

**Implicit and Explicit Bias at the Intersection of Race and Age**

AnnaRose Beckett-Herbert

McGill University

Supervised by Dr. Jordan Axt

### **Abstract**

For decades, scholars have investigated variation in implicit attitudes on the basis of a single social identity, such as race, age, or gender. However, intersectionality — the idea that social identities can combine to create complex and multi-categorizable targets — has only recently been considered in the implicit bias literature. The present study adds to this growing body of work by investigating attitudes towards targets varying in both race and age. Using a Multi-Category Implicit Association Test (MC-IAT), 1559 participants from the Project Implicit research pool evaluated targets across four race/age categories: younger White, older White, younger Black, and older Black. Explicit evaluations of these target groups were also measured. Results suggest that age tends to take precedence over race in shaping implicit evaluations. However, the specific pattern of evaluation depended on participants' own age and race. These findings support the idea of a dominant social category driving intersectional race-age evaluations, as well as the importance of perceiver identities in shaping such attitudes. Implications of these findings for real-world issues of racial discrimination and ageism are discussed.

Keywords: Social cognition, Implicit bias, Intersectionality, Prejudice.

### **Implicit and Explicit Bias at the Intersection of Race and Age**

A person's membership in different social groups — such as race, gender, religion, age, and socioeconomic status — can have significant impacts on a wide range of life outcomes (i.e., Bertrand & Mullainathan, 2004; Jost et al., 2009). This is due, in part, to the way in which individuals are categorized into such groups and evaluated based on group membership. Psychologists have long sought to understand the cognitive processes underpinning this categorization and evaluation (i.e., Dunham, 2018). More recently, this work has looked into both explicit and implicit forms of evaluation (De Houser et al., 2009). Explicit evaluations are relatively more aligned with conscious values and goals, and such attitudes towards different groups have historically been assessed through self-reported measures such as “feeling thermometers” (e.g., Axt, 2018). However, it has become increasingly clear that much of human cognition takes place outside of conscious awareness or control. As a result, psychologists have looked towards implicit social cognition as another source of intergroup evaluative biases. Specifically, implicit attitudes are comprised of associations that are automatically activated and can operate below the threshold of conscious awareness (Greenwald & Banaji, 1995).

The most common measure of implicit social cognition is the Implicit Association Test (IAT; Greenwald, McGhee & Schwartz, 1998). The IAT captures implicit attitudes through a differential association procedure using two concepts (such as White people and Black people) and two attributes (such as Good and Bad). Participants are presented with exemplars of each concept and use keys on their computer to sort them into four possible categories (e.g., faces of White people and “Good” words). The test hinges on the premise that when a given group is more highly associated with an attribute, response times are faster. In other words, when White people and Good words share a computer response key, participants with an implicit preference

for White people will categorize them more quickly relative to when Black people and Good words share a response key. The development of the IAT then enabled researchers to investigate implicit attitudes for many social groups (i.e., race, gender, age) as well as specific stereotypical associations (such as men with science and women with the arts), and to measure evaluations that exist in participants' mind but do not rely on self-report measures (Nosek & Smyth, 2007).

Decades of research indicate that there are hierarchical patterns of implicit group evaluation (i.e., Greenwald & Lai, 2020; Nosek, Banaji, & Greenwald, 2002). These patterns tend to favor culturally dominant groups: for example, White targets consistently evoke more positive evaluations than Black targets, as do younger targets compared to older targets. (Nosek, Banaji, & Greenwald, 2007). Such biases are not only consistent across studies, but also have been shown to be pervasive over time; for instance, researchers have found similar patterns of evaluations in data collected from the years of 2000 to 2006, as well as from 2007 to 2015 (Nosek, Greenwald & Banaji, 2007; Ratliff et al., 2022).

While this work has been informative and influential, scholars have argued that targets in the real world are not always perceived and evaluated on the basis of membership in one social group at a time. Rather, the process of stereotyping is complicated by the fact that people hold many group identities at once (Hester et al., 2020). Intersectionality theory posits that these social identities may combine to create unique stereotypes that in turn influence how people are evaluated and how they experience discrimination (Crenshaw, 1989).

Although this theory was developed by Black feminist scholars with the particular interactions between racism and sexism in mind, the logic of intersectionality can be applied to all social group identities. Indeed, intersectionality has been increasingly considered in the stereotyping and social categorization literatures, resulting in a variety of proposed models for

how intersectional stereotypes function (Petsko, Rosette & Oberhausen, 2019; Petsko et al., 2022). Adopting an intersectional approach creates for various possibilities when determining what factors guide intergroup implicit evaluations.

For one, prejudices may compound additively, meaning that bias will increase or decrease linearly depending on the number of out-groups a target is perceived to belong to (Connor et al., 2023; Turner & Brown, 1979). Another possibility is that stereotyping effects are multiplicative, such that individuals who are members of multiple stigmatized social groups experience a negative bias greater than the sum of biases associated with each of these groups (i.e., Ransford, 1980). Finally, some researchers argue that in the face of complex social stimuli, constraints on cognition drive perceivers to rely on a single identity category when evaluating targets, obscuring any potential impacts of other social identities. However, which category prevails as dominant will depend on a variety of factors, including the goals and pre-existing biases of the perceiver (Connor et al., 2023). For instance, one study by Macrae, Oberhausen, & Milne (1995) found that when participants were primed with a certain social group (i.e., woman), concepts and stereotypes associated with this group became more accessible when they evaluated a target with multiple group identities (i.e., Black woman).

Despite competing theoretical models, it is clear from existing literature that using an intersectional approach often reveals novel and complex patterns of stereotyping and discrimination. In one example, which investigated targets that vary on both race and gender, Jaxon et al. (2019) found that although men are generally thought to be more brilliant than women, children reverse this association for Black men and women. Similarly, children as young as four respond less positively to Black boys than all other race and gender group combinations, suggesting an interaction between race and gender to create uniquely negative evaluations

(Perske et al., 2019). There is also evidence for interactions between race and socioeconomic status on implicit attitudes (Moore-Berg et al., 2017; Mattan et al., 2019): for instance, being perceived as high-status can mitigate the effects of race, such that one study found no difference in implicit evaluations of high-status White and Black targets (Moore-Berg et al., 2021).

However, intersectional stereotyping research has produced some contradictory findings. While there exists compelling evidence that impressions of targets can be influenced by intersecting identities, there also appear to be some contexts in which evaluations of targets are independent of the multiple identity groups to which they belong (Petsko et al., 2022). This is particularly true of research examining the intersection of race and age. Some scholars suggest that racial stereotyping varies depending on the age of the target: for instance, racial disparities in NYPD stops are much greater for adolescents than adults (Hester et al., 2020), and the tendency for perceivers to view Black targets as angry is significantly lessened when the targets in question are older adults (Kang & Chasteen, 2009). In contrast, other researchers have found that weapon identification biases — the tendency for perceivers to misidentify harmless objects as weapons — were equally strong when primes consisted of either adult Black man or young Black boy faces (Todd et al., 2016). Similarly, Lundberg et al. (2018) investigated whether age moderated associations linking Black men with danger, finding that dangerous objects and words were identified more easily following Black face primes, regardless of prime age.

The present study aims to contribute to this discussion by examining intersectional implicit bias in intergroup evaluations across race (Black vs. White) and age (young vs. old) groups. This is done using a newer version of the Implicit Associations Test — the Multi-Category IAT — which enables participants to evaluate targets along multiple axes of identity at once. In this case, rather than evaluating Black vs. White and young vs. old targets separately, participants are

presented with all four combinations of race and age (young White, young Black, etc.) in the same task. Participants from all four combination identity groups are also included in the sample, and evaluations can be calculated separately to reveal unique patterns for each group (for instance, the evaluative preferences of young Black participants as compared to young White participants). As such, this study aims to clarify existing contradictions in the literature through a better understanding of how implicit evaluations are shaped by the interactions between race and age on the level of both the target and the perceiver.

## **Methods**

### *Participants*

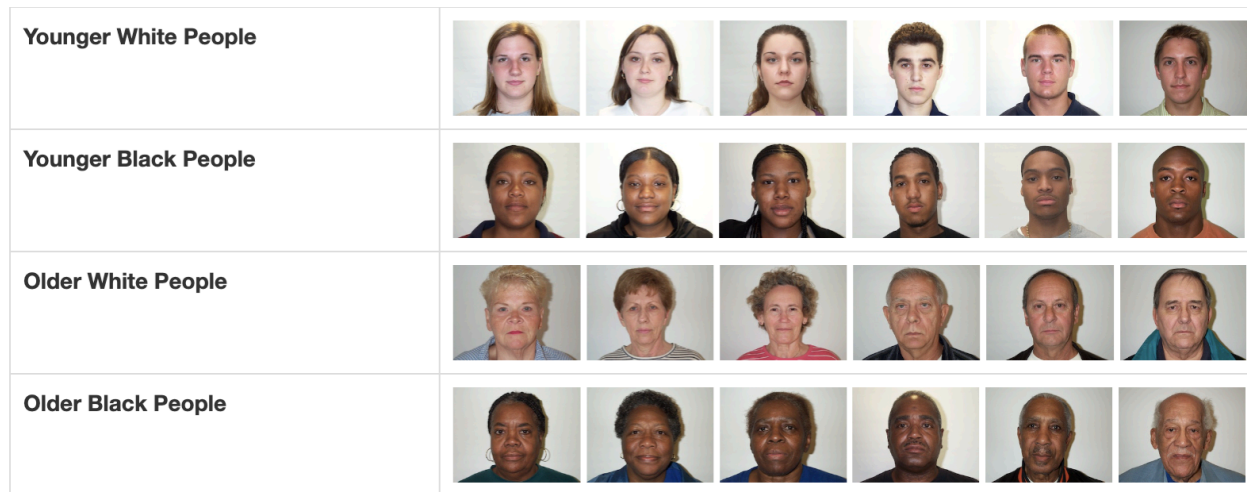
A total of 1559 participants were recruited for this study from the Project Implicit research pool. Of these, 818 identified as younger (under 30 years old) and White, 327 as younger and Black, 326 as older (over 60 years old) and White, and 88 older and Black. Inclusion criteria for the study were that participants must be at least 18 years old and fluent in English. Participant's data was excluded from collection if more than 10% of critical MC-IAT trials were faster than 300ms (At et al., 2014; 97% of participants providing MC-IAT data). For young Black, young White, and old White participants, our sample provided a minimum of 80% power to detect a within-subjects effect as small as  $d = .19$ . For old, Black participants our sample provided a minimum of 80% power to detect a within-subjects effect as small as  $d = .37$ . Study materials and preregistration can be found at <https://osf.io/gejup/>.

### *Stimuli*

Stimuli photos were collected from the Park Aging Mind Laboratory at UT Dallas Face Database (Minera & Park, 2004). This database was chosen due to its diverse range of ages and

## Figure 1

### *Stimuli Photos*



racess represented. Six photos were selected from each of the four categories of interest, including three female and three male photos for each racial category (see Figure 1). All stimuli photos had neutral facial expressions and were equated on as many dimensions (e.g., physical attractiveness) as possible.

### *Measures*

The study contained two components: an implicit measure and an explicit measure. The implicit measure was a version of the Multi-Category Implicit Association Test (MC-IAT). The explicit measure entailed self-reported preferences for the studied groups. The order of these two components was randomized for each participant.

### *MC-IAT*

This version of the Multi-Category Implicit Association Test (MC-IAT) measured implicit evaluations of different combinations of race and age groups: young Black, young White, old White, and old Black. The task itself contained 12 critical blocks of 16 trials each.



Implicit attitudes were measured on the MC-IAT as the strength of associations between different groups and positive evaluations.

Participants were first given instructions on how to complete the MC-IAT task. Prior to the 12 critical blocks, participants completed two practice blocks. The first practice block asked participants to sort “Good words” (e.g., love, pleasant) from others (specifically, “Bad words” such as hate, awful, etc.) by pressing the “I” key if the item belonged to the category “Good words” and the “E” key if not. In the second block, participants were asked to repeat this process with a randomized race/age combination (e.g., old White people) and “Good words” to practice sorting with multiple categories simultaneously. This procedure was repeated for the following 12 blocks: stimuli words or faces were presented one at a time and participants categorized them as quickly as possible by sorting them into “X faces and Good words” and “All else.” Categorization errors had to be corrected before continuing to the next trial. For these critical blocks, the target group and other groups rotated between all 12 possible combinations. For example, there were three blocks for which participants hit the “I” key for young White faces, and the other faces were young Black, old Black, or old White faces. Participants were randomly assigned to block orders.

#### *Explicit Attitude Measure*

For our explicit measure, participants were asked to self-report their preferences for each group relative to each other on a 7-point Likert scale (Axt, 2018). Scores of 1 and 7 indicted a strong preference for one group over the other, with 4 reflecting no preference. For example, for the contrast score between younger White and younger Black people, “I like younger White people and younger Black people equally” would receive a score of 4, “I strongly prefer younger White people to younger Black people” would receive a 7, and “I strongly prefer younger Black

people to younger White people” would receive a 1. This question was posed for all group pairings, resulting in 6 total responses per participant.

### *Procedure*

Participants completed the MC-IAT and the self-report questionnaire in a randomized order. After completing all blocks of the MC-IAT, participants were debriefed and shown a summary of their performance on the task.

### *Analyses*

Following recommendations from previous literature (e.g., Axt et al., 2014), MC-IAT *D* scores were calculated both for each of the six individual contrast pairings (e.g., young Black vs. young White), as well as four aggregate *D* scores for each combination of race/age (e.g., overall implicit evaluations of young, Black people relative to the three other groups included in the MC-IAT). These *D* scores were calculated separately for each of our four sample demographic groups: 1) younger, White participants (those less than 30 years old), 2) younger, Black (those less than 30 years old), 3) older, White participants (those more than 60 years old), and 4) older, Black participants (those more than 60 years old). Primary analyses largely focus on aggregate scores, again following past research (Axt et al., 2014).

Within each demographic sample (older White, younger White, older Black, younger Black), six within-subjects *t*-tests were completed. These *t*-tests compared the group receiving the highest MC-IAT *D* score to the groups receiving the second, third and lowest scores, and so on for the group receiving the second highest MC-IAT score, resulting in six total contrast scores between groups. For example, young White participants had the highest aggregate *D* score for young White targets, the second highest for young Black, then old White, and old Black. For these participants, *t*-tests first compared young White to young Black targets, followed by young

White to old White, young White to old Black, young Black to Old White, young Black to Old Black, and finally, old White to old Black.

This same analysis was completed for aggregate measures of explicit preference: four aggregate scores were calculated for each race/age group, in addition to six contrast scores, and compared using within-subjects *t*-tests.

## **Results**

### *Implicit Evaluations*

All participants other than older White participants implicitly preferred young targets of both races to older targets of both races. When ages of targets were equated, participants always preferred their own race to the other race (i.e., young White participants evaluated young White targets most positively, followed by young Black, old White, and old Black targets). When target race was equated, participants always preferred younger targets to older ones. Except for old White participants, all participants preferred young targets of the other race to older targets of their own race.

Older White participants, however, showed more reliance on age than race in determining implicit evaluations. That is, older White participants showed the strongest positive evaluations of young White and old White targets, followed by old Black and then young Black. In other words, the positive bias towards young targets regardless of race was consistent in the implicit preferences of all groups of participants except for older White ones, who showed preferences for both younger and older White targets over Black ones.

In particular, Black participants of both age groups had the most positive implicit evaluations of young Black targets, followed by young White, old Black, and old White targets. For young Black participants, the preference for Young Black relative to Young White was

statistically significant,  $t(244)=5.380, p < .001, d = .34$ , as was the preference for Old Black to Old White,  $t(242)=7.499, p < .001, d = .48$ . In contrast, older Black participants did not significantly prefer young Black to young White targets,  $t(67)=1.387, p = 0.170, d = .17$ , nor did they reliably prefer old Black targets over old White ones,  $t(67)=1.674, p = 0.099, d = .20$ .

Young White participants preferred young White targets over young Black ones,  $t(672)=3.81, p < 0.001, d = .15$ ; as well as old White targets over old Black ones,  $t(672)=2.25, p = 0.025, d = .09$ . Old White participants preferred both groups of White targets to both groups of Black ones, and had a significant preference for young relative to old White targets,  $t(277)=6.35, p < .001, d = .38$ . However, they also demonstrated a preference for old Black targets over young Black targets,  $t(277)=4.31, p < .001, d = .26$ . In other words, the tendency to prefer young targets over old ones was reversed for Older White participants when evaluating Black targets.

**Table 1**  
*MC-IAT D Scores*

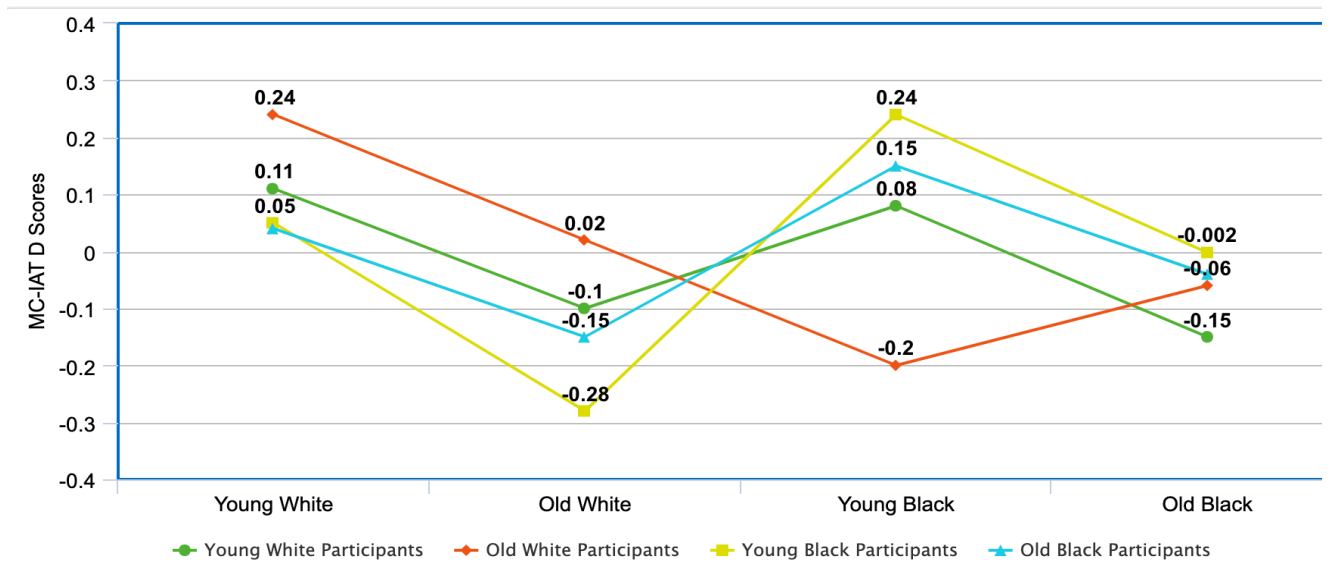
Participants	Young White		Old White		Young Black		Old Black	
	M	SD	M	SD	M	SD	M	SD
Young White	0.17	0.36	-0.10	0.34	0.08	0.35	-0.15	0.35
Old White	0.24	0.359	0.02	0.314	-0.20	0.32	-0.06	0.31
Young Black	0.05	0.36	-0.28	0.36	0.24	0.33	0.00	0.35
Old Black	0.04	0.35	-0.15	0.35	0.15	0.39	-0.04	0.33

**Table 2**  
*MC-IAT t-tests*

Participants	Group 1 vs. Group 2			Group 2 vs. Group 3			Group 3 vs. Group 4		
	<i>t</i>	<i>d</i>	<i>p</i>	<i>t</i>	<i>d</i>	<i>p</i>	<i>t</i>	<i>d</i>	<i>p</i>
Young White	3.81	0.10	<.001*	8.08	0.08	<.001*	2.25	0.03	0.025*
Old White	9.50	0.26	<.001*	2.67	0.12	0.008*	7.65	0.22	<.001*
Young Black	5.38	0.17	<.001*	1.19	0.00	0.24	7.50	0.24	<.001*
Old Black	1.39	0.21	0.170	1.19	0.09	0.239	1.67	0.03	0.099

**Figure 2**

*Aggregate MC-IAT D Scores*



*Note:* More positive scores indicate more favorable evaluations.

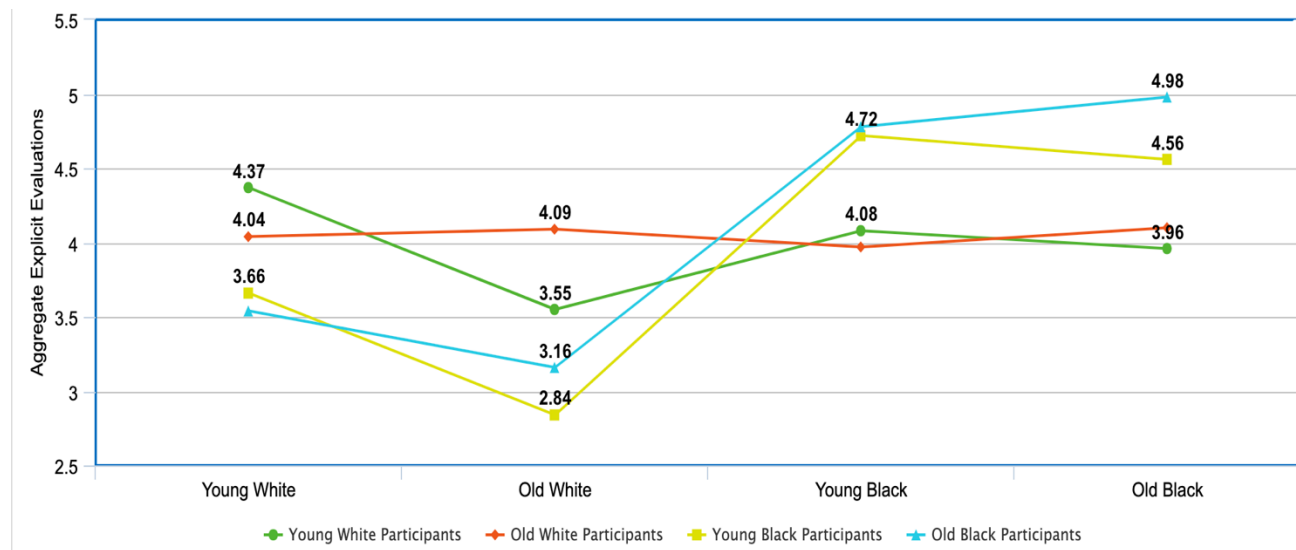
*Explicit Evaluations*

Explicitly, Black participants of all ages reported a preference for Black people over White people, with the most positive score going to Black people of their own age group. Given that the implicit attitudes of both young Black and old Black participants demonstrated a preference for young targets over old targets, this reveals a reversal of that pattern in explicit evaluations. In other words, the explicit evaluations of Black participants were driven primarily by race, whereas their implicit evaluations were driven primarily by age.

The pattern of explicit evaluation is slightly more complicated for White participants. For young White participants, the implicit preference for young targets (White, then Black) was reflected in the explicit measure as well as the MC-IAT. However, these participants also reported an explicit preference for old Black targets over old White targets, which was not reflected in their MC-IAT scores. Lastly, old White participants explicitly preferred older targets of both races to their younger counterparts, but implicitly preferred both age groups of White targets to Black. That is, the explicit evaluations of these participants were driven mostly by the age of the target, whereas implicit evaluations primarily depended on the target's race.

**Figure 3**

*Aggregate explicit evaluations*



*Note:* Higher scores indicate more favorable evaluations.

**Table 3**  
*Aggregate explicit evaluations*

Participants	Young White		Old White		Young Black		Old Black	
	M	SD	M	SD	M	SD	M	SD
Young White	4.37	0.64	3.55	0.80	4.08	0.43	3.96	0.63
Old White	4.04	0.50	4.09	0.61	3.97	0.41	4.10	0.56
Young Black	3.66	0.84	2.84	1.16	4.72	0.84	4.56	0.97
Old Black	3.54	0.85	3.16	1.05	4.78	1.01	4.98	1.09

**Table 4**  
*Explicit evaluation t-tests*

Participants	Group 1 vs. Group 2		Group 2 vs. Group 3		Group 3 vs. Group 4	
	<i>t</i>	<i>p</i>	<i>t</i>	<i>p</i>	<i>t</i>	<i>p</i>
Young White	9.45	<.001*	5.74	<.001*	10.51	<.001*
Old White	0.14	0.886	0.95	0.345	6.00	<.001*
Young Black	4.43	<.001*	9.36	<.001*	10.36	<.001*
Old Black	1.96	0.06	6.01	<.001*	2.82	0.006*

## Discussion

The present study investigated how implicit and explicit evaluations are shaped by two social identities: race and age. Participants completed indirect and direct measures of intergroup evaluations for targets varying in both race and age. Our results suggest that when perceivers evaluate targets varying in both race and age, age is dominant in the shaping of implicit evaluations. We found that all participants -- other than older White participants -- preferred younger targets of both races to older targets of both races, and notably even preferred young targets of the other race to older targets of their own race. However, participants implicitly preferred targets from their race to the other when age was equated. In other words, ingroup effects of race were present, but not strong enough to override a positive implicit bias towards younger targets.

This finding is important to highlight because implicit ingroup favoritism has been consistently observed across many social groups (i.e., Jost et al., 2004), including bias towards one's own racial group (Axt et al., 2014). However, our results demonstrate that this ingroup racial preference mostly disappears when variation in target age is introduced. This suggests that not only is a pro-young age bias found across the lifespan (Nosek, Banaji, & Greenwald, 2002), but that this bias is strong enough to then overpower previously observed racial biases, which used targets that were equated on age.

Overall, our findings are largely supportive a category dominance model of implicit evaluations (Fiske & Taylor, 1991; Macrae, Oberhausen, & Milne, 1995), in which cognitive constraints compel perceivers to prioritize a single identity category over others when evaluating targets. Although the evaluations of younger White participants did follow the hierarchy predicted by the additive bias model -- with younger White receiving the most favorable



evaluations and older Black the least favorable -- these participants still significantly preferred young Black targets over older White ones. Similarly, old White participants significantly preferred older Black targets to younger Black targets. These results further reinforce the primacy of age over race in such evaluations, and the data are consistent with the idea that perceiver evaluations are shaped by one dominant social category of the target. However, why the dominant category was age rather than race cannot be determined from our data and is a clear direction for future research on this topic.

These results also suggest that perceiver identities play a significant role in intersectional bias. Although our overall results suggest dominance of age, race was primary in driving implicit evaluations for older White participants, with White targets of all ages receiving more positive implicit evaluations than Black targets of all ages. Moreover, Black participants explicitly reported a preference for Black people over White regardless of age, suggesting that for these participants age and race have differential impacts on implicit and explicit evaluation. In other words, which social category prevails as dominant in intergroup evaluations may depend on the group memberships or other characteristics of the perceiver, which is consistent with prior work finding that status-based evaluations are sensitive to perceiver characteristics (Mattan et al., 2017; Mattan et al., 2019). Further research will be necessary to determine which characteristics are most impactful on evaluations (e.g., gender, social status), particularly when targets occupy multiple social categories at once.

In the realm of racial bias, our results show that whenever targets were equated on age, participants had implicit preferences for own-race over other-race members (at least descriptively). For instance, both younger and older White participants demonstrated an implicit preference for young White targets over young Black ones. This is consistent with findings

demonstrating unequal outcomes for Black youth as compared to White. For instance, Black juvenile offenders were rated as more deserving of adult treatment relative to White offenders of the same age (Rattan et al., 2012); Black adolescents have been found to be judged as more culpable than White adolescents of the same age (Goff et al., 2014), and at school, when students misbehave more than once, teachers are likely to stereotype Black students as troublemakers and recommend harsher discipline (Ozonous & Eberhardt, 2015). In fact, older White participants were significantly more biased against young Black targets than any other group, with this perceiver/target combination receiving both the lowest *D*-score and explicit evaluations reported. One implication of this finding is that, as old White people tend to be disproportionately represented in positions of power, younger Black relative to older Black men may be at a greater risk of being targets of prejudice or discrimination.

Consistent with existing literature on age perception, we found that older targets were generally evaluated more negatively than their younger counterparts (Greenwald et al., 2000; Nosek, Banaji, & Greenwald, 2002). Older targets of both racial groups received a negative aggregate *D*-score from all groups of participants other than older White participants, who evaluated only older White targets more positively. Explicitly, older Black targets were evaluated positively (receiving a score higher than 4) by all participant groups other than younger White participants. Older White targets, however, were evaluated more negatively by all participant groups except older White participants. Despite these racial differences in explicit bias, our findings reaffirm the importance of combating age bias, which has been demonstrated to lead to negative outcomes across setting ranging from healthcare (Madan et al., 2006) to hiring outcomes (Carlsson & Eriksson, 2019).

## Limitations and Future Directions

Our results are not without limitations. First, our sample was unrepresentative of any specific population. All participants were recruited from the Project Implicit Research pool, meaning that selection bias in who learns about the site and chooses to participate was unavoidable. Those who volunteer to participate in such research, which is often linked to from online articles discussing issues of intergroup bias, are likely to be more concerned with issues of prejudice than the average person, which may correspond to lower levels of bias among these participants. Random sampling from the general population would almost certainly include fewer participants with previous knowledge of implicit bias, which could lead to different -- likely greater -- effects in terms of overall levels of bias displayed on implicit and explicit measures. Moreover, the small sample of older Black participants decreases the strength of our findings about this specific subgroup of perceivers.

In addition, our stimuli categories of “younger” and “older” were quite broad, encompassing multiple decades of ages in each group. Future research using more specific age categories, including even younger targets, may help to clarify our findings. This is particularly true given that some of the bias found against younger Black targets may be amplified for adolescents (Hester et al., 2020), meaning follow-up studies in this line of research may benefit from more granular distinctions concerning age (e.g., “children” versus “adolescents”).

Another avenue for future research is to investigate the effects of priming participants with age or race related words before completing the measures used here (see Macrae, Oberhausen, & Milne, 1995). This approach may further clarify how perceiver goals contribute to intersectional bias, as such manipulations could reveal malleability in terms of the social category that is most impactful on evaluations. The present results demonstrate that age takes

precedence over race when no such priming occurs, but this effect may shift depending on the goals of the perceiver, or depending on what information is most active in mind. That is, the pattern of results – specifically, the primacy of age in implicit evaluations – may change if the concept of race is activated before completing the MC-IAT.

Finally, a natural progression of this line of research is to investigate what would happen if a third social identity is considered (e.g., targets varying in both race, age, and gender). Including more social identity categories would likely show even more nuanced or complicated effects; however, within the format of an MC-IAT this would take an impractically long time to complete. Thus, other forms of implicit measurement, such as a Go/No-Go Task or evaluative priming (Fazio et al., 1995), may be necessary to investigate this question, and adopting these methods may reveal additional complexity in implicit social cognition.

## **Conclusion**

In sum, our findings add to a growing body of literature exploring how perceivers evaluate targets based on multiple social categories at once. Although many questions remain to be investigated, a better understanding of how intersectionality influences implicit evaluations will be critical to better understanding real-world issues of stereotyping and discrimination.

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