a marginal relationship between overall N200 amplitudes in the passive-viewing task use of individuating information in the individuation task. Furthermore, differences in attention to race at the N100 and N200 marginally related to a greater use of race when predicting aggression for Black and

White individuals. Though this the relationship was marginal, this suggests that the differential deployment of attention that occurs within 200 ms of viewing a person relates to the application of individualized information. To my knowledge, this is the first investigation of the relationship between early selective attention and individuation.

THE RELATIONSHIP BETWEEN ATTENTION AND INDIVIDUATION

One mechanism that contributes to use of individuating information is early variations in depth of encoding of individuals. Previous models of impression formation suggest that increases in attention to a target contribute to individuated processing (Fiske & Neuberg, 1990). The marginal relationship between N200s and individuation in this research suggests that this relationship occurs even at the earliest stages of encoding. In this study, participants' spontaneous attention to individuals in the passive-viewing task marginally predicted use of individuating information.

It is perhaps not surprising that this marginal relationship occurred at the N200. Correlations between N200s and responding during implicit stereotyping tasks and categorization tasks have been found in previous work (Correll et al, 2006; Kubota & Ito, 2007). Moreover, the N200 has been associated with attention to a variety of cues important in person construal (Bentin & Deouell, 2000; Folstein, Van Petten, & Rose, 2007; Ito & Urland, 2003; 2005; Kubota & Ito, 2007; Tanaka, et al., 2006). Given the timing and association of the N200 with selective attention to typically more individuated targets this time point might allow for deeper encoding of cues used to facilitate individuation.

The present research replicates previous race effects in the passive-viewing task at the P200 and N200, on the mean level. Ito and Urland (2003) found that the N100 as well as the P200 were greater to Black than White faces. While automatic vigilance mechanisms make it adaptive to initially devote greater attentional resources to threatening and/or novel faces of racial outgroup members (as reflected in the N100 and P200), in the absence of any strong potential negative consequences, perceivers may subsequently devote more attentional resources to racial ingroup members because they are typically more desirable for greater individuation and/or are more approachable. Replicating previous work, there were larger N200s to ingroup White as compared to outgroup Black faces in the passive-viewing task (Ito & Urland, 2003; 2005; Kubota & Ito, 2007; Willadsen-Jensen & Ito, 2006).

Ito and Urland (2005) found that even when participants are performing more individuating tasks such as making a personality judgment or judging an individual's food preference, race still affects P200 and N200 amplitudes (Ito & Urland, 2005). In fact, focusing attention away from the social nature of the stimuli by having participants attend to the presence or absence of a dot on a picture of a face similarly fails to reduce P200 and N200 race effects (Ito & Urland, 2005). Thus, even when the goal is to process at a level deeper than the social category by making a personality or food preference judgment or when the goal is unrelated to the social nature of the stimuli, race processing is still observed in a similar pattern to when individuals are asked to explicitly attend to race and gender information.

Although effects of differentiation by race are observed at the mean level, the marginal relationship between overall N200 amplitudes and individuation remains. There is a trend that the more neural resources devoted at this stage of processing, the more individuating information is used and this occurs for both ingroup and outgroup targets. In addition, there is a trend for the more an individual differentiates by race in early selective attention at both the N100 and N200, the more they use race when predicting aggression. Thusly, there is tentative evidence, indicated by a marginal relationship between overall N200s while passively-viewing targets and individuation estimates that greater attention as indexed by the N200 to any target increases individuation. But for individuals who spontaneously differentiate by race in early selective attention, they may be more likely to rely on race when predicting behavior.

The correlations between ERP estimates in the passive-viewing task and individuation estimates were of only marginal significance. One possible explanation for these marginal relationships is the relatively small sample size leading to less power to detect these relationships. The trend however is interesting particularly given this relationship was explored between viewing one set of targets and individuating another set. In addition, the relationship between use of individuating information and N200s was predicted. Future research should seek to explore this relationship further.

WHY DID PARTICIPANTS NOT RELY ON RACE WHEN PREDICTING AGGRESSION?

Participants relied on individuating information to an equal degree for Black and White targets. In fact, the diagnostic information provided accounted for 64 % of the variance in aggression judgments. Interestingly, participants did not rely on the race of the target. This was the case for all amounts of aggressive information. Even when targets behaved inconsistently, as was the case with two pieces of aggressive and two pieces of non-aggressive information, participants did not rely on race when predicting aggression.

This finding on the surface seems like a departure from Blair, Chapleau, and Judd (2005) where participants relied on afrocentric physical features when predicting aggression in this same task. Unlike Blair and colleagues in their 2005 study, in this task, participants viewed individuals who were clearly categorically Black or White. Previous research suggests that given time and motivation to be accurate individuals are likely to control racial prejudices and stereotypes (Devine, 1989; Dunton & Fazio, 1997; Fiske & Neuberg, 1990). While participants had both time and accuracy instructions in both Blair and colleagues' study (2005) and in the present research, the salience between category distinctions in the present study may have increased motivation to focus on the information only and, because participants were not asked to respond to the photo, they may have to some degree attempted to disregard the photograph.

The importance of a photograph in this task has been explored in previous research. Beckett and Park (1995) found that when participants were provided with a photo of the target they used gender to predict assertiveness of the target. However, when there was no photo the participants did not use gender to make their predictions. These results are contrary to the present findings because even when provided with the photograph participants failed to use race. It could be that there are more concerns about racial stereotyping than gender stereotyping. Participants may be more willing to use gender when judging assertiveness. Though it is an empirical question whether individuals are more willing to explicitly stereotype by gender than race, this willingness might account for the discrepancy in these findings.

To summarize, the three main hypotheses were supported in this investigation. First, replicating previous work, participants rely on individuating information when predicting behavior (Beckett & Park, 1995; Blair et al., 2005; Locksley et al., 1982). However, in the present research where participants predicted aggression behavior for both Black and White target, participants did not rely on race when predicting aggression in the individuation task. Second, as in previous literature, spontaneous category-based processing was observed within 120 ms of viewing a target in the passive-viewing task (Ito & Urland, 2003). The main theoretically contribution of this work emerged from the finding that overall N200 amplitudes marginally correlated with individuation. In addition, there is a trend for the more attention differs as a function of race at the N100 and N200, the more participants use race when predicting behavior even in the presence of individuating information. Therefore, there is a tantalizing, albeit marginal relationship, between spontaneous depth of processing, as indexed by the N200, and general use of individuating information and differences in attention at the N200 as a function of race relate to use of racial information.

The marginal relationship between N200s and individuation exists for ingroup members as well as for outgroup members. This study demonstrates a marginal relationship between individual differences in individuation and individual differences in how targets are processed at the N200. Although the effect did not reach significance, this suggests that individuation is marginally related to early and automatic depth of processing differences to targets. If a person attends more to targets at this stage in processing, they maybe more likely to individuate someone; however, if instead they attend more to ingroup members compared with outgroup members, then category-knowledge influences impressions. This is an interesting first step, but can this early attention be changed at the N200 to encourage similar processing of ingroup members who are more likely to be individuated and outgroup members who are less likely to be individuated?

CHAPTER 7: THE INFLUENCE OF PERSPECTIVE-TAKING ON NEURAL ENCODING

Study 1 replicated previous work, finding encoding of category cues at the N100, P200, and N200 during passive-viewing. Interestingly, there was a trend for a relationship between N200s and use of category information and individuating information. However, the relationships were slightly different. Larger category-based encoding differences at the N200, marginally related to greater use category information even in the presence of individuating information. Additionally, greater attention overall at the N200, marginally related to greater use of individuating information. Therefore, this marginal relationship suggest that if individuals devote more attention, as indexed by the N200, to ingroup members as compared to outgroup members, then they are more likely to rely on category information when forming impressions of others (Ito & Urland, 2003). However, the more devotion of attention to any target at the N200, the more individuals use individuating information when forming impressions. It stands to reason then that if attention to outgroup members, who are typically less individuated, is increased at the N200 there should be increases in individuation.

In general, ingroup members are individuated more than outgroup members (Brewer, 1989). However, the goals and motives brought to an interaction can influence impressions of a target. If goals can encourage deeper and more individuated processing of targets and if the processes reflected in the N200 relate to individuation, then goal manipulations should alter N200s.

Previous research suggests that in many encounters, ingroup favoritism dominates group relations both in terms of perception and behavior (Brewer, 1988). On average, ingroup members are often more elaborated during encoding (e.g. processed more deeply), leading to more personalized impressions. In addition, information regarding those individuals tends to be more accurate than when encoding outgroup members (Brewer, 1989).

In contrast, impressions of outgroup members are typically based on the existing stereotypes, particularly in the absence of individualized information (Clement & Krueger, 2002; Fiske & Neuberg, 1990). Outgroup members are viewed as endorsing more stereotypic beliefs and less counterstereotypic beliefs and attitudes than ingroup members (Park & Rothbart, 1982). Automatic stereotyping of unfamiliar targets occurs even when provided with neutral information, ambiguous information, and counterstereotypic information about an outgroup member (Allport, 1954; Bodenhausen & Macrae, 1998; Fiske & Neuberg, 1990). Previous research suggests that one important factor in affecting the likelihood of individuated impressions is the goals brought to an encounter.

IMPRESSION GOALS

Under certain circumstances, goals brought to an encounter can alter the impressions formed of others and in turn change the attitudes and behavioral reactions towards individuals (Neuberg, 1989; Neuberg & Fiske, 1987). Although category-based impressions are cognitively efficient (Macrae, Bodenhausen, Milne, & Jetten, 1994) and highly prioritized during processing (Fiske & Neuberg, 1990) implicit and explicit control over attention and interpretation of information through variations in impression goals can decrease stereotypic bias. Figure 5 is a schematic of various impression goals employed in the social psychological literature to alter stereotypic impressions.

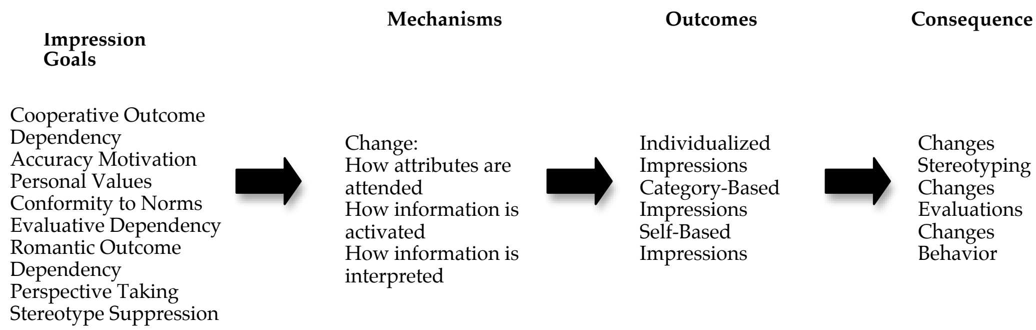


FIGURE 5. Examples of impression goals, mechanisms, outcomes, and consequences (Brewer, 1988; Fiske & Neuberg, 1999).

Figure 5 is a list of examples of impression goals, but the focus of this study is on one goal in particular, that of perspective-taking. Perspective-taking was selected as the focus for two reasons. First, perspective-taking influences the information activated about a target, activating self-traits and increasing self-relevance (Davis, Corddin, Smith, & Loce, 1996). Unlike other impression goal manipulations, perspective-taking increases both the relevance of a target and the perceived similarity between the self and others (Ames, Jenkins, Banaji, & Mitchell, 2008). Self-relevance and self similarity in turn increase attention paid to targets (Davis et al., 1996). Perspective-taking may in turn affect early selective attention to targets.

PERSPECTIVE-TAKING

Perspective-taking refers to the act of putting yourself in the shoes of another individual and thinking about what it is like to be that individual. Often perspective-taking is manipulated through use of first-person essay writing where participants write a day-in-the-life essay about a person (Galinsky & Moskowitz, 2000; Ames et al., 2008). Essay writing from the first-person, using "I", as compared with essay writing from the third-person, using "he/she", activates self-traits and self similarity.

In terms of a first-person perspective goal, individuals are likely to draw upon self-referential traits, because use of the "I" pronoun primes the self (Galinsky & Moskowitz, 2000). Self-reference leads to discounting of stereotype-consistent information, increases in explicit liking and empathic concern, and decreases in negative evaluations of others (Davis et al., 1996; Galinsky & Moskowitz, 2000). Most importantly for the present research, perspective-taking increases attentional focus on the individual.

In general, individuals generalize automatically from themselves to others, using self-reference to infer the mental states of those around them (Dunning & Hayes, 1996). However, perceivers tend to use self-reference more often for ingroup members than for outgroup members (Cadinu & Rothbart 1996; Krueger & Clement, 1997; Smith & Henry, 1996). Thus, individuals use their standing on traits and attitudes to predict the standing of individuals who they view similar to themselves, through anchoring and simulation, and fail to use self-reference and instead tend to rely on category knowledge when predicting the standing of outgroup members (Marx & Stapel, 2006; Mitchell, Macrae, & Banaji, 2006). This occurs because individuals often assume that their experience and judgments may be less applicable to those they view to be dissimilar to themselves (see Figure 6).[9]

Self-referential thought can lead to egocentric biases, but it also increases self-relevance and in turn greater attention to the target's individualized characteristics. Although first-person perspective-taking increases activation of the self-traits, leading others to think that because they like chocolate, others do to, it also increases focus on individualized characteristics because participants are instructed to try to imagine what it would be like to be this person. This means that while a perceiver probably uses him or herself as the standard of judgment and perhaps brings individuals closer to them on ratings of their attitudes and behaviors, individuals also increase their effort in thinking what this person might be like. Focusing on personal characteristics of a target contributes to individuated processing.

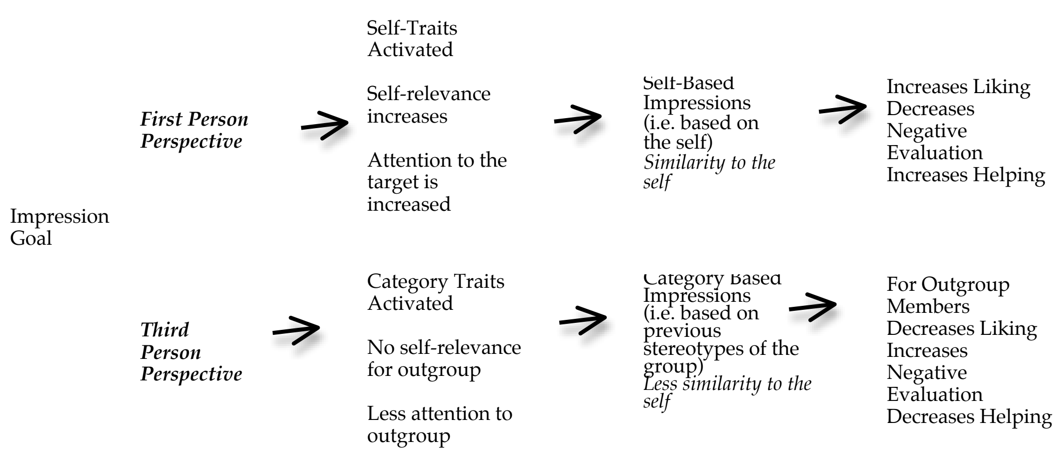


FIGURE 6. Perspective-taking, mechanisms, impressions, and outcomes.

[9] To be clear, perspective-taking goals can lead to an egocentric bias and actually decreases accuracy in impressions (Epley, Keysar, Van Boven, & Gilovich, 2004) while still increasing positive evaluations.

To sum, previous research suggests that goals related to taking the perspective of others increase the accessibility of the self-concept by increasing the self-other overlap in mental representations, leading to less stereotyping of dissimilar others (Galinsky & Moskowitz, 2000; Mitchell et al., 2006). In addition, individuals spontaneously individuate others who they view to be more similar to the self (Fiske & Neuberg, 1990). Because first-person perspective-taking increases similarity, it also may, in turn, increase in depth of processing of outgroup members and increase at least an attempt at individuation (Fiske & Neuberg, 1990). If perspective-taking influences depth of encoding, can perspective-taking increase attention to a target at the N200?

Increasing Selective Attention To Individuals?

The main theoretical contribution of the present research is whether perspective-taking can increase selective attention to the targets. If N200s reflect depth of encoding then increasing perceived similarity and attention should result in greater processing of both targets when asked to take those target's perspective.

Therefore, in a third-person perspective-taking frame, outgroup members should require less processing and attention compared with the White target, who because of ingroup status, will be spontaneously encoded more deeply. In contrast, when taking the perspective of targets in the first-person, attention should increase to both targets, leading to attention to White targets to be greater then attention to the Black target.

In the first study, the relationship between attention to targets when passively viewing faces and individuation was explored. In this study, ERP effects were explored in the passive-viewing task and individuation effects were explored in the individuation task. The purpose of Study 2 was to determine whether taking that target's perspective could encourage depth of encoding for that target. Therefore, in this study, unlike Study 1, ERPs were explored during the social judgment task where individuals made judgments of the two targets they took the perspective of. Although there was passive-viewing task included in this second study, it was not the main focus of the ERP investigation.

Hypothesis 1: Differences in attention to the White and Black target at the N200 should depend on perspective-taking.

A: In the third-person perspective-taking condition, N200s should be larger to the White targets than the Black targets.

B: Under first-person perspective-taking instructions, participants should view both the Black and the White targets as more similar to them and they should process them more deeply. Thus N200s should be similar between the White and the Black target.

CHAPTER 8: OVERVIEW OF STUDY 2

To explore these questions in Study 2, participants learned about an ingroup member and an outgroup member. Half of the participants were instructed to write a day-in-the-life essay about the ingroup member and then the outgroup member (one-at-a-time in counterbalanced orders across participants) from the first-person, using the "I" pronoun. The other half of the participants wrote in the third-person, using the name of the target. Participants were provided with a small biographical statement and a photo of each person. The biographical statements contained neutral nondiagnostic information. Stereotypes about groups are activated in the presence of neutral stereotype-nondiagnostic information (Bodenhausen & Macrae, 1998; Fiske & Neuberg, 1990). Therefore, in the third-person, the addition of the photo of each target was presumed to activate stereotypes about the group (see Beckett & Park, 1985). As in Galinsky and Moskowitz (2000) use of the first-person was presumed to activate self-traits and to bolster interest and attention to the target.

Next, participants rated how much they themselves and the ingroup and outgroup member would agree with a number of statements. These statements were selected to vary in valence and stereotypicality. Statements were selected to vary in stereotypicality and valence because previous work finds that ascription of self-traits to outgroup members differs by valence and stereotypicality (Davis et al., 1996; Galinsky & Moskowitz, 2000).

First-person perspective-taking reduces the application of stereotypical traits and also increases the similarity between self and outgroup members compared to a control condition (in the present work this condition is referred to as the third-person perspective-taking condition). In addition, participants express more positive evaluations of targets and self/other judgments are more similar for both positive and negative traits. In the present research valence categories included positive, negative, and neutral statements and stereotypical categories included statements highly stereotypical of African Americans, highly stereotypical of Whites, and stereotype-irrelevant for African Americans and White Americans. From the work by Galinsky and Moskowitz (2000) and Davis and colleagues (1996) the following hypotheses were tested:

Hypothesis 2: Ratings of targets will depend on the valence and stereotypicality of the statements and this should depend on perspective-taking.

A: In terms of stereotypicality, in the third-person perspective-taking condition, targets will be rated as more stereotypical (i.e. agreeing more with stereotypical statements) compared to ratings when participants are in the first-person perspective-taking condition. That is, participants in the third person perspective-taking condition will rate the Black target as agreeing more with Black stereotypical statements than White targets and White targets will be rated as agreeing more with White stereotypical statements than Black targets. In the first-person, ratings should be less stereotypical for both Black and White targets. Participants will generally rate both the Black and the White target low on stereotype-irrelevant statements for both perspective-taking conditions.

B: In terms of valence ratings, in the third-person perspective-taking condition, the outgroup target will be rated as agreeing more with negative statements compared with positive or neutral statements and the White target will be rated as agreeing more with positive and neutral statements compared with negative statements. In the first-person, participants should rate both targets as agreeing more with positive and neutral statements compared with negative statements.

In addition to target by perspective effects across stereotypicality and valence, there is reason to believe that valence and stereotypicality will interact. Opinions can be both valenced and stereotypical. For example, a common stereotype about African Americans is that all African Americans attend church (Devine, 1989). Holding this belief about the group is stereotypical, but this stereotype is thought to be positive. Wittenbrink, Judd, and Park (1997) find that, on an implicit task, both the stereotypicality and the valence of items affects bias. Wittenbrink and colleagues find increased facilitation of positive White stereotypical items when primed with White targets compared with Black targets. In addition, increased facilitation occurs for negative Black stereotypical items when primed with Black targets compared with White targets.

If first-person perspective-taking decreases bias, this prejudicial stereotyping effect should be greater in the third-person perspective-taking condition than the first-person.

Hypothesis 3: There should be a four-way interaction among valence, stereotypicality, target, and perspective-taking.

A: Participants should rate agreement higher for Black targets for

Black stereotypical negative statements compared with White targets and agreement higher for White targets for White stereotypical positive statements compared with Black positive statements in the third-person and these differences should be reduced in the first-person. In the first-person, participants should rate targets similar across statements.

To explore hypotheses 1 through 3, the present experiment occurred in five phases. In **phase 1**, participants were fitted for ERP recording and a photo of them was taken. In **phase 2**, participants learned about one racial ingroup member and one racial outgroup member, and received the perspective-taking manipulation. In **phase 3**, participants rated how the ingroup member, outgroup member, and they themselves would respond to a variety of social judgment statements followed by explicit measures of similarity of each individual to the self and likability of each individual (borrowed from Mitchell et al., 2006). The social judgment statements varied in two dimensions, that of valence (positive, negative, and neutral) and that of stereotypicality (Black stereotypical, White stereotypical, and stereotype-irrelevant for both groups). In **phase 4**, participants performed the same passive-viewing task as in Study 1[10]. In **phase 5**, participants filled out a helping measure asking whether they would help the outgroup member with research. The helping measure was designed for the present research.

Davis and colleagues (1996) also found that liking and helping were increased with perspective-taking compared with a control condition. These results contributed to the fourth hypothesis:

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[10] ERP effects in the passive-viewing task replicated those observed in Study 1. For a discussion of these effects please see Appendix O.

Hypothesis 4: Liking of both targets and helping the outgroup member should increase under first-person perspective-taking instructions compared with third-person perspective-taking instructions.

Chapter 9: Methods For Study 2

Participants

Forty-nine (41 Caucasian, 1 Asian, 1 Hispanic, and 3 multi-race) undergraduates enrolled in introductory psychology at the University of Colorado Boulder participated in return for partial credit toward their experiment participation requirement.

The primary focus of this study is on how perspective-taking manipulations effect early selective attention to ingroup and outgroup members. To focus on ingroup and outgroup attention differences specifically, only Caucasian participants were included as a means of controlling the race of the ingroup and outgroup. Of the 41 Caucasian participants, three were excluded due to computer errors; two were excluded due to a mix-up between instructed perspective-taking and the perspective written in the essay (i.e. first-person instructions and wrote in the third-person). Of the remaining 36, all had lived in the United States for more than 10 years and spoke English as their first language. Most were freshman (M_{age} = 19.31, SD = 1.51). Thirteen were female and 23 were male. Of those participants, 19 completed the task with first-person instructions and 17 completed the task with third-person instructions.

FACES

For the first task, the social judgment task, color photos of the two targets (one Black and one White) were included (see Appendix H). Piloting procedures were similar to those used in Study 1. Although there were only two selected faces, the means of the percent of pilot participants who rated the faces as neutral, the percent of pilot participants who rated the face as Black or White, the pilot participants' mean rating of confidence in selecting Black or White as the ethnicity, and the mean rated attractiveness for each target are reported. Each target was rated as having a neutral expression by the majority of pilot participants (M_{Black} = 90.48 % and M_{White} = 84.21 %), and rated to be representative of each group by over 70% of the pilot participants (M_{Black} = 76.00 % rated as Black and 7.68 confident in that rating and M_{White} = 84.00 % rated as White and 8.04 confident in that rating). The attractiveness ratings for each target across pilot participants was M_{Black} = 3.58 and M_{White} = 4.31.

SOCIAL JUDGMENT STATEMENTS

Statements were selected to vary simultaneously on stereotypicality and valence. This was determined based on pilot testing 246 statements on 66 participants. Fifty-eight were Caucasian, 2 were Hispanic, 1 Asian, 4 Other, and 1 did not respond. Twenty-four were male and 42 were female. The average age of the pilot participants was 18.90 years.

Social judgment statements included such things as: attends church every Sunday, looks forward to owning a big house in the suburbs, meditates for an hour at a Buddhist center, finds John Stewart's humor on "The Daily Show" hilarious, and a bit uncoordinated (see Appendix J for a complete list of opinions selected for use in Study

2). Many of the social judgment statements were used extensively in other research (see Jenkins, Macrae, & Mitchell, 2008; Mitchell et al., 2006)[11].

Participants rated stereotypicality (1 = *Not at all stereotypical* to 7 = *Extremely stereotypical*), valence (1 = *Extremely Negative*, 4 = *Neither positive or negative*, 7 = *Extremely positive*), and diagnosticity of each social judgment statement of a person's personality (1 = *Not at all diagnostic of personality* to 7 = *Extremely diagnostic of personality*; see Appendix I for instructions). Participants always rated the opinions for stereotypicality, valence, and the diagnosticity of personality in that order for either African Americans or White Americans.

From the 246 statements, 72 were selected to fulfill a 3 (Stereotypicality: Highly Stereotypical of African Americans, Highly Stereotypical of White Americans, and Stereotype-Irrelevant for African Americans or White Americans) x 3 (Valence: Positive, Neutral, Negative) matrix. Eight social judgment statements were selected for each of the nine combinations, leading to 72 social judgment statements (see Appendix J for a the means for each statement and Appendix K for an analysis of stereotypicality and valence ratings). Table 3 represents the mean piloted stereotypicality ratings for each statement type. Table 4 represents the mean piloted valence ratings for each statement type. Target (i.e. Black, White) is a between subjects factor.

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[11] This researcher would like to thank Jason Mitchell for his generosity in sharing these social judgment statements. In addition to those provided, some statements were constructed for pilot testing for the present research.

	Positive		Neutral		Negative		Grand Mean	
	Black	White	Black	White	Black	White	Black	White
Highly Stereotypic Black	5.31	4.20	5.07	3.76	5.04	3.85	5.14	3.94
Highly Stereotypic White	3.46	5.23	3.36	4.92	2.98	4.73	3.26	4.96
Stereotype-Irrelevant for Blacks or Whites	2.15	3.35	2.92	3.67	2.62	3.33	2.56	3.44
Grand Mean	3.64	4.26	3.78	4.11	3.54	3.97		

Table 3. Mean stereotypicality normative ratings as a function of stereotypicality and valence for African Americans and White Americans.

	Positive		Neutral		Negative		Grand Mean	
	Black	White	Black	White	Black	White	Black	White
Highly Stereotypic Black	5.11	5.05	4.00	4.04	3.32	3.44	4.15	4.18
Highly Stereotypic White	4.71	4.90	3.98	4.22	3.54	3.53	4.08	4.21
Stereotype-Irrelevant for Blacks or Whites	4.68	4.72	4.04	4.19	3.58	3.65	4.10	4.19
Grand Mean	4.83	4.89	3.78	4.15	3.48	3.97		

Table 4. Mean valence normative ratings as a function of stereotypicality and valence for African Americans and White Americans.

On average, social judgment statements varied in stereotypicality ratings in the manner intended. Statements selected for the high stereotypical category were rated as higher in stereotypicality than those selected to be stereotypically-irrelevant. Social judgment statements were rated on average equally high in stereotypicality for White stereotypical statements and Black stereotypical statements. Those statements selected to be stereotypically-irrelevant were rated as lower in stereotypicality for Black Americans than White Americans and rated for both groups as lower than the mean in stereotypicality (see Appendix K for the full stereotypicality and valence statement analyses).

In addition, the valence of the statements varied in valence in the manner selected. Positive statements were rated more positively than neutral statements or negative statements, neutral statements were rated as neutral, and negative statements were rated as more negative than positive and neutral statements. There were differences in how valence was rated (positive, neutral, and negative) depending on stereotypically. There were however, some slight differences when comparing stereotypicality within each valence category. Positive Black stereotypical statements were more positive than positive White and positive stereotypically-irrelevant statements. Negative Black stereotypical statements were more negative than stereotype-irrelevant statements but were similar to negative White stereotypical statements. Negative White stereotypical and negative stereotype irrelevant statements did not differ (see Appendix K for the full stereotypicality and valence statement analyses). There were no differences for neutral statements.

Procedures

Recall that this experiment occurred in five phases. These phases will be outlined.

PHASE 1: ERP INTRODUCTION

Upon arrival, participants were seated and asked to read and sign a consent form. The study was described as an investigation of brain activity when people form impressions of others. After a brief description of the ERP setup process and the experiment, the participant's photo was taken and uploaded into the program. Self faces were edited to match the White and the Black targets. Backgrounds were eliminated, faces were cropped from the neck up, and remaining clothing was blacked out to match the collar on their shirt. Backgrounds were filled-in gray. All faces were presented in 640 x 480.

PHASE 2: PERSPECTIVE-TAKING MANIPULATION

Following the introduction to the study, participants were given a packet that contained the perspective-taking manipulation on the first page, biographical information of the target on the second page, a color photograph of the target on the third page (see Appendix H), and a sheet of lined paper on the fourth page. Participants were instructed to read the information and write a short five-minute day-in-the-life essay about each person's typical day. Participants would do this for each individual (Matt and Chris), one at a time. The order of presentation was randomized such that half the participants read and wrote about Matt before Chris and half the participants read and wrote about Chris before Matt. In addition, the race of Matt and Chris was randomized such that half the time Matt or Chris was Black and half the time Matt or Chris was White.

As in previous research (Ames et al., 2008; Galinsky & Moskowitz, 2000), for the perspective-taking instructions the participants were told:

The purpose of this study is to assess your ability to construct life-event details from limited information. Imagine a day in the life of these individuals as if you were them, looking at the world through their eyes and walking through the world in their shoes. We will provide you with information about two individual's and after reading this information please write two short narrative essays where you take the perspective of these individuals. In order to really get into the minds of these individuals, please write all essays in the first person, using the I pronoun.

Or

The purpose of this study is to assess your ability to construct life-event details from limited information. Please read the information about the individual and then write an essay about their day using the provided paper.

Following this instruction, participants were given basic biographical information about the individual (either Matt or Chris). These profiles were similar in length and contained ostensibly factual information. Each individual was described in terms of neutral information.

Biographical Statement 1:

My name is Matt. I am a 19-year-old sophomore attending Fairhaven College. I am majoring in communications and I think this major will help me get a good job in the future. So far I have enjoyed my time at the university. In my first year I made new some friends in the dorms who I still hangout with all the time. For fun, I like to watch movies and get out of the house. I feel like I am a good student who gets his work done and still makes time for friends. I go home some weekends to see my family. I have one younger brother and enjoy hanging out with him.

Biographical Statement 2:

My name is Chris and I am 20 years old. Currently, I am attending Kenyon College and I am just beginning my third semester. My hometown is close, so I go back to see my older sister and friends. So far, I have a solid grade point average and I find it easy to make time for both school and friends. In my first year, I started to take political science classes and decided this semester to declare my major in that area. Eventually, I would like to get a job where I can put my political science education to good use. I enjoy the outdoors and listening to music.

Following the perspective-taking manipulation and biographical information was a photo of the target. On the last page was lined paper. Participants were given five minutes to read and write their day-in-the-life essay about each target. Recall that participants were introduced to the targets sequentially; thus after finishing one essay they were introduced to the next target and wrote an essay about them.

PHASE 3: SOCIAL JUDGMENT STATEMENTS

Participants then completed the social judgment task. They were told that they would rate Matt's agreement and Chris' agreement with a number of statements and their own agreement with the same statements. Each trial began with a color photo of either themselves, the Black individual, or the White individual for 500 ms. The face was then removed from the screen and replaced with a statement. There were 72 social judgment statements and participants answered agreement with these opinions three times, once for themselves, once for the outgroup target, and once for the ingroup target, depending on the preceding photo. The statement remained on the screen for 350 ms. Then underneath the opinion statement would appear the question: “How much would he agree with this statement?” If the face preceding the statement was a picture of themselves then “he” would be replaced with “you”. Participants rated the individual in the photo’s agreement with the statement on a 1 (*Strongly Disagree*) to 7 (*Strongly Agree*) scale. Participants had unlimited time to respond. They were told that when they saw the photo they should try to think about what the person is like and to give their best guess for how this individual would respond. ERP responses were recorded as participants saw the target individuals and made their judgments.

At the end of the trait judgments, participants rated “How generally likable does (Chris/Matt) seem?” on a scale from 1 (*Not at all likable [your worst enemy]*) to 7 (*Extremely likeable [your best friend]*). Participants then rated “How similar do your see yourself to (Chris/Matt)?” on a scale from 1 (*Not at all similar*) to 7 (*Identical*). For half the participants, the outgroup member was rated first and for half the participants the ingroup member was rated first. Participants always rated liking then similarity for a target and then similarity and liking for the next target.

Phase 4: Passive-Viewing Task

The passive-viewing task was identical procedurally to Study 1, except faces were shown for 500 ms followed by a 1000 ms ITI. This task was included as a replication of the passive-viewing task in Study 1 and also to explore whether taking the perspective of one member of a group would increase depth of encoding the group in general. There were no effects in the passive-viewing task a function of perspective-taking. Please see Appendix O.

Phase 5: Helping Measure

Participants completed a measure of how willing they would be to help the Black target on a task after the experiment was finished. In this case, the task was a school project that would require additional effort. This measure was designed to assess how much perspective-taking influences the participant's willingness to help an outgroup member. Past research demonstrates that individuals are less likely to help outgroup members than ingroup members (Brewer & Brown, 1998). However, under perspective-taking instructions individuals are equally likely to help outgroup and ingroup members (see for example, Davis et al., 1996; Cialdini et al., 1997). The helping questions asked:

> *Thank you for helping us with this research. Social scientists rely on volunteers such as you to understand how people think and behave. If you enjoy doing things like this, (Insert outgroup members name here) is actually an honor's student who will be collecting data at CU this semester. If you would be interested in helping him collect data for his research project please mark yes below and how many hours you could volunteer and the experimenter will discuss the options with you.*

This statement was developed explicitly for this research.

ERP PROCEDURES

ERP data were recorded in the same manner as Study 1 (see EPR Data Collection and Reduction).

Waveforms derived from artifact free trials were averaged for each participant for each trial type in each task. For the social judgment task, three averages were computed for the electrical activity associated with the Black targets and the White targets[12].

The results are broken down into four sections. First, I will examine the response to the social judgments to examine hypotheses 2 and 3. I will explore the participants reported agreement with each statement for each target. The next section will examine the ERP effects during the social judgment task (Hypothesis 1). I will then present the findings from the explicit liking ratings, the explicit similarity ratings, and the helping measure (Hypothesis 4).

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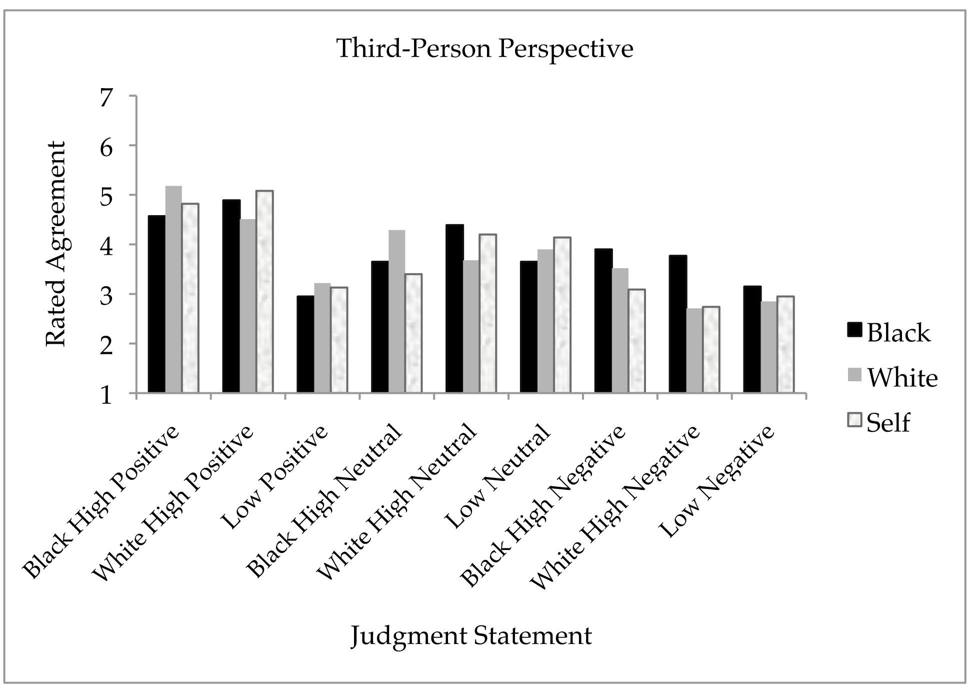
[12] Self faces were included in this task as well. Self other effects in the ERPs was not the main focus of this investigation and are thus included in Appendix N.

CHAPTER 10: RESULTS FOR STUDY 2

RATED AGREEMENT WITH PREJUDICIAL STEREOTYPES

To assess hypotheses 2 and 3, rated agreement on each of the social judgments statements was averaged within statement type. Agreement analyses were run with a 3 (Target: Black, White, Self) x 3 (Stereotypicality: Black Stereotypical, White Stereotypical, Stereotype-irrelevant) x 3 (Valence: Positive, Neutral, Negative) x 2 (Perspective-taking: First-person, Third-person) GLM with all factors except perspective-taking varying within subjects (Figure 7).



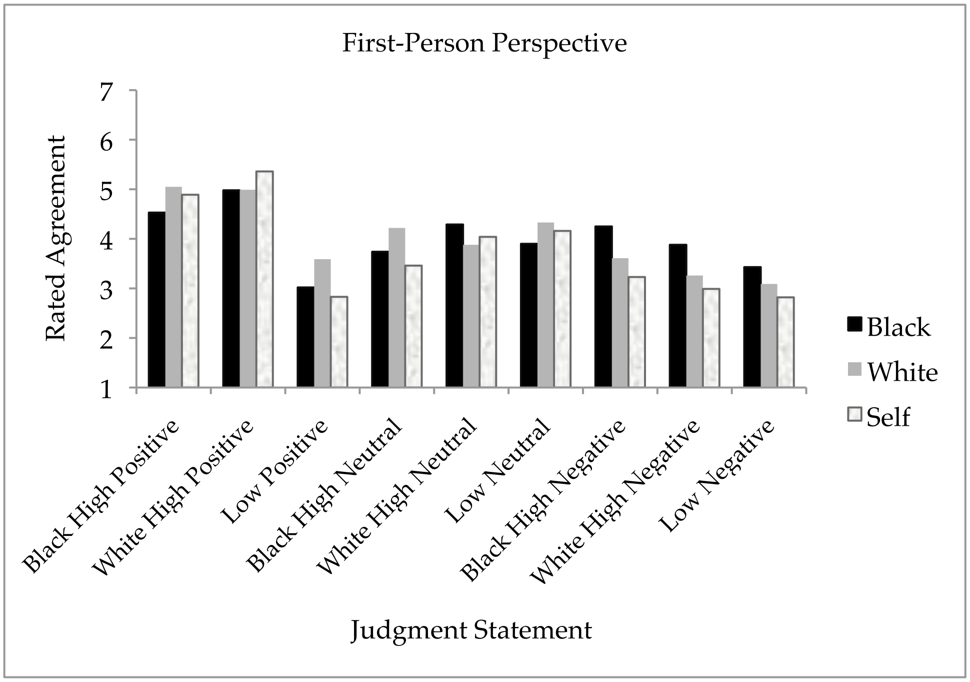


FIGURE 7. Agreement with the social judgment statements for each target. Black bars represent the Black target, gray bars represent the White target, and marbled black/gray bars represent the self. Agreement ranged from 1 to 7 with 7 being the highest level of agreement.

Contrary to predictions, perspective-taking did not moderate any of the effects. Taking this factor out of the model did not change any of the effects, so it was left in the comparisons. This analysis reveled a Valence main effect ($F(2, 68) = 103.31$, $p < .01$, $PRE = .75$), showing rated agreement with the positive statements to be the highest ($M = 4.31$) compared with neutral statements ($M = 3.96$; $F(1, 34) = 45.70$, $p < .01$, $PRE = .57$) or negative statements ($M = 3.29$; $F(1, 34) = 135.21$, $p < .01$, $PRE = .06$). Neutral statements had higher rated agreement than negative statements ($F(1, 34) = 89.13$ $p < .01$, $PRE = .19$).

There was also a Target main effect ($F(2, 68) = 7.23$, $p < .01$, $PRE = .18$), showing the participants said they agreed less with the statements ($M = 3.74$) compared with either the Black target ($M = 3.94$; $F(1, 34) = 14.44$, $p < .01$, $PRE = .41$) or the White target

($M = 3.88$; $F(1, 34) = 5.56$, $p < .05$, $PRE = .28$). Across statement type, participants said that the Black and White target would agree equally with the statements ($F(1, 34) = 1.37$, $p < .01$, $PRE = .60$).

It is perhaps not surprising that participants thought they would agree less with the statements than the other targets given, on average, more statements were highly stereotypical of group-based stereotypes than low in stereotypicality of the groups. Optimal distinctiveness theory asserts that individuals must maintain a balance of assimilation to the ingroup and distinction from that group in order to satisfy self-motives to be unique (Brewer, 1991, 2003).

In addition, there was a Stereotypicality main effect ($F(2, 68) = 43.59$, $p < .01$, $PRE = .56$). The pattern of the effects were such that participants rated more agreement overall with the Black and White stereotypical statements ($M = 4.08$ and $M = 4.09$, respectively) compared with stereotype-irrelevant statements ($M = 3.40$; $F's(1, 34) = 57.42$ and 75.69, $p's < .01$, $PRE's = .63$ and $.72$).

In addition to these main effects, all two-way interactions were significant (see Appendix L for full deconstruction of each). There was a Target x Valence interaction ($F(4, 136) = 22.54$, $p < .01$, $PRE = .40$), a Target x Stereotypicality interaction ($F(4, 136) = 7.55$, $p < .01$, $PRE = .18$), and a Stereotypicality x Valence interaction ($F(4, 136) = 127.48$, $p < .01$, $PRE = .79$). These effects were qualified by the 3-way interaction among target, valence, and stereotypicality ($F(8, 272) = 5.19$, $p < .01$, $PRE = .13$, Table 5).

	White	Black	Self
Black Stereotypical Positive	5.12	4.55	4.86
White Stereotypical Positive	4.75	4.94	5.22
Stereotypicality Irrelevant Positive	3.40	2.98	2.98
Black Stereotypical Neutral	4.26	3.70	3.43
White Stereotypical Neutral	3.78	4.34	4.12
Stereotypicality Irrelevant Neutral	4.12	3.78	4.15
Black Stereotypical Negative	3.57	4.07	3.16
White Stereotypical Negative	2.99	3.82	2.87
Stereotypicality Irrelevant Negative	2.97	3.29	2.89

Table 5. Average rated target agreement with the social judgment statements as a function of stereotypicality and valence.

Decomposing the three-way interactions revealed that participants rated agreement with the statements in an unexpected manner.

For self targets, there was a significant Valence x Stereotyping interaction ($F(4, 136) = 55.96$, $p < .01$, $PRE = .62$). For positive statements, participants said they agreed more with the White stereotypical statements compared with the Black stereotypical ($F(1, 34) = 4.75$, $p < .05$) or stereotype-irrelevant statements ($F(1, 34) = 88.16$, $p < .01$). Positive stereotype-irrelevant statements have lower rated agreement than Black stereotypical statements ($F(1, 34) = 150.82$, $p < .01$). For neutral statements, participants said they agreed equally with the White stereotypical and stereotype-irrelevant statements and these both are higher in rated self agreement than the Black stereotypical statements ($F's(1, 34) = 22.03$ and 18.30, $p's < .01$). When considering negative statements, participants reported equally low agreement at all levels of stereotypicality.

Together, this pattern of self judgments revels that participants agree, on average, more with the White stereotypical statements than the Black stereotypical statements when statements are positive or neutral. For stereotype-irrelevant statements, positive statements as a whole tended to be stereotypical of other groups such as women or Asians and the neutral statements tended to be more neutral of many groups. This could have contributed to the pattern of effects. Participants might have rated the stereotype-irrelevant neutral statements higher for themselves because they were not stereotypical of the participants' outgroups.

Turning to agreement ratings for the ingroup and outgroup target a new pattern emerges. When considering the Stereotypicality x Target interaction separately for positive, negative, and neutral statements an interesting pattern emerges.

Visual inspection of the mean rated agreement for the ingroup and outgroup targets suggests that for positive and neutral statements participants rated counterstereotypic (items highly stereotypical of the other group) higher than stereotypic statements but for negative statements participants rated the Black target as having higher agreement in general. For the ingroup/outgroup ratings, the target by stereotypicality interaction was significant within each level of valence (F's$(2, 64) =$ 13.79 to 3.55, *p's* < .05, *PRE's* = .29 to .10). Counter to hypothesis 2A, this effect did not depend on perspective-taking. In both perspective-taking conditions, participants rate agreement higher for counterstereotypic statements for both targets.

To deconstruct this interaction several post-hoc comparisons were constructed to investigate the simple differences within levels of valence. The first comparison examined rated target agreement between highly stereotypical Black statements, highly stereotypical White statements, and stereotype-irrelevant statements. This was done first for the White target and then for the Black target. Next, rated agreement for differences between the Black target and the White target were compared at each level of stereotypicality. These comparisons were examined separately for each valence category.

For positive statements, there was a Target x Stereotypicality interaction ($F(2, 68) = 7.83$, $p < .05$, $PRE = .19$). Considering first the simple differences in agreement for statements varying in stereotypicality for the White target. Participants rate the White target higher on positive Black stereotypic statements than positive stereotype-irrelevant statements and marginally higher than positive stereotypically White statements ($F's(1, 34) = 98.97$ and 3.59, $p < .01$ and $p = .07$, respectively). Participants rate positive White stereotypical statements higher in agreement than positive stereotype-irrelevant statements for the White target ($F(1, 34) = 88.73$, $p < .01$).

When considering the simple differences in agreement for statements varying in stereotypicality for the Black target, participants rate positive Black stereotypic statements and stereotype-irrelevant statements lower in rated agreement than positive stereotypically White statements ($F's(1, 34) = 8.38$ and 145.04, $p's < .01$, respectively). Participants also rate the Black target higher on positive White stereotypic statements than positive Black stereotypic statements ($F(1, 34) = 142.72$, $p < .01$).

When comparing the difference in ratings for positive statements between targets for each stereotypicality level, participants rate the White target higher on positive stereotypically Black statements than the Black target ($F(1, 34) = 21.23$, $p < .01$) and the White target higher on positive stereotype-irrelevant statements than the Black target

($F(1, 34) = 5.24$, $p < .05$). For positive statements, participants rate the Black and the White target similarly on White stereotypical statements although directionally, participants say the Black target agrees more.

Next when investigating the target by stereotypicality effect for neutral statements, there is also a significant Target x Stereotypicality interaction ($F(2, 68) = 13.79$, $p < .01$, $PRE = .29$). For the White target, comparing the simple differences in agreement between levels of stereotypicality, participants rate the White target higher on neutral Black stereotypic statements and neutral stereotype-irrelevant statements compared with neutral stereotypically White statements ($F's(1, 34) = 6.28$ and 6.76, $p's < .01$, respectively). The neutral Black stereotypical and neutral stereotype-irrelevant statements do not differ. For the Black target, participants rate neutral Black stereotypic statements and neutral stereotype-irrelevant statements lower in agreement compared with neutral stereotypically White statements ($F's(1, 34) = 22.42$ and 17.86, $p's < .01$, respectively). For the Black target, ratings for neutral Black stereotypic and neutral stereotype-irrelevant statements did not differ.

Participants rate the White target lower on neutral stereotypically White statements than the Black target ($F(1, 34) = 7.84$, $p < .01$), the Black target lower on neutral stereotypically Black statements $F(1, 34) = 30.78$, $p < .01$), and the White target higher on stereotype-irrelevant statements than the Black target ($F(1, 34) = 5.71$, $p < .05$).

Finally, for negative statements, there is a Target x Stereotypicality interaction ($F(2, 68) = 3.55$, $p < .05$, $PRE = .10$). Participants rate the White target lower on negative White stereotypic statements and stereotype-irrelevant statements compared with negative stereotypically Black statements ($F's(1, 34) = 10.94$ and 10.12, $p's < .01$, respectively). Agreement ratings for the White target do not differ between negative

White stereotypical and negative stereotype-irrelevant statements. For the Black target, participants rate negative White stereotypic statements and negative stereotype-irrelevant statements lower than negative stereotypically Black statements ($F's(1, 34)$ = 3.43 and 19.35, $p = .07$ and $p < .01$, respectively). Participants also rate negative Black stereotypical statements higher than negative stereotype-irrelevant statements for the Black target ($F(1, 34) = 14.29$, $p < .01$).

When considering the simple differences for negative statements in agreement ratings between targets at each level of stereotypicality, participants rate the Black target higher at all levels of stereotypicality than the White target. Participants rate the agreement of the Black target higher than the White target on negative stereotypically White statements ($F(1, 34) = 6.24$, $p < .05$), on negative stereotypically Black negative statements $F(1, 34) = 74.49$, $p < .01$), and on negative stereotype-irrelevant statements ($F(1, 34) = 9.75$, $p < .01$). Participants say the Black target agrees more with negative statements across stereotypicality.

To summarize, when statements are positive or neutral, participants rate the targets higher on counterstereotypic statements. It is only when statements are negative that participants rate the Black target as having higher agreement than the White target.

Recall that Wittenbrink and colleagues (1997) found, at an implicit level, facilitation in priming when positively valenced White stereotypical traits followed a White prime and when negatively valenced stereotypical traits followed a Black prime.

Though the judgments in the current task were explicit and unconstrained in terms of response latency there was evidence of a partial replication of the effects observed by Wittenbrink and colleagues (1997). For highly stereotypical Black negative statements responses replicate Wittenbrink and colleagues, participants rated the Black target as agreeing more with these statements than the White target. For highly stereotypical White positive statements there was no difference in rated agreement between the White and the Black target. If anything, directionally, participants rate the Black target's agreement higher on positive White stereotypical statements than the White target. Therefore, there is support for a prejudicial stereotyping effect for the negative statements. Because stereotypes related to the ingroup are less defined, it is possible the White positive stereotypical statements were not typical enough to elicit the effect found by Wittenbrink and colleagues (1997).

Contrary to the hypotheses, none of the effects depended on perspective-taking. Because participants rate agreement for positive and neutral counterstereotypic statements higher for each target in the third-person condition, there was no stereotyping to be ameliorated by the first-person perspective. Participants had ample time to respond to the statements, allowing for control processes to engage and guide responding in both perspective-taking conditions. Participants were instructed to be accurate in both perspective-taking conditions this may have reduced the likelihood of observing stereotyping effects particularly given judgments were explicit (Fiske & Neuberg, 1990).

To summarize the behavioral results, perspective-taking does not affect rated agreement. Participants rate both targets and themselves as agreeing more with counterstereotypic positive and neutral statements. Participants ascribe negative opinions and behaviors (i.e. higher rated agreement) to the outgroup member compared with the ingroup member and themselves for Black stereotypical statements, White stereotypical statements, and stereotype-irrelevant statements.

The next section investigates hypothesis 1. It is predicted that selective attention to the targets should vary as a function of perspective-taking. In the third-person perspective-taking condition, N200s should be larger to the White target than the Black target because category-based processing is the norm in early selective attention (Ito & Urland, 2003). Under first-person perspective-taking instructions, participants should view both the Black and the White targets as more similar to them and self-relevance should increase interest in these individuals. Thus N200s should not differ between the White and the Black target. [13]

ERPs During the Social Judgment Task

In the social judgment task, the face of each target was shown for 500 ms and was replaced immediately by a statement. The statement was shown for 350 ms at which time a response scale was presented below the statement and participants were then allowed to respond. The timeframe of face presentation during the social judgment task (500 ms) yielded three distinct deflections: the N100 (M = 143 ms), P200 (M = 197 ms), N200 (M = 288 ms), and N300[14] (M = 313 ms)[15]. In addition to these components, a later deflection occurred during the presentation of the statement that was sensitive to variation in the target. This component had a frontal distribution, and so was descriptively named the medial frontal negativity (MFP: M = 773 ms).

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[13] Similarity between ratings of the self and ratings of the other targets was also examined. Please see Appendix M.

[14] The N300 was the second negative deflection that occurred within the time window that is typical for the N200 from 180-350 ms for most of the participants. The first deflection peaked around 288 ms following the prime. The second deflection peaked around 313 ms following the prime. Both components were scored and analyzed.

[15] The P300 is a positive-going component with a latency window spanning from around 300 ms to roughly 600 ms after presentation of a stimulus. In this task, the social judgment statement appeared in the middle of this time window, likely interrupting this component with other processing. Therefore, this component was not investigated in this task.

Peak component amplitudes for the N100, P200, N200, N300, and MFP were scored for each participant in each condition (Black First-Person, White First-Person, Black Third-Person, and White Third-Person) at 9 scalp sites (Fz, F3, F4, Cz, C3, C4, Pz, P3, and P4) by locating the maximal negative deflections between 70 - 180 ms (N100) and 180 - 300 ms (N200), 300 – 350 (N300), and the maximal peak positive deflection between 120 - 220 ms (P200), and (MFP) 600 to 1000 ms (MFP).[16]

Hypothesis 1 states that there should exist a change in processing to targets that will depend on perspective-taking at the N200. Differences in attention to the Black and White targets were explored for each component. To investigate this, all components were analyzed with separate 2 (Target: Black, White) x 3 (Lateral Sites: Right, Midline, Left) x 3 (Sagittal Site: Frontal, Central, Parietal) x 2 (Perspective-taking: First-Person, Third-Person) repeated measures GLMs.[17] It is not uncommon for ERP amplitudes to vary across electrode locations. The distribution of the components was not the main focus of this study. Thus, all main effects and interactions involving the lateral and sagittal scalp site factors that do not involve target are reported in Appendix O. [18]

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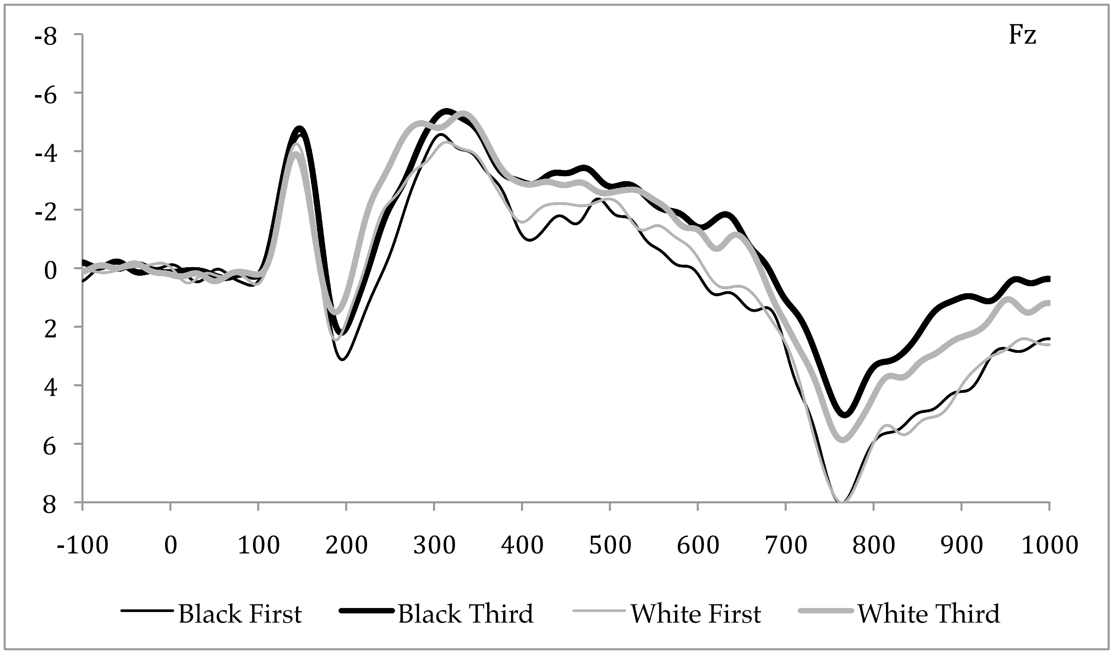
[16] ERPs in the passive-viewing task replicated effects observed in passive-viewing task in Study 1. Please see Appendix O.

[17] Effects did not depend on participant gender.

[18] Processing to the self and to the other targets might differ at the N100, P200, and MFP. To investigate these processes, all components were analyzed with separate 3 (Target: Black, White, Self) x 2 (Perspective-taking: First-Person, Third-Person) repeated measures GLMs.[18] These analyses were conducted at the maximal component with focused contrasts run on: (1) the difference in amplitudes between the self and other targets, (2) the difference in amplitudes between the self and the White target, and (3) the difference in amplitudes between the self and the Black target. Please see Appendix O for a discussion of these effects.


Fz
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-4
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Black First
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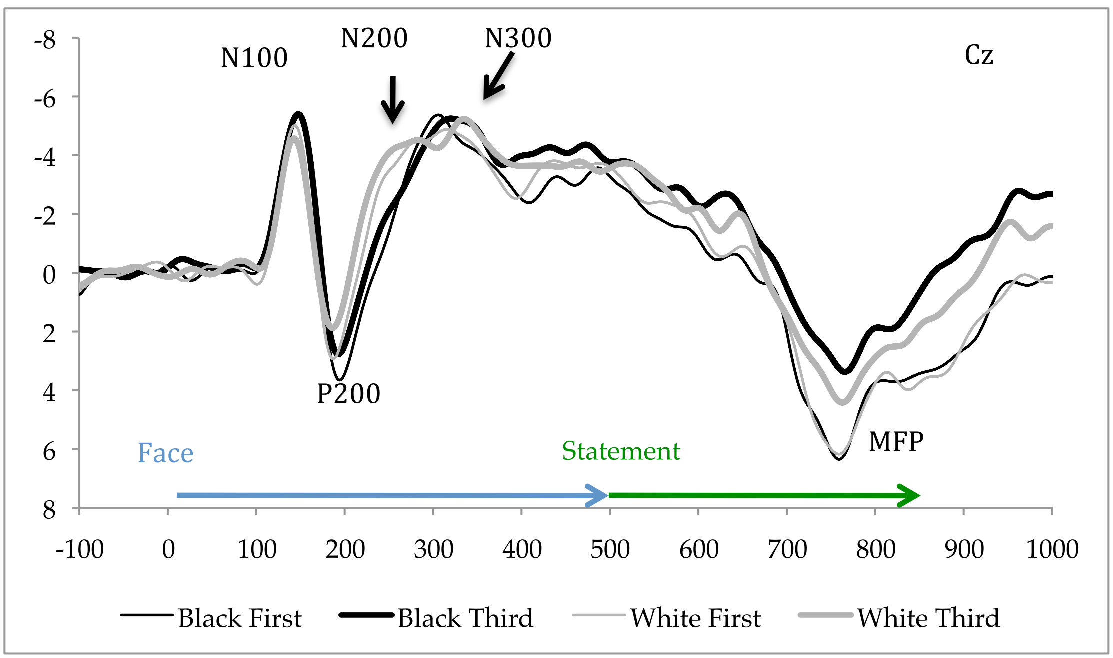
White Third


Cz
N100
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N300
P200
MFP
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Black First
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White First
White Third

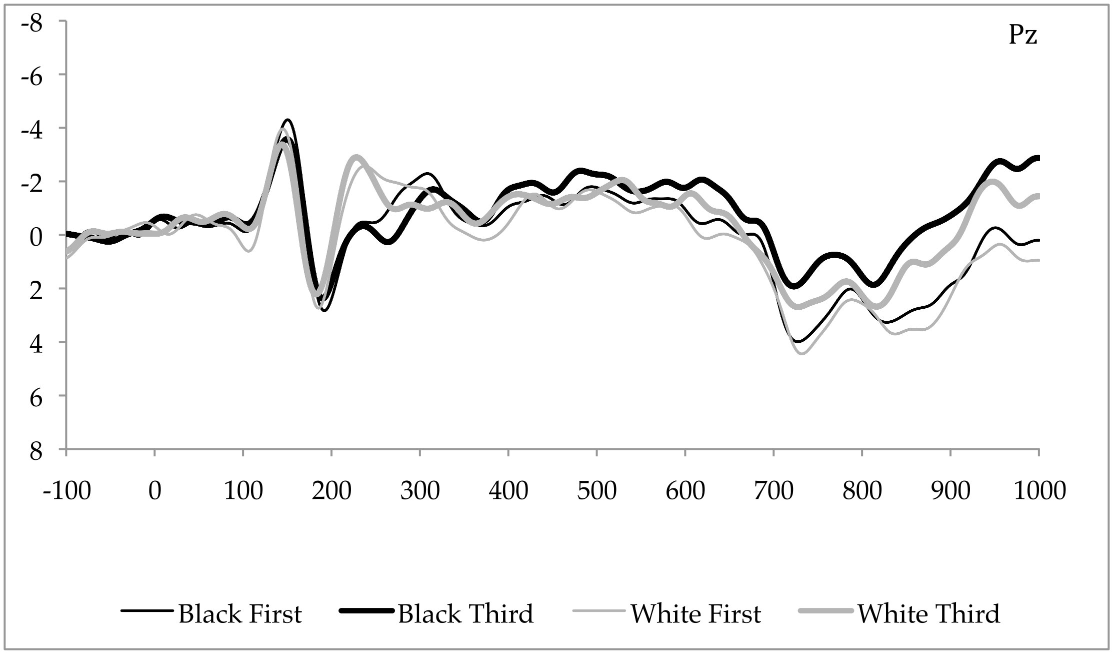

FIGURE 8. ERPs during the social judgment task. Black lines represent Black faces and gray lines represent White faces. Electrodes from the midline are shown at frontal (Fz), central (Cz), and parietal (Pz) locations. Component locations in the waveform are displayed on Cz. X-axis represents time in ms and Y-axis represents amplitude in μV. The blue arrow represents the face presentation and the green arrow represents the statement presentation.

N100 Amplitude. The N100 had a mean latency of 143 ms (see Figure 8). N100 amplitudes were maximal at Fz. There were no effects of target or perspective-taking at the N100.

P200 amplitude. The P200 can be seen as the positive-going deflection with a mean latency of 197 ms that was maximal over parietal locations (see Figure 8).

Across electrodes, there is a Target main effect ($F(1, 34) = 12.43$, $p < .01$, $PRE = .27$). As in Study 1, P200s were larger, more positive, to Black faces ($M = 4.25$ μV) than White faces ($M = 3.32$ μV).

Overall, amplitudes to the Black target were larger than amplitudes to the White target in both perspective-taking conditions, suggesting perspective-taking did not have an effect on processing of the ingroup member and the outgroup member at the P200.

N200 amplitude. The N200 can be seen as the negative-going deflection with a mean latency of 288 ms that was maximal at Cz (see Figure 8).

Considering first attention differences between the White and the Black target across electrode locations, there was a main effect of Target ($F(1, 34) = 7.20$, $p < .05$, $PRE = .18$), with larger (more negative) N200s to White than Black faces ($M = -5.05$ μV, $M = -4.36$ μV, respectively).

Hypothesis 1 stated that race differences at the N200 should depend on perspective-taking. As predicted, the effect of Target depended on perspective-taking across electrode locations ($F(1, 34) = 6.08$, $p < .05$, $PRE = .15$). If first-person perspective-taking triggers self-referential thoughts and thereby increases interest in the outgroup member, the Black target should then be processed in a similar manner to the White (ingroup) target. This prediction was supported. In the first-person perspective-taking condition, N200s did not differ between the White target ($M = -4.60$ μV) and the Black target ($M = -4.54$ μV). In the third-person condition, N200s were larger to the White target ($M = -5.50$ μV) than to the Black target ($M = -4.19$ μV; $F(1, 16) = 9.31$, $p < .01$, $PRE = .37$). Processing of the Black and the White target did not differ between the first-person and third-person.

The target main effect was qualified by a Sagittal x Target interaction ($F(2, 68) = 17.17$, $p < .05$, $PRE = .12$). Although N200 amplitudes were directionally larger to the White than the Black target at all sites, this difference reached significance at only parietal locations. Amplitudes were marginally larger to the White ($M = -5.55$ μV) than the Black target (M = -5.04 μV) at frontal locations ($F(1, 34) = 3.46$, $p = .08$, $PRE = .62$) and larger to the White (M = -3.84 μV) than the Black target (M = -2.53 μV) at parietal locations ($F(1, 34) = 8.35$, $p < .01$, $PRE = .20$). Amplitudes were similar to the Black and the White target at central locations where amplitudes were maximal (M_{White} = 5.75 μV and M_{Black} = -5.52 μV).

There was also a Laterality x Target interaction ($F(2, 68) = 17.17$, $p < .05$, PRE = .12). Though amplitudes were directionally larger to the White than the Black target at all sites, this difference reached significance at the midline and in the right hemisphere (M_{White} = -6.22 μV and M_{White} = -5.34 μV and M_{White} = -4.18 μV and M_{White} = -3.31 μV; $F's(1, 34) = 10.17$ and 7.26, $p's < .01$, $PRE's$ = .23 and .18). Amplitudes were similar to the White and the Black target in the left hemisphere (M_{White} = -4.73 μV and M_{Black} = -4.44 μV).

N300 amplitude. The second negative deflection had a mean latency of 313 ms and was maximal over Cz (see Figure 8).

Considering attention differences between the White and the Black target across electrodes, there were no effects involving Target ($F(1, 34) = .12$, $p = .73$, $PRE = .004$). In addition there were no effects of perspective-taking.

MFP amplitude. The MFP can be seen as the positive-going deflection with a mean latency of 773 ms that was maximal over frontal locations (see Figure 8).

Across electrode locations, there was a marginal Target main effect ($F(1, 34)$ = 4.00, $p = .06$, $PRE = .10$). MFPs were marginally larger (more positive) to the White target (M = 6.12 μV) than to the Black target (M = 5.64 μV). This effect did not depend on perspective-taking ($F(1, 34) = 1.64$, $p = .21$, $PRE = .05$).

In addition, this was the first point at which there was Perspective-taking main effect ($F(1, 34) = 4.90$, $p < .05$, $PRE = .13$). MFP amplitudes were larger in the first-person perspective-taking condition (M = 6.39 μV) than the third-person perspective-taking condition (M = 4.62 μV).

LIKING, EXPLICIT RATINGS OF SIMILARITY, AND HELPING

Liking. The higher the degree of similarity between the self and another, the more favor similar targets receive over individuals viewed as less similar to the self (Heider, 1958; Tesser, 1986; Tesser, Millar, & Moore, 1988). Brown and Hewstone (2005) hypothesize that ascription of self-traits to outgroup members, through priming of the self-concept or through extended contact with outgroup members increases positive evaluations of outgroup members (see also, Davis et al., 1996; Turner, Hewstone, Voci, & Vonofakou, 2008). In this study, there were no differences in reported liking of the Black (M = 4.87) or White target (M = 4.73; $F(1, 34) = .53$, $p = .47$, $PRE = .02$) and there were no differences as a function of perspective-taking ($F(1, 34) = .17$, $p = .69$, $PRE = .01$). See Figure 9.

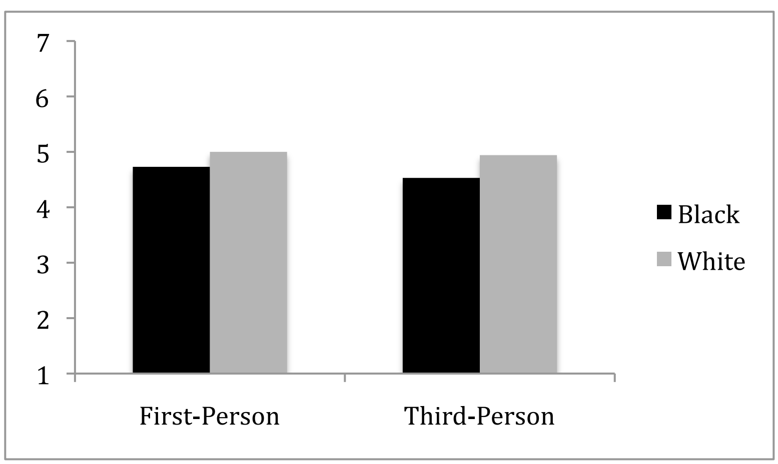

FIGURE 9. Reported liking of the outgroup and ingroup member as a function of perspective-taking. Black bars represent the Black target and gray bars represent the White target. None of the simple differences reached significance.

Similarity. In terms of explicit ratings of similarity to the self, there were no differences in explicit ratings of similarity of the Black (M = 3.59) or White target (M = 3.53; $F(1, 34) = .07$, $p = .80$, $PRE = .002$) and there were no differences as a function of perspective-taking ($F(1, 34) = 1.33$, $p = .26$, $PRE = .04$). See Figure 10.

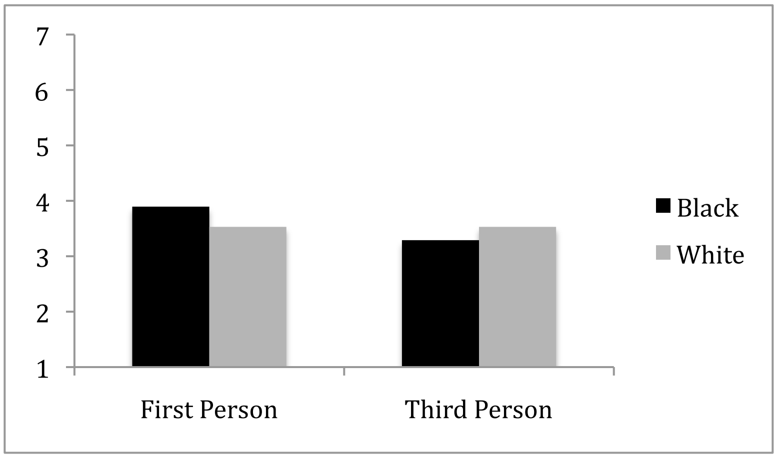

FIGURE 10. Reported similarity of the outgroup and ingroup member to the self as a function of perspective-taking. Black bars represent the Black target and gray bars represent the White target. None of the simple differences reached significance.

Helping. Davis et al. (1996) hypothesize that first-person perspective-taking should increase empathy to outgroup members. Because empathy increases helping (Cialdini et al., 1987), a first person perspective should increase helping of the outgroup member. These effects were not replicated. Only 9 participants volunteered to help the outgroup member. Not surprisingly given the low rate of offering help, there were no difference in volunteering to help by perspective-taking condition[19].

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[19] As in Study 1, there was interest in the relationship between ERP amplitudes and the behavioral data. There were a number of correlations and the investigation was exploratory. Please see Appendix P.

CHAPTER 11: DISCUSSION FOR STUDY 2

The main focus of Study 2 was to determine if early selective attention to a target can be changed by taking the perspective of the individual. As predicted, race differences observed at the N200 depend on perspective-taking. In support of the main theoretical prediction of Study 2, in the social judgment task, when individuals formed impressions of a target based on little information and their photo, attention, as indexed by N200s, was greater for the White target compared with the Black target (Ito & Urland, 2003; 2005). When individuals took the perspective of the Black and White target, racially biased encoding differences disappeared.

Replicating previous work and Study 1, race differences in attention were observed for all participants at the P200 (Ito & Urland, 2003; 2005). Therefore, category-based processing was observed even when participants are taking the perspective of another target. However, as predicted, category-based attention was interrupted when taking the perspective of a target at the N200.

In terms of behavioral effects, ascription of various traits and beliefs to the targets did not differ as a function of perspective. In fact, participants rated ingroup and outgroup members as agreeing more with counterstereotypic statements for positive and neutral statements. However, in both perspective-taking conditions, individuals rated the Black target as agreeing more with negative statements than the White target.

This suggests that when statements are positive and neutral, individuals rate both ingroup and outgroup members as agreeing with counterstereotypic information both when taking the perspective of those individuals and when given only category information about them. Additionally, people view outgroup members as holding more negative attitudes and opinions then ingroup members and themselves and this bias exists across perspective-taking.

Perspective-taking Affects Similarity and Not Explicit Agreement

One question that arises from these data is why perspective-taking failed to affect overall agreement. Galinsky and Moskowitz (2000) found that ratings were more positive and less stereotypical when taking the perspective of an elderly target. There was one main difference between Galinsky and Moskowitz's investigation and the present research. First, the present work investigated the effect of perspective-taking on racial stereotypes. One strategy for avoiding stereotyping on this task is to rate the target highly on counterstereotypic statements. When participants are asked to rate how much a Black target agrees with a stereotypical statement and have ample time for activation of cognitive control processes, stereotyping can probably easily be avoided. Participants are more likely to activate control processes when they feel they are being evaluated for stereotyping (Amodio, Kubota, Harmon-Jones, & Devine, 2006). In the third-person condition, participants have controlled the influence of stereotypes. Controlling stereotyping for participants in the third-person may have contributed to similar effects in between perspective-taking.

Selection Attention to Ingroup and Outgroup Members

Race differentiation at the N200 depended on perspective-taking in the social judgment task where participants focused on a single outgroup member. In this task, individuals were asked to mentalize about the targets they wrote day-in-the-life essays about. Effects of perspective-taking emerge when asked to mentalize about targets. Participants must put themselves in the shoes of the ingroup and outgroup member in order to alter category-based processing.

Typically in race perception research, individuals differentiate by race within 180 ms of viewing a target (Ito & Urland, 2003; 2005; Kubota & Ito, 2007). This effect was supported in the social judgment task. Race differences across perspective-taking were observed at the P200. Replicating previous research and Study 1, P200s were larger to Black than White targets (Ito & Urland, 2003). The fact that race effects are observed in the social judgment task across perspective-taking conditions suggests that category-based processing is observed early in encoding even when participants are asked to mentalize about targets and adopt the target's perspective. In fact, this processing is similar to effects observed when passively viewing unfamiliar targets (please see passive-viewing task data from Study 1 and 2). Differences as a function of perspective-taking were observed in the social judgment task at components later in processing.

N200 and N300

Two negative-deflections were observed in the social judgment task within the timeframe of the N200 (Ito & Urland, 2003). At an individual subject level, many (though not all) participants had two deflections during this timeframe. This morphology in the waveform was unexpected. Typically, the N200 is observed in the timeframe of 200 to 350 ms (see Ito & Urland, 2003; 2005). There have been cases in previous work where two negative deflections were observed (see also Kubota & Ito, 2007). Upon visual inspection, race effects appear at both points, but are often larger at around 250 ms (Ito & Urland, 2003; 2005; Kubota & Ito, 2007). In the social judgment task, the first negative-deflection occurred around 288 ms after viewing the face and the second negative-deflection occurred around 313 ms[20]. Race differentiation was observed for the N200 and not for the N300. The relative contribution of the N200 and N300 to deeper encoding of targets remains unanswered in this research. If these components reflected similar underlying psychological processes, then effects should have been parallel, which was not the case. Future research should seek to understand the relative contribution of the N300, if any, to impression formation.

Medial Frontal Positivity

Though unexpected, there was a positive deflection that peaked about 300 after the presentation of the social judgment statement that varied as a function of the target. While the social judgment statement was on the screen, participants were instructed to think about their impression of the target. Therefore, it is perhaps not surprising that effects of target were seen at this latency even in the absence of the face (when the face was no longer on the screen). Oftentimes during this later timeframe, there are a variety of broader deflections that underlie what researchers call the late positive complex. However, this positivity is typically larger at parietal regions. During the social judgment task, this component was larger at frontal locations.

[20] Careful attention was paid to peak-picking the first deflection that occurred closest to 250 ms and peak-picking the second deflection that directly followed. For participants who had two negative-deflections, the first negative-deflection was always scored during peak-picking.

A medial frontal positivity was observed in recent work by Van Duynslaeger, Van Overwalle, and Verstraeten (2007) during a similar timeframe of 600 to 1000 ms (see also Van der Cruyssen, Van Duynslaeger, Cortoos, & Van Overwalle, 2009; Van Overwalle, Van den Eede, Baetens, & Vandekerckhove, 2009). Van Duynslaeger and colleagues (2007) asked participants to read 20 paragraphs describing behavior of a target. These paragraphs were constructed to facilitate a particular trait inference that functioned as the overall impression of the target. Following the introductory paragraph, 12 behavioral sentences were presented one after another. Each sentence was constructed such that the last word determined the consistency of the behavior with the impression paragraph. Sentences could either be trait-consistent, trait-inconsistent, competence-inconsistent, or irrelevant. ERPs were recorded to the last word of each sentence.

Half of the participants were instructed to pay close attention during the task in order to recall the sentences presented for a later memory test and half were asked to form an impression of the target while reading the introductory paragraph and the 12 behavioral sentences. ERPs relative to the words yielded a positive deflection in the same timeframe (600 to 1000 ms) as that found in the social judgment task. Interestingly, participants with only the accuracy instruction had smaller ERPs in this timeframe than participants with explicit instructions to form an impression and this did not depend on consistency of the statement. Source localization of the electrical signal using LORETA, found that the medial positive deflection reflected activity in the medial prefrontal cortex (mPFC), a structure important for self-referential thought and mentalizing, in the impression formation condition (called the intention condition by

Van Duynslaeger and colleagues) [21] Earlier ERP deflections from 400 to 600 ms reflected activity in the temporoparietal junction (TPJ), a structure important for self-other distinctions and exogenous attention. These studies suggest a relationship between the MFP and impression goals (see also Ames et al., 2008).

Effects found by Van Duynslaeger and colleagues (2007) inform the interpretation of the MFP in the social judgment task. Although ERPs during the social judgment task were recorded in relation to the faces and not the sentences, there was a perspective-taking main effect such that MFPs were larger during the first-person perspective-taking condition than during the third-person. Participants were encouraged to be accurate in both perspective-taking conditions. Additionally, MFPs were larger to the self than to the other targets in both perspective-taking conditions. Taken together and in light of work by Van Duynslaeger and colleagues (2007), the MFP may reflect intentional inference processes. This would be expected to be particularly important while thinking whether the individual would agree with the social statement based on their formed impression of the individual.

[21] Localizing EEG activity is difficult in that it has less precision for spatial location than for example fMRI and also only reflects activity in the cortex and not in deeper brain regions. Therefore, structures that contribute to component activity from subcortical regions (for example the amygdala) cannot be determined though source localization.

CHAPTER 12: GENERAL DISCUSSION

The goal of these studies was to understand the neural correlates and moderators of individuated impressions. Study 1 evaluated the relationship between individual differences in individuation and individual differences in how targets are processed at the N200. Behaviorally, individuals relied on the individuating information when predicting behavior in an individuation task and did not rely on race. Spontaneous category-based processing was observed within 120 ms of viewing a target in the passive-viewing task and continued through the N200. There was a marginal relationship between N200 amplitudes in the passive-viewing task and use of individuating information. In addition, there was a marginal relationship between greater race differentiation at the N200 in the passive-viewing task and reliance on race when predicting aggression for Black and White targets.

In the second study, the main focus was whether perspective-taking could promote similar depth of encoding (as indexed by the N200) of an ingroup member and an outgroup member. Category-based processing was observed within 120 ms of viewing each targets. When taking the perspective of a target, attention at the N200 no longer differed for the White and the Black target in the social judgment task. Race differentiation at the N200 was observed in the third-person perspective-taking condition.

Across studies, category-based processing of group members was observed within ms of viewing them. At the mean level, in both studies, racial differences in attention were observed at the N200 when viewing unfamiliar ingroup and outgroup members in the first study during the passive-viewing task and when forming an impression of an ingroup and an outgroup member from a third-person perspective. Differences in attention at the N200 as a function of race were not observed when individuals were asked to mentalize about the target in Study 2. In general, overall N200 amplitudes marginally related to individuated judgments in Study 1. There was a marginal relationship between greater devotion of attention at the N200 and reliance on individuating information when predicting behavior in Study 1. Additionally, the more of a tendency to differentiate targets as a function of race, the more individuals relied on race when predicting behavior (a marginal relationship observed in Study 1).

Individuation is typically reserved for people we would benefit from gathering more information about, which often includes ingroup members. Supporting this claim, research has shown that ingroup members are spontaneously processed more deeply than other racial groups (Anthony, Cooper, & Mullen, 1992; Levin, 2000). N200s are sensitive to stimuli that require deeper encoding, encoding that supports individuation (Ito & Urland, 2003; 2005; Kubota & Ito, 2007). This deeper encoding occurs more often for targets with greater perceived familiar and targets that a perceiver might benefit from individuating. N200s are larger, for White participants, to White faces compared with Black faces (Ito & Urland, 2003, 2005; Kubota & Ito, 2007). As in previous research, N200s in both of the present studies were larger to ingroup members than to outgroup members.

I postulate that N200s reflect depth of encoding of targets and this depth of encoding supports individuation. Though the relationship between N200s and use of individuating information was marginal in the current investigation where power was low, the marginal relationship is still tantalizing particularly in light of the fact that it was predicted. Devotion of attention at this point in time may supports attribute analysis that in turn promotes individuation. Individuation is supported by focusing more attentional resources on individuals and this devotion of attention in turn facilitates encoding of personal characteristics. I am not suggesting that encoding at the N200 is a necessary aspect of individuation. There are many points in between devotion of greater attention to an individual's face and an actual informed personalized impression of them. Nevertheless, selective attention that occurs at the N200 should increase the likelihood of individualized judgments.

The current work demonstrates a novel, albeit marginal, link between extremely early devotion of attention to visual aspects of individuals and individuation. Specifically, attention previously investigated with respect to category-based processing may be an important contributor to individuated judgments. While there exists a general tendency to spontaneously devote more attention to one's ingroup at the N200, as observed in the first task of Study 1, when activating self-referential thought about an outgroup member racial biased differences in selective attention disappear (Study 2).

In summary, without a goal to process an individual more deeply category-based encoding should be the norm in first encounters. When processed categorically, judgments of those individuals may be based more on stereotypes and prejudices. In this case, outgroup members are encoded at a superficial level. Ingroup members are more likely to be spontaneously individuated and therefore personalized information and self-reference guide responding in many first encounters. However, when asked to mentalize about an outgroup member and form an impression of them, category-based processing is interrupted and replaced by greater devotion of attention. Increases in attention then should support individualized judgments. Though the dual aspects of impression formation is not a new finding, what is novel about this research is both the timing of processes that support individuation, within 300 ms of encountering an individual, and the type of processes, general selective attention to a face, that support individuation. Moreover, impression goals affect rapid and relatively implicit selective attention to targets eliminating category-based encoding.

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Appendix A: Study 1 Face Stimuli Piloting

Aggression Instructions and Rating Scale:

Aggression Rating Instructions: *In this task, we are interested in collecting ratings of how aggressive someone appears. For each person that you see, please rate how aggressive you think this person is.*

Keep in mind that this judgment should be based on your best guess of how aggressive this person appears to be.

Aggression Rating: *Rate how aggressive this person appears to be on the following 9-point scale (1 = Not At All Aggressive and 9 = Extremely Aggressive).*

Ethnicity Instructions and Rating Scale:

Ethnicity Rating Instructions: *In this task, we would like to get your judgment about each person's ETHNICITY. Please look at each person and enter the number that corresponds to the description that you think best represents the person's ethnicity.*

For each picture, you will be able to choose from the following options:

1. *African American*
2. *Asian American*
3. *Hispanic/Latino*
4. *White/Caucasian*
5. *Middle Eastern (e.g. from Iran, Saudi Arabia)*
6. *Native American*
7. *Southeast Asian (e.g. from India, Pakistan)*
8. *Polynesian*
9. *Other*

Ethnicity Rating: *What do you think this person's ethnicity is?*

Ethnicity Confidence Instructions and Rating Scale:

Ethnicity Confidence Rating Instructions: *After you provide your ethnicity judgment, you will then be asked to indicate how CONFIDENT you are that your ethnicity judgment accurately reflects the person's true ethnicity.*

Ethnicity Confidence Rating: *How confident are you in your ethnicity judgment (1 = Not At All Confident and 7 = Extremely Confident)*?

Attractiveness Instructions and Rating Scale:

Attractiveness Rating Instructions: *In this task, we are interested in collecting ATTRACTIVENESS JUDGMENTS. For each person that you see, please rate how attractive you think this person is.* Keep in mind that we are not asking whether you are personally attracted to this person. Instead, we would like you to make your rating based on your personal standards of who is more or less attractive.

Attractiveness Rating: *Rate each photo on the following scale 7-point scale (1 = Not At All Attractive and 7 = Extremely Attractive).* [22]

[22] For faces used in the passive-viewing task, attractiveness was rated on a 1 to 9 Likert scale.

APPENDIX B: INDIVIDUATION TASK INSTRUCTIONS READ TO PARTICIPANTS

Now I am going to give you more information about the tasks you will be completing. Today you will perform two short tasks. The first will involve judgment making and the second you will view pictures of yourself and others.

Often we hear people say that they "know exactly" how someone else will behave in a given situation. Past research shows that people use a variety of cues to predict what someone else will do. Of interest in this study is the manner in which people predict future behavior based on limited information. To examine this issue, you will be shown photos of different people along with some information about their past behavior. Your task will be to predict how each person is likely to behave in a new situation.

In preparation for this study, male students from the University of Georgia and UCLA were surveyed with regard to social decision-making. As part of that survey, each student was given a list of five situations in which a person could choose to respond aggressively or non-aggressively. After reading these situations, each student indicated if he had experienced the same or similar situation in real life and how he had behaved in each situation.

Of these students, 64 were selected for this study because they had experiences that were similar to all 5 situations, meaning that in each situation they had chosen to either behave AGGRESSIVELY or NON-AGGRESSIVELY.

In a moment, you will be shown the photo of each student, one at a time. With each photo, you will also see that person's responses in the four situations to the right of the photo. You will then be asked to predict the likelihood that the person behaved aggressively in a fifth situation. Because we have information about these individual's actual behavior, we will be able to determine how accurate your predictions are. YOUR RESPONSE WILL BE COMPARED WITH THE INDIVIDUALS ACTUAL RESPONSE.

Before you begin, we want you to read through each of the situations one at a time to familiarize yourself with them. You will read each situation one at a time and the two possible reactions. The scenarios will always be presented in the same order and be the same.

DOES THIS MAKE SENSE SO FAR? DO YOU HAVE ANY QUESTIONS?

You will have to predict how likely it is that each of the 64 individuals behaved aggressively. You will make this prediction on a 0 to 99 scale. Zero means the individual behaved NON-AGGRESSIVELY. Ninety-nine means that the individual in the photo behaved AGGRESSIVELY. Again the judgment is how likely is it that the individual behaved aggressively. Please focus on the photo and the then read through the behaviors carefully before you respond.

That is task 1. Following this task, you will complete a second task where you will see a number of photos one at a time including a picture of you. For this task, please focus on the pictures. Please let me know when you are done with this task.

During the task, please focus on the photos and read the information. Also, try to sit as still as possible and not to look down when you are entering the number on the keyboard. If you are unhappy with your answer, you can delete it and enter a new number. You must press return when you are happy with your response to move onto the next photo.

APPENDIX C: INDIVIDUATION TASK INSTRUCTIONS PARTICIPANTS READ ON THE COMPUTER

Welcome to the experiment. Please read through these directions carefully. If you have questions please feel free to ask your experimenter at any time.

Often, we hear people say that they "know exactly" how someone else will behave in a given situation. In fact, as society becomes more complex, the ability to accurately predict the actions of others becomes increasingly important and advantageous.

Past research has shown that people use a variety of cues to predict what someone else will do. Of interest in this study is the manner in which people predict future behavior based on limited information. To examine this issue, you will be shown photographs of different people along with some information about their past behavior. Your task will be to predict how each person is likely to behave in a new situation.

In preparation for this study, male students from the University of Georgia and UCLA were surveyed with regard to social decision-making. As part of that survey, each student was given a list of five situations in which a person could choose to respond aggressively or non-aggressively. After reading these situations, each student indicated if he had experienced the same or similar situations in real life and how he had behaved in each situation.

Of these students, 64 were selected for this study because they had experiences that were similar to all 5 situations, meaning that in each situation they had chosen to either behave AGGRESSIVELY or NON-AGGRESSIVELY.

In a moment, you will be shown the photographs of each of the 64 students, one at a time. With each photograph you will also see that person's responses in the first 4 situations. You will then be asked to predict the likelihood that the person behaved AGGRESSIVELY in the 5th situation. Because we have information about these individuals' actual behavior, we will be able to determine how accurate your predictions are.

Before you begin, we want you to read through each of the five scenarios to familiarize yourself with them. You will read each situation one at a time and the two possible reactions.

The first scenario involves driving. During the study, this scenario will be referred to as Driving.

In this situation, a person has to decide how to respond to another driver while driving on a busy road. He wants to pass the other car but the driver refuses to let him pass.

At this point, the person either:

1. Tailgate the other car and lay on the horn

2. Just let it go and give up trying to pass

The second scenario involves a situation on the basketball court. During the study this scenario will be referred to as Basketball.

In this situation, a person had to decide how to react to another person on the basketball court. In a pick-up game of basketball on the neighborhood court, the game gets a little rough. As they are playing, a guy from the other team continually matches him up and tries to shove him around. At one point, the other guy pushes him so hard that he falls backward and hurts his ankle. He doesn't know any of the other players and none of them seem to notice what is going on. He has already said a couple of things to the other guy and he knows that if he stays in the game, they are going to get into a fight.

He either:

1. Get into a fight with the guy

2. Walk away from the game

The third scenario involves the individual's girlfriend. During the study this scenario will be referred to as Girlfriend.

In this situation, a person has to decide how to deal with his girlfriend's flirtatious behavior. He and his girlfriend are at a friend's party. The music is cool and everyone is dancing and having a great time. The only problem is that his girlfriend keeps dancing and flirting with another guy.

Nothing serious, but he doesn't like her ignoring him and he thinks that she's drinking too much. When he makes a sarcastic remark to her, she asks him what his problem is.

He can either:

1. Grab her by the arm and drag her out of the party

2. Do nothing and talk with her about it later

The fourth scenario involves the individual's roommates in their apartment. During the study this scenario will be referred to as Apartment.

In this situation, a person has to decide how to respond to a friend who destroyed some of his property. The friend was staying at his apartment while he was gone for the weekend. When he returns, a neighbor complains to him about the noisy party over the weekend, and the apartment itself is a mess. There is a large stain on the carpet, which is going to cost him a good chunk of his deposit, and an expensive print has been ripped. When he asks his friend about it, the friend tells him that it's not a big deal and refuses to pay for the damages, claiming that the stain is an old one.

He can either:

1. Blow up at his friend and threaten him

2. He let it go and 'soak up' the damages

The fifth scenario is the prediction scenario. In the study, you will have to predict how likely it is that each of the 64 individuals behaved aggressively in this scenario. You will make this prediction on a 0 to 99 scale. Zero means that the individual chose to behave NON-AGGRESSIVELY. Ninety-nine means that the individual chose to behave AGGRESSIVELY. Your job is to predict what the chances are, given what you have learned about this individual, that they behaved aggressively.

This scenario involves a situation at a bar. During the study this scenario will be referred to as Bar.

In this situation, a person has to decide how to react to a rude person in a bar. It is late in the evening and the bar is crowded. Going anywhere is difficult and he has to carefully edge around people to get to the bathroom. He is almost there when another guy passes, intentionally bumping into him as he goes by and sloshes his drink all over him. The guy smirks and gives him a look as if saying, 'what are you going to do about it?'

He can either:

1. Shove the guy back

2. Just keep walking

During the experiment you will see a photo of the individual followed by their responses to the four scenarios.

So for example you will see:

1. Driving: He tailgated the other car and laid on the horn

2. Basketball: He walked away from the game

3. Girlfriend: He grabbed her by the arm and dragged her out of the party

4. Apartment: He blew up at his friend and threatened him

Then, you will be asked to predict how this individual reacted in the bar scenario. You will be asked to estimate the probability that the individual behaved aggressively in the Bar scenario on a 0 to 99 scale with 0 being non-aggressive and 99 being most aggressive. After you have entered your response.

Remember that your response will be compared with the individual's actual response. So, please pay attention the individuals and read through all of the information.

APPENDIX D: PARAMETER ESTIMATES WHEN PAST BEHAVIOR IS MODELED SEPARATELY FOR EACH SCENARIO

Predictor	*M*	*SE*	*t-Value*	*Partial Correlation*
Situation 1 (Driving)	8.67	.37	23.25*	.48
Situation 2 (Basketball)	14.83	.38	38.92*	.67
Situation 3 (Girlfriend)	10.06	.37	26.85*	.53
Situation 4 (Apartment)	11.05	.38	29.14*	.56
Normative Aggression	1.80	.72	2.48*	.06
Normative Attractiveness	.25	.55	.45	.01

Table 6. Mean slopes, standard errors, t-values, and partial correlations of the parameter estimates. $R^2 = .67$.

Predictor	*M*	*SE*	*t-Value*	*Partial Correlation*
Situation 1 (Driving)	8.70	.37	23.27*	.48
Situation 2 (Basketball)	14.84	.38	38.94*	.67
Situation 3 (Girlfriend)	10.07	.38	26.88*	.53
Situation 4 (Apartment)	11.06	.38	29.16*	.56
Race	.44	.38	1.18	.03
Normative Aggression	1.84	.73	2.54*	.06
Normative Attractiveness	.21	.55	.39	.01

Table 7. Mean slopes, standard errors, t-values, and partial correlations of the parameter estimates. $R^2 = .67$.

Predictor	*M*	*SE*	*t-Value*	*Partial Correlation*
Scenario 1	8.69	.38	23.05*	.48
Scenario 2	14.83	.39	38.09*	.67
Scenario 3	10.07	.38	26.61*	.53
Scenario 4	11.11	.39	28.75*	.56
Race	.45	.38	1.20	.03
Normative Aggression	2.56	.91	2.82*	.07
Normative Attractiveness	.02	.76	.03	.001
S1 x S2	-.06	.38	-.15	-.003
S1 x S3	.01	.40	.02	.000
S1 x S4	.001	.39	.003	.000
S2 x S3	-1.05	.39	-2.72*	-.06
S2 x S4	-.08	.43	-.20	-.01
S3 x S4	-.09	.39	-.24	-.01
S1 x Race	-.03	.38	-.08	-.002
S2 x Race	.99	.38	2.58*	.06
S3 x Race	-.40	.39	-1.03	-.02
S4 x Race	.45	.41	1.10	.03
S1 x S2 x S3	-.001	.38	-.003	.000
S1 x S2 x S4	-.44	.38	-1.16	-.03
S2 x S3 x S4	-.64	.39	-1.63	-.04
S1 x S3 x S4	-.31	.38	-.82	-.02
Race x S1 x S2	-.26	.38	-.68	-.02
Race x S1 X S3	.44	.38	1.16	.03
Race x S1 x S4	-.17	.38	-.45	-.01
Race x S2 x S3	.47	.38	1.26	.03
Race x S2 x S4	-.16	.38	-.43	-.01
Race x S3 x S4	-.30	.38	-.79	-.02
S1 x S2 x S3 x Race	.06	.39	.16	.004
S2 x S3 x S4 x Race	-.50	.38	-1.32	-.03
S1 x S2 x S4 x Race	-.01	.39	-.02	.000
S1 x S3 x S4 x Race	-.35	.38	-.92	-.02
S1 x S2 x S3 x S4	.41	.38	1.07	.03
S1 x S2 x S3 x S4 x Race	.03	.39	.09	.002

Table 8. Mean slopes, standard errors, t-values, and partial correlations of the parameter estimates. $R^2 = .67$.

APPENDIX E: ERPS DURING THE INDIVIDUATION TASK

The ERPs during the individuation task did not replicate previous findings (Ito & Urland, 2003; 2005). There were three main inconsistencies with previous research. First, the ERP latencies were extremely fast compared latencies obtained in previous face perception research (e.g. Ito & Urland, 2003; 2005; Figure 11). Normally, N100s occur around 100 ms after viewing a stimulus. N100s in this task occurred around 70 ms. Second, during the time window of the N200, there were two negative deflections. In addition, the maximal electrodes for the components do not replicate previous research.

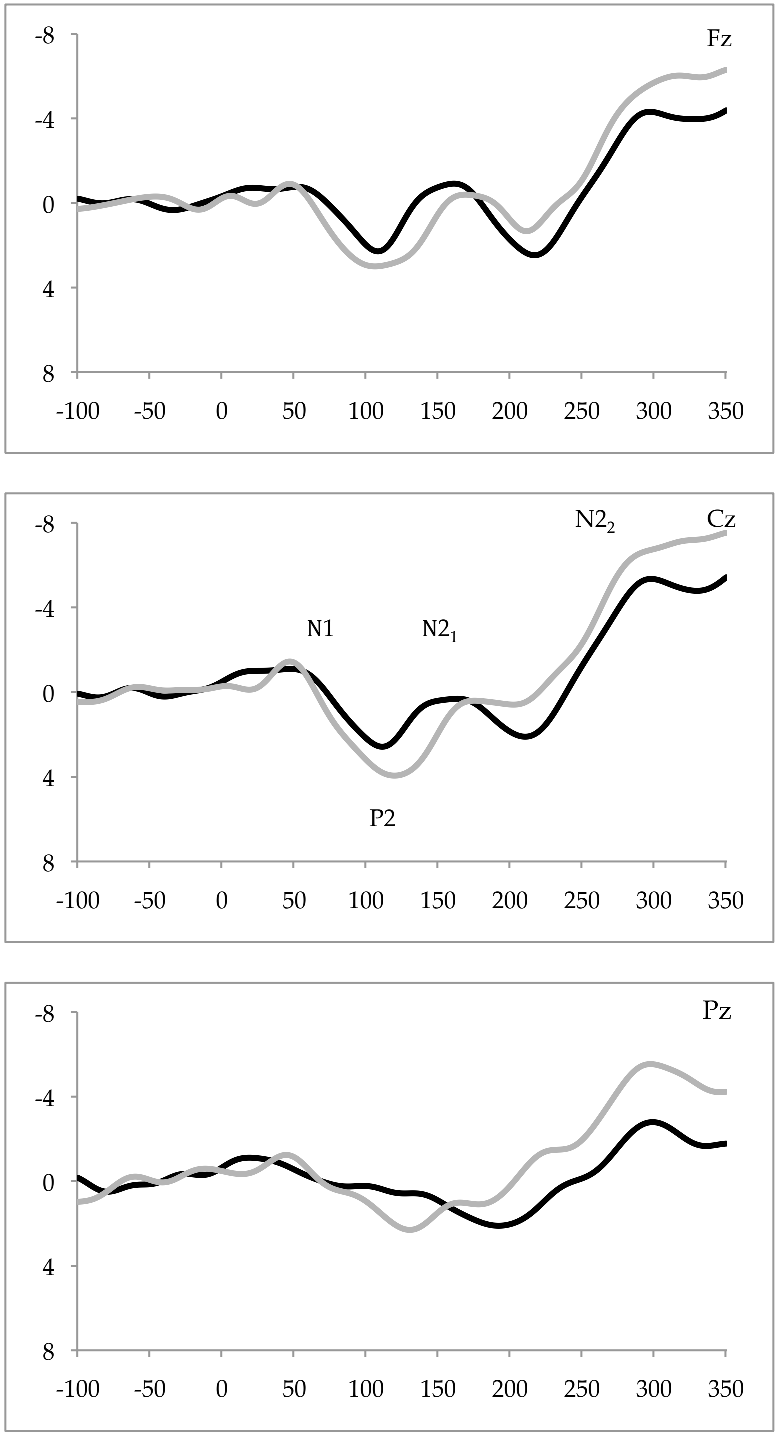

FIGURE 11. ERPs during the individuation task. Black lines represent Black faces and gray lines represent White faces. Electrodes are shown at frontal (F), central (C), and parietal (P) locations along the midline. Component locations in the waveform are displayed on Cz. X-axis represents time in ms and Y-axis represents amplitude in μV.

Target effects were not replicated at the N100, P200, or at the $N200_1$. At each of these points in time there was no differences in attention to race. These inconsistencies could have arisen from the lateralized presentation of the faces in the individuation task or from the psychological processes involved in this task. One possible explanation is that participants were engaged in an individuation task for all targets and perhaps this psychological processing frame reduced race differences that are typically observed in the ERPs. The relative contribution of these hypotheses cannot be addressed by the present data.

While ERP effects during the individuation task failed to replicate previous research both in morphology and amplitude differences, the effects at each component were still explored.

During the individuation task, four distinct deflections were revealed from visual inspection of the averages: the N100 ($M_{latency}$ = 73 ms), P200 ($M_{latency}$ = 133 ms), $N200_1$ ($M_{latency}$ = 204 ms) and $N200_2$[23] ($M_{latency}$ = 300 ms). Peak component amplitudes were scored for each participant in each condition at 9 scalp sites (Fz, F3, F4, Cz, C3, C4, Pz, P3, and P4) by locating the maximal negative deflections between 30 - 140 ms (N100), 150 - 250 ms ($N200_1$) and 255 – 355 ($N200_2$) the maximal peak positive deflection between 80 - 220 ms (P200).

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[23] As can be seen from the waveforms, there were two negative deflections that typically presented from 150-350 ms for most of the participants. The first deflection peaked around 200 ms following the face, a latency that closely matches N200s obtained in prior studies of racial encoding (Ito & Urland, 2003, 2005; Kubota & Ito, 2007; Willadsen-Jensen & Ito, 2006). The second deflection peaked around 300 ms following the face. Both components were analyzed.

N100 Amplitude. The N100 can be seen as the negative-going deflection with a mean latency of 73 ms. N100 amplitudes were maximal at P4. There were no effects involving race at the N100.

There was a Sagittal main effect ($F(2, 56) = 5.89$, $p < .01$, $PRE = .17$) that was qualified by a Sagittal x Laterality interaction ($F(4, 112) = 4.98$, $p < .01$, $PRE = .15$). There was no laterality effects at frontal or central locations. The difference was at parietal locations, where N100s on the right hemisphere ($M = -5.51\ \mu V$) were larger than N100s at central ($M = -4.91\ \mu V$) or left locations ($M = -3.11\ \mu V$; $F's(1, 28) = 11.97$ and 9.18, $p's < .01$, respectively).

P200 amplitude. The P200 can be seen as the positive-going deflection with a mean latency of 133 ms that was maximal at Cz (see Figure 11). There were no significant race effects of at the P200.

There was a marginal Sagittal x Laterality interaction ($F(4, 112) = 2.53$, $p = .07$, $PRE = .08$). There were no laterality effects at frontal or parietal locations. Amplitudes were similar across locations and hemispheres except at central locations. P200s were large at Cz ($M = 4.86\ \mu V$) compared with C3 ($M = 4.06\ \mu V$; $F(1, 28) = 7.40$, $p < .05$) and marginally larger at Cz compared with C4 ($M = 4.09\ \mu V$; $F(1, 28) = 3.88$, $p = .06$).

$N200_1$ amplitude. The $N200_1$ can be seen as the negative-going deflection with a mean latency of 204 ms that was maximal at Cz (see Figure 11). There were no significant differences at the $N200_1$.

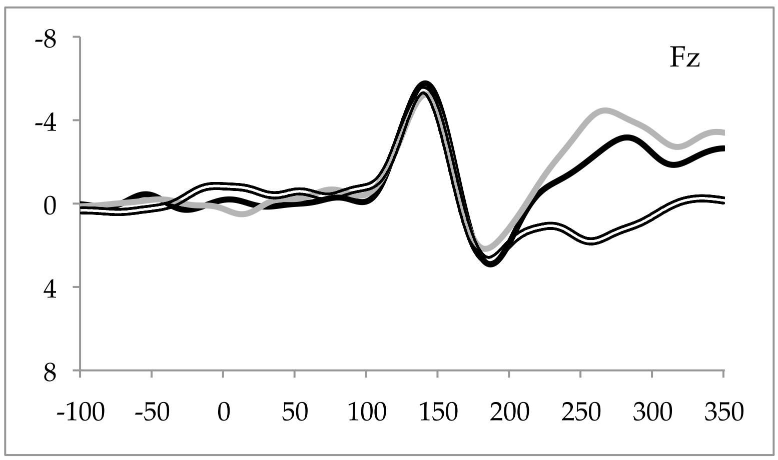
$N200_2$ amplitude. The $N200_2$ can be seen as the negative-going deflection with a mean latency of 300 ms that was maximal at Cz (see Figure 11). This is the only point in the individuation task where target race yields an effect on ERP amplitudes.

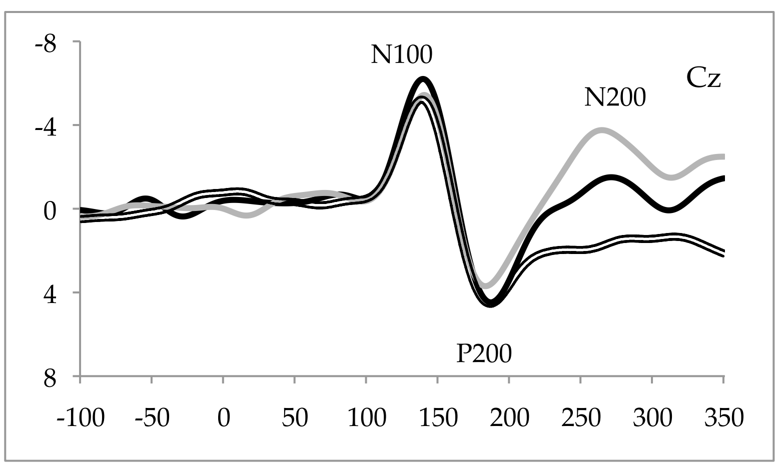
Past race effects were replicated in the $N200_2$ (see Figure 11; Ito & Urland, 2003, 2005; Ito et al., 2004) with larger (more negative) N200s to White than Black faces (M = -5.81 μV and M = -4.11 μV, respectively, $F(1, 28) = 8.37$, $p < .01$, $PRE = .23$). Race interacted with the sagittal position of the electrode ($F(2, 56) = 4.43$, $p < .05$, $PRE = .14$). Of importance, N200s were larger to White than Black faces at central and parietal locations ($F's(1, 28) = 6.97$ and 15.44, $p's < .05$, $PRE = .20$ and .40, respectively) but not at frontal locations.

There were Laterality and Sagittal location main effects ($F's(1, 28) = 9.41$ and 4.00, $p's < .05$, $PRE's = .25$ and .13, respectively). These effects were qualified by a Laterality x Sagittal interaction ($F(4, 112) = 8.00$, $p < .01$, $PRE = .22$). At frontal locations, there was a quadratic effect such that the left was smaller than the midline and right ($F(1, 28) = 19.49$, $p < .01$). At central locations, there was a quadratic effect such that the left and right had smaller amplitudes than the midline ($F(1, 28) = 6.76$, $p < .05$). At parietal locations, amplitudes were smaller on the right and left compared with the midline ($F(1, 28) = 26.94$, $p < .01$).

Consistent with past research, the race effect suggests deeper processing and attention to ingroup Whites (Ito & Urland, 2003; 2005; Kubota & Ito, 2007).

APPENDIX F: SCALP DISTRIBUTIONS OF ERP COMPONENTS DURING THE PASSIVE-VIEWING TASK





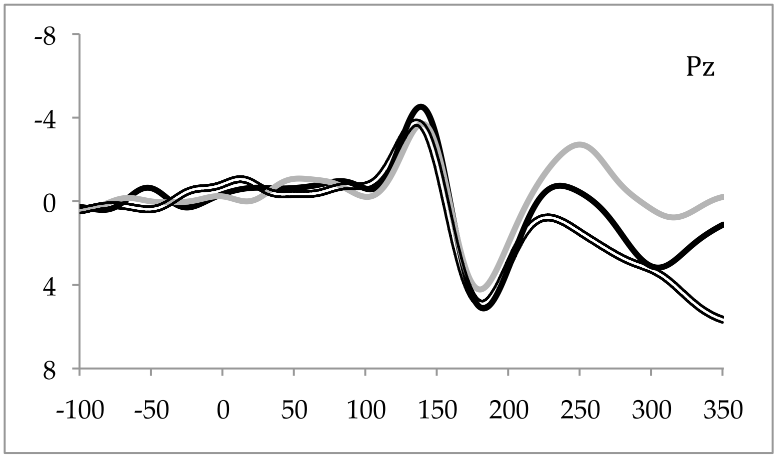


FIGURE 12. ERPs during the passive-viewing task. Black lines represent Black faces, gray lines represent White faces, and double black lines represent self faces. Electrodes from the midline are shown at frontal (Fz), central (Cz), and parietal (Pz) locations. Component locations in the waveform are displayed on Cz. X-axis represents time in ms and Y-axis represents amplitude in μV.

N100 Amplitudes. There were no differences in attention to target at Cz when self was included as a factor (M_{self} = -6.38 μV; M_{Black} = -6.94 μV; M_{White} = -6.16 μV). See Figure 12.

There were Sagittal and Laterality main effects (*F's*(2, 56) = 11.14 and 26.97, *p's* < .01, *PRE's* = .29 and .49). The was also a Sagittal x Laterality interaction (*F*(4, 112) = 6.47, *p* < .01, *PRE* = .19). Post-hoc contrasts found that at frontal locations, amplitudes at the midline (*M* = -5.96 μV) were larger than amplitudes in the right hemisphere (*M* = -4.50 μV; *F*(1, 28) = 11.66, *p* < .01). Amplitudes on the left (*M* = -5.91 μV) did not differ from either the midline or amplitudes in the right hemisphere. At central locations, amplitudes at the midline (*M* = -6.54 μV) were larger than amplitudes in the left (*M* = -5.96 μV) or right hemisphere (*M* = -4.91 μV; *F's*(1, 28) = 6.36 and 27.53, *p's* < .05, respectively). Amplitudes on the left were greater then amplitudes in the right hemisphere (*F*(1, 28) = 6.91, *p* < .05). At parietal locations, amplitudes at the midline (*M*

= -5.14 μV) were larger than amplitudes in the left (M = -4.50 μV) or right hemisphere (M = -3.11 μV; F's(1, 28) = 10.00 and 62.64, p's < .01, respectively). Amplitudes on the left were greater then amplitudes in the right hemisphere (F(1, 28) = 19.68, p < .01).

P200 Amplitudes. There was no effect of target at Pz when self was included as a factor (M_{self} = 6.54 μV; M_{Black} = 6.77 μV; M_{White} = 5.70 μV).

There were Sagittal and Laterality main effects (F's(2, 56) = 14.97 and 4.51, p's < .05, *PRE's* = .35 and .14). P200s were larger at parietal locations (M = 5.95 μV) compared with central (M = 5.10 μV) and frontal locations (M = 4.12 μV; F's(1, 28) = 18.92 and 6.57, p's < .05). Amplitudes at central locations were larger than amplitudes at frontal locations (F(1, 28) = 19.82, p < .01). Amplitudes were larger and at the midline (M = 5.42 μV) compared with electrodes in the left (M = 4.70 μV) or right hemisphere (M = 5.05 μV; F's(1, 28) = 8.12 and 5.45, p's < .05, respectively).

N200 Amplitudes. When considering differences in attention at Fz between self and others at the N200, there was a main effect of Target (F(2, 56) = 13.43, p < .01, *PRE* = .32), with larger (more negative) N200s to White than self or Black faces (M_{self} = -2.50 μV; M_{Black} = -4.38 μV; M_{White} = -5.97 μV; F's(1, 28) = 27.41 and 7.51, p's < .01, *PRE's* = .50 and .21, respectively). There was no difference between amplitudes to the self compared with Black faces.

There were Sagittal and Laterality main effects (F's(2, 56) = 13.99 and 13.12, p's < .01, *PRE's* = .33 and .32). N200s were larger at frontal locations (M = -4.92 μV) compared with central (M = -3.66 μV) or parietal locations (M = -2.63μV; F's(1, 28) = 22.03 and 16.59, p's < .01, respectively). Amplitudes at central locations were greater than at parietal locations (F(1, 28) = 6.00, p < .05). Amplitudes at the midline (M = -4.27 μV) were marginally greater than in the left hemisphere (M = -3.82 μV) and larger than in the right hemisphere (M = -3.11 μV; $F's(1, 28) = 3.74$ and 28.28, $p = .06$ and $p < .01$, respectively). Amplitudes were larger in the left hemisphere than in the right ($F(1, 28) = 9.10$, $p < .01$).

Unexpectedly, participants did not differentiate the self from the other targets early on in processing. At the N100 and P200, participants attend to the self and the Black and White targets similarly. If N100s and P200s are related psychologically to threat processing, it would be expected that Black targets should be attended to more than self or White targets for this Caucasian sample. In addition, if N200s reflect attention related to depth of encoding, N200s should have been larger to the self than to the White or Black targets because the self is the most individuated target. Instead, participants actually attend more to White faces than to themselves and in addition do not differentiate between self and Black targets at the N200.

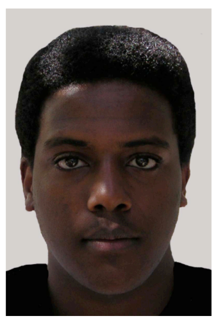
Appendix G: Relationship Between ERPs and Individuation Task Estimates When There Was No Aggressive Information Provided and When All of the Information Was Aggressive

Slopes For Individuation Task

		Use of Individuating Information	Use of Race: Centering of Aggression Predictor 0	2	4	Race by Individuation Interaction
N100						
	N100 Overall Amplitude	.02 (.93)	-.20 (.31)	-.31 (.10)$^{+}$	-.18 (.36)	-.03 (.88)
	N100 (White – Black)	.13 (.51)	-.08 (.67)	.01 (.96)	-.07 (.73)	.09 (.65)
	N100 Black	-.10 (.62)	-.21 (.27)	-.30 (.11)	-.16 (.40)	-.01 (.95)
	N100 White	.11 (.57)	-.15 (.43)	-.26 (.17)	-.16 (.40)	-.04 (.84)
P200						
	P200 Overall Amplitude	-.03 (.89)	.03 (.87)	.03 (.86)	.01 (.95)	-.01 (.97)
	P200 (Black – White)	-.03 (.86)	.02 (.91)	.08 (.66)	.07 (.72)	.04 (.84)
	P200 Black	-.03 (.86)	.04 (.85)	.06 (.78)	.03 (.87)	.004 (.98)
	P200 White	-.02 (.94)	.03 (.89)	.01 (.96)	-.01 (.97)	-.02 (.92)
N200						
	N200 Overall Amplitude	**-.35 (.06)***	-.14 (.47)	.03 (.88)	.12 (.52)	.16 (41)
	N200 (Black – White)	-.07 (.73)	.07 (.72)	-.31 (.10)$^{+}$	**-.36 (.05)**	-.30 (.12)
	N200 Black	-.30 (.12)	-.12 (.55)	-.06 (.74)	-.002 (.99)	.07 (.73)
	N200 White	-.28 (.14)	-.16 (.41)	.08 (.68)	.26 (.18)	.23 (.26)

Table 9. Estimating the relationship between visual attention and individuation. Correlations and (p-values). Recall that the N100 and N200 are negative-going components so negative correlations represent larger amplitudes. Centering at 2 are identical to results provided in the main text. * $p < .1$, $^{+}$ $p < .15$.

APPENDIX H: PHOTOS USED IN SOCIAL JUDGMENT TASK



APPENDIX I: SOCIAL JUDGMENT STATEMENT PILOTING INSTRUCTIONS

In this experiment you will complete two different computer tasks.

In the first task you will judge opinion statements. On each trial, an opinion statement like "*Really likes traveling to new places*" will appear. You will make a judgment of how typical you think this statement is of a particular group, how positive or negative this opinion is, and how informative you think the information is of someone's personality. You will make each of these ratings on a 1-7 point scale.

Each opinion statement will appear in blue. You will then see three questions below it, one at a time. The first question will ask you how typical you think holding this opinion is of a group in general. For this study, we are not interested in your personal beliefs about groups, but rather in your sense of how general society views these groups. If you think the general view in society is that this group likes to travel, you would rate this statement as highly typical. On the other hand, if you think the general view of this group is that they don't like to travel, you would rate this statement as not very typical.

After you give your answer to this first question, you will be asked to rate how positive or negative you think it is to hold this opinion. That is, you would judge how positive or negative you think it is to like to travel to new places.

Finally, you will tell us how informative you think knowing this piece of information would be about a person's personality. That is, how much do you think it would tell you about the personality of the person if you were to find this piece of information out?

Is everything clear so far? Do you have any questions?

When you complete this task. Please let the experimenter know.

Next you will complete a questionnaire regarding your opinions and attitudes about various topics. Please answer as honestly and accurately as possible. Be careful to read all of the instructions for each portion of the questionnaire. Please let the experimenter know when you have completed this task.

APPENDIX J: SOCIAL JUDGMENT STATEMENTS USED IN STUDY 2

Positive/Highly Stereotypical of Blacks:

Opinion Statement	Stereotypicality Rating For Black	Stereotypicality Rating For White	Valence Rating For Black	Valence Rating For White	Personality Rating For Black	Personality Rating For White
Able to do more than five pull-ups in a row	5.08	3.3	5.08	4.85	3.69	4.33
Able to run a mile in under seven minutes	5.12	3.42	5.15	5.33	3.88	4.72
Attends church every Sunday	5.27	4.6	4.96	4.7	5.27	5.05
Thinks an equal rights amendment should be passed	5.5	4.62	5.42	5.42	4.92	4.97
Thinks children in poor areas should be bussed to better schools	5.08	3.85	5.23	4.92	5	4.78
Thinks minimum wage should be raised	5.19	4.62	4.88	4.78	4.46	4.4
Thinks racial profiling is wrong	5.96	4.38	5.15	5.4	4.92	5.12
Wants to be more athletic	5.31	4.8	5.08	5	4.92	4.75
Average	5.31	4.20	5.12	5.05	4.6325	4.765

Positive/Highly Stereotypical of Whites:

Opinion Statement	Stereotypicality Rating For Black	Stereotypicality Rating For White	Valence Rating For Black	Valence Rating For White	Personality Rating For Black	Personality Rating For White
Cares a lot about having a job that pays well	3.65	5.5	4.77	4.67	5.15	5.08
Excited to dress up for Halloween	3.15	5	4.46	4.97	4.35	4.67
Goes away with friends for spring break	3.23	5.28	4.54	4.58	4.04	4.5
Is proud to be an American	4.62	5.28	5.15	5.47	4.88	5.03
Looks forward to owning a big house in the suburbs	3.15	5.7	4.23	4.4	4.69	4.95
Spends an hour in a coffee shop with friends	1.96	5	4.46	4.6	3.96	4.8
Thinks a firm handshake is important	4.12	5.05	5.12	5.03	4.92	5.08
Thinks personal hygiene is very important	3.77	5	4.92	5.47	4.65	5.15
Average	3.45625	5.22625	4.70625	4.89875	4.58	4.9075

Positive/Neither Stereotypical of Blacks or Whites:

Opinion Statement	Stereotypicality Rating For Black	Stereotypicality Rating For White	Valence Rating For Black	Valence Rating For White	Personality Rating For Black	Personality Rating For White
Always comes to a complete stop at a stop sign	2.5	3.5	4.46	4.47	3.04	4.35
Likes to give money to the poor on the street	2.42	3.65	4.96	4.47	4.96	4.62
Meditates for an hour at a Buddhist Center	1.92	2.77	4.23	4.67	4.62	5.47
Often picks up garbage off the street and throws it away	2.19	3.27	5.19	5.28	4.69	5.25
Plans to major in women's studies	2.27	3.27	4.23	4.53	4.58	5.17
Speaks two foreign languages fluently and is learning a third for	1.81	2.92	5.23	4.97	4.96	5.2
Spends an hour reading poetry	2.27	3.8	4.42	4.47	4.65	4.83
Wants to travel through India and Nepal	1.85	3.58	4.73	4.9	4.5	4.78
Average	2.15375	3.345	4.68125	4.72	4.5	4.95875

Negative/Highly Stereotypical of Blacks:

Opinion Statement	Stereotypicality Rating For Black	Stereotypicality Rating For White	Valence Rating For Black	Valence Rating For White	Personality Rating For Black	Personality Rating For White
Frequently speaks very loud	5.15	4.1	3.58	3.62	4.96	4.88
Has a tattoo	5.04	4.3	3.77	3.77	4.35	4.67
Has sex with someone on a first date	4.58	3.85	2.92	3.23	5.12	5.03
Likes to question authority	5.15	3.85	3.69	3.95	4.69	4.92
Prefers dating lots of people rather than just one	4.65	3.88	3.23	3.23	5.42	5.03
Resents authority figures	4.88	4.03	2.88	3.35	4.96	4.95
Tends to get angry	5.15	4.17	2.81	3.08	4.58	4.97
Wears lots of bling	5.73	2.62	3.65	3.33	4.73	4.64
Average	5.04125	3.85	3.31625	3.445	4.85125	4.88625

Negative/Highly Stereotypical of Whites:

Opinion Statement	Stereotypicality Rating For Black	Stereotypicality Rating For White	Valence Rating For Black	Valence Rating For White	Personality Rating For Black	Personality Rating For White
Browses through an entertainment magazine for 30 minutes	3.65	4.9	3.73	3.8	3.92	4.45
Cares a lot about pop culture	4.12	4.85	3.88	3.83	4.54	4.67
Is a bit uncoordinated	2.73	4.08	3.35	3.52	3.5	3.9
Sometimes plays computer games	3.38	4.78	4	3.85	4.08	4.58
Spends half an hour browsing a celebrity gossip website	2.65	4.8	3.15	3.5	4.42	4.65
Sunburns easily in the summer	1.46	5.35	3.62	3.23	2.46	2.8
Thinks gays should not be allowed in the military	3.46	4.53	3.15	2.95	4.69	5.05
Thinks more public land should be open to hunting	2.35	4.55	3.46	3.55	4.08	4.92
Average	2.975	4.73	3.5425	3.52875	3.96125	4.3775

Negative/Neither Stereotypical of Blacks or Whites:

Opinion Statement	Stereotypicality Rating For Black	Stereotypicality Rating For White	Valence Rating For Black	Valence Rating For White	Personality Rating For Black	Personality Rating For White
Afraid of dogs	3.27	2.83	3.38	3.55	4.12	4.35
Agnostic about the existence of God	2.85	3.75	3.58	3.88	4.65	4.85
Doesn't mind letting others be in control	2.62	3.1	3.62	3.58	5.19	5.17
Enjoys goth night at a dance club	1.96	3.33	3.46	3.6	4.65	5
Has had hair that was dyed purple	2.27	3	3.42	3.77	3.96	4.92
Supports cloning	2.73	3.77	3.92	3.65	3.96	4.67
Thinks 'under God' should be removed from the Pledge of Allegiance	2.35	3.35	3.62	3.6	5.19	4.97
Thinks government should be very involved in people's lives	2.88	3.52	3.62	3.6	4.5	4.88
Average	2.61625	3.33125	3.5775	3.65375	4.5275	4.85125

Neutral/Highly Stereotypical of Blacks:

Opinion Statement	Stereotypicality Rating For Black	Stereotypicality Rating For White	Valence Rating For Black	Valence Rating For White	Personality Rating For Black	Personality Rating For White
Dislikes the idea of wiretapping	4.81	4.08	4.12	4.03	4.62	4.35
Drives a car with nice rims	5.73	3.5	4.08	4.08	4.35	4.42
Feels most at home in a busy city	5.19	4.33	3.88	4.15	4.62	4.78
Goes to clubs most weekends	4.85	4.2	3.92	3.95	4.42	4.9
Goes to lunch at an all-you-can-eat buffet	4.73	4.35	3.88	3.7	3.69	4.3
Recently shaved their head	5	3.42	3.85	3.75	3.12	3.98
Thinks the wealthy have a responsibility to help the poor	4.81	3.4	4.27	4.42	4.69	5
Watches BET	5.42	2.77	4	4.2	4.31	4.17
Average	5.0675	3.75625	4	4.035	4.2275	4.4875

Neutral/Highly Stereotypical of Whites:

Opinion Statement	Stereotypicality Rating For Black	Stereotypicality Rating For White	Valence Rating For Black	Valence Rating For White	Personality Rating For Black	Personality Rating For White
Cares a lot about getting credit for doing things	3.88	5.05	4.23	4.2	4.81	5.12
Finds John Stewart's humor on 'The Daily Show' hilarious	2.96	5.03	4.19	4.38	4.5	4.72
Loves country music	1.81	5.25	3.81	4.35	4.54	4.78
Loves to people-watch	3.58	4.75	3.58	4.2	4.65	4.83
Thinks it's important to keep up with fashion trends	4.04	4.85	3.96	3.92	4.65	4.95
Thinks that having a strong military is critical to continued pro	4	4.85	4.35	4.17	4.38	4.83
Wears tight pants	2.35	4.85	3.65	4.2	3.62	4.45
Goes shopping at an outlet mall	4.27	4.7	4.04	4.3	3.88	4.17
Average	3.36125	4.91625	3.97625	4.215	4.37875	4.73125

Neutral/ Neither Stereotypical of Blacks or Whites:

Opinion Statement	Stereotypicality Rating For Black	Stereotypicality Rating For White	Valence Rating For Black	Valence Rating For White	Personality Rating For Black	Personality Rating For White
Enjoys dating someone of a different race or religion	2.92	3.33	4.31	4.22	4.96	5.1
Enjoys eating new food from southeast Asia	2.23	3.5	4.38	4.22	3.54	4.28
Happy with the current US governme nt	3.35	3.73	3.73	4.15	4.46	4.8
Has a lot of respect for the current governme nt	3.58	3.85	4	4.35	4.69	4.85
Likes tofu	1.73	3.7	4	4.33	3.65	4.22
Supports a terminally ill patient's right to die	3.23	3.85	3.85	3.9	4.27	4.75
Thinks hunting for sport is cruel	2.5	3.62	4	4.03	4.5	5.15
Wears fairly hip clothes bought at thrift shops	3.81	3.77	4.08	4.3	4.19	4.78
Average	2.91875	3.66875	4.04375	4.1875	4.2825	4.74125

APPENDIX K: ANALYSIS OF STEREOTYPICALITY AND VALENCE FOR THE PILOT RATINGS FOR THE SOCIAL JUDGMENT STATEMENTS

Stereotypicality Ratings. Considering ratings of stereotypicality for the selected statements, there was a significant stereotypicality main effect ($F(2, 126) = 115.00$, $p < .01$, $PRE = .67$), there was a Target main effect ($F(1, 126) = 28.89$, $p < .01$, $PRE = .19$), and these effects were qualified by the interaction between stereotypicality and target ($F(2, 126) = 102.92$, $p < .01$, $PRE = .62$). As intended, Black stereotypical statements were rated higher in stereotypicality of African Americans than of White Americans ($F(1, 126) = 66.85$, $p < .01$, $PRE = .35$) and White stereotypical statements were rated higher in stereotypicality of White Americans than Black Americans ($F(1, 126) = 131.83$, $p < .01$, $PRE = .51$). Statements selected to be stereotype-irrelevant were rated higher in stereotypicality for the White Americans than for Black Americans ($F(1, 126) = 36.04$, $p < .01$, $PRE = .22$).

Within target, participants always rated the stereotype-congruent statements greater than the stereotype-irrelevant statements on stereotypicality. For White targets, White stereotypical statements were rated higher than stereotype-irrelevant statements ($F(1, 126) = 307.56$, $p < .01$). For Black targets, Black stereotypical statements were rated higher than stereotype-irrelevant statements ($F(1, 126) = 105.38$, $p < .01$).

There was also a valence by stereotypicality interaction for stereotypicality ratings ($F(4, 126) = 4.13$, $p < .01$, $PRE = .12$), importantly highly stereotypical opinions were rated higher in stereotypicality compared with stereotype-irrelevant statements at each level of valence (*F's*(1, 70) = 122.95 to 66.14, *p's* < .01; see Table 3).

The interaction occurred because participants rated stereotypicality differently for statements of different valence. For Black stereotypical statements, positive statements were rated marginally higher in stereotypicality than negative or neutral statements (*F's*(1, 70) = 2.95 and 3.61, $p = .09$ and $p = .06$). Negative Black stereotypical statements did not differ from neutral Black stereotypical statements. For White stereotypical statements, positive statements were rated higher in stereotypicality than negative statements ($F(1, 126) = 7.30$, $p < .01$), but did not differ from neutral statements. Again White stereotypical negative statements did not differ on rated stereotypicality from White stereotypical neutral statements. Thus, for highly stereotypical statements, stereotypicality was rated higher for positive statements generally. For stereotype-irrelevant statements, neutral statements were rated higher in stereotypicality than positive or negative statements (*F's*(1, 126) = 9.03 and 3.13, $p < .01$ and $p = .08$). It is often easier to rate stereotypicality higher for positive stereotypes than for negative stereotypes (Gaertner & McLaughlin, 1983).

To review, social judgment statements varied in stereotypicality ratings in the manner intended, social judgment statements selected for the high stereotypical category were rated as higher in stereotypicality than those selected to stereotype-irrelevant. Social judgment statements were rated on average equally high in stereotypicality for White and Black Americans. Those questions rated stereotype-irrelevant were rated as lower in stereotypicality for Black Americans than White Americans. Importantly, statements selected to be low in stereotypicality (stereotype-irrelevant) were rated for both groups as lower than the mean in stereotypicality.

Valence Ratings. Considering valence ratings of the social judgment statements, there was a significant Valence main effect ($F(2, 126) = 286.04$, $p < .01$, $PRE = .82$), such that positive, negative, and neutral statements varied in the manner expected. Positive statements ($M = 4.86$) were rated more positively than negative statements ($M = 3.51$; $F(1, 126) = 562.61$, $p < .01$) and neutral statements ($M = 4.08$; $F(1, 126) = 190.15$, $p < .01$). Neutral statements were rated at the mean of valence scale (recall that 4 was neutral) and higher in valence than negative statements ($F(1, 126) = 98.60$, $p < .01$). While the positive and negative opinions on average were not at the extremes of the valence ratings, they were sampled from the ends of the valence distribution (see Table 4).

There was also a significant valence by stereotypicality interaction ($F(4, 126) = 5.81$, $p < .01$, $PRE = .16$). Importantly, the valence structure remained intact at each level of stereotypicality. For Black stereotypical statements, positive statements were rated more positively than negative and neutral statements ($F's(1, 126) = 302.33$ and 118.54, $p's < .01$). Neutral statements were rated higher in valence than negative statements ($F(1, 126) = 42.25$, $p < .01$). For White highly stereotypical statements, positive statements were rated more positively than negative and neutral statements ($F's(1, 126) = 167.15$ and 52.05, $p's < .01$). Neutral statements were rated higher in valence than negative statements ($F(1, 126) = 32.65$, $p < .01$). For opinions selected to be stereotypically-irrelevant, positive opinions were rated more positively than negative and neutral statements ($F's(1, 126) = 122.58$ and 35.63, $p's < .01$). Neutral statements were rated higher in valence than negative statements ($F(1, 126) = 26.03$, $p < .01$).

The interaction came from variations in how valence was rated across levels of stereotypicality. For statements selected to be positive, Black stereotypical opinions were rated more positively than White stereotypical statements and stereotype-irrelevant statements (F's(1, 126) = 8.28 and 15.35, '*sp* $< .01$). Positive White stereotypical and positive stereotype-irrelevant statements did not differ in valence. For opinions selected to be negative, Black stereotypical statements were rated more negatively than stereotype-irrelevant statements ($F(1, 126) = 5.75$, $p < .05$). Negative Black stereotypical and negative White stereotypical statements were rated equally negative. Negative White stereotypical and stereotype-irrelevant statements were rated equally negative. For statements selected to be neutral, all opinions were rated as equally neutral.

To summarize, the social judgment statements, on average, varied in valence in the manner selected. There were differences in how valence was rated depending on whether the statement was highly stereotypical or stereotype-irrelevant. Positive Black stereotypical statements were more positive than positive White and stereotype-irrelevant positive. Negative Black stereotypical statements were more negative than stereotype-irrelevant statements but were similar to White stereotypical statements.

APPENDIX L: DECONSTRUCTION OF TWO-WAY INTERACTIONS IN AGREEMENT WITH SOCIAL JUDGMENT STATEMENTS

There was a Target x Valence effect ($F(4, 136) = 22.54$, $p < .01$, $PRE = .40$). Participants rated agreement with the statements varying in valence in a similar manner across targets, meaning participants always rated the most agreement with positive statements, then neutral, and then negative statements for the White target, the Black target, and for themselves ($F's(1, 34) = 118.07$ to 9.79, $p's < .01$, $PRE's = .79$ to .33). The interaction arose from how participants rated agreement of the targets within valence category. To deconstruct the interaction further, the Valence x Target interaction was compared between positive and negative, negative and neutral, and positive and neutral statements. The differences in ratings for targets between positive and negative and negative and neutral were significant (F's(2, 68) = 27.52 and 37.54, $p's < .01$, $PRE's =$ .45 and .53, respectively) and the difference in rating targets between positive and neutral statements was marginal ($F(2, 68) = 2.49$, $p = .09$, $PRE = .07$). This suggests that there were differences in how participants rated agreement for targets when rating statements of varying valence. Most notably, participants rated target vary differently in for negative statements compared with positive or neutral statements. Positive and neutral statements were rated in a similar manner.

When looking at the simple differences among targets within a valence category, for neutral statements, participants rated all targets, including themselves, at the mean and these ratings did not differ ($M_{\text{self}} = 3.90$, $M_{\text{White}} = 4.05$, $M_{\text{Black}} = 3.94$). When statements were positive, participants rated the White target ($M = 4.42$) and themselves ($M = 4.35$) as having higher agreement with the statements then the Black target ($M = 4.16$; ($F's(1, 34) = 9.95$ and 5.14, $p's < .05$, $PRE's = .23$ to $.13$, respectively). Participants did not rate agreement for positive statements differently for themselves compared to the White target ($F(1, 34) = .51$, $p > .05$, $PRE = .02$). For negative statements, ratings of agreement flipped from those found in positive. All ratings within negative differed. As expected, participants rated the Black target ($M = 3.73$) as having higher agreement with the negative statements then either the White target ($M = 3.17$; $F(1, 34) = 41.12$, $p < .01$, $PRE = .55$) or themselves ($M = 2.97$; $F(1, 34) = 64.76$, $p < .01$, $PRE = .66$). Participants also rated themselves as agreeing less with the negative statements compared with the White targets ($F(1, 34) = 6.68$, $p < .05$, $PRE = .16$). This suggests that participants rated agreement between targets similarly for the neutral statements, but there were differences between the positive and negative statements. These rating conformed to stereotypes. Participants said that the ingroup member and themselves had higher agreement with positive statements than the outgroup member. For negative statements, participants said that the outgroup member had the highest agreement with the statements. As expected, participants distanced themselves from the negative statements, even rating themselves lower than the ingroup target.

In addition to the Target x Valence interaction, there was a Target x Stereotyping interaction ($F(4, 136) = 7.55$, $p < .01$, $PRE = .18$). Again, participants always rated more agreement for the highly stereotypical statements compared with the items low in stereotypicality (White: $F(1, 34) = 63.81$, $p < .01$, $PRE = .65$; Black: $F(1, 34) = 29.91$, $p < .01$, $PRE = .47$; Self: $F(1, 34) = 25.86$, $p < .01$, $PRE = .43$). The interaction arose from how participants rated agreement of the targets within valence stereotypicality. To deconstruct the interaction further, the Stereotypicality x Target interaction was compared between highly stereotypical statements of Blacks with highly stereotypical statements of Whites, highly stereotypical statements of Blacks with statements low in stereotypicality for both Blacks and Whites, and highly stereotypical statements of Whites with statements low in stereotypicality for both Blacks and Whites. The differences in ratings for targets between statements highly stereotypical of Blacks and highly stereotypical of Whites and statements highly stereotypical of Whites and statements low in stereotypicality for Black and White targets were significant (F's$(2, 68) = 12.30$ and 11.58, $p < .01$, $PRE = .27$ and .25, respectively). There was not a difference in ratings for targets between statements highly stereotypical of Blacks and statements low in stereotypicality for Black and White targets ($F(2, 68) = 1.82$, $p = .17$, $PRE = .05$).

To investigate the Stereotyping x Target interaction further the simple differences were explored. When looking at the simple differences among targets within a stereotypicality, for Black stereotypical statements, participants rated the Black target ($M = 4.11$) and White target ($M = 4.31$) similarly and higher in agreement with Black stereotypical statements than they rated themselves ($M = 3.82$; ($F's(1, 34) = 6.90$ and 13.91, $p's < .05$, $PRE's = .17$ and .29, respectively). For White stereotypical questions, participants rated the Black target ($M = 4.37$) higher than the both the White target ($M = 3.84$) and themselves ($M = 4.10$; ($F's(1, 34) = 51.95$ and 8.10, $p's < .01$, $PRE's = .60$ and .19, respectively). Self ratings were also higher than ratings for the White target ($F(1, 34) = 4.93$, $p < .05$, $PRE = .13$). For statements low in stereotypicality, participants rated targets equal ($M_{White} = 3.50$; $M_{Black} = 3.35$; $M_{Self} = 3.34$). This suggests that on average and across valence category, participants are targets higher on counter stereotypic items. The Black target is rated as agreeing more than the other targets with White stereotypical statements and, even though the Black and White target are rated statistically equal for Black stereotypical statements directionally participants are rating White targets higher. This pattern holds true when comparing within stereotypical statements. Black targets are rated as agreeing more with counter stereotypic White statements compared with Black stereotypical or low stereotypical statements ($F's(1, 34) = 9.29$ and 40.26, $p's < .01$, $PRE's = .23$ and .54, respectively). Likewise, White targets are rated as agreeing more with counter stereotypic Black statements compared with White stereotypical or low stereotypical statements ($F's(1, 34) = 8.57$ and 23.32, $p's < .01$, $PRE's = .20$ and .41, respectively). For statements low in stereotypicality, participants generally say that themselves, an ingroup member, and an outgroup member generally do not agree with the statements equally.

Finally, there was a Valence x Stereotyping interaction ($F(4, 136) = 127.48$, $p < .01$, $PRE = .79$). Participants tended to rate agreement higher for positive questions, followed by neutral statements, and then negative statements for Black stereotypical statements and White stereotypical statements. Positive Black stereotypical statements had higher agreement than neutral statements or negative statements (F's(1, 34) = 158.30 and 109.16, $p < .01$, $PRE = .82$ and .76, respectively). Neutral Black stereotypical statements had higher rated agreement than negative Black stereotypical statements ($F(1, 34) = 4.63$, $p < .05$, $PRE = .12$). Positive White stereotypical statements had higher agreement than neutral statements or negative statements (F's(1, 34) = 90.03 and 219.20, $p < .01$, $PRE = .73$ and .87, respectively). Neutral White stereotypical statements had higher rated agreement than negative Black stereotypical statements ($F(1, 34) = 111.15$, $p < .01$, $PRE = .77$). The pattern was slightly different for the statements low in stereotypicality. For these statements, participants rated agreement the same and low for positive and negative statements and less than neutral statements which were rated at about the mean of the agreement scale (*F's*(1, 34) = 209.28 and 128.07, *p's* < .01, *PRE's* = .86 and .79).

For positive statements, Black stereotypical and White stereotypical items were rated equal and higher in target agreement than low stereotypicality statements (*F's*(1, 34) = 209.28 and 128.07, *p's* < .01, *PRE's* = .86 and .79, respectively). For neutral statements, White stereotypical and low stereotypicality statements were rated equal and higher than Black stereotypical statements (*F's*(1, 34) = 8.92 and 4.70, *p's* < .01, *PRE's* = .21 and .12, respectively). For negative statements, Black stereotypical statements had higher rated agreement than White stereotypical or low stereotypicality statements (*F's*(1, 34) = 13.38 and 22.78, *p's* < .01, *PRE's* = .28 and .40, respectively). White negative stereotypical statements had marginally higher rated agreement than low stereotypicality statements (*F*(1, 34) = 3.64, *p* < .05, *PRE* = .10)

These patterns indicate that participants are rating agreement in a manner consistent with expectations. Generally, participants say that the targets would agree more with positive statements at all levels of stereotypicality. There is slight variation in the manner in which participants rate agreement for varying stereotypicality within valence categories. This difference is perhaps best understood in the context of the three-way interaction among stereotypicality, valence, and target. Please see the results section of Study 2 for full deconstruction of this interaction.

Appendix M: Exploring the Relationship Between Self And Other Judgments

A secondary interest of this research was to explore the relationship between early selective attention to the self as compared with attention to ingroup and outgroup members. Social Projection Theory states that judgments of others are based on perceived similarity between the self and others (Clement & Krueger, 2002; Robbins & Krueger, 2005). In general, people overestimate the similarity between themselves and others, an effect known as false-consensus (Ross, Greene, & House, 1977). This projection of self-traits onto others is more likely for more similar targets (Clement & Krueger, 2002). This leads to the prediction that projection should be greater for ingroup members than for outgroup members (Mullen, Dovidio, Johnson, & Copper, 1992). When there is greater perceived similarity between the self and an outgroup member, projection increases and stereotyping decreases (Ames, 2004).

Therefore, perceived similarity should increase through perspective-taking to both ingroup and outgroup members (Galinsky and Moskowitz, 2000). In general, self-reference is reserved for ingroup members (Cadinu & Rothbart 1996; Krueger & Clement, 1997; Smith & Henry, 1996). Typically, individuals rely on category knowledge when predicting the standing of outgroup members on traits and opinions (Bewer, 1988; Fiske & Neuberg, 1990). Researchers find ingroup projection and little to no outgroup projection (Krueger, 2007; Robbins & Krueger, 2005). First-person perspective-taking increases self-reference to outgroup members (Galinsky &

Moskowitz, 2000; Mitchell et al., 2006). If first-person perspective-taking increases self-reference, that is typically low to outgroup members, then there should be greater similarity between the self and the Black target in the first-person perspective-taking condition compared with the third-person perspective-taking condition.

This prediction translates into a target by perspective interaction on an index of self-other similarity. To investigate similarity in agreement ratings between the self and the ingroup member and outgroup member, the participant's standing on each statement was subtracted from their agreement rating for the ingroup member (self agreement - ingroup agreement) and for the outgroup member (self agreement - outgroup agreement). Then the absolute value of each difference score was averaged across the individual statements within each condition. A lower score would indicate greater similarity between self and the target. These averaged differences were submitted to a 2 (Similarity of Self With Target: |Self-Ingroup|, |Self-Outgroup|) x 3 (Stereotypicality: Black stereotypical, White stereotypical, Stereotype-Irrelevant) x 3 (Valence: Positive, Negative, Neutral) x 2 (Perspective-taking: First-person, Third-person) GLM.

There was a Valence main effect (F (2, 68) = 6.00, $p < .01$, $PRE = .15$) that was qualified by a Similarity x Valence interaction (F (2, 68) = 3.96, $p < .05$, $PRE = .10$), a Stereotypicality main effect (F (2, 68) = 4.74, $p < .05$, $PRE = .12$), and these effects were qualified by the three-way interaction among similarity, valence, and stereotypicality (F (4, 136) = 2.60, $p < .05$, $PRE = .07$).

Overall, there was a tendency to perceive the Black target as less similar to the self than the White target. Statements were rated similarly for all positive statements (Black Stereotypical: $M_{|SelfWhite|} = 1.53$ and $M_{|SelfBlack|} = 1.63$; White Stereotypical:

$M_{|SelfWhite|} = 1.53$ and $M_{|SelfBlack|} = 1.66$; Stereotype-Irrelevant: $M_{|SelfWhite|} = 1.50$ and $M_{|SelfBlack|} = 1.39$). Ratings for the White target were more similar to the self than ratings for the Black target for all negative statements (Black Stereotypical: $M_{|SelfWhite|} = 1.72$ and $M_{|SelfBlack|} = 1.96$, $F(1, 34) = 4.49$, $p < .05$; White Stereotypical: $M_{|SelfWhite|} = 1.71$ and $M_{|SelfBlack|} = 1.96$, $F(1, 34) = 5.70$, $p < .05$; Stereotype-Irrelevant: $M_{|SelfWhite|} = 1.51$ and $M_{|SelfBlack|} = 1.81$, $F(1, 34) = 8.41$, $p < .01$). There was also a similarity difference for neutral White stereotypical statements ($M_{|SelfWhite|} = 1.52$ and $M_{|SelfBlack|} = 1.81$; $F(1, 34) = 6.40$, $p < .05$). The similarity effect did not reach significance for neutral Black stereotypical ($M_{|SelfWhite|} = 1.86$ and $M_{|SelfBlack|} = 1.70$) and neutral stereotype-irrelevant statements ($M_{|SelfWhite|} = 1.59$ and $M_{|SelfBlack|} = 1.58$)[24].

Focus contrast were computed comparing the perspective by similarity interaction for negative Black stereotypical statements and positive White stereotypical statements. Neither effect depended on perspective-taking. In addition, when comparing the stereotyping by target effect for negative statements, there was no effect of perspective.

Of most theoretical interest was how perspective-taking affected ratings of similarity for targets. There was a Similarity of Target main effect (F (1, 34) = 4.55, $p < .05$, $PRE = .12$) that depended on perspective-taking (F (1, 34) = 4.48, $p < .05$, $PRE = .12$). It was predicted that under a third-person perspective-taking manipulation, participants engage in more stereotyping and view themselves as more similar to the White target and less similar to the Black target. In the first-person perspective-taking condition, participants should view themselves as more similar to both the ingroup and

[24] With Bonferroni correction, all absolute mean differences were greater than zero for all statement categories ($t's(35) = 21.84$ to 12.82, p's $< .01$).

the outgroup member. That was not the case. There was no difference in similarity ratings between the self and the Black target and the self and the White target in the third-person perspective-taking condition ($M_{|SelfWhite|}$ = 1.66 and $M_{|SelfBlack|}$ = 1.66). Instead, differences arose in the first-person where self and Black ratings were less similar than self and White ratings across statements ($M_{|SelfWhite|}$ = 1.56 and $M_{|SelfBlack|}$ = 1.78; $F(1, 34) = 9.56$, $p < .01$).[25] There were no other effects involving perspective-taking.

In order to investigate this unexpected finding further, post-hoc analyses were conducted. Table 10 represents the mean difference scores in ratings between targets. Although the overall four-way interaction failed to reach significance, there was an interest in exploring the pattern of effects. Tests represent differences from zero with a Bonferroni correction for multiple comparisons.

[25] With Bonferroni correction, all absolute mean differences were greater than zero for all statement categories (t's(35) = 14.64 to 18.70, p's < .01).

			Self - Black	Self - White	White - Black
Black Stereotypical	Positive	First-Person	.40	-.19	.59*
		Third-Person	.21	-.47	**.68***
	Neutral	First-Person	-.27	**-.90***	.63*
		Third-Person	.000	**-.79***	.79
	Negative	First-Person	-1.01	-.48	-.52
		Third-Person	-.46	-.26	-.19
White Stereotypical	Positive	First-Person	.31	.30	.01
		Third-Person	.33	.54	-.21
	Neutral	First-Person	-.32	.09	-.42
		Third-Person	.04	.65	**-.60***
	Negative	First-Person	**-1.05***	-.25	**-.81***
		Third-Person	**-.84***	.00	**-.83***
Stereotype-Irrelevant	Positive	First-Person	-.16	-.51	.35
		Third-Person	-.05	-.38	.33
	Neutral	First-Person	.14	-.05	.19
		Third-Person	.37	-.05	.42
	Negative	First-Person	-.33	-.09	-.24
		Third-Person	**-.65***	-.21	-.43

Table 10. Rated similarity between the self, the ingroup member and the outgroup members. The absolute difference of the numbers indicates the strength of the projection and the sign indicates the direction of the effect. Negative numbers indicate higher agreement for the ingroup or outgroup member compared with the self. Test of difference from zero is indicated by * $p < .01$. Bonferroni corrections set the $p < .003$.

In general, participants rate targets similarly on positive statements in both perspective-conditions with one exception. Participants in the third-person rate the White target as agreeing more with positive Black stereotypical statements than the Black target ($t(16) = 4.64$, $p < .003$). For neutral statements, participants rate themselves similarly to the other targets for stereotype-irrelevant and White stereotypical statements. For neutral Black stereotypical statements, ratings between the Black target and the self do not differ. Participants instead rate the White target and the self differently, rating the White target as agreeing more in both perspective conditions (First-person: $t(18) = -3.65$, $p < .003$; Third-person $t(16) = -3.86$, $p < .003$). In the third-person condition, participants rate the Black target as agreeing more with neutral White stereotypical statements than the White target ($t(16) = -4.26$, $p < .003$).

For negative statements, participants rated targets similarly for Black stereotypical statements in both conditions. For negative White stereotypical statements, in both perspective conditions, ratings are less similar between the self and the Black target (First-person: $t(18) = -4.48$, $p < .003$; Third-person $t(16) = -5.13$, $p < .003$). Ratings are similar for the self and the White target. Ratings for the Black and the White target for negative White stereotypical statements are also different in both conditions (First-person: $t(18) = -4.45$, $p < .003$; Third-person $t(16) = -8.08$, $p < .003$). Interestingly, participants in the third-person, but not the first-person, had less similar ratings between themselves and the Black target for negative stereotype-irrelevant statements $t(16) = -3.43$, $p = .003$). Ratings were otherwise similar for stereotype-irrelevant statements.

Participants rate the outgroup member, on average, as more similar to the self than the White target in the third-person perspective-taking condition. In the first-person, participant's ratings are less similar between the self and the Black target the self and the White target.

APPENDIX N: SCALP DISTRIBUTIONS AND SELF ERP EFFECTS IN THE SOCIAL JUDGMENT TASK

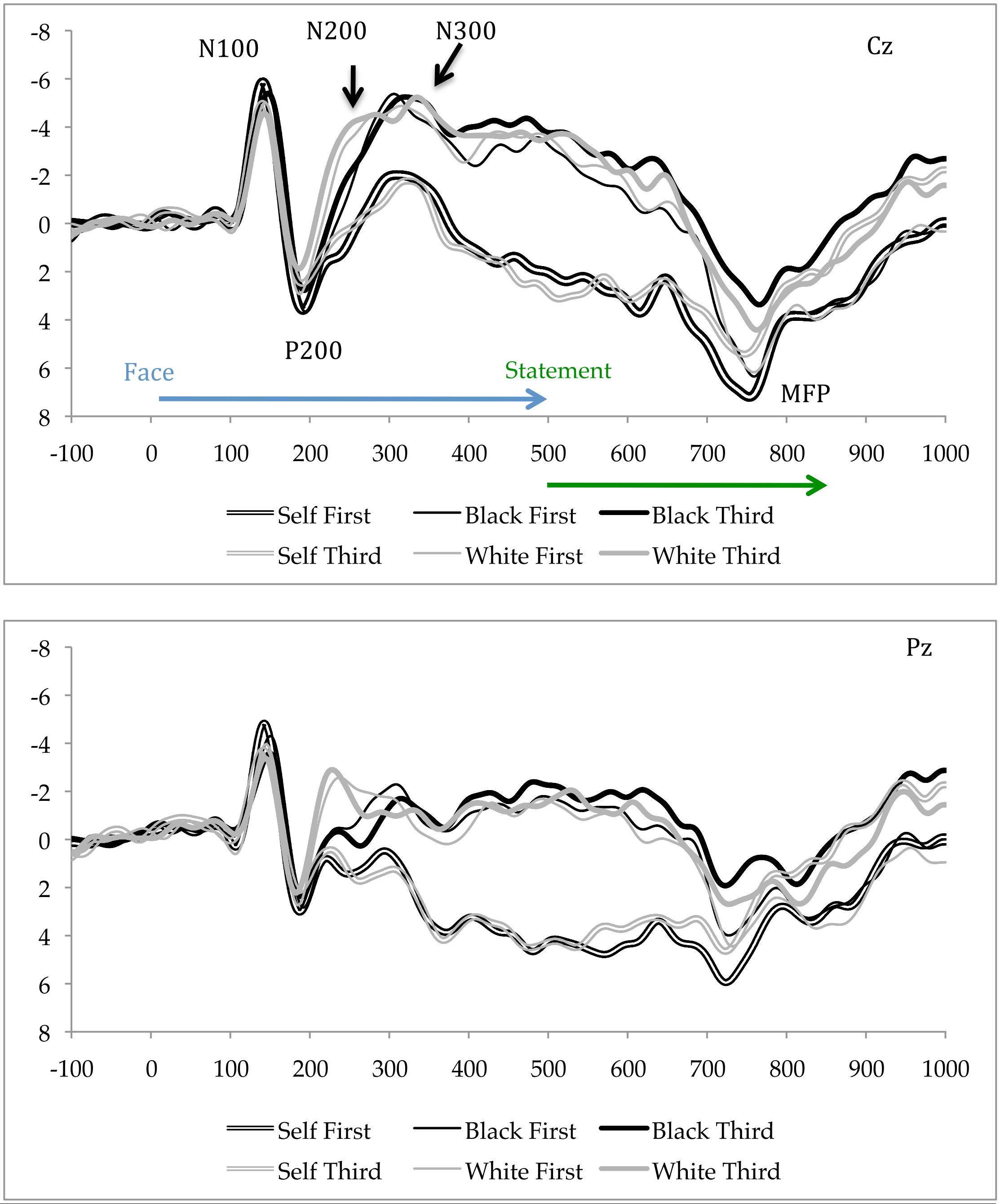


FIGURE 13. ERPs during the social judgment task. Black lines represent Black faces, gray lines represent White faces, and double lines represent self faces. Electrodes from the midline are shown at frontal (Fz), central (Cz), and parietal (Pz) locations. Component locations in the waveform are displayed on Cz. X-axis represents time in ms and Y-axis represents amplitude in μV. The blue arrow represents the face presentation and the green arrow represents the statement presentation.

N100 Amplitude. When considering the difference between self and other processing, there were no effects of target or perspective-taking. See Figure 13.

There was a Laterality main effect ($F(2, 68) = 42.14$, $p < .01$, $PRE = .53$), a Sagittal main effect ($F(2, 68) = 13.51$, $p < .01$, $PRE = .28$), and both were qualified by a Laterality x Sagittal interaction ($F(4, 136) = 8.39$, $p < .01$, $PRE = .20$). Amplitudes at the midline were always larger than amplitudes in the right or left hemisphere at all at frontal central and parietal locations. This interaction arose from slightly different scalp distribution in amplitudes. At frontal locations where amplitudes were maximal, midline had greater amplitudes than both the left and right hemisphere ($F's(1, 34) = 39.63$ and 19.31, $p's < .01$, respectively). Amplitudes were larger in the right hemisphere than the left hemisphere ($F(1, 34) = 18.14$, $p < .01$). At central locations, amplitudes at the midline were larger than in the right hemisphere ($F(1, 34) = 10.20$, $p < .01$), but the midline and the left hemisphere did not differ. Amplitudes were larger in the left hemisphere than the right hemisphere ($F(1, 34) = 10.73$, $p < .01$). At parietal locations, the midline had greater amplitudes than in the left and right hemisphere ($F's(1, 34) = 56.84$ and 43.43, $p's < .01$, respectively). The right and the left hemisphere did not differ.

P200 amplitude. When considering the difference between self and other processing (the average of P200 amplitudes to the Black and the White target), there was a Target main effect ($F(2, 68) = 3.39$, $p = .05$, $PRE = .09$). This effect did not depend on perspective-taking. Overall, amplitudes between the self and other targets did not differ ($F(1, 34) = 1.74$, $p = .20$, $PRE = .05$). Instead, there was a simple difference between the White target ($M = 3.64$ μV) and the self ($M = 4.51$ μV; $F(2, 68) = 5.92$, $p < .05$, $PRE =$

.15). The self had similarly larger amplitudes as the Black target (M = 4.39 μV). At Pz, amplitudes to the Black targets were larger than amplitudes to the White targets ($F(1, 34) = 7.48$, $p < .05$, $PRE = .18$).

This finding is preliminary evidence in support of the distinctiveness interpretation of the P200. The self was the most rare target compared with the other two targets, self presentation was 72 times and other presentation was 144 times. In addition, Black faces are more novel or distinctive to Caucasian participants who, on average, have more contact with White individuals. If participants were focusing on threatening stimuli, amplitudes to the Black faces should have been larger than amplitudes to the White faces and the self. Given that self and Black amplitudes did not differ and that amplitudes to the self were larger than amplitudes to the White face, a threat interpretation of this component is not supported by these data. Because this study does not have a threatening context or focus, it might have allowed participants more room to focus on novel, rare, or distinctive stimuli.

At the P200, there was a Laterality x Perspective-taking interaction ($F(2, 68) = 4.53$, $p < .05$, $PRE = .12$). Amplitudes were similar in each perspective-taking condition across hemispheres. The interaction arose from differences in laterality within perspective-taking. In the first-person perspective-taking, amplitudes were similar across hemispheres. In the third-person perspective-taking condition, amplitudes for these participants were smaller at the midline than in the left or right hemisphere ($F's\ (1, 34) = 4.85$ and 6.13, $p's < .01$, respectively). Amplitudes were similar in both the left and right hemisphere.

There was also a Laterality x Sagittal interaction ($F(4, 136) = 3.83$, $p < .05$, $PRE = .10$) that depended on perspective-taking condition ($F(4, 136) = 3.32$, $p < .05$, $PRE = .09$).

There were no differences in amplitudes between the perspective-taking conditions at any of the sites. This effect was similar to that outline in the Laterality x Perspective-taking interaction. There were no differences in the distribution of amplitudes for participants in the first-person perspective-taking condition. In the third-person, amplitudes at frontal locations largest over the left hemisphere compared with the midline or the right (*F's* (1, 34) = 4.53 and 3.48, *p's* < .01, respectively). Amplitudes were similar at the midline and in the right hemisphere. At central locations, amplitudes were largest over the right hemisphere compared with the midline or the left (*F's* (1, 34) = 8.04 and 10.93, *p's* < .01, respectively). Amplitudes were similar at the midline and in the left hemisphere. At parietal locations, amplitudes were also largest over the right hemisphere compared with the midline or the left (*F's* (1, 34) = 5.19 and 5.73, *p's* < .01, respectively). Amplitudes were similar at the midline and in the left hemisphere.

N200 amplitude. At Cz, there was a Target main effect (*F* (2, 68) = 19.61, *p* < .05, *PRE* = .37). Contrary to predictions, this effect did not depend on perspective-taking (*F* (2, 68) = 1.13, *p* = .32, *PRE* = .03). Amplitudes to the self (*M* = -4.16 μV) were smaller than amplitudes to the other targets ($M_{Black/White}$ = -6.51 μV; *F* (1, 34) = 27.49, *p* < .01, *PRE* = .45). Amplitudes to the self were smaller than amplitudes to the Black and White targets (*F's* (1, 34) = 17.72 and 32.35, *p's* < .01, *PRE's* = .34 and .49). At Cz, in the first-person perspective-taking condition, amplitudes were similar between the White (*M* = -6.27 μV) and the Black target (*M* = -6.29 μV; *F* (1, 18) = .001, *p* = .98, *PRE* = .00). In the third-person at Cz, amplitudes were marginally larger to the White (*M* = -7.21 μV) target than the Black (*M* = -6.31 μV; *F* (1, 16) = 3.82, *p* = .07, *PRE* = .19).

Previous work finds that N200 amplitudes correlate with attention to targets that favor deeper encoding. For instance, larger N200s have been obtained to famous as compared to non-famous faces (Bentin & Deouell, 2000), larger to ingroup targets than outgroup targets (Ito & Urland, 2003; 2005; Willadsen-Jensen & Ito, 2008), and to racially ambiguous targets than to outgroup targets (Willadsen-Jensen & Ito, 2006; Willadsen-Jensen & Ito, 2008). This deeper encoding parallels one aspect of impression formation where individuals rely on an attribute-by-attribute analysis of a target for whom participants are more motivated to individuate (Brewer, 1988; Fiske & Neuberg, 1990). In this context, self-stimuli though the most familiar target, is the target least in need of deeper encoding. Smaller amplitudes to the self compared to the other targets, replicates Study 1 and supports a deeper encoding interpretation of the N200 and fails to support a familiarity interpretation (see Tanaka et al., 2006 for an exception to this finding).

There was a Laterality main effect ($F(2, 68) = 56.18$, $p < .01$, $PRE = .62$), a Sagittal main effect ($F(2, 68) = 22.47$, $p < .01$, $PRE = .40$), and both were qualified by a Laterality x Sagittal interaction ($F(4, 136) = 10.82$, $p < .01$, $PRE = .24$). Amplitudes at the midline were always larger than amplitudes in the right or left hemisphere at frontal central and parietal locations. At frontal locations, the midline had greater amplitudes than both the left and right hemisphere ($F's(1, 34) = 20.88$ and 8.46, $p's < .01$, respectively). Amplitudes were larger in the right hemisphere than the left hemisphere (F $(1, 34) = 8.74$, $p < .01$). At central locations, amplitudes at the midline were larger than in the right hemisphere ($F(1, 34) = 36.07$, $p < .01$), but the midline and the left hemisphere did not differ. Amplitudes were larger in the left hemisphere than the right hemisphere (F $(1, 34) = 26.80$, $p < .01$). At parietal locations, the midline had greater amplitudes than in the left and right hemisphere ($F's(1, 34) = 31.89$ and 93.02, $p's < .01$, respectively). The right and the left hemisphere did not differ.

<u>N300 amplitude.</u> When considering the difference between self and other processing, there was a Target main effect (F (2, 68) = 30.60, p < .01, PRE = .47). This effect did not depend on perspective-taking. Amplitudes to the self (M = -3.30 μV) were smaller than amplitudes to the other targets ($M_{Black/White}$ = -6.44 μV; F (1, 34) = 34.31, p < .01, PRE = .50). Amplitudes to the self were smaller than amplitudes to both the Black (M = -6.48 μV) and the White target (M = -6.44 μV; $F's$ (1, 34) = 39.73 and 34.31, $p's$ < .01, $PRE's$ = .54 and .50). Amplitudes did not differ between White and Black targets at Cz.

There was a Sagittal main effect (F(2, 68) = 21.38, p < .0., PRE = .39). Amplitudes were smallest at parietal locations compared to central and frontal locations ($F's$(1, 34) = 14.62 and 51.34, $p's$ < .01, respectively). Amplitudes at frontal and central locations were similar.

<u>MFP amplitude.</u> The largest difference in amplitudes between targets for MFPs was observed at Fz, so this is the site at which self-other analyses were run. When considering the difference between self and other processing, there was a Target main effect (F (2, 68) = 3.57, p < .05, PRE = .10). This effect did not depend on perspective-taking (F (2, 68) = 1.86, p = .17, PRE = .05). Amplitudes to the self (M = 7.20 μV) were larger than amplitudes to the other targets ($M_{Black/White}$ = 5.95 μV; F (1, 34) = 5.04, p < .05, PRE = .13). Amplitudes to the self were larger than amplitudes to the Black (M = 5.82 μV) and White targets (M = 6.08 μV; $F's$ (1, 34) = 34.12 and 3.85, p < .01 and p = .06, $PRE's$ = .13 and .10). Amplitudes did not differ at Fz between the White and the Black target.

At the P200, there was a Laterality main effect (F(2, 68) = 4.26, p < .05, PRE = .11) that was qualified by a Laterality x Perspective-taking interaction (F(2, 68) = 3.66, p < .05, PRE = .10). Amplitudes were different across hemispheres in the different perspective-taking conditions. At frontal sites, amplitudes did not differ between perspective-taking conditions, but were directionally larger in the first-person perspective-taking condition. At the midline and in the left hemisphere, amplitudes were larger in the first-person perspective-taking compared to the third-person perspective-taking condition (*F's* (1, 34) = 7.03 and 4.83, *p's* < .01, respectively). Within perspective-taking conditions, amplitudes did not differ across hemispheres. In the third-person perspective-taking condition, amplitudes were smaller at the midline than in the left or right hemisphere (*F's* (1, 34) = 11.85 and 8.33, *p's* < .01, respectively).

There was also a Sagittal main effect (*F*(2, 68) = 11.89, *p* < .01, *PRE* = .26) and a Laterality x Sagittal interaction (*F*(4, 136) = 8.78, *p* < .01, *PRE* = .21) that depended on perspective-taking condition (*F*(4, 136) = 3.30, *p* < .05, *PRE* = .09). The effect of larger amplitudes in the first-person perspective-taking condition compared to the third-person perspective-taking condition only reached significance at frontal locations at the midline and in the right hemisphere (*F's*(1, 34) = 9.73 and 11.28, *p's* < .01, respectively) and at central locations at the midline and in the left hemisphere (*F's*(1, 34) = 5.96 and 3.85, *p* < .05 and *p* = .06, respectively).

APPENDIX O: ERP EFFECTS IN THE PASSIVE-VIEWING TASK FOR THE SECOND STUDY

The passive-viewing task was included to determine if perspective-taking effects observed at the N200 could generalize from the specific Black and White target for whom the perspective was taken to other Black and White targets in general. Previous theorizing by Galinsky and Moskowitz (2000) suggests that self-other overlap created through first-person perspective-taking should not only increase positive evaluations of the target for which the self-concept was activated, but also generalize to the group as a whole. If the effects of perspective-taking generalize to ingroup and outgroup members effects should be similar at the N200 in both the social judgment task and the passive-viewing task.

Faces for the passive-viewing task were the same as those used in passive-viewing task in Study 1, excluding the two faces that were used in the social judgment task (task 1). The passive-viewing task was included to determine whether perspective-taking effects observed for one target generalize to group. Galinsky and Moskowitz (2000) found that effects of perspective-taking generalized from a single elderly individual to implicit ratings of the elderly. The passive-viewing task provided the opportunity to explore whether perspective-taking effects found at the neural level to a single target of a group would also be observed for the group in general. To ensure that any perspective-taking effects in the passive-viewing task were not based solely on viewing the targets used in the first task, the two individuals who were shown in the social judgment task were excluded, leaving 9 Black and 9 White faces (see Study 1 for piloting information).[26]

These 18 faces were judged to be Black or White by over 85 % of the participants (M_{Black} = 88.00 % and M_{White} = 90.67 %; $t(16) = .48$, $p = .64$). Participant's were equally confident in their ethnicity ratings of these faces (M_{Black} = 8.26 and M_{White} = 8.11; $t(16) = .71$, $p = .48$). Selected photos were rated as neutral by the majority of pilot participants (M_{Black} = 77.77 % and M_{White} = 69.71 %; $t(16) = 1.30$, $p = .21$). Faces were rated as equal in attractiveness (M_{Black} = 4.02 and M_{White} = 3.92; $t(16) = .28$, $p = .79$).

In the passive-viewing task, the face was shown for 500 ms followed by a 1000 ms ITI. In this presentation window, four distinct deflections were revealed from visual inspection of the averages: the N100 ($M_{latency}$ = 138 ms), P200 ($M_{latency}$ = 188 ms), N200 ($M_{latency}$ = 288 ms) and a positive-slow wave (PSW; $M_{latency}$ = 489 ms). Peak component amplitudes for the N100, P200, and N200 were scored for each participant in each condition (Black First-Person, White First-Person, Self First-Person, Black Third-Person, White Third-Person, and Self Third-Person,) at 9 scalp sites (Fz, F3, F4, Cz, C3, C4, Pz, P3, and P4) by locating the maximal negative deflections between 70 - 180 ms (N100) and 180 - 300 ms (N200) and the maximal peak positive deflection between 120 - 220 ms (P200). The PSW was a broad deflection and the peak of the PSW was not well defined. Therefore, the average amplitude from 300 to 650 ms was computed for this component.

As in the social judgment task, analyses were run with an initial focus on the ingroup/outgroup differences for each component. To investigate this, all components were analyzed with separate 2 (Target: Black, White) x 3 (Lateral Sites: Right, Midline,

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[26] 21 participants saw the two faces used during the social judgment task during the passive-viewing task. Those faces were excluded from ERP analyses and averages. These faces were only shown four times each. Of the 21 participants, 11 were in the first-person condition and 10 were in the third-person condition.

Left) x 3 (Sagittal Site: Frontal, Central, Parietal) x 2 (Perspective-taking: First-Person, Third-Person) repeated measures GLMs.[27]

To investigate differences between attention to the self and attention to the other targets all components were analyzed with separate 3 (Target: Black, White, Self) x 2 (Perspective-taking: First-Person, Third-Person) repeated measures GLMs, conducted at the maximal component. Focused contrasts were run on: (1) the difference in amplitudes between the self and other targets, (2) the difference in amplitudes between the self and the White target, and (3) the difference in amplitudes between the self and the Black target.

[27] Effects did not depend on participant gender.

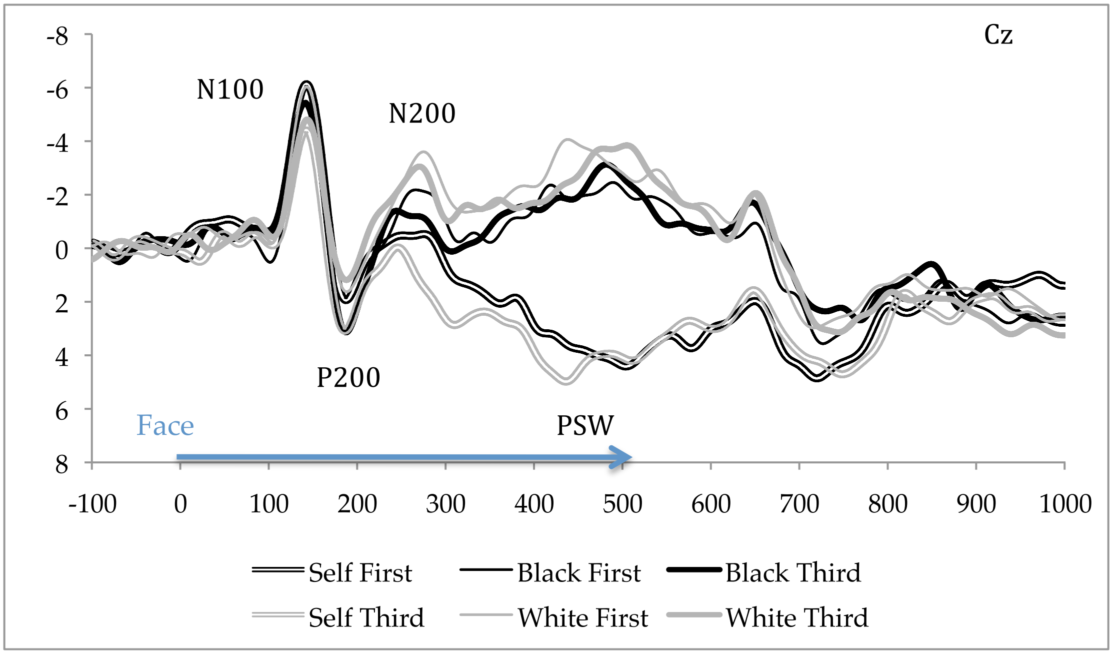

FIGURE 14. ERPs during the passive-viewing task. Black lines represent Black faces, gray lines represent White faces, and double lines represent self faces. Electrodes from the midline are shown at frontal (Fz), central (Cz), and parietal (Pz) locations. Component locations in the waveform are displayed on Cz. X-axis represents time in ms and Y-axis represents amplitude in μV. The blue line represents face presentation and following this presentation was a 1000 ms ITI.

<u>N100 Amplitude.</u> The N100 in the passive-viewing task had a mean latency (138 ms; see Figure 14)[28]. N100 amplitudes were maximal at Cz. There were no effects of target or perspective-taking at the N100.

When considering the difference between self and other processing, there were no effects of target or perspective-taking.

There was a Laterality main effect ($F(2, 66) = 30.50$, $p < .01$, $PRE = .48$), a Sagittal main effect ($F(2, 66) = 34.34$, $p < .01$, $PRE = .51$), and both were qualified by a Laterality x Sagittal interaction ($F(4, 133) = 9.19$, $p < .01$, $PRE = .22$). Amplitudes at the midline were always larger than amplitudes in the right or left hemisphere at all at frontal central and parietal locations. At frontal locations, the midline had larger amplitudes than both the left (this effect was marginal) and right hemisphere ($F's(1, 33) = 3.50$ and 8.54, $p = .07$ and $p < .01$, respectively). Amplitudes were similar in the right and left hemisphere. At central locations, amplitudes at the midline were larger than in the left and right hemisphere ($F's(1, 33) = 37.73$ and 45.72, $p's < .01$, respectively). Amplitudes were larger in the left hemisphere than the right hemisphere ($F\ (1, 33) = 7.12$, $p < .01$). At parietal locations, the midline had greater amplitudes than in the left and right hemisphere ($F's(1, 33) = 33.31$ and 46.18, $p's < .01$, respectively). Amplitudes were larger in the left hemisphere than the right hemisphere ($F\ (1, 33) = 8.78$, $p < .01$).

<u>P200 amplitude.</u> The P200 had a mean latency of 188 ms that was maximal at Pz (see Figure 14).

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[28] One participant in the first-person perspective-taking failed to complete the passive-viewing task, leaving 18 participants in the first-person condition and 17 in the third-person condition.

As expected, across electrodes, there was a Target main effect ($F(1, 33) = 7.90$, $p < .01$, $PRE = .19$). P200s were larger, more positive, to Black targets ($M = 3.91$ μV) than to White targets ($M = 2.68$ μV).

The target effect was qualified by a Sagittal x Target interaction (F (2, 66) = 4.12, $p < .05$, $PRE = .11$). Amplitudes to Black targets were larger than amplitudes to White targets at frontal ($M_{Black} = 3.38$ μV and $M_{White} = 1.69$ μV) and central locations ($M_{Black} = 4.02$ μV and $M_{White} = 2.86$ μV; $F's$ (1, 33) = 12.43 and 6.20, $p's < .05$, $PRE's$ = .27 and .16), but this effect was marginal at parietal locations ($M_{Black} = 4.33$ μV and $M_{White} = 3.49$ μV; $F(1, 33) = 3.21$, $p = .08$, $PRE = .09$).

When considering the difference between self and other processing, there was a marginal Target main effect (F (2, 66) = 2.32, $p = .11$, $PRE = .07$). This effect did not depend on perspective-taking. Amplitudes to the self ($M = 4.04$ μV) did not differ from amplitudes to the other targets ($M_{Black} = 4.60$ μV and $M_{White} = 3.51$ μV). At Pz, the target effect was driven by larger amplitudes to Black targets than to White targets (F (1, 33) = 4.96, $p < .05$, $PRE = .13$).

Amplitudes to the Black targets were larger than amplitudes to the White targets in both perspective-taking conditions. There were no self/other difference in attention at Pz.

At the P200, there was a Laterality x Perspective-taking interaction ($F(2, 66) = 4.01$, $p < .05$, $PRE = .11$). Amplitudes were similar in each perspective-taking condition across hemispheres. In the first-person perspective-taking, amplitudes were similar across hemispheres. However, amplitudes in the right hemisphere were smaller than amplitudes in the left hemisphere (F (1, 33) = 4.62, $p < .05$). Amplitudes were similar in the right hemisphere and at the midline. In the third-person perspective-taking condition, amplitudes were smaller in the left hemisphere than in the right hemisphere (F (1, 33) = 6.11, $p < .01$). Amplitudes were similar between the midline and the left and right hemisphere.

There was a Sagittal main effect (F (2, 66) = 15.45, $p < .01$, *PRE* = .32) that was qualified by a Sagittal x Perspective-taking interaction (F(2, 66) = 3.40, $p < .05$, *PRE* = .09). Amplitudes were similar in each perspective-taking condition from frontal through parietal locations. In the first-person perspective-taking, amplitudes were similar across hemispheres. However, amplitudes at frontal locations were smaller than amplitudes at central locations (F (1, 33) = 9.50, $p < .01$). Amplitudes were similar at frontal and parietal locations and at central and parietal locations. In the third-person perspective-taking condition, amplitudes were larger at parietal locations than at central or frontal locations (*F's* (1, 33) = 18.20 and 9.87, *p's* < .01). Amplitudes at central locations were larger than at frontal locations (F (1, 33) = 13.10, $p < .01$).

There was also a Laterality x Sagittal interaction (F(4, 136) = 3.83, $p < .05$, *PRE* = .10) that depended on perspective-taking condition (F(4, 136) = 3.32, $p < .05$, *PRE* = .09). There were no differences in amplitudes between the perspective-taking conditions at any of the sites. This effect was similar to that outline in the Laterality x Perspective-taking interaction. There were no differences in the distribution of amplitudes for participants in the first-person perspective-taking condition. In the third-person, amplitudes at frontal locations largest over the left hemisphere compared with the midline or the right (*F's* (1, 34) = 4.53 and 3.48, *p's* < .01, respectively). Amplitudes were similar at the midline and in the right hemisphere. At central locations, amplitudes were largest over the right hemisphere compared with the midline or the left (*F's* (1, 34) = 8.04 and 10.93, *p's* < .01, respectively). Amplitudes were similar at the midline and in the left hemisphere. At parietal locations, amplitudes were also largest over the right hemisphere compared with the midline or the left (*F's* (1, 34) = 5.19 and 5.73, *p's* < .01, respectively). Amplitudes were similar at the midline and in the left hemisphere.

N200 amplitude. The N200 had a mean latency of 258 ms that was maximal at Fz (see Figure 14).

Considering first attention differences between the White and the Black targets across electrodes, there was a main effect of Target ($F(1, 33) = 6.00$, $p < .01$, $PRE = .15$), with larger (more negative) N200s to White than the Black faces ($M = -2.03$ μV, $M = -3.96$ μV). Unlike the first task, this effect did not depend on perspective-taking condition ($F(1, 33) = .05$, $p = .83$, $PRE = .001$; First-person: $M_{White} = -3.92$ μV, $M_{Black} = -2.90$ μV, Third-person: $M_{White} = -4.01$ μV, $M_{Black} = -3.15$ μV).

In the first task, participants viewed pictures of the Black and the White target that they wrote essays for. In the passive-viewing task, participants saw unfamiliar Black and White targets and were not asked to respond to these targets in anyway. It appears that perspective-taking effects on early selective attention observed in the first task, do not, in this case, generalize to the passive-viewing task. Instead, it appears that decreases in race differences in attention between White and Black targets observed in the first-person perspective-taking condition occurred only for the target for whom self-reference was activated. In the passive-viewing task, amplitudes were larger to White than Black targets in both the first-person and third-person perspective-taking conditions.

When considering the difference between self and other processing at the maximal electrode (Fz), there was a Target main effect (F (2, 66) = 7.44, $p < .01$, PRE = .18). This effect did not depend on perspective-taking (F (2, 66) = 1.26, $p = .29$, PRE =

.04). As in the first task, amplitudes to the self (M = -2.80 μV) were smaller than amplitudes to the other targets ($M_{Black/White}$ = -4.43 μV; F (1, 33) = 8.02, p < .01, PRE = .20). Amplitudes to the self were marginally smaller than amplitudes to the Black targets (M = -3.85; F (1, 33) = 2.88, p = .10, PRE = .08). Amplitudes to the self were smaller than amplitudes to White targets (M = -5.02; F (1, 33) = 12.55, p < .01, PRE = .28). At Fz, amplitudes to the White targets were larger than amplitudes to the Black targets (F (1, 33) = 6.27, p < .05, PRE = .16).

There was a Laterality main effect (F(2, 66) = 18.64, p < .01, PRE = .36), a Sagittal main effect (F(2, 66) = 12.71, p < .01, PRE = .28), and both were qualified by a Laterality x Sagittal interaction (F(4, 132) = 8.10, p < .01, PRE = .20). Amplitudes at the midline were always larger than amplitudes in the right or left hemisphere at frontal, central, and parietal locations. At frontal locations, the midline had greater amplitudes than the left hemisphere (F(1, 33) = 5.57, p < .05). Amplitudes were similar at the midline and in the right hemisphere and similar between the left and right hemispheres. At central locations, amplitudes at the midline were larger than in the left or right hemisphere ($F's$(1, 33) = 21.17 and 24.80, $p's$ < .01). Amplitudes were marginally larger in the right hemisphere than the left hemisphere (F (1, 33) = 3.68, p = .06). At parietal locations, the midline had greater amplitudes than in the left and right hemisphere ($F's$(1, 33) = 10.38 and 31.04, $p's$ < .01, respectively). Amplitudes were larger in the right hemisphere than the left hemisphere (F (1, 33) = 10.67, p < .01).

<u>PSW mean amplitude.</u> The PSW can be seen as the positive-going deflection with a mean latency within 300 to 650 ms and was maximal over parietal locations (see Figure 14).

There was a Target main effect ($F(1, 34) = 8.00$, $p < .01$, $PRE = .20$). Past work related to the P300, a component that spans this timeframe and is thought to contribute to positive slow waves, finds fluctuations in amplitudes as a function of the arousing properties of a stimulus (e.g. Dolcos & Cabeza, 2002; Eimer et al., 2003). Outgroup members are thought to arouse anxiety for individuals (Stephan & Stephan, 1985). If P300s are sensitive to the arousing nature of a stimulus P300s should be larger to outgroup Blacks. Mean amplitudes were larger to the Black targets ($M = -.33$ μV) than the White targets ($M = -1.37$ μV). This effect did not differ as a function of perspective-taking ($F(1, 33) = .38$, $p = .54$, $PRE = .01$).

Analyses were conducted at Pz and P4 where mean amplitudes were the largest. Initial analyses found that the effects did not change between these sites. Effects from Pz will be reported in the text. When considering the difference between self and other processing, there was a Target main effect ($F(2, 66) = 58.74$, $p < .01$, $PRE = .64$). This effect did not depend on perspective-taking. Mean amplitudes to the self ($M = 5.40$ μV) were larger than mean amplitudes to the other targets ($M_{Black/White} = .35$ μV; $F(1, 33) = 76.12$, $p < .01$, $PRE = .70$). Amplitudes to the self were larger than mean amplitudes to the Black ($M = .82$ μV) and the White targets ($M = -.13$ μV; $F's(1, 33) = 63.24$ and 73.96, $p's < .01$, $PRE's = .66$ and $.69$). At Pz, mean amplitudes were larger to the Black target than the White target ($F(1, 33) = 5.66$, $p < .05$, $PRE = .15$).

Self faces may have been more arousing then the other targets but for slightly different reasons then the Black target. Arousal relates to the how reactive an individual is to stimuli. Participants may have generally been more reactive to pictures of themselves then to pictures of other targets. In addition, outgroup faces are more arousing then ingroup stimuli, leading to larger mean amplitudes for Black targets compared with the White targets.

There was a Laterality main effect ($F(2, 66) = 34.25$, $p < .01$, $PRE = .51$), a Sagittal main effect ($F(2, 66) = 57.49$, $p < .01$, $PRE = .64$), and these effects were qualified by the Laterality x Sagittal interaction ($F(4, 132) = 4.77$, $p < .01$, $PRE = .13$). Mean amplitudes were greater at Parietal locations and in the right hemisphere at all sites. At frontal locations, the right hemisphere had larger mean amplitudes than the midline hemisphere and the left ($F's(1, 33) = 26.46$ and 16.57, $p's < .01$). Mean amplitudes were similar at the midline and in the left hemisphere and similar between the left and right hemispheres. At central locations, mean amplitudes in the right hemisphere were larger than at the midline or left hemisphere ($F's(1, 33) = 44.84$ and 24.33, $p's < .01$). Mean amplitudes were larger in the left hemisphere than at the midline ($F (1, 33) = 12.10$, $p < .01$). At parietal locations, the right hemisphere had larger mean amplitudes than the midline and left hemisphere ($F's(1, 33) = 34.40$ and 25.44, $p's < .01$, respectively). Mean amplitudes were similar at the midline and in the left hemisphere.

Self Versus Other Processing In ERPs

Self other differences emerged around 180 ms after face presentation. In the P200, amplitudes to the self were undifferentiated from the Black target (social judgment task) and Black unfamiliar targets (passive-viewing task). Two hypotheses have been put forth regarding the psychological process underlying the P200. Greater allocation of attention to males and Blacks by predominantly White participants at the P200 led researchers to suggest P200s reflect orienting to more threatening and/or salient social group (Ito & Urland, 2003; Kubota & Ito, 2009). In both the social judgment and the passive-viewing task, amplitudes to the self were similar to those of the Black targets and both had larger amplitudes than to the White targets. This is not the pattern expected for a component that reflects attention to threatening stimuli. The self is the least threatening stimulus, particularly in comparison to an outgroup target. In terms of these stimuli, self targets are arguably the most salient stimulus. Outgroup members are also particularly salient but for different reasons. Outgroup members are more novel than ingroup faces and in addition, outgroup targets are shown to stand out in a crowd. Levin (2000) found that Black faces pop out in an array of White faces, finding greater ease and speed for locating a Black face in this array. Because of self focus, the self might pop out in a crowd of other faces (see for example, Gibbons, 1990). Results from this work support a salience or distinctiveness interpretation of the P200.

At the N200, in the social judgment task (N200 and N300) and in the passive-viewing task, N200s were smaller to the self than to the other targets. These effects replicate previous work by Keyes and colleagues (2010). Keyes and colleagues presented participants with pictures of themselves, their friend, and a stranger, N200s at frontal and central locations were smallest to self faces compared to both the friend and the stranger. Friend and stranger did not differ. When comparing self-other differences at parietal sites, N200s were larger to the self than to the other targets (self versus friend only reached significance in the right hemisphere). The temporoparietal effects observed by Keyes and colleagues (2010) mirror those found by Tanaka and colleagues (2006); amplitudes to the self are larger than amplitudes to the other targets.

An interpretation of the present work and the findings of Keyes et al. (2000) is that participants are extremely familiar with themselves and do not need to process themselves in a particularly deep manner in order to make the judgments required in the social judgment task. Moreover, in the social judgment task participants are presumably equally familiar to the White and Black target. Although on average Caucasian participants are more familiar with White faces than Black faces, the participants were introduced to the Black target before the study both visually and in terms of background information. N200s were still larger to White than Black targets. Participant might devote more cognitive resources to deeper encoding of ingroup members than outgroup members at this point in processing. This conceptualization of the N200, as reflecting devotion of more attentional resources to promote deeper encoding of the target would predict larger N200s to strangers than to friends. This effect was also observed by Keyes et al. (2010) at frontal locations. This review coupled with the self/other encoding differences found in Study 1 and Study 2, support a deeper processing interpretation of the N200.

Appendix P: The Relationship Between Attention to Ingroup and Outgroup Targets and Agreement In The Social Judgment Task

As in Study 1, the relationship between attention to the ingroup and outgroup member and behavioral judgments were correlated. Behavioral judgments consisted of the ratings of agreement with the statements. Parallel race differentiation contrasts were computed in the ERP components at the electrode site where component amplitudes were maximal. The race main effect contrasts in the N100, P200, N200[29], and MFP in the social judgment task and the N100, P200, N200, and PSW for the passive-viewing task were calculated as the difference in processing to Black and White targets. In addition, the difference in explicit ratings of liking (White – Black) and the difference in explicit ratings of similarity (White – Black) are correlated with ERPs in the both tasks[30].

In the social judgment task two main behavioral predictions were supported (Hypotheses 2B and 3). It was predicted that participants would rate the Black target as agreeing more with negative statements and the White target as agreeing more with positive statements (Hypothesis 2B). This valence by target effect was supported in these data. Second, it was hypothesized that participants would rate the Black target especially high on Black stereotypical negative statements compared with the White

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[29] There were no correlations between N300s and agreement or between N300s and similarity in agreement.

[30] Helping was excluded from these correlations because there were not enough subjects to achieve reliable results.

target (Hypothesis 3). This effect was supported in these data. It was predicted that these effects would depend on perspective-taking condition, such that the target by stereotypicality by valence interaction would be observed in the third-person perspective-taking condition and not in the first-person.

Although these effects in overall agreement did not differ as a function of perspective-taking, there was still interest in how individual differences in these ratings in each perspective-taking condition would relate to individual differences in attention to the ingroup and outgroup member. Therefore, correlations are run for these two predicted and supported effects in agreement.

For the valence by target interaction, the difference in rated agreement between the White and the Black target and the Black and White target were calculated separately for positive and negative statements, respectively. Contrasts were calculated to suggest that the ingroup member agrees with positive statements more than the outgroup member. For negative statements, contrasts were calculated such that a positive difference would reflect higher rated agreement for the outgroup member than the ingroup member. These contrasts reflect general findings that individuals hold negative attitudes towards outgroup members, therefore ascribing them higher negative traits and behaviors, and generally positive attitudes towards ingroup members (Allport, 1954; Brewer, 1979).

To evaluate individual differences in prejudicial stereotyping, contrast were computed to reflect the degree to which the outgroup member was rated to agree more with negative Black stereotypical statements compared to the ingroup member. An example of a Black stereotypical negative statement is: how much does the target agree with statement, has sex with someone on a first date? Stereotypes about the ingroup tend to be positive (Park & Judd, 1990). Positive White stereotypical statements were items such as: is proud to be an American and thinks personal hygiene is very important. To evaluate this form of ingroup favoritism, contrasts were computed to reflect agreement in favor of the White target on positive White stereotypical statements. See Table 11 for correlations.

		N100 Black –White		P200 Black – White		N200 White – Black		MFP White – Black	
		Third $n = 17$	First $n = 19$	Third $n = 17$	First $n = 19$	Third $n = 17$	First $n = 19$	Third $n = 17$	First $n = 19$
Valence x Target									
	Negative Black - White	-.11 (.66)	.03 (.90)	-.13 (.63)	-.12 (.64)	-.22 (.40)	-.03 (.91)	-.10 (.69)	.11 (.66)
	Positive White – Black	.14 (.59)	-.30 (.21)	.07 (.78)	.32 (.19)	-.16 (.54)	-.01 (.95)	-.24 (.35)	.04 (.87)
Valence x Stereotypicality									
	Black Stereotypical Negative (Black – White)	-.02 (.93)	.15 (.53)	-.22 (.40)	.02 (.94)	-.19 (.47)	-.21 (.39)	-.14 (.59)	-.01 (.96)
	White Stereotypical Positive (White – Black)	.14 (.59)	-.07 (.77)	-.04 (.88)	.38 (.11)	-.13 (.62)	.02 (.94)	**-.58* (.02)**	-.07 (.79)
Liking White - Black		-.03 (.90)	-.09 (.71)	.26 (.32)	.18 (.47)	.16 (.55)	-.06 (.81)	.09 (.74)	-.18 (.47)
Similarity White - Black		.06 (.82)	.14 (.57)	.24 (.36)	-.27 (.26)	.24 (.35)	.04 (.86)	.19 (.47)	-.03 (.90)

Table 11. Estimating the relationship between attention to the Black and White target in the social judgment task and bias in rated agreement. Correlations and (p-values) are listed. Recall that the N100 and N200 are negative-going components so negative correlations represent larger amplitudes. * $p < .01$, $^{+}$ $p < .1$.

These correlations produced only one relationship. There were a number of correlations conducted in this investigation as a means of exploring the pattern of the relationships; however, given the number of correlations the weight one can give in interpreting its meaning must be tempered in light of the number of other correlations that were non-significant (Type 1 error). A bonferroni adjustment sets the p-value at .003 for both groups. P-values will be reported and all relationships reaching .05 will be discussed for exploratory purposes. The larger the race difference in MFPs (larger to the White target than the Black target) the less the difference between the White and Black target on White stereotypical statements but only in the third-person perspective-taking condition ($r(17) = -.58$, $p < .05$, see Table 11). To determine whether this relationship is unique to the goal process, correlations were conducted across participants as well. This relationship was no longer significant across participants.

Next correlations were computed between race differences in the ERPs and similarity in ratings between the self and the other targets. For similarity between the self and the targets, the absolute difference between ratings for the self and the target were calculated. Smaller numbers reflect greater similarity in ratings between the self and the targets. Calculations for both statements were conducted to reflect more stereotypical prejudice in viewed similarity. For negative Black stereotypical statements, calculations were conducted to reflect a general tendency to view the self and the White target as more similar and agreeing less with Black stereotypical statements. This difference was subtracted from the tendency to differentiate the self from the Black target. Larger numbers suggest that the Black target and the self were viewed as less similar on negative Black stereotypical statements compared with the self and the White target. For positive White stereotypical statements, because the White target was part of the participant's ingroup there should be a tendency to view the self and the White target as similar on these statements at least compared to the Black target and the self. Therefore, the absolute difference in ratings between the self and the White target were subtracted from the absolute difference in ratings between the self and the Black target. Larger numbers suggest that the Black target and the self were viewed as less similar on positive White stereotypical statements compared with the self and the White target.

		N100 Black –White		P200 Black – White		N200 White – Black		MFP White – Black	
		Third $n = 17$	First $n = 19$	Third $n = 17$	First $n = 19$	Third $n = 17$	First $n = 19$	Third $n = 17$	First $n = 19$
Similarity to Self									
	| Self – White |	-.02 (.94)	-.22 (.37)	-.19 (.47)	-.14 (.56)	**-.52* (.03)**	.07 (.78)	.21 (.43)	.26 (.28)
	| Self – Black |	-.18 (.48)	-.24 (.32)	-.17 (.53)	-.08 (.75)	-.32 (.21)	-.17 (.48)	-.17 (.51)	.19 (.45)
Valence x Stereotypicality									
	Black Stereotypical Negative | Self – Black | – | Self - White |	-.13 (.62)	.19 (.43)	-.04 (.87)	-.23 (.34)	.13 (.62)	-.26 (.29)	-.26 (.32)	-.06 (.81)
	White Stereotypical Positive | Self – Black | – | Self - White |	-.05 (.86)	-.34 (.16)	.16 (.53)	**.70* (.001)**	.30 (.24)	-.37 (.12)	-.33 (.19)	-.11 (.66)

Table 12. Estimating the relationship between attention to the Black and White target in the social judgment task and similarity in agreement. Correlations and (p-values) are listed. Recall that the N100 and N200 are negative-going components so negative correlations represent larger amplitudes. * $p < .01$, $^{+}$ $p < .1$.

For correlations with similarity in ratings and ERPs in the social judgment task, for participants in the third-person, the more attention devoted to the White target compared with the Black target at the N200 the less similar participants rate themselves to the White target (self/White: $r(17) = -.52$, $p < .05$, see Table 12). When comparing this relationship across perspective-taking for all 36 participants, the relationship was no longer significant ($r(36) = -.20$, $p = .26$). In addition, there was a relationship between P200s and similarity ratings. The greater the race difference at the P200, the more participants distance themselves from the Black target than from the White target on positive White stereotypical statements ($r(19) = .70$, $p < .01$). This relationship was marginal across participants ($r(36) = .31$, $p < .07$).

Correlations between agreement and similarity and ERPs were also examined for ERPs in the passive-viewing task. Recall that in Study 1, spontaneous activity in ERPs to unfamiliar Black and White targets related to use of race in the individuation task. In terms of agreement, there are very few correlations between race differences in attention for each component and rated agreement with the statements. The smaller the difference in attention to Black targets compared with White targets, the more participants rated the White target as agreeing more with White stereotypical positive statements than Black stereotypical positive statements in the third person ($r(17) = .48$, $p = .05$, see Table 13). Again this relationship disappears when collapsing across perspective-taking.

		N100 Black –White		P200 Black – White		N200 White – Black		PSW Black – White	
		Third n=17	First n=18	Third n=17	First n=18	Third n=17	First n=18	Third n=17	First n=18
Valence x Target									
	Negative (Black – White)	-.35 (.17)	-.23 (.37)	.01 (.98)	-.06 (.81)	.04 (.87)	.30 (.23)	-.35 (.17)	.20 (.42)
	Positive (White – Black)	.18 (.48)	-.21 (.39)	-.01 (.97)	-.29 (.25)	.22 (.39)	.11 (.67)	.15 (.57)	-.21 (.40)
Valence x Stereotypicality									
	Black Stereotypical Negative (Black – White)	-.34 (.19)	-.33 (.18)	-.02 (.94)	-.10 (.68)	.11 (.67)	.25 (.32)	-.25 (.33)	-.25 (.31)
	White Stereotypical Positive (White – Black)	**.48* (.05)**	.05 (.84)	.003 (.99)	-.34 (.17)	-.25 (.33)	.04 (.89)	-.04 (.88)	.07 (.77)
Liking White - Black		-.24 (.35)	.15 (.55)	.05 (.85)	-.39 (.11)	.01 (.99)	-.40 (.10)	-.23 (.37)	-.13 (.61)
Similarity White - Black		-.17 (.52)	.25 (.31)	.30 (.24)	-.02 (.94)	.07 (.80)	.29 (.24)	-.16 (.55)	.13 (.62)

Table 13. Estimating the relationship between attention to the Black and White target in the passive-viewing task and bias in rated agreement. Correlations and (p-values) are listed. Recall that the N100 and N200 are negative-going components so negative correlations represent larger amplitudes. * $p < .01$, $^{+}$ $p < .1$.

Looking next at similarity and spontaneous activity in ERPs to Black and White targets in the passive-viewing task there were several relationships. For the N100, the less differentiation between race, the more similarity of ratings between the self and the White target ($r(17) = -.45$, $p = .07$, see Table 14). Across perspective conditions this relationship is non-significant ($r(35) = -.28$, $p = .11$). This effect was marginal. Given the number of relationships and the fact that it was not significant in the first-person perspective condition or across participants confidence in this effect is low.

At the P200, the more participants attend to the Black target compared with the White target, the greater the absolute difference in similarity of ratings between the self and the White target ($r(17) = .48$, $p = .05$) and the self and the Black target ($r(17) = .51$, $p < .05$). For participants in the first-person perspective condition there existed a marginal relationship whereby the more racial differentiation at the P200, the greater the absolute difference in similarity of ratings between the self and the White target ($r(18) = .40$, $p = .10$). Across perspective conditions, the relationship between racially biased attention at the P200 and similarity ratings between the self and the targets remained significant (Self/Black: $r(35) = .41$, $p < .05$ and Self/White: $r(35) = .41$, $p < .05$). In general, the more an individual differentiates by race at the P200, the less similar their ratings between the self and the targets become.

There was also one marginal correlation between PSWs and similarity ratings. For participants in the third-person perspective taking condition, the larger the race difference between the Black and White targets (amplitudes were larger to Black targets than White targets), the less similar participants' ratings are between themselves and the Black target ($r(17) = -.43$, $p = .08$). This effect failed to reach significance across participants.

		N100 Black –White		P200 Black – White		N200 White – Black		PSW Black – White	
		Third *n*=17	First *n*=18	Third *n*=17	First *n*=18	Third *n*=17	First *n*=18	Third *n*=17	First *n*=18
Similarity to Self									
	ǀSelf – Whiteǀ	**-.45^{+} (.07)**	-.07 (.77)	**.48* (.05)**	**.40^{+} (.10)**	-.41 (.10)	.01 (.98)	-.40 (.11)	.19 (.46)
	ǀSelf – Blackǀ	-.09 (.72)	.14 (.58)	**.51* (.04)**	.34 (.16)	.23 (.37)	-.10 (.70)	**-.43^{+} (.08)**	.23 (.36)
Valence x Stereotypicality									
	Black Stereotypical Negative ǀSelf - Blackǀ - ǀSelf - Whiteǀ	.31 (.22)	.36 (.14)	.15 (.56)	-.16 (.53)	-.30 (.24)	-.31 (.22)	-.04 (.87)	.19 (.45)
	White Stereotypical Positive ǀSelf - Blackǀ - ǀSelf - Whiteǀ	.33 (.20)	-.01 (.98)	-.09 (.73)	.08 (.75)	-.16 (.55)	-.29 (.24)	.17 (.53)	.05 (.84)

Table 14. Estimating the relationship between attention to the Black and White target in the passive-viewing task and similarity in agreement. Correlations and (p-values) are listed. Recall that the N100 and N200 are negative-going components so negative correlations represent larger amplitudes. * $p < .01$, $^{+}$ $p < .1$.

To summarize, there were no correlations between liking and similarity differences and the ERPs in either task (some effects were trending in that direction but failed to reach significance even when collapsing across participants). There existed correlations between the ERPs and agreement and similarity. In general, there were more correlations between similarity ratings and the ERPs in both the social judgment and the passive-viewing task. Unfortunately, the pattern of correlations was not consistent. For example, correlations bounced between the third-person and the first-person participants. Likewise, correlations were not consistent across ERPs or particular to one task or judgment. Given the sheer number of exploratory correlations run it is perhaps not surprising that effects bounced around. Further research should determine whether these patterns are replicable.

Before beginning this section it should be noted that given the number of exploratory correlations, interpretation of significant and marginal effects must be interpreted in the context of the number of non-significant effects. As an attempt to increase confidence in these results, only effects that remained significant across perspective-taking will be discussed. Focusing on the effects across perspective-taking allowed for an investigation of the general mechanism related to explicit ascription of prejudicial and stereotypical traits and behaviors. Attention mechanisms should be similar across goals because while encoding might change (as it did at the N200) the psychological process that underlies each component does not. Although one aspect of a psychological process might be more important when participants are in a first-person frame versus a third-person, it is difficult with the number of comparisons and the number of participants to have high confidence in those relationships. In general, however, there were more correlations with early attention as indexed by ERPs and responding for participants in the third-person perspective than in the first-person and more for similarity in judgments.

Across participants, there was a relationship between P200s in the passive-viewing task and responding. The more participants attend to the outgroup compared with the ingroup, the less similar their ratings between the self and the targets become (r's (35) = .41, p's < .05). These relationships did not reach significance when looking at P200 amplitudes separately for each target (i.e. P200s to the Black target, $r(35) = -.10$, $p = .59$, and P200s to the White target, $r(35) = -.08$, $p = .66$). Or when exploring overall P200 amplitudes across targets (r's(35) = -.13 to -.15, p's = .40 to .46). Therefore, it appears that differential attention to race relates to similarity in judgments. The more participants spontaneously attend to race, the more they view the targets as distinct from themselves. When asked to mentalize about two targets in the social judgment task this relationship no longer reaches significance.

In the social judgment task, there was a relationship between N200s and responding. Although, this effect did not reach significance across participants ($r(36) = -.20$, $p = .26$), the more attention devoted to the White target overall across participants (N200s to the White target), the less similar ratings become between themselves and the White target ($r(36) = -.33$, $p < .05$). This relationship did not reach significance for the Black target ($r(36) = -.22$, $p = .19$). It appears that racially biased depth of encoding (larger amplitudes to the White target compared with the Black target) is increasing differentiation between the self and the White target. This might be a form of individuation. For example, as an individual encodes a target more deeply, they rely less on their own ratings to make judgments. However, this appears to only be the case for the White target. It appears that some other psychological process guided similarity in judgments between the self and the Black target. No other correlations reached significance across perspective condition.

Two conclusions can be drawn from these patterns of correlations. First, N200s to the White targets in the social judgment task related to responding in both perspective-taking conditions. The more participants deeply encode the White target, the more their ratings of the White target become unique (i.e. different from the self). There was also a relationship between P200s in the passive-viewing task and responding. When passively encoding faces, the more participants differentially attend to race at the P200, the more they view the targets as distinct from themselves. It could be that the more participants notice race generally, the more they use race when making judgments about targets.

The effects of the P200 and N200 are in a similar direction in that greater racial differentiation at these components leads to less similarity in ratings between the self and Black and the White target for the P200 and the self and the White target for the N200. Although psychologically the tasks that gave rise to these relationships were very different (for the P200 passive-viewing and for the N200 social judgment), it appears that in both cases the more participants selectively attend to race, the more they view the targets as distinct from themselves.