

The rules of implicit evaluation by race, religion, and age

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Authors' note: Nosek is an officer and Axt is a consultant of Project Implicit Inc., a non-profit organization that includes in its mission "To develop and deliver methods for investigating and applying phenomena of implicit social cognition, including especially phenomena of implicit bias based on age, race, gender or other factors." Author contributions: J. A. and B.N. developed the paper's outline and concept. J.A. analyzed the data from Study 1 and 3. C.E. analyzed the data from Study 2. J.A. drafted and B. N. and C. E. edited the paper. All authors approved the final version of the paper for submission. We thank Grant Garland for assistance with data collection and analysis for Study 1, as well as Nicole Lindner for providing data for Study 3.

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Abstract

The social world is stratified. Social hierarchies are known but often disavowed as anachronisms or unjust. Nonetheless, hierarchies may persist in social memory. In three studies (total $N > 200,000$), we found evidence of social hierarchies in implicit evaluation by race, religion, and age. Across racial groups, implicit positive associations followed this rule: *my racial group > Whites > Asians > Blacks > Hispanics*. Each racial group evaluated its own group most positively, with the remaining three groups ordered identically following it. Across religions, implicit positive associations followed this rule: *my religion > Christians > Jews > Hindus/Buddhists > Muslims*. A final task investigating positive associations with various age groups found this rule: *children > young adult > middle-age adult > older adult* across all participant ages. These results suggest that the rules of social evaluation are pervasively embedded in culture and mind.

Word Count: 143

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The rules of implicit social evaluation by race, religion and age

Social status is relational – some are higher status, others are lower status. This differential status both reflects and causes differential outcomes for groups. Groups with higher status enjoy superior academic outcomes (Sirin, 2005), perceive less discrimination (Kessler, Mickelson & Williams, 1999), report better physical and mental health (Williams, Yu, Jackson & Anderson, 1999), create broader social networks (Campbell, Marsden & Hurlbert, 1986), and receive more opportunities and consideration for coveted positions (Lin, Ensel & Vaughn, 1981).

If hierarchies are consensual, then they may become cultural truisms that sustain differential assessments of who is valued, and create differential opportunities and outcomes across social groups (Sidanius & Pratto, 1999). If status hierarchies are idiosyncratic – for example, each group perceiving itself on top – then such ingroup favoritism may sustain intergroup conflict in the competition for opportunities and resources (Hagendoorn & Hraba, 1987; Hraba, Hagendoorn & Hagendoorn, 1989; Tajfel, 1982).

There is existing support for both of these possibilities. In a variety of cultures – both modern and historical – consensus can be observed in judging which groups are higher and lower status, particularly when focusing on social power – one element of status. This has been shown among ethnic groups in the former Soviet Union (Hagendoorn et al., 1998), Canadian immigrants (Berry & Kalin, 1979), ethnic youth in the Netherlands (Verkuyten, Hagendoorn & Massen, 1996), and among ethnic groups in modern American society (Kahn, Ho, Sidanius & Pratto, 2009).

Status is partly a function of social power, but is also a function of social evaluation. Some groups are evaluated more favorably than others, and this is distinct from social power. On the one hand, there is substantial evidence for ingroup favoritism among both high and low

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status groups (Bettencourt, Dorr, Charlton & Hume, 2001; Mullen, Brown & Smith, 1992).

According to social identity theory, humans have a desire to maintain a positive social identity, often achieved by favoring one's own group and by believing that group to be superior to others (Tajfel, 1978). These ingroup biases are more pronounced when group boundaries are believed to be stable and relatively impermeable (Tajfel & Turner, 1986).

On the other hand, system justification theory suggests limits in ingroup favoritism when it is clearly at odds with the "status" status quo (Jost, Banaji, & Nosek, 2004). System justification theory suggests that there is a pervasive tendency to see the world as just and fair. This is presumed to be true even if one's own group is not atop the hierarchy, and particularly evident on measures of implicit social cognition (Jost et al., 2004). Even when people do not consciously endorse hierarchies, they may nonetheless learn and encode them in social memory. Such associations may be the basis for automatic responses that shape perception, judgment and action (Nosek, Hawkins, & Frazier, 2011, 2012). In sum, status hierarchies in social evaluation may be evident in implicit social cognition, even among groups with lower status and counter to tendencies for ingroup favoritism.

We investigated the presence of hierarchies in social evaluation – who is good – in three social domains among American samples: race, religion, and age. We further examine whether these hierarchies were consensually shared among social groups, and whether they showed evidence of ingroup favoritism. Finally, we examined hierarchies in both explicit and implicit social cognition, hypothesizing that they would be particularly likely to be observed in implicit social cognition as markers of cultural influence despite whatever people may believe and endorse consciously. The results provide support for pervasive hierarchies in social evaluation that complement evidence for pervasive hierarchies in social power.

Study 1

Methods

Participants

97,641 participants completed at least one measure while this study appeared as the featured task at Project Implicit (implicit.harvard.edu) from June 5, 2012 to April 11, 2013.¹ The study end date was selected arbitrarily when another task became the featured task. Due to the possible cultural specificity of these rules, only American citizens or residents were included in the analysis (81.6% of participants who reported demographics). For all studies, the ordinal pattern of results did not change when including all participants; results from the full samples are included in the online supplement.

Among those reporting demographics, 61% were female and the mean age was 30.2 (SD=13.5). By race, 70.8% were White, 8.5% African American, 3.2% East Asian, 2% South Asian, 5% biracial, and 10.5 % other or unknown. By ethnicity, 9.6% (n=5,351) were Hispanic or Latino. For all studies, sample sizes vary among tests due to missing data. For analyses, participants were classified as White (n=37,314), Black (n=4,514), or East Asian (n=1,756) if they selected that race and reported their ethnicity as not Hispanic.

Procedure

The study session consisted of four components completed in a random order: two surveys that were not analyzed for this manuscript, a demographics questionnaire, and a four-category race Multi-Category Implicit Association Test (MC-IAT). After completing all measures, participants were debriefed and given feedback on their MC-IAT performance (see <https://osf.io/zg2su/> for measures and data from all studies as well as demonstration links to view the study protocols).

¹ The study had 105,293 started sessions, with 97,641 providing data, and 60,611 completing the study (58% completion rate).

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Demographics and Survey Items. Participants completed a 15-item demographics questionnaire. We only analyzed the items relating to race, ethnicity, gender, and age. After demographics, participants completed six items concerning preferences for Black, White, Asian, and Hispanic people responding on a 7-point scale ranging from “I strongly prefer X people to Y people”(1) to “I strongly prefer Y people to X people”(7) for all six possible pairings.

Implicit Measure. The Multi-Category Implicit Association Test (MC-IAT), a variant of the Brief IAT (Sriram and Greenwald, 2009), measured association strengths between racial groups and positive evaluation. The task contained 14 total blocks, of which the first two were practice. In each block, items were presented one at a time and participants categorized them as quickly as possible. Categorization errors had to be corrected before continuing to the next trial. In the first block (16 trials), participants pressed the “I” key for all *Good* words (Love, Pleasant, Great, Wonderful) and the “E” key for “for other words.” Other words were Hate, Unpleasant, Awful, and Terrible. In the second block (20 trials), participants pressed the “I” key for all *Good* words and for faces (2 male, 2 female with prototypical surnames, e.g., “N. Chang” below the face²) belonging to one of Asian, Black, Hispanic, or White faces, and the “E” key for “any other images and words.” The other items were the same negative words, and faces from one of the other three racial groups. For the remaining 12 blocks (16 trials each), the structure was the same as the second block with the target and other racial group rotating between all 12 possible combinations. For example, there were three blocks for which participants hit the “I” key for Asian faces, and the other faces were Black, Hispanic, or White faces each for one of those blocks. Randomization was constrained so that each racial group appeared as a target once every four blocks. Participants were randomly assigned to one out of 24 possible block orders.

² Pretesting revealed that adding prototypical surnames increased accuracy particularly for Hispanic faces.

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MC-IAT *D* Scores were calculated following the guidelines outlined for the Brief IAT in Nosek et al. (2013). This MC-IAT produced six *D* scores representing each paired comparison of racial groups (White vs. Black, White vs. Asian, White vs. Hispanic, Asian vs. Black, Asian vs. Hispanic, Black vs. Hispanic).

To calculate each *D* score, all trials greater than 10,000 milliseconds (ms) were removed, as were the first four trials of each block, as these were practice. Next, all responses lower than 400 ms were recoded to 400 ms and all responses greater than 2000 ms were recoded to 2000 ms. A *D* score was computed for each contrast by subtracting the mean latency for one block (e.g., White faces with Good words, Black faces with bad words) from the other block (e.g., Black faces with Good words, White faces with Bad words) and then dividing by the standard deviation of the latencies across both blocks.

Participants' MC-IAT data were excluded if more than 10% of their responses were less than 400 milliseconds, indicating careless responding (2.1% of participants who completed the MC-IAT). From these six contrast *D* scores, we computed an aggregate score for each race, e.g., the White score was the average of 3 *D* scores comparing White with Asian, Black and Hispanic people. This provides an evaluation of each group in comparison to the others. These four scores are interdependent such that knowing three scores directly implies the fourth and their mean is necessarily 0. As such, positive scores indicate more favorable evaluations than the average evaluation among the four groups, and negative scores more unfavorable evaluations than the average evaluation among the four groups. This analysis strategy was used for all three studies.

Results

The Rules of Implicit Racial Evaluation

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For all racial and ethnic groups, the ordinal relation of implicit racial preferences was the same (Figure 1). Each group exhibited the most positive associations for their own racial group, followed by White, Asian, Black and Hispanic people: all pairwise t 's > 4.06 , all p 's $< .001$, all d 's $> .06$, average $d = .2$, except for the comparison between the Black aggregate and Hispanic aggregate variables among Asian participants, $t(1468) = .86$, $p = .394$. Participants that identified with racial groups (e.g., American Indian, Pacific Islander) other than the four targets showed the same ordinal pattern (all t 's > 4.2 , all p 's $< .001$, all d 's $> .08$, average $d = .10$). For all studies, see Table 1 for implicit means, Table 2 for t and d values for comparisons. Supplementary tables can be downloaded at <https://osf.io/zg2su/> and include explicit means, t and d values, means for the six BIAT contrast scores as well as implicit-explicit correlations.

In general, across all studies, the individual group contrasts show transitive relations with the aggregate scores. That is, knowing only the aggregate relations among the four groups provides sufficient information to derive relatively accurate estimates for any particular pairing. For example, Whites' preferences between any two groups calculated by taking the difference between any two aggregate scores were within $1/5^{\text{th}}$ of a standard deviation of the six actual contrast scores. As such, the six contrast scores do not provide much additional information than what can be derived from the summary scores.

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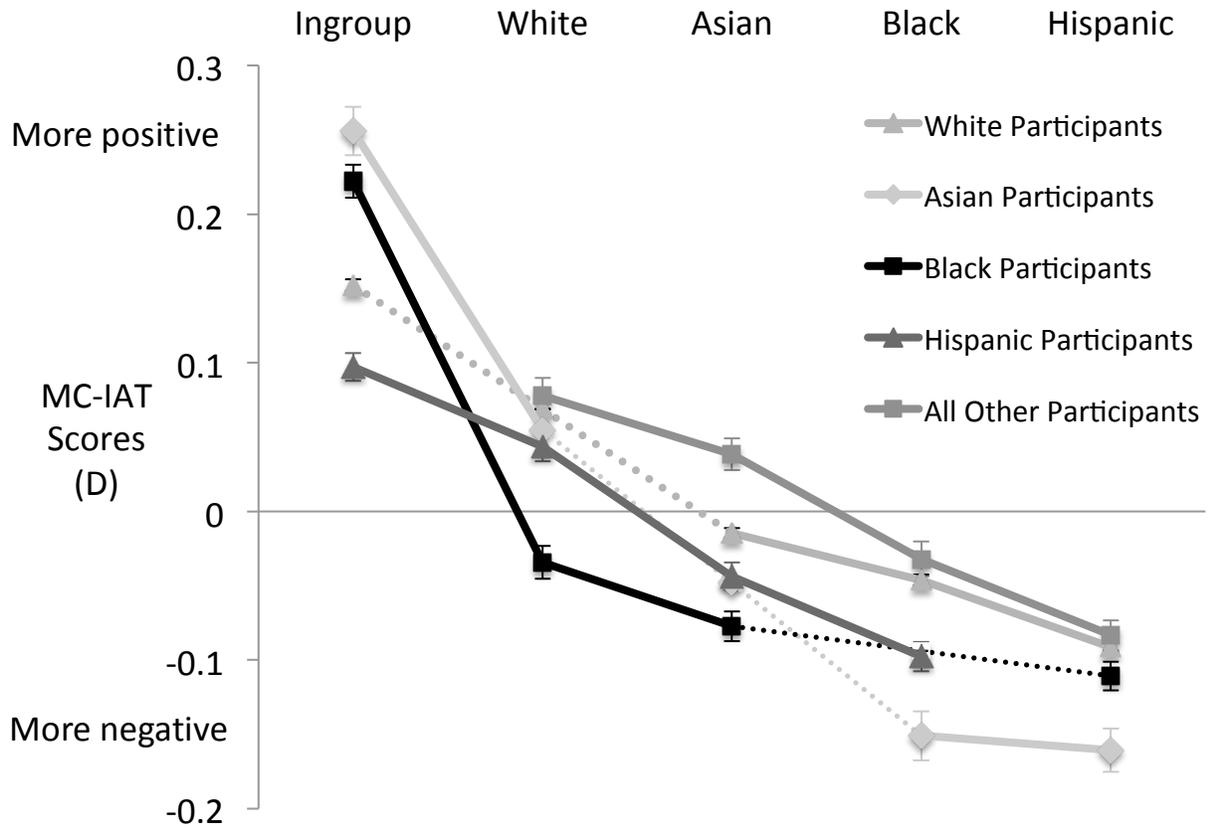


Figure 1. MC-IAT D scores for one's ingroup, White, Asian, Black and Hispanic people by participant race (Study 1). Dotted lines connect means that skip over the ingroup. Error bars denote 95% confidence intervals on the mean.

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Table 1

Implicit Attitudes (Descriptive Statistics)

<i>Participant Race</i>	White People			Asian People			Black People			Hispanic People		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
White	31,656	.15	.36	31,684	-.01	.30	31,674	-.05	.33	31,664	-.09	.29
Asian	1,469	.06	.34	1,474	.26	.32	1,472	-.15	.32	1,472	-.16	.29
Black	3,676	-.03	.34	3,680	-.08	.31	3,677	.22	.34	3,676	-.11	.30
Hispanic	4,411	.04	.34	4,414	-.04	.31	4,413	-.10	.34	4,411	.10	.32
Other Races	3,307	.08	.35	3,311	.04	.32	3,317	-.03	.35	3,307	-.08	.30

<i>Partic. Religion</i>	Christianity			Judaism			Hinduism			Islam		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Christianity	39,931	.47	.34	39,949	-.02	.30	39,935	-.21	0.30	39,937	-.25	.29
Judaism	3,642	-.03	.33	3,644	.48	.34	3,639	-.18	0.30	3,642	-.27	.31
Hinduism	732	.06	.32	735	-.16	.29	730	.36	0.33	733	-.26	.32
Islam	1,286	.03	.31	1,281	-.16	.31	1,279	-.25	0.32	1,277	.37	.34
Other or No Rel.	33,029	.18	.36	33,013	.01	.30	32,995	-.02	0.32	33,007	-.16	.30

<i>Partic. Religion</i>	Christianity			Judaism			Buddhism			Islam		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Christianity	40,661	.46	.34	40,659	-.04	.30	40,663	-.15	.31	40,666	-.27	.29
Judaism	3,642	-.05	.33	3,640	.45	.33	3,634	-.12	.31	3,639	-.28	.30
Buddhism	1,210	.05	.34	1,209	-.15	.29	1,209	.37	.33	1,205	-.28	.29
Islam	1,314	.02	.31	1,308	-.16	.30	1,306	-.21	.31	1,312	.35	.35
Other or No Rel.	33,212	.15	.36	33,222	-.03	.30	33,192	.09	.34	33,232	-.20	.31

<i>Participant Age</i>	Children			Young Adults			Middle-Age Adults			Old Adults		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Teens	2,772	.21	.30	2,772	.11	.29	2,770	-.15	.27	2,769	-.17	.31
Twenties	8,362	.19	.30	8,362	.10	.28	8,369	-.13	.28	8,374	-.16	.31
Thirties	3,864	.24	.31	3,862	.09	.29	3,862	-.15	.28	3,865	-.18	.32
Forties	3,306	.21	.31	3,299	.06	.28	3,294	-.10	.27	3,295	-.17	.33
Fifties	2,572	.19	.32	2,580	.03	.27	2,579	-.08	.28	2,578	-.15	.32
Sixties	1,008	.20	.32	1,008	.01	.27	1,008	-.08	.28	1,007	-.13	.33

Note. *N* = number of participants. *M* = mean MCIAT score, expressed as aggregate *D* scores (Greenwald et al., 2003); positive values indicate greater preference for members of that group. *SD* = standard deviation of the mean.

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Table 2

Implicit Attitudes (Inferential Statistics)

<i>Participant Race</i>	Race 1 vs. Race 2		Race 2 vs. Race 3		Race 3 vs. Race 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
White	55.84	.31	11.02	.06	16.21	.09
Asian	14.91	.39	13.87	.36	.86*	.02*
Black	27.20	.45	4.82	.08	4.06	.07
Hispanic	6.60	.10	11.10	.17	6.87	.10
Other Races	4.24	.08	7.43	.13	5.59	.10

<i>Participant Religion</i>	Religion 1 vs. Religion 2		Religion 2 vs. Religion 3		Religion 3 vs. Religion 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
Christianity	195.35	.97	75.74	.38	17.73	.09
Judaism	55.97	.93	18.23	.30	11.15	.19
Hinduism	15.14	.56	12.20	.45	6.03	.22
Islam	22.76	.64	13.27	.37	6.67	.19
Other or No Religion	57.18	.32	11.11	.06	52.76	.29

<i>Participant Religion</i>	Religion 1 vs. Religion 2		Religion 2 vs. Religion 3		Religion 3 vs. Religion 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
Christianity	195.84	.97	46.46	.23	49.59	.25
Judaism	54.55	.91	8.75	.15	20.07	.33
Buddhism	19.56	.56	13.78	.40	9.29	.27
Islam	22.21	.61	13.19	.37	3.85	.11
Other or No Religion	19.33	.11	41.50	.23	62.50	.34

<i>Participant Age</i>	Age 1 vs. Age 2		Age 2 vs. Age 3		Age 3 vs. Age 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
Teens	12.40	.24	29.73	.57	2.39	.05
Twenties	19.28	.21	46.52	.51	4.38	.05
Thirties	21.88	.35	30.91	.50	4.06	.07
Forties	20.19	.35	18.69	.33	9.27	.16
Fifties	18.52	.37	12.36	.24	8.4	.17
Sixties	14.28	.45	6.01	.19	3.75	.12

Note. *t* = t-value from dependent samples t-test contrasting the group with the highest MC-IAT D scores with the group receiving the next highest score. *d* = Cohen's d effect size calculated from the mean difference between each group's D score. All *p* values less than .02, except for the contrast marked with an *, where *p* = .394.

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Explicit evaluations were less consistent in ordinal relations among racial groups. All groups did show preference for their own racial group compared to others, and most showed a hierarchy of Whites, Asians, Hispanics, and then Blacks. Explicitly, White and Asian participants evaluated Hispanic people more positively than Black people, whereas the reverse was true in implicit evaluation. Furthermore, Black participants explicitly preferred Hispanics to Asians and Whites, on average.

Study 2

In Study 2, we tested whether invariance in implicit evaluation would be observed for another social identity – religion.

Methods

Participants

353,048 participants completed at least one measure while this study appeared as the featured task at Project Implicit from June 20, 2009 to June 13, 2013.³ The study end date was selected arbitrarily once at least 2,500 participants from each religious group had been collected. Only American citizens or residents were included in analysis (82.6% of participants reporting demographics). Among those reporting demographics, 58.5% were female and the mean age was 28.2 years (SD=12.8). By race, 76.4% were White, 6.9% African American, 2.4% East Asian, 2.5% South Asian, 6.2% biracial, and 5.7% other or unknown. By ethnicity, 9.2% were Hispanic or Latino. For analyses, participants were classified as Christian (n=109,190), Jewish (n=9,641), Buddhist (n=3,705), Hindu (n=2,934) or Muslim (n=5,277) based on their self-reported religious affiliation.

Procedure

³ The study had 366,629 started sessions, with 353,048 providing data and 224,648 completing the study (64% completion rate).

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Each study session had three components presented in a randomized order. Participants completed 16 survey items, 13 demographics items, and a four-category religion MC-IAT that compared evaluations of Christianity, Judaism, Islam, and either Hinduism or Buddhism randomized between subjects.

Demographics and Survey Items

Participants completed a 14-item demographics questionnaire. We only analyzed the items relating to race, ethnicity, gender, and age. Also, we analyzed only four of the 16 survey items. These items assessed perceptions of warmth toward each of the four religious groups, “How warm or cold are your feelings toward religion X?” with a scale of 1=*Extremely cold* to 9=*Extremely warm*. The unanalyzed 12 items were random selections from a pool of 186 items about attitudes, beliefs, and ideology (Graham, Hawkins & Nosek, 2012).

Implicit Measure

The MC-IAT procedure was the same as Study 1 with the race categories and items exchanged for ones representing religion. Religious stimuli consisted of words associated with each group, *Christianity* (Gospel, Christian, Jesus, Church), *Islam* (Koran, Muslim, Muhammad, Allah), *Judaism* (Torah, Jew, Abraham, Yahweh), *Buddhism* (Mantra, Buddhist, Buddha, Dharma) and *Hinduism* (Mantra, Hindu, Krishna, Karma). *D* score calculation and exclusion criteria were the same as in Study 1 (3.3% of participants who completed the MC-IAT).

Results

The Rules of Implicit Religious Evaluation

For all five religious groups, the ordinal relations of implicit evaluation were the same (Figures 2 and 3). Each religious group exhibited the most positive associations for their own group, followed by Christian, Jewish, Hindu or Buddhist (depending on condition), and Muslim

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(all t 's > 3.85 , all p 's $< .001$, all d 's $> .09$, average $d = .44$). Participants who did not belong to any of the target religions showed the same ordinal relations (all t 's > 11.1 , all p 's $< .001$, all d 's $> .06$, average $d = .22$), with one exception to the rule in the Buddhism condition with Buddhists favored slightly over Jews.

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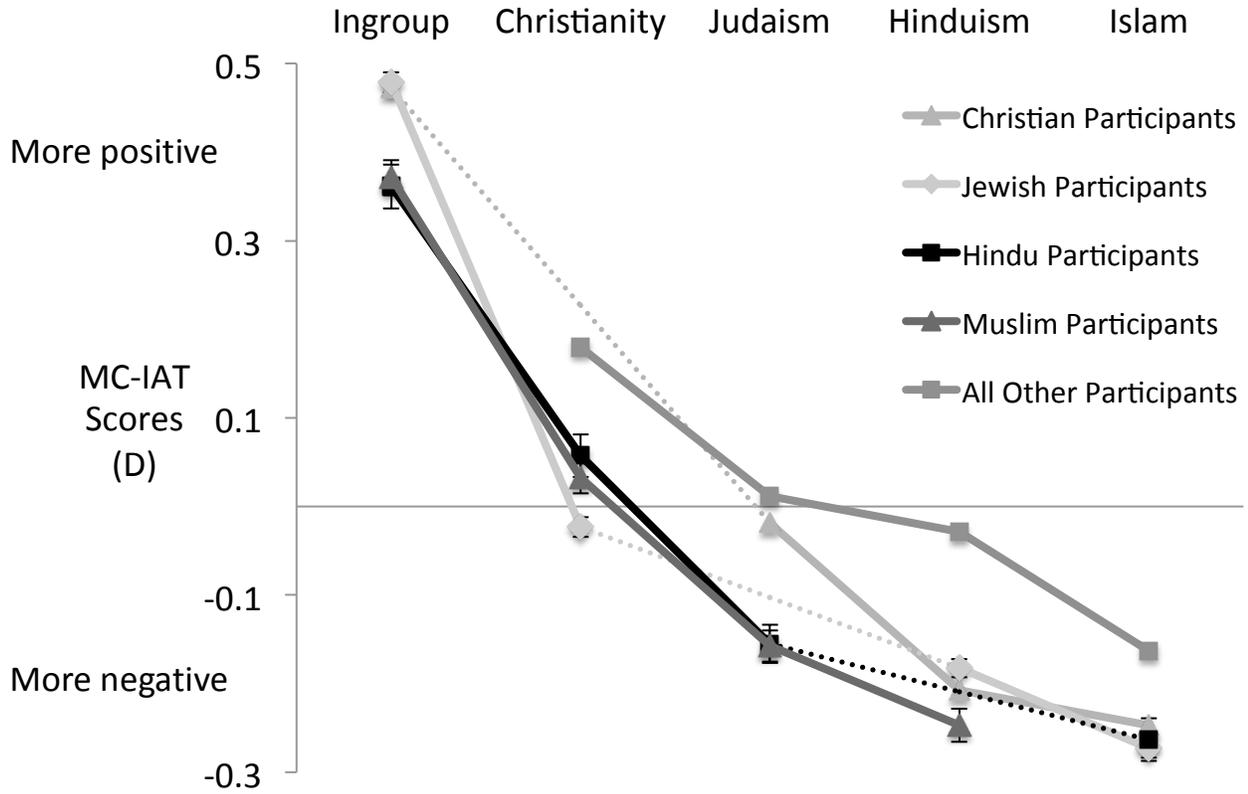


Figure 2. MC-IAT D scores for one's ingroup, Christianity, Judaism, Hinduism and Islam by participant religion (Study 2). Dotted lines connect means that skip over one's own ingroup. Error bars denote 95% confidence intervals on the mean.

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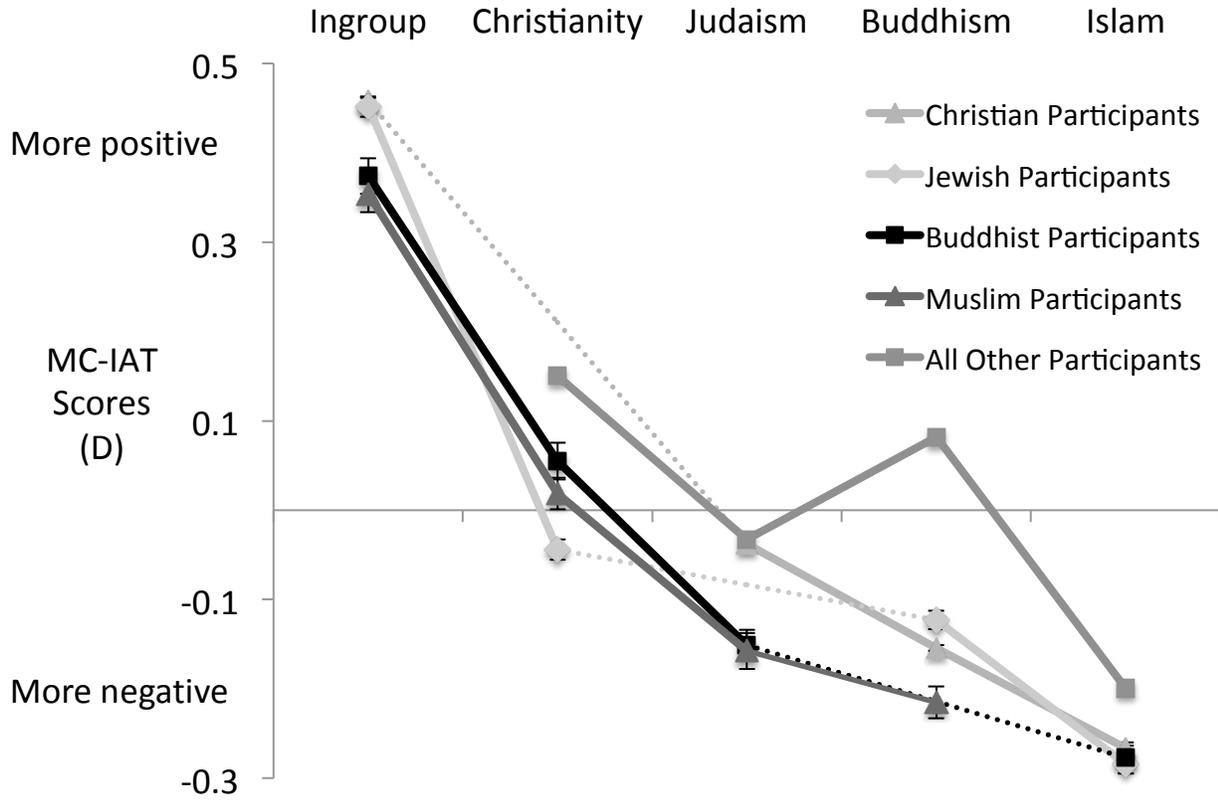


Figure 3. MC-IAT D scores for one's ingroup, Christianity, Judaism, Buddhism and Islam by participant religion (Study 2). Dotted lines connect means that skip over one's own ingroup.

Error bars denote 95% confidence intervals on the mean

Explicit evaluations did not show the same consistent ordinal relations. All five target religious groups reported a preference for their own religious group compared to others. However, Jewish participants viewed Buddhists and Hindus more warmly than Christians. Muslim participants evaluated Buddhists more warmly than Jews. Buddhist and Hindu participants evaluated Jews more warmly than Muslims and Christians.

Study 3

In Study 3, we tested whether invariance in implicit evaluation would be observed for one more social identity – age.

Methods

Participants

49,014 participants completed at least one measure while this study appeared as the featured task at Project Implicit from April 21, 2011 to January 19, 2012.⁴ The study end date was selected arbitrarily when another task became the featured task. The demographics questionnaire only asked about citizenship, so only American citizens were included in analysis (76.9% of those reporting demographics). Among those reporting demographics, 68.9% were female and the mean age was 33.3 years (SD=14.1). By race, 72.5% were White, 10.4% African American, 2.3% East Asian, 1.5% South Asian, 7.2% biracial, and 6.1% other or unknown. By ethnicity, 8.7% were Hispanic or Latino.

There are few definitive markers for when one leaves one age group and enters another in order to clarify ingroup status. In the case of age attitudes, this is non-consequential because prior evidence suggests that age preferences are relatively steady across the age span, regardless of one's group membership (Nosek, Banaji & Greenwald, 2002; Nosek, Smyth, et al., 2007). We report the findings using age as a continuous variable or by presenting age brackets from

⁴ The study had 54,665 started sessions, with 49,014 providing data, and 29,982 completing the study (61% completion rate).

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10's through 60's: teens (n=3,561), twenties (n=10,113), thirties (n=4,713), forties (n=3,965), fifties (n=3,091) and sixties (n=1,208).

Procedure

Each study session had three components presented in a randomized order. Participants completed a set of 4 survey items, 9 demographics items, and a four-category age MC-IAT.

Demographics and Survey Items

Participants completed a 9-item demographics questionnaire. We only analyzed the items relating to race, ethnicity, gender, and age. Participants completed four items concerning age-group attitudes by rating the warmth of their feeling toward each age group. Participants were instructed to “*Consider how you feel toward the age groups of children, young adults, middle-aged adults, and old adults, as represented by each set of faces. Below, please rate how warm or cold you feel toward each age group relative to each another*” and items were presented in that age order. Participants responded on an 11-point scale anchored on 0 (*Very Cold*) and 10 (*Very Warm*; 5: *Neutral*). Participants also made the same judgments regarding each age group's competence and likability (on eight-point scales from “Extremely incompetent/unlikable” to “Extremely competent/likable”).

Implicit Measure

The four-category age MC-IAT had the same structure as Study 1 with minor changes. Test blocks had 18 instead of 16 critical trials, and each age group used six instead of four images. *Good* words consisted of Love, Pleasant, Great and Wonderful; *Other* words were Hate, Unpleasant, Awful and Terrible. Age stimuli were selected from pretest ratings of the apparent age of faces from of face databases (N=13; Ebner, 2008; Langer et al., 2010; Minear & Park, 2004) and manufactured faces (using www.fantamorph.com). The 3 male and 3 female stimuli

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were selected to create four age groups of White faces with neutral expressions and non-descript backgrounds: children (pretesting: $M_{age} = 11.1$, $SD = 1.9$), young adults (pretesting: $M_{age} = 21.0$, $SD = 2.8$), middle-aged adults (pretesting: $M_{age} = 47.0$, $SD = 6.0$), and old adults (pretesting: $M_{age} = 72.0$, $SD = 7.9$). D score calculation and exclusion criteria were the same as the prior studies (3% of participants who completed the MC-IAT).

Results

The Rules of Implicit Age Evaluation

For all six decade age groups, the ordinal relations of implicit evaluation were the same (Figure 4). Each age group exhibited the most positive associations for children, followed by young adults, middle-age adults, then older adults (all t 's > 2.4 , all p 's $< .02$, all d 's $> .05$, average $d = .27$).

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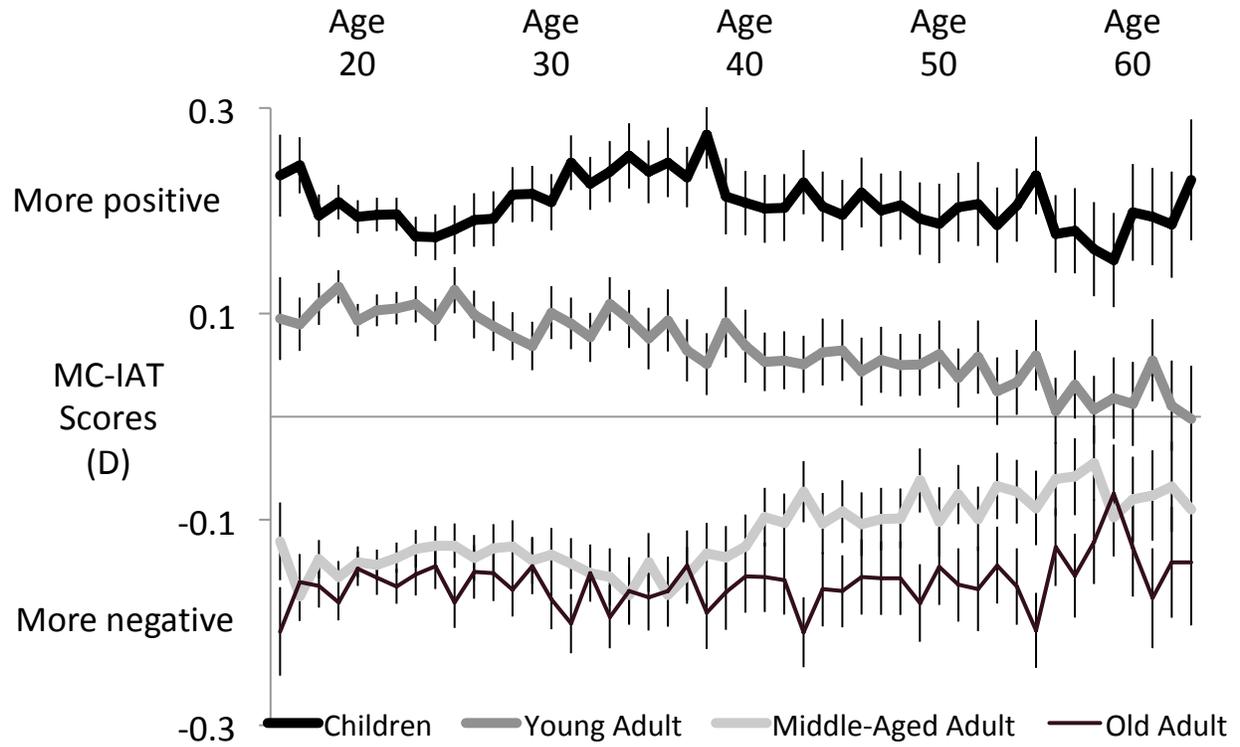


Figure 4. MC-IAT D scores for children, young adults, middle-aged adults and old adults by participant age for all ages with more than 100 participants (Study 3). Error bars denote 95% confidence intervals on the mean.

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Unlike race and religion associations, ingroup favoritism did not dominate the implicit age hierarchy. Nonetheless, there was evidence of a small ingroup effect. When restricting the sample to those participants that were one standard deviation below the estimate of the age for the young adult images to one standard deviation above the age for the middle-age images (18 to 53; $n=19,090$), older age predicted more positive implicit evaluations of middle-age adults ($r=.06$, $p<.001$), and more negative implicit evaluations of young adults ($r=-.08$, $p<.001$). That effect was small enough that it did not disrupt the ordinal relations between any of the age groups across the entire sample.

As in Study 1 and 2, explicit evaluations did not show the same invariance as implicit evaluations. For example, teenage participants and participants in their twenties preferred young adults to middle-age adults, children and older adults were preferred roughly equally by participants in their fifties, and participants in their thirties and above evaluated young adults most negatively of all age groups.

Perceptions of likability were strongly correlated with perceptions of warmth (all r 's $> .54$) and showed a similar lack of invariance across age groups. Perceptions of competence were more weakly correlated with likability (all r 's $> .33$) and warmth (all r 's $> .27$) across age groups. Competence ratings did follow to a single ordinal pattern across participant age groups (middle-aged adults $>$ old adults $>$ young adults $>$ children) but it was nearly reversed from the implicit evaluation hierarchy (see Table S9 for details).

General Discussion

Across three social domains, we found evidence for rules of social evaluation that are largely invariant across racial, religious and age groups. These rules were clear and consistent with implicit measures of evaluation, and less so with explicit measures of evaluation. For race,

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implicit evaluations showed ingroup > Whites > Asians > Blacks > Hispanics. For religion, implicit evaluations showed ingroup > Christianity > Judaism > Buddhism or Hinduism > Islam. For age, implicit evaluations showed children > young adults > middle-aged adults > older adults. These hierarchies by social evaluation complement evidence for distinct, consensual hierarchies for social power.

The results suggest that hierarchies of social identities are partly dependent on culture-wide social structures and are pervasively embedded in social minds (Nosek & Hansen, 2008), particularly in implicit evaluations that are not endorsed and may be contrary to conscious beliefs and values (Nosek et al., 2012). One interpretation of the difference across measures is that implicit evaluations reflect the accumulation of experience, whereas explicit evaluations are qualified by idiosyncratic beliefs and values that are consciously decided and endorsed (Gawronski & Bodenhausen, 2006; Nosek & Hansen, 2008). Finally, the results suggest that implicit evaluative hierarchies reflect some expectations of both ingroup favoritism (Tajfel, 1978) and system justification (Jost et al., 2004) perspectives.

Boundaries of Ingroup Favoritism

Ingroup favoritism is seen in most social groups, particularly explicitly (Mullen, Brown & Smith, 1992), but not always (Jost et al., 2004; Rudman & Goodwin, 2004). The lack of ingroup favoritism was observed most dramatically in the implicit age hierarchy in Study 3. An influence of ingroup identity was swamped by the general pattern of younger is better – even among the oldest participants. Why implicit ingroup favoritism occurred for race and religion but not age cannot be inferred directly from these data. A plausible influence is that age categories are ambiguous and people can avoid identifying in older age categories (e.g., Kleinspehn-Ammerlahn, Kotter-Gruhn, & Smith, 2008). This may be playing a role, but the fact

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that the rank ordering of children > young adult > middle-aged adult > old adult remains constant even among people in their 60's suggest that this explanation is incomplete.

Another possibility is that, by age group, the faces used evoke differences in attractiveness or caregiving responses across the age span. However, a similar pattern of implicit favoritism for young people over old people across the age span has been observed with implicit measures using names instead of faces (Nosek, Banaji & Greenwald, 2002).

Finally, research on ingroup favoritism suggests a variety of boundary conditions for the effect such as one's belief in social dominance (Overbeck et al., 2004) or perceived outgroup negativity (Livingston, 2002). However, it is not clear that these are sufficient to account for the present differences between age and race or religion.

Social Status = f(Competence, Warmth)

Existing evidence shows substantial consensus for hierarchies of social power (e.g., Barry & Kalin, 1979; Hagendoorn et al., 1998; Kahn et al., 2009). The present results extend the evidence for pervasive hierarchies to implicit social evaluation – who is *good*. It is already well known that social evaluation and social power are not equivalent (e.g., Eagly, Mladnic, & Otto, 1991). In the present race and religion evidence, for example, members of each group implicitly evaluated their own group atop the hierarchy on average, suggesting that social power is not the only contributor to implicit hierarchies unless there is widespread misperception of the power of one's own group. Moreover, with the age hierarchy, children were implicitly evaluated most positively despite having relatively little social power and the least amount of perceived competence compared to young adults and middle-aged adults especially.

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The present evidence adds to the existing literature to suggest that both social power and social evaluation contribute to understanding social status, and that both may be embedded in implicit social cognition. A notable distinction is that the rules of social evaluation appear, in some cases, to be more sensitive to group membership. Some groups perceive themselves to be the most good even if recognizing that they are not the most powerful.

From our perspective, the most promising means of understanding the interplay of power and evaluative hierarchies is consideration of two dimensions of social evaluation: competence and warmth (Fiske, Cuddy, Glick, & Xu, 2002). In Study 3, we measured competence and warmth explicitly but not implicitly. They did elicit distinct hierarchies of evaluation, with warmth ratings being closest to the implicit effects. However, actual evidence for this possibility requires extending to implicit measures assessing warmth and competence separately to estimate their independent and joint contribution to the social evaluation assessed in the present studies, and likewise to complementary assessments of social power.

Hispanics, not Blacks, Occupy the Bottom of the Implicit Racial Hierarchy

A noteworthy side finding from Study 1 was that Black people generally received more positive implicit evaluations than Hispanic people. Past research has indicated that Black people occupy the lowest rung of the racial status hierarchy (Sidanius, Levin, Liu & Pratto, 2000). Recent work suggests that Hispanic people may in fact occupy a position of lower status in the United States. For example, Hispanic men and women have lower weekly earnings than their White, Asian, and Black counterparts (“Women’s earnings and income”, 2013). Further, this research reveals heretofore undocumented evidence that Hispanics are evaluated less positively on average than Blacks, at least implicitly.

Limitations

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It is important to note that, while the samples were extremely large, they are not representative of any definable population. It is possible that representative samples of the U.S. population would not show the same invariance across these categories – though we cannot identify a plausible reason to expect this lack of generalizability. Further, it will be useful to extend these findings to other forms of implicit measurement, and to other social domains to document the extent to which implicit evaluations demonstrate invariance in social ranking in other areas.

This article examined the rules of social evaluation in the aggregate, but there are many unique effects that have potential research implications. For example, it remains unclear why Buddhists received such positive implicit evaluations from non-religious participants or participants belonging to other religions in Study 2, or why Black participants were the only group to have a comparatively negative evaluation of White people in Study 1. Furthermore, a reviewer noted that the structure of the MC-IAT may lend itself to alternative analysis strategies (e.g., dyadic analysis, Kenny & La Voie, 1984) that could reveal additional insights into the structure of social evaluation. In short, the present dataset is larger and richer than can be appreciated in the present article. To facilitate additional research, all data and materials are available at <https://osf.io/zg2su/>.

Conclusion

The present studies document invariance in implicit social evaluation across racial, religious, and age groups in the U.S. These implicit evaluations appear to be dually sensitive to one's own group identity as well as the relative status of other groups. That is, the rules of implicit social evaluation cannot be determined by ingroup identity alone. An obvious next

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question is to clarify the origins as well the consequences of such implicit hierarchies on social judgment.

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RUNNING HEAD: RULES OF IMPLICIT RACE, RELIGION AND AGE EVALUATIONS

Table S1

Explicit Attitudes (Descriptive Statistics)

<i>Participant Race</i>	White People			Asian People			Black People			Hispanic People		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
White	32,277	.56	.81	32,225	-.07	.67	32,224	-.27	.71	32,221	-.22	.62
Asian	1,487	.21	.83	1,490	.95	1.04	1,486	-.67	.81	1,484	-.49	.73
Black	3,671	-.32	.79	3,670	-.32	.75	3,691	.74	1.04	3,659	-.09	.64
Hispanic	4,473	.06	.85	4,472	-.26	.76	4,471	-.35	.84	4,472	.54	.89
Other Races	3,206	.21	.82	3,205	.18	.80	3,197	-.23	.82	3,197	-.17	.66

<i>Partic. Religion</i>	Christianity			Judaism			Hinduism			Islam		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Christianity	40,834	7.95	1.34	40,745	5.94	1.68	40,725	5.04	1.75	40,715	4.66	1.84
Judaism	3,721	5.18	1.72	3,724	8.12	1.12	3,715	5.92	1.43	3,713	4.75	1.78
Hinduism	749	5.75	1.65	750	6.00	1.40	750	7.95	1.27	749	5.27	1.78
Islam	1,295	5.89	1.71	1,299	5.37	1.91	1,296	5.16	1.92	1,303	8.26	1.25
Other or No Rel.	33,840	4.31	1.88	33,819	5.35	1.62	33,828	5.64	1.52	33,834	4.67	1.69

<i>Partic. Religion</i>	Christianity			Judaism			Buddhism			Islam		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Christianity	41,601	7.96	1.34	41,497	5.92	1.69	41,502	5.27	1.90	41,474	4.63	1.87
Judaism	3,740	5.24	1.73	3,745	8.13	1.11	3,742	6.35	1.51	3,736	4.79	1.83
Buddhism	1,235	4.71	1.85	1,234	5.73	1.51	1,235	8.25	1.02	1,235	5.15	1.61
Islam	1,328	5.98	1.70	1,326	5.41	1.93	1,330	5.69	1.88	1,337	8.22	1.34
Other or No Rel.	34,074	4.35	1.90	34,073	5.37	1.62	34,081	6.40	1.55	34,050	4.68	1.70

<i>Participant Age</i>	Children			Young Adults			Middle-Age Adults			Old Adults		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Teens	2,832	6.56	2.17	2,827	6.32	1.95	2,834	5.71	1.71	2,828	6.41	2.16
Twenties	8,539	6.93	2.19	8,560	6.27	1.91	8,567	6.11	1.67	8,542	6.74	2.09
Thirties	3,947	7.46	2.19	3,946	6.24	1.92	3,950	6.39	1.78	3,942	7.23	2.11
Forties	3,332	7.12	2.26	3,340	6.56	1.92	3,340	6.75	1.83	3,340	7.45	2.07
Fifties	2,565	7.45	2.12	2,568	6.75	1.90	2,569	7.00	1.80	2,564	7.47	1.98
Sixties	1,010	7.70	2.07	1,011	7.00	1.90	1,009	7.16	1.73	1,010	7.47	1.95

Note. N = number of participants. For racial attitudes, M = mean aggregate explicit preference score, with 0 meaning no preference and a possible range of -3 to +3; positive values indicate greater preference for members of that group. For religious attitudes, M= mean warmth (1-9). For age attitudes, M= mean warmth (0-10), with higher scores indicating greater warmth felt towards that group. SD = standard deviation of the mean.

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Table S2

Explicit Attitudes (Inferential Statistics)

<i>Participant Race</i>	Race 1 vs. Race 2		Race 2 vs. Race 3		Race 3 vs. Race 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
White	97.49	.54	25.05	.14	9.16	.05
Asian	19.85	.51	20.62	.54	7.17	.19
Black	38.00	.63	13.33	.22	.07*	0*
Hispanic	22.21	.33	17.16	.26	4.67	.07
Other Races	1.40*	.02*	15.86	.28	3.37	.06

<i>Participant Religion</i>	Religion 1 vs. Religion 2		Religion 2 vs. Religion 3		Religion 3 vs. Religion 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
Christianity	202.03	1.00	105.51	.52	57.56	.29
Judaism	80.17	1.32	24.75	.41	13.06	.21
Hinduism	32.63	1.19	4.89	.18	7.42	.27
Islam	44.38	1.24	12.01	.33	4.29	.12
Other or No Religion	40.07	.22	85.24	.46	37.68	.20

<i>Participant Religion</i>	Religion 1 vs. Religion 2		Religion 2 vs. Religion 3		Religion 3 vs. Religion 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
Christianity	205.10	1.00	73.99	.36	85.11	.42
Judaism	61.89	1.01	33.67	.55	13.25	.22
Buddhism	54.91	1.56	13.79	.39	8.09	.23
Islam	41.77	1.15	5.59	.15	5.50	.15
Other or No Religion	120.60	.65	87.64	.48	32.76	.18

<i>Participant Age</i>	Age 1 vs. Age 2		Age 2 vs. Age 3		Age 3 vs. Age 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
Teens	3.24	.06	1.35*	.03*	15.68	.30
Twenties	7.37	.08	16.27	.17	7.86	.09
Thirties	6.14	.10	25.95	.41	4.74	.08
Forties	3.54	.06	20.57	.36	5.95	.10
Fifties	.55*	.01*	10.23	.20	6.94	.14
Sixties	3.46	.11	5.64	.18	2.77	.09

Note. *t* = t-value from dependent samples t-test contrasting the group with the highest explicit scores with the group receiving the next highest score. *d* = Cohen's *d* effect size calculated from the mean difference between each group's *D* score. All *p* values less than .03, except for the contrasts marked with an *.

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Table S3

Implicit Attitudes, Full Sample (Descriptive Statistics)

<i>Participant Race</i>	White People			Asian People			Black People			Hispanic People		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
White	38,604	.15	.36	38,622	-.01	.30	38,622	-.05	.33	38,600	-.09	.29
Asian	2,061	.05	.33	2,068	.26	.32	2,064	-.15	.32	2,064	-.16	.28
Black	3,926	-.03	.34	3,929	-.08	.31	3,927	.22	.34	3,926	-.11	.30
Hispanic	5,097	.05	.34	5,098	-.04	.31	5,099	-.09	.34	5,108	.09	.31
Other Races	4,516	.08	.35	4,518	.04	.32	4,522	-.03	.34	4,513	-.08	.29

<i>Partic. Religion</i>	Christianity			Judaism			Hinduism			Islam		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Christianity	43,937	.47	0.34	43,955	-.02	0.30	43,932	-.21	0.30	43,936	-.25	0.29
Judaism	3,971	-.02	0.33	3,971	.47	0.34	3,968	-.18	0.30	3,969	-.27	0.31
Hinduism	1,140	.07	0.32	1,144	-.17	0.28	1,138	.36	0.33	1,143	-.26	0.31
Islam	2,000	.02	0.31	1,997	-.16	0.31	1,994	-.25	0.32	1,995	.38	0.34
Other or No Rel.	40,893	.18	0.35	40,868	0	0.30	40,863	-.02	0.32	40,871	-.16	0.30

<i>Partic. Religion</i>	Christianity			Judaism			Buddhism			Islam		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Christianity	44,722	.45	0.34	44,720	-.04	0.30	44,723	-.15	0.31	44,736	-.27	0.29
Judaism	3,994	-.04	0.33	3,992	.45	0.34	3,985	-.12	0.31	3,994	-.29	0.31
Buddhism	1,527	.06	0.34	1,527	-.16	0.30	1,525	.37	0.34	1,519	-.27	0.30
Islam	2,032	.02	0.31	2,027	-.18	0.30	2,030	-.20	0.31	2,030	.36	0.35
Other or No Rel.	41,187	.15	0.35	41,191	-.04	0.30	41,156	.09	0.34	41,198	-.20	0.31

<i>Participant Age</i>	Children			Young Adults			Middle-Age Adults			Old Adults		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Teens	3,615	.21	.30	3,605	.11	.29	3,609	-.15	.27	3,604	-.17	.31
Twenties	10,967	.20	.30	10,966	.10	.28	10,976	-.14	.28	10,971	-.16	.31
Thirties	5,206	.24	.31	5,206	.09	.29	5,208	-.15	.28	5,213	-.18	.32
Forties	4,321	.21	.31	4,307	.06	.28	4,301	-.10	.27	4,306	-.18	.33
Fifties	3,160	.19	.32	3,165	.04	.27	3,166	-.08	.28	3,164	-.15	.32
Sixties	1,188	.20	.34	1,188	.02	.31	1,186	-.08	.34	1,187	-.14	.33

Note. *N* = number of participants. *M* = mean MCIAT score, expressed as aggregate *D* scores (Greenwald et al., 2003); positive values indicate greater preference for members of that group. *SD* = standard deviation of the mean.

RULES OF IMPLICIT RACE, RELIGION AND AGE EVALUATIONS

Table S4

Implicit Attitudes, Full Sample (Inferential Statistics)

<i>Participant Race</i>	Race 1 vs. Race 2		Race 2 vs. Race 3		Race 3 vs. Race 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
White	59.10	.30	12.65	.06	16.65	.08
Asian	18.18	.40	16.87	.37	.73*	.02*
Black	27.53	.44	5.69	.09	3.83	.06
Hispanic	5.74	.08	12.02	.17	6.57	.09
Other Races	5.66	.08	8.56	.13	6.45	.10

<i>Participant Religion</i>	Religion 1 vs. Religion 2		Religion 2 vs. Religion 3		Religion 3 vs. Religion 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
Christianity	201.05	.96	78.50	.38	18.95	.09
Judaism	57.27	.91	19.77	.31	11.47	.18
Hinduism	17.93	.53	16.99	.50	6.81	.20
Islam	29.23	.66	16.27	.36	7.94	.18
Other or No Religion	67.05	.33	11.14	.06	56.93	.28

<i>Participant Religion</i>	Religion 1 vs. Religion 2		Religion 2 vs. Religion 3		Religion 3 vs. Religion 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
Christianity	204.12	.97	46.08	.21	53.42	.25
Judaism	55.92	.89	9.46	.15	21.66	.34
Buddhism	21.32	.55	16.50	.42	8.94	.23
Islam	27.45	.61	18.32	.41	2.38	.05
Other or No Religion	22.80	.11	48.08	.24	65.67	.32

<i>Participant Age</i>	Age 1 vs. Age 2		Age 2 vs. Age 3		Age 3 vs. Age 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
Teens	14.01	.23	34.36	.57	2.60	.04
Twenties	22.63	.22	54.08	.52	4.93	.05
Thirties	24.73	.34	35.58	.49	5.04	.07
Forties	22.60	.34	22.82	.45	11.35	.17
Fifties	20.44	.36	14.61	.26	9.10	.16
Sixties	15.04	.44	7.35	.21	4.48	.13

Note. *t* = t-value from dependent samples t-test contrasting the group with the highest MC-IAT D scores with the group receiving the next highest score. *d* = Cohen's d effect size calculated from the mean difference between each group's D score. All *p* values less than .02, except for the contrast marked with an *, where *p* = .465.

RULES OF IMPLICIT RACE, RELIGION AND AGE EVALUATIONS

Table S5

Explicit Attitudes, Full Sample (Descriptive Statistics)

<i>Participant Race</i>	White People			Asian People			Black People			Hispanic People		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
White	39,421	.54	.80	39,371	-.07	.66	39,362	-.27	.70	39,352	-.20	.61
Asian	2,096	.22	.80	2,099	.89	1.02	2,095	-.68	.82	2,091	-.43	.71
Black	3,921	-.32	.80	3,921	-.32	.75	3,943	.73	1.03	3,910	-.09	.64
Hispanic	5,181	.09	.84	5,181	-.25	.76	5,179	-.34	.83	5,180	.50	.88
Other Races	4,420	.20	.79	4,418	.19	.80	4,412	-.25	.80	4,404	-.14	.64

<i>Partic. Religion</i>	Christianity			Judaism			Hinduism			Islam		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Christianity	44,914	7.90	1.38	44,816	5.92	1.68	44,795	5.06	1.74	44,783	4.66	1.84
Judaism	4,053	5.18	1.71	4,055	8.08	1.17	4,046	5.91	1.42	4,044	4.72	1.79
Hinduism	1,175	5.82	1.64	1,170	5.92	1.41	1,175	7.81	1.36	1,175	5.20	1.84
Islam	2,027	5.86	1.72	2,028	5.22	1.94	2,029	5.08	1.94	2,034	8.14	1.38
Other or No Rel.	41,872	4.28	1.87	41,840	5.24	1.64	41,856	5.58	1.53	41,863	4.57	1.72

<i>Partic. Religion</i>	Christianity			Judaism			Buddhism			Islam		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Christianity	45,728	7.91	1.36	45,612	5.91	1.69	45,621	5.31	1.90	45,596	4.64	1.87
Judaism	4,103	5.24	1.73	4,110	8.10	1.15	4,106	6.34	1.51	4,098	4.73	1.84
Buddhism	1,556	4.79	1.84	1,558	5.64	1.51	1,560	8.18	1.10	1,560	5.07	1.68
Islam	2,085	5.92	1.71	2,082	5.22	1.97	2,089	5.61	1.90	2,097	8.16	1.38
Other or No Rel.	42,227	4.32	1.89	42,220	5.25	1.45	42,229	6.35	1.57	42,188	4.57	1.73

<i>Participant Age</i>	Children			Young Adults			Middle-Age Adults			Old Adults		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Teens	3,690	6.53	2.16	3,692	6.32	1.89	36984	5.71	1.73	3,683	6.38	1.94
Twenties	11,202	6.89	2.18	11,230	6.28	1.89	11,242	6.10	1.67	11,207	6.72	2.07
Thirties	5,310	7.37	2.17	5,310	6.26	1.89	5,315	6.34	1.74	5,303	7.13	2.08
Forties	4,356	7.58	2.09	4,362	6.56	1.89	4,363	6.72	1.79	4,360	7.35	2.06
Fifties	3,146	7.47	2.10	3,149	6.77	1.88	3,152	6.99	1.78	3,155	7.42	1.98
Sixties	1,186	7.68	2.07	1,186	7.00	1.89	1,185	7.16	1.73	1,185	7.44	1.94

Note. N = number of participants. For racial attitudes, M = mean aggregate explicit preference score, with 0 meaning no preference and a possible range of -3 to +3; positive values indicate greater preference for members of that group. For religious attitudes, M= mean warmth (1-9). For age attitudes, M= mean warmth (0-10), with higher scores indicating greater warmth felt towards that group. SD = standard deviation of the mean.

RULES OF IMPLICIT RACE, RELIGION AND AGE EVALUATIONS

Table S6

Explicit Attitudes, Full Sample (Inferential Statistics)

<i>Participant Race</i>	Race 1 vs. Race 2		Race 2 vs. Race 3		Race 3 vs. Race 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
White	105.84	.53	24.16	.12	14.19	.07
Asian	21.66	.47	23.91	.52	11.84	.26
Black	38.88	.62	13.16	.21	.21*	0*
Hispanic	20.96	.29	19.60	.27	5.12	.07
Other Races	.79*	.01*	18.09	.27	6.67	.10

<i>Participant Religion</i>	Religion 1 vs. Religion 2		Religion 2 vs. Religion 3		Religion 3 vs. Religion 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
Christianity	209.18	.99	105.05	.50	62.14	.29
Judaism	81.86	1.29	25.34	.40	14.55	.23
Hinduism	41.22	1.21	2.42	.07	12.07	.35
Islam	51.78	1.15	18.39	.41	3.48	.08
Other or No Religion	51.63	.25	94.35	.46	32.94	.16

<i>Participant Religion</i>	Religion 1 vs. Religion 2		Religion 2 vs. Religion 3		Religion 3 vs. Religion 4	
	<i>t</i>	<i>D</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
Christianity	213.00	1.00	69.87	.33	92.28	.43
Judaism	63.28	.99	35.30	.55	15.72	.25
Buddhism	60.22	1.53	14.60	.37	5.70	.14
Islam	50.90	1.12	7.49	.16	9.30	.20
Other or No Religion	141.00	.69	95.23	.46	28.30	.14

<i>Participant Age</i>	Age 1 vs. Age 2		Age 2 vs. Age 3		Age 3 vs. Age 4	
	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>	<i>t</i>	<i>d</i>
Teens	3.78	.06	1.07*	.02*	17.99	.30
Twenties	7.30	.07	17.73	.17	10.51	.10
Thirties	7.61	.10	28.36	.39	2.90	.04
Forties	7.27	.11	21.07	.32	5.93	.09
Fifties	1.37*	.02*	12.99	.23	6.72	.12
Sixties	4.00	.12	5.55	.16	3.08	.09

Note. *t* = t-value from dependent samples t-test contrasting the group with the highest explicit scores with the group receiving the next highest score. *d* = Cohen's *d* effect size calculated from the mean difference between each group's *D* score. All *p* values less than .05 except those marked with *.

RUNNING HEAD: RULES OF IMPLICIT RACE, RELIGION AND AGE EVALUATIONS

Table S7

Implicit Attitudes- Contrasts (Descriptive Statistics)

<i>Participant Race</i>	White-Asian			White-Hispanic			White-Black			Asian-Hispanic			Asian-Black			Black-Hispanic		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
White	32,037	.13	.51	31,998	.18	.50	32,010	.15	.55	32,034	.06	.47	32,025	.02	.51	32,043	.03	.49
Asian	1,483	-.17	.51	1,490	.16	.49	1,480	.17	.55	1,487	.32	.47	1,492	.27	.51	1,487	0	.47
Black	3,724	.03	.52	3,723	.06	.51	3,728	-.19	.54	3,732	.01	.49	3,725	-.22	.53	3,717	.26	.49
Hispanic	4,453	.06	.51	4,457	-.03	.50	4,456	.10	.55	4,464	-.11	.50	4,454	.04	.52	4,459	-.15	.51
Other Races	3,356	.02	.52	3,345	.12	.51	3,363	.09	.55	3,359	.09	.49	3,351	.05	.52	3,355	.04	.50
<i>Partic. Religion</i>	Christianity-Judaism			Christianity-Islam			Christianity-Hinduism			Judaism-Islam			Judaism-Hinduism			Hinduism-Islam		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Christianity	40,519	.37	.48	40,523	.54	.49	40,547	.51	.50	40,557	.18	.47	40,524	.14	.50	40,508	.03	.47
Judaism	3,696	-.42	.50	3,690	.20	.52	3,698	.14	.52	3,696	.54	.48	3,693	.48	.49	3,693	.07	.49
Hinduism	744	.19	.50	749	.25	.51	741	-.26	.52	748	.10	.49	747	-.37	.48	743	.45	.47
Islam	1,301	.16	.49	1,304	-.29	.51	1,305	.21	.52	1,301	-.36	.49	1,299	.06	.52	1,294	-.48	.49
Other or No Rel.	33,473	.14	.51	33,490	.25	.53	33,476	.15	.55	33,479	.14	.47	33,464	.03	.50	33,454	.11	.48
<i>Partic. Religion</i>	Christianity-Judaism			Christianity-Islam			Christianity-Buddhism			Judaism-Islam			Judaism-Buddhism			Buddhism-Islam		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Christianity	41,223	.38	.48	41,203	.54	.49	41,233	.46	.51	41,230	.18	.47	41,208	.08	.50	41,233	.08	.47
Judaism	3,695	-.41	.50	3,699	.20	.52	3,695	.07	.53	3,698	.53	.47	3,696	.42	.49	3,693	.12	.49
Buddhism	1,228	.17	.51	1,221	.25	.52	1,225	-.26	.54	1,222	.11	.46	1,222	-.40	.48	1,224	.46	.46
Islam	1,336	.16	.48	1,333	-.28	.52	1,330	.17	.51	1,330	-.35	.48	1,326	.04	.49	1,332	-.43	.49
Other or No Rel.	33,722	.15	.51	33,707	.25	.53	33,712	.05	.55	33,721	.15	.47	33,691	-.10	.51	33,704	.21	.49
<i>Participant Age</i>	Child-Young Adult			Child-Middle Adult			Child-Old Adult			Young-Middle Adult			Young-Old Adult			Middle-Old Adult		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Teens	2,823	.13	.44	2,829	.26	.47	2,821	.25	.49	2,821	.28	.45	2,823	.18	.48	2,826	.09	.46
Twenties	8,503	.11	.46	8,487	.25	.47	8,487	.22	.49	8,482	.25	.46	8,493	.15	.49	8,506	.10	.46
Thirties	3,924	.15	.45	3,928	.30	.48	3,926	.27	.50	3,926	.24	.47	3,925	.17	.50	3,922	.10	.47

RULES OF IMPLICIT RACE, RELIGION AND AGE EVALUATIONS

Forties	3,351	.15	.44	3,340	.23	.47	3,341	.23	.50	3,338	.18	.47	3,335	.14	.49	3,336	.12	.46
Fifties	2,605	.14	.43	2,608	.22	.49	2,600	.21	.51	2,604	.13	.46	2,615	.12	.50	2,612	.12	.46
Sixties	1,020	.17	.44	1,019	.21	.47	1,020	.21	.52	1,021	.12	.45	1,020	.09	.50	1,018	.10	.45

Note. *N* = number of participants. *M* = mean MCIAT score, expressed as *D* scores (Greenwald et al., 2003); positive values indicate greater preference for members of the group listed first in the comparison. *SD* = standard deviation of the mean.

RULES OF IMPLICIT RACE, RELIGION AND AGE EVALUATIONS

Table S8

Explicit Race Attitudes (Descriptive Statistics)

<i>Particip. Race</i>	White-Asian			White-Hispanic			White-Black			Asian-Hispanic			Asian-Black			Black-Hispanic		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
White	32,349	.51	.95	32,342	.56	1.00	32,348	.61	.97	32,30	.14	.92	32,300	.16	.98	32,300	-.04	.84
Asian	1,494	-.57	1.34	1,491	.56	1.08	1,496	.63	1.1	1,493	1.06	1.26	1,497	1.23	1.26	1,488	-.15	.86
Black	3,692	-.02	.97	3,686	-.20	1.08	3,718	-.77	1.3	3,686	-.24	.96	3,708	-.76	1.28	3,702	.70	1.17
Hispanic	4,487	.25	1.06	4,485	-.35	1.21	4,488	.28	1.1	4,487	-.61	1.18	4,486	.08	1.06	4,484	-.67	1.12
Other Races	3,226	.05	1.05	3,226	.28	1.03	3,229	.31	1.1	3,220	.28	1.05	3,219	.31	1.14	3,215	-.06	.91

Note. *N* = number of participants. *M* = mean explicit preference score (-3 to +3); positive values indicate greater preference for members of the group listed first in the comparison. *SD* = standard deviation of the mean.

RUNNING HEAD: RULES OF IMPLICIT RACE, RELIGION AND AGE EVALUATIONS

Table S9

Likability and Competence Age Perceptions (Descriptive Statistics)

	Children			Young Adults			Middle-Age Adults			Old Adults		
Likability	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
<i>Participant Age</i>												
Teens	2,857	5.71	1.56	2,856	5.54	1.40	2,856	5.26	1.27	2,856	5.70	1.52
Twenties	8,602	5.95	1.51	8,602	5.62	1.30	8,602	5.63	1.15	8,602	5.93	1.35
Thirties	3,955	6.34	1.33	3,955	5.75	1.26	3,955	5.95	1.10	3,955	6.30	1.24
Forties	3,364	6.47	1.26	3,364	6.06	1.17	3,364	6.25	1.01	3,363	6.49	1.15
Fifties	2,598	6.46	1.23	2,599	6.15	1.11	2,599	6.33	.97	2,599	6.48	1.09
Sixties	1,018	6.62	1.13	1,018	6.26	1.10	1,018	6.45	.91	1,018	6.54	1.00
Competence	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
<i>Participant Age</i>												
Teens	2,853	4.43	1.70	2,852	5.28	1.46	2,852	6.14	1.25	2,850	5.40	1.63
Twenties	8,589	4.55	1.69	8,590	5.37	1.39	8,592	6.35	1.12	8,590	5.65	1.44
Thirties	3,956	4.94	1.66	3,956	5.42	1.42	3,955	6.53	1.00	3,953	6.03	1.29
Forties	3,359	5.12	1.60	3,358	5.61	1.30	3,362	6.65	.92	3,360	6.31	1.16
Fifties	2,583	5.23	1.54	2,584	5.70	1.22	2,583	6.63	.86	2,582	6.34	1.08
Sixties	1,014	5.49	1.47	1,014	5.89	1.17	1,014	6.63	.90	1,013	6.41	1.00

Note. N = number of participants. For racial attitudes, M = mean likability or competence (1-8). Positive values indicate greater perceptions of the trait. SD = standard deviation of the mean.

RULES OF IMPLICIT RACE, RELIGION AND AGE EVALUATIONS

Table S10

Implicit-Explicit Correlations

<i>Race Associations</i>	<i>r</i>
White	.32
Asian	.21
Black	.29
Hispanic	.21
<i>Religious Associations</i>	<i>r</i>
<i>Buddhism Version</i>	
Christianity	.42
Judaism	.23
Buddhism	.32
Islam	.21
<i>Religious Associations</i>	<i>r</i>
<i>Hinduism Version</i>	
Christianity	.40
Judaism	.23
Hinduism	.22
Islam	.21
<i>Age Associations</i>	<i>r</i>
Children	.13
Young Adults	.08
Middle-Age Adults	.05
Old Adults	.09

Note. r = Pearson's correlation. For race associations, correlations are between aggregate explicit and implicit variables. For religious and associations, correlations are between aggregate implicit and warmth ratings. All p values less than .001.