Title
Aging and prejudice: Diminished regulation of automatic race bias among older adults

Journal
Journal of Experimental Social Psychology, 45(2)

ISSN
0022-1031

Authors
Gonsalkorale, Karen
Sherman, Jeffrey W
Klauer, Karl Christoph

Publication Date
2009-02-01

DOI
10.1016/j.jesp.2008.11.004

Peer reviewed

Journal of Experimental Social Psychology 45 (2009) 410–414

Contents lists available at ScienceDirect

Journal of Experimental Social Psychology

journal homepage: www.elsevier.com/locate/jesp

Reports

Aging and prejudice: Diminished regulation of automatic race bias among older adults

Karen Gonsalkorale [a,*], Jeffrey W. Sherman [b], Karl Christoph Klauer [c]

[a] School of Psychology, Brennan MacCallum Building (A18), The University of Sydney, NSW 2006, Australia
[b] Department of Psychology, University of California, One Shields Avenue, Davis, CA 95616, USA
[c] Institut für Psychologie, Albert-Ludwigs-Universität Freiburg, D-79085 Freiburg, Germany

ARTICLE INFO

Article history:
Received 8 September 2008
Revised 11 November 2008
Available online 6 December 2008

Keywords:
Implicit attitudes
Prejudice
Aging
Automatic associations
Self-regulation

ABSTRACT

A popular view holds that older adults are more prejudiced than younger adults because they grew up in a less tolerant era. An alternative view proposes that aging corresponds with stronger prejudice among older adults because they have reduced capacity to inhibit biased associations that come to mind automatically. To independently assess these possibilities, we modeled the processes underlying implicit racial attitudes in samples of teenagers through people in their nineties. Results indicated that older adults showed greater implicit bias because they were less able to regulate the automatic associations they possessed, not because of holding stronger associations in the first place. These findings suggest that age-related increases in racial biases, even those that are implicit, may be due to self-regulatory failure of older adults, rather than to cohort effects.

Why do older people tend to be more racially prejudiced than younger people (Danigelis & Cutler, 1991; Firebaugh & Davis, 1988; Wilson, 1996)? One possibility is that age differences in prejudice reflect a “generation gap” between the young and the old. According to this idea, a person’s knowledge and evaluation of racial groups are produced by the historical period in which he or she grew up. Because Blacks were portrayed more negatively in the distant than in the recent past, older people should have stronger racially biased associations compared to younger people. This cohort account forecasts a shift in racial attitudes, as older generations dwindle and younger generations replace them. If “baby boomers,” “Generation Xers,” and other recent cohorts carry their egalitarian attitudes into old age, society will become less prejudiced.

A second explanation for age differences in prejudice is that deficits in cognitive resources alter the attitudinal expression of older adults. Given that the ability to inhibit automatically activated stereotypes enables people to behave non-prejudicially (Bartholow, Dickter, & Sestir, 2006; Devine, 1989; Moskowitz, Gollwitzer, Wasel, & Schaal, 1999), and inhibitory functioning declines with age (Connelly, Hasher, & Zacks, 1991; Hasher & Zacks, 1988), losses in inhibitory ability may increase stereotyping and prejudice during old age, even if the underlying attitudes are of equivalent (or even declining) strength across the life span (von Hippel, Silver, & Lynch, 2000). This inhibitory deficits account proposes that people of all ages have racially biased associations, but older adults are less able to suppress their associations. In other words, a younger and older adult with the same racial attitude in mind may look very different behaviorally because of age differences in self-regulatory capacity.

The cohort and the inhibitory deficits accounts of age differences in prejudice have been examined in previous research. Consistent with the cohort account, large national surveys have shown that older white Americans are more likely than their younger counterparts to endorse negative racial stereotypes, oppose principles of racial equality, and reject social contact with minority members (Danigelis & Cutler, 1991; Firebaugh & Davis, 1988; Wilson, 1996). von Hippel et al. (2000) demonstrated similar age differences in explicit stereotyping and prejudice, and at the same time, showed that the older adults performed more poorly on a cognitive inhibition task than the younger adults. Moreover, inhibitory ability mediated age differences in stereotyping, and partially mediated age differences in prejudice, providing initial support for the inhibitory deficits account.

Although research findings have been consistent with both cohort-based differences in biased associations and age-related differences in inhibition, it has been difficult to gauge the relative influence of these factors. This limitation has arisen, in part, from the use of self-report measures of stereotyping and prejudice in the previous studies. On such explicit measures, the influence of biased associations may be readily altered or inhibited according to respondents’ motives to behave in a non-biased fashion (e.g., Fazio, Jackson, Dunton, & Williams, 1995). In other words, the measures reflect combinations of underlying associations and various

* Corresponding author. Fax: +61 2 9036 5223.
E-mail address: kareng@psych.usyd.edu.au (K. Gonsalkorale).

0022-1031/$ - see front matter © 2008 Elsevier Inc. All rights reserved.
doi:10.1016/j.jesp.2008.11.004

motives that alter the expression of those associations. Consequently, age differences in self-reported prejudice do not necessarily indicate cohort-based differences in biased associations. In addition, while the results of von Hippel et al. (2000) suggest that inhibitory ability influences the expression of bias, they do not speak to the relative roles of biased associations and inhibition in prejudice because the former were not assessed. What is needed is a means to measure biased associations independently of inhibition of those associations.

In recent years, implicit measures of prejudice have become a popular way to measure bias independently of motivations to inhibit the expression of biased associations (for a review, see Fazio & Olson, 2003). These measures are meant to assess the extent of biased associations of which people may be unaware and that they may not personally endorse. Importantly, responses on these measures also are meant to be difficult or impossible to alter with conscious intent. Using one such measure (the Implicit Association Test or IAT; Greenwald, McGhee, & Schwartz, 1998), a large study (Nosek, Banaji, & Greenwald, 2002) reported a positive correlation between age and implicit racial prejudice. To the extent that these responses were impervious to inhibitory efforts, these data provide the strongest support yet for cohort-based differences in prejudice. That is, if participants' responses could not reflect inhibitory efforts, then the age differences were likely due to differences in the extent of biased associations.

However, although implicit measures surely restrict the role of inhibitory processes more so than do self-report measures, even here, self-regulatory abilities affect task performance (Conrey, Sherman, Gawronski, Hugenberg, & Groom, 2005; Gonsalkorale, von Hippel, Sherman, & Klauer, 2009; Sherman et al., 2008; see also Bartholow et al., 2006). Thus, implicit measures, in and of themselves, do not provide the key to separating underlying biases from inhibitory processes. In an attempt to address this issue, we have developed and validated a method to assess the independent contributions of biased associations and inhibition of those associations on implicit task performance (see Sherman et al., 2008 for a review). We used this method (known as the Quadruple process or Quad model) in the present research to estimate the independent contributions of biased associations and regulation of those associations in producing observed aging effects on an implicit measure of prejudice. In so doing, for the first time, we were able to examine independently the extent to which age differences in prejudice reflect differences in biased associations, differences in inhibitory abilities, or a combination of the two.

The Quad model

The Quad model is a multinomial model (see Batchelder & Riefer, 1999) designed to estimate the independent contributions of multiple processes from responses on implicit measures of bias (for reviews of this approach, see Sherman, 2006; Sherman et al., 2008). According to the model, responses on implicit measures of bias reflect the operation of four qualitatively distinct processes: Activation of Associations (AC), Detection (D), Overcoming Bias (OB), and Guessing (G). The AC parameter refers to the degree to which biased associations are automatically activated when responding to a stimulus. All else being equal, the stronger the associations, the more likely they are to be activated and to influence behavior. The D parameter reflects a relatively controlled process that discriminates between appropriate and inappropriate responses. Sometimes, the activated associations conflict with the detected correct response. For example, on incompatible trials of implicit attitude measures (e.g., trying to associate Black faces with positive words in an IAT), automatic associations (e.g., between outgroups and negativity) conflict with detected correct responses. In such cases, the Quad model proposes that an overcoming bias process resolves the conflict. As such, the OB parameter refers to self-regulatory efforts that prevent automatically activated associations from influencing behavior when they conflict with detected correct responses. Finally, the G parameter reflects general response tendencies that may occur when individuals have no associations that direct behavior, and they are unable to detect the appropriate response. The Quad model and the construct validity of its parameters have been extensively validated in previous research (see Beer, Stallen, Lombardo, Gonsalkorale, Cunningham, & Sherman, 2008; Conrey et al., 2005; Gonsalkorale et al., 2009; Sherman et al., 2008).

In the current study, a large number of White participants aged between 11 and 94 completed the race version of the IAT (Greenwald et al., 1998). The IAT is a reaction-time measure that has been widely used to assess implicit evaluations across a range of attitude domains (Greenwald et al., 1998; Nosek et al., 2002). Based on previous findings (Nosek et al., 2002), we predicted that older adults would show greater bias on the IAT than younger adults. More importantly, we used the Quad model to distinguish between the cohort and inhibitory deficits accounts. If age differences in implicit prejudice are due to cohort effects, process estimates of Association Activation should be higher for older adults than for younger adults. On the other hand, if inhibitory deficits are responsible for age-related increases in implicit prejudice, Overcoming Bias should decline with increasing age. In addition to the primary aim of testing the cohort account against the inhibitory deficits account, we also were able to examine age differences in Detection and Guessing. Thus, our modeling approach allowed us to examine the relative influence of the four processes in accounting for age differences in implicit racial bias. The advantage of this approach is that, unlike previous research, we were able to assess the underlying processes simultaneously and independently in a single task.

Method

Participants

Participants were 15,752 (M age = 37.41, SD = 18.36, range = 11–94) White individuals who visited the IAT demonstration website (http://implicit.harvard.edu/; Nosek et al., 2002) between December 2002 and May 2006.[1,2] For the analyses reported here, participants were split into eight age groups: 11–15, 16–20, 21–30, 31–40, 41–50, 51–60, 61–70, and 71+.

Materials and procedure

After providing demographic information (age, gender, race/ethnicity, and educational level), participants completed the race version of the IAT. In the IAT, participants used two keys to categorize 12 target images (six Black faces, six White faces) and 16 evaluative words (eight pleasant, eight unpleasant). They were instructed to make their classifications as quickly and accurately as possible. They first completed two 20-trial practice blocks, in which they discriminated pleasant from unpleasant words, and Black from White faces. The third and fourth blocks were critical

[1] During this period, a total of 271,013 White respondents reported their age and completed the race IAT. The participant sample in the current study included the White respondents aged over 70 (N = 352) and 2200 respondents from each of the other age groups.

[2] Although non-White individuals also visited the IAT demonstration site, the small number of older Hispanic, Asian, and Native American respondents prevented analysis of the relationship between age and prejudice in these ethnic groups. Among Black respondents, IAT scores did not significantly increase with age group, $F(1,7) = 0.64$, $p = .43$. Thus, there was no evidence to suggest that there were age differences in Black individuals' implicit attitudes toward their ingroup.

blocks consisting of 20 and 40 trials, respectively. Participants were instructed to press one key whenever they saw a picture of a White person or a pleasant word, and another key whenever they saw a picture of a Black person or an unpleasant word. The keys used to categorize Black and Whites faces were switched in the remaining blocks. The fifth block was a practice block in which participants discriminated Black from White faces. In the last two blocks, "Black" shared a response key with the evaluative dimension "unpleasant." Participants who respond more quickly when "Black" shares a key with "unpleasant" ("compatible" trials) than when it shares a key with "pleasant" ("incompatible" trials) are thought to have an implicit preference for Whites relative to Blacks (Greenwald et al., 1998). Category labels remained on the top left and right of the screen throughout the task, while stimulus pictures and words appeared in the center of the screen. A red "X" appeared whenever participants made an error, and they were required to correct it before moving on to the next trial. The order of the critical blocks was counterbalanced across participants.

Results

To examine age differences in implicit prejudice and processes, we calculated mean IAT scores and parameter estimates as a function of participant age group.

IAT scores

IAT effects were computed using the algorithm described by Greenwald, Nosek, and Banaji (2003). This algorithm was designed, in part, to control for differences in overall speed of responding, and has been shown to minimize the effects of age-related slowing on the IAT. Higher IAT effects indicate stronger implicit pro-White preference. As shown in Fig. 1, IAT bias increased with increasing age group, indicating that older participants had a stronger implicit preference for Whites relative to Blacks than younger participants, $F(1,7) = 32.74$, $p < .01$.

Quad model parameter estimates

The structure of the Quad model is depicted as a processing tree in Fig. 2. In the tree, each path represents a likelihood. Processing parameters with lines leading to them are conditional upon all preceding parameters. For instance, Overcoming Bias (OB) is conditional upon both Activation of Associations (AC) and Detection (D). Similarly, Guessing (G) is conditional upon the lack of Activation of Associations (1-AC) and the lack of Detection (1-D).

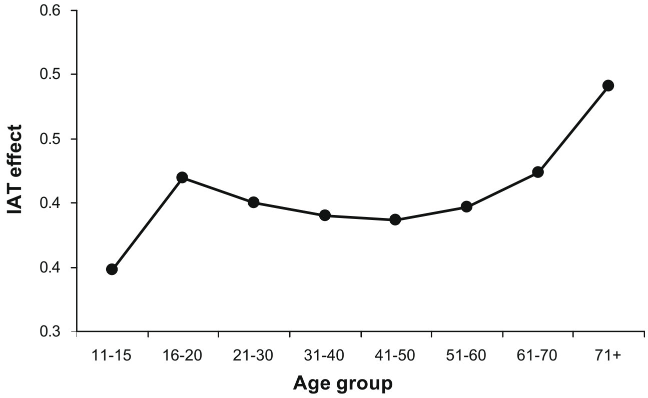

Fig. 1. IAT bias as a function of age. Higher scores indicate a stronger preference for Whites relative to Blacks.

The conditional relationships described by the model form a system of equations that predict the number of correct and incorrect responses in different conditions (e.g., compatible and incompatible trials). The model's predictions are then compared to the actual data to determine the model's ability to account for the data. A χ^2-estimate is computed for the difference between the predicted and observed errors. In order to best approximate the model to the data, the four parameter values are changed through maximum likelihood estimation until they produce a minimum possible value of the χ^2. The final parameter values that result from this process are interpreted as relative levels of the four processes. For a complete description of data analysis within the Quad model, see Conrey et al. (2005).

The overall error rate for the IAT was 6.5%. Two AC, one OB, one D, and one G parameter were estimated for each age group. One AC parameter measured the extent to which associations between "Black" and "unpleasant" were activated in performing the task, and the other AC parameter measured the extent to which associations between "White" and "pleasant" were activated in performing the task. The G parameter was coded so that higher scores represent a bias towards guessing with the positive ("pleasant") key.

One of the difficulties with modeling large datasets is that the χ^2 test is dependent on sample size, such that minute deviations from the model can jeopardize model fit when power is high (see Bollen & Long, 1993). Not surprisingly, the Quad model did not fit our large dataset. However, the effect size of this difference between the data and the model's predicted data was small, $w = 0.05$, indicating satisfactory fit when controlling for power.

Fig. 3 displays mean parameter estimates as a function of participant age. Testing for parameter differences between adjacent age groups revealed the following significant effects at $p < .01$ (i.e., $\Delta\chi 2(1) > 6.64$). Black-unpleasant AC was significantly lower for the 31–40 group than for the 21–30 group. White-pleasant AC decreased with increasing age between the 21–30 and 51–60 age groups. This does not support the pattern predicted by the cohort hypothesis that would expect stronger Activation of Associations among older participants to match the stronger IAT effects among the same participants. In contrast, starting from the 41–50 group, the Overcoming Bias parameter declined as age increased, demonstrating that older participants were less able to regulate their activated associations than were younger participants. Detection significantly increased between adjacent age groups up until the 51–60 group, whose D estimate was not significantly different to that of the 61–70 group. However, D was significantly lower for the 71+ group compared to the 61–70 group. The only effect for Guessing was that it was higher for the 51–60 group than for the 41–50 group.[3]

Discussion

These findings indicate that age-related differences in performance on measures of implicit racial bias arise from differences in the ability of older and younger adults to regulate automatically activated associations. Contrary to the cohort account, automatic Activation of Associations was not stronger among the older age groups. Indeed, the AC parameters diminished significantly with

[3] When each individual subject performs relatively few trials (as in the current case), parameter estimates derived from aggregated data are more accurate than parameter estimates derived from each participant separately (e.g., Cohen, Sanborn, & Shiffrin, 2008). As such, our analyses utilized aggregated data. Nevertheless, analyses based on individual-level parameter estimates produced results nearly identical to those produced by aggregate analyses, except that OB, D, White-pleasant AC, and Black-pleasant AC each had a significant quadratic relationship with age. Individual-level data are available from the authors on request.

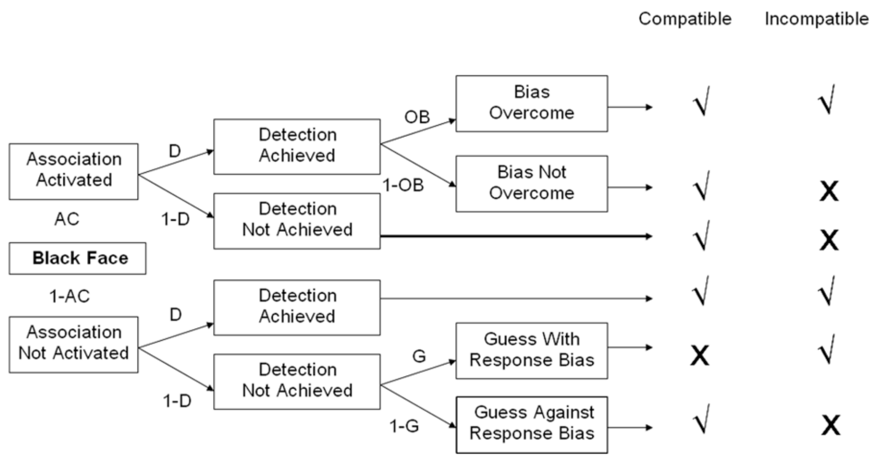

Fig. 2. The Quadruple process model (Quad model). Each path represents a likelihood. Parameters with lines leading to them are conditional upon all preceding parameters. The table on the right side of the figure depicts correct (√) and incorrect (X) responses as a function of process pattern and trial type. In this figure, the response bias refers to guessing with the positive key.

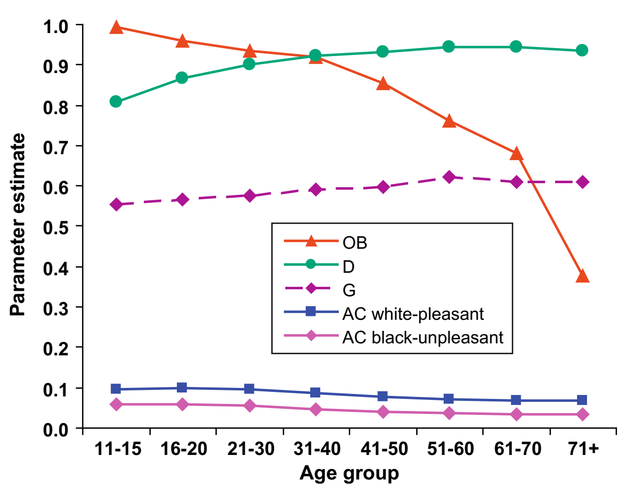

Fig. 3. Quad model parameter estimates as a function of age (OB = Overcoming Bias, D = Detection, G = Guessing, AC = Activation of Associations).

increasing age across some groups, and never increased with increasing age. Instead, as predicted by the inhibitory deficits account, Overcoming Bias decreased with age. It appears that the older adults exhibited stronger prejudice on the implicit measure because they were less able to inhibit their activated associations. These findings suggest that age differences in implicit racial bias are due to age-related losses in inhibitory deficits rather than to cohort effects.

The inhibitory deficits account proposes that the aging process strips older adults of their ability to effectively regulate automatic associations. Considerable evidence points to the conclusion that controlled inhibitory processes are impaired in old age (Connelly et al., 1991; Hasher & Zacks, 1988). However, an alternative interpretation could be that the older adults lacked motivation and were not engaged in the task. This possibility is unlikely for two reasons. First, older adults may actually be more concerned with impression management than younger adults (von Hippel et al., 2000), which would increase motivation to perform the task accurately. Second, estimates of Detection increased between the ages of 15 and 50, even as IAT bias also was increasing. Thus, diminished D cannot account for increased IAT bias. This age-based dissociation between OB and D is consistent with previous research (Rosano et al., 2005) showing that not all forms of controlled processing diminish with age. Rather, age-related deficits in cognitive control appear to be related primarily to self-regulatory processes.

A possible limitation of the current study is that, because the sample was comprised of self-selected internet users, participant characteristics may have accounted for the observed pattern of results. Although we did not have detailed information on participant demographics, we did have information on one potentially important variable: level of education. On average, the younger participants had completed fewer years of formal education than the older participants, even when we restricted the sample to age groups for which every member was old enough to have obtained a higher degree, $F(1,4) = 20.01$, $p < .01$. However, education was not related to the size of the IAT effect in the whole sample. Among those participants aged over 30, there was a small negative correlation between level of education and IAT bias ($r = -.05$). Moreover, the effect of age group on IAT scores remained significant when we included years of education as a covariate, $F(1,7) = 39.66$, $p < .01$. Thus, it is clear that differences in education did not account for the effect of age on implicit attitudes. Nevertheless, it is possible that other, unmeasured demographic variables may have influenced the results. Future research should incorporate detailed demographic variables to rule out their effects.

This caveat notwithstanding, our current and previous findings (e.g., Sherman et al., 2008) suggest that acting in non-prejudicial ways may require effortful control over automatically activated associations (Devine, 1989; Monteith, Ashburn-Nardo, Voils, & Czopp, 2002). This has implications for younger as well as older people, because age is not the only source of variability in inhibitory functioning. For example, when they are intoxicated (Easdon & Vogel-Sprott, 2000), under cognitive load (Wegner, 1994), or when their circadian arousal is low (May & Hasher, 1998), younger adults are less able to inhibit distracting thoughts and restrain inappropriate responses on cognitive tasks. In fact, it has been found that younger adults who are under cognitive load perform at similar levels on cognitive tasks as older adults who are not under cognitive load (Macrae, Schloerscheidt, Bodenhausen, & Milne, 2002). These factors that impair the efficiency of inhibitory mechanisms also have been linked to greater stereotyping and racially biased responding in younger adults (Bartholow et al., 2006; Bodenhausen, 1990). In other words, younger adults whose inhibitory capacity is constrained by situational factors may exhibit as much prejudice as older adults.

In the United States and other developed nations, older people are occupying a growing proportion of the population. While policymakers and community leaders grapple with the economic and health implications of the aging population, our study points to an important social challenge; that, as the population ages, biased behavior may become an increasingly common social problem. Older people appear to be prone to responding prejudicially, not because they have more biased associations than younger people, but because they have more difficulty suppressing the associations that they do possess. This suggests that future strategies for promoting positive intergroup relations will need to focus not only on changing people's biased associations, but also on training them how to control their expression.

Acknowledgements

This research was supported by a grant from the National Science Foundation (BCS 0820855) to the second author. We are grateful to Brian Nosek, Tony Greenwald, and Mahzarin Banaji for sharing data from Project Implicit. We also thank Brian Nosek and Tony Greenwald for their helpful comments on this research.

References

Bartholow, B. D., Dickter, C. L., & Sestir, M. A. (2006). Stereotype activation and control of race bias: Cognitive control of inhibition and its impairment by alcohol. *Journal of Personality and Social Psychology, 90*, 272–287.

Batchelder, W. H., & Riefer, D. M. (1999). Theoretical and empirical review of multinomial process tree modeling. *Psychonomic Bulletin & Review, 6*, 57–86.

Beer, J. S., Stallen, M., Lombardo, M. V., Gonsalkorale, K., Cunningham, W. A., & Sherman, J. W. (2008). The Quadruple Model approach to examining the neural underpinnings of prejudice. *Neuroimage, 43*, 775–783.

Bodenhausen, G. V. (1990). Stereotypes as judgmental heuristics: Evidence of circadian variations in discrimination. *Psychological Science, 1*, 319–322.

Bollen, K. A., & Long, J. S. (1993). *Testing structural equation models*. Newbury Park, CA: Sage Publications.

Cohen, A. L., Sanborn, A. N., & Shiffrin, R. M. (2008). Model evaluation using grouped or individual data. *Psychonomic Bulletin and Review, 15*, 692–712.

Connelly, S. L., Hasher, L., & Zacks, R. T. (1991). Age and reading: The impact of distraction. *Psychology and Aging, 6*, 533–541.

Conrey, F. R., Sherman, J. W., Gawronski, B., Hugenberg, K., & Groom, C. J. (2005). Separating multiple processes in implicit social cognition: The Quad model of implicit task performance. *Journal of Personality and Social Psychology, 89*, 469–487.

Danigelis, N. L., & Cutler, S. J. (1991). An inter-cohort comparison of changes in racial attitudes. *Research on Aging, 13*, 383–404.

Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology, 56*, 5–18.

Easdon, C. M., & Vogel-Sprott, M. (2000). Alcohol and behavioral control: Impaired response inhibition and flexibility in social drinkers. *Experimental and Clinical Psychopharmacology, 8*, 387–394.

Fazio, R. H., Jackson, J. R., Dunton, B. C., & Williams, C. J. (1995). Variability in automatic activation as an unobstrusive measure of racial attitudes: A bona fide pipeline? *Journal of Personality & Social Psychology, 69*, 1013–1027.

Fazio, R. H., & Olson, M. A. (2003). Implicit measures in social cognition research: Their meaning and uses. *Annual Review of Psychology, 54*, 297–327.

Firebaugh, G., & Davis, K. E. (1988). Trends in antiblack prejudice, 1972–1984: Region and cohort effects. *American Journal of Sociology, 94*, 251–272.

Gonsalkorale, K., von Hippel, W., Sherman, J. W., & Klauer, K. C. (2009). Bias and regulation of bias in intergroup interactions: Implicit attitudes toward Muslims and interaction quality. *Journal of Experimental Social Psychology, 45*, 161–166.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality & Social Psychology, 74*, 1464–1480.

Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the Implicit Association Test: An improved scoring algorithm.I. *Journal of Personality and Social Psychology, 85*, 197–216.

Hasher, L., & Zacks, R. T. (1988). Working memory, comprehension, and aging: A review and a new view. In G. H. Bower (Ed.). *The psychology of learning and motivation: Advances in research and theory* (Vol. 22, pp. 193–225). San Diego, CA: Academic Press.

Macrae, C. N., Schloerscheidt, A. M., Bodenhausen, G. V., & Milne, A. B. (2002). Creating memory illusions: Expectancy-based processing and the generation of false memories. *Memory, 10*, 63–80.

May, C. P., & Hasher, L. (1998). Synchrony effects in inhibitory control over thought and action. *Journal of Experimental Psychology: Human Perception and Performance, 24*, 363–379.

Monteith, M. J., Ashburn-Nardo, L., Voils, C. I., & Czopp, A. M. (2002). Putting the brakes on prejudice: On the development and operation of cues for control. *Journal of Personality & Social Psychology, 83*, 1029–1050.

Moskowitz, G. B., Gollwitzer, P. M., Wasel, W., & Schaal, B. (1999). Preconscious control of stereotype activation through chronic egalitarian goals. *Journal of Personality and Social Psychology, 77*, 167–184.

Nosek, B. A., Banaji, M., & Greenwald, A. G. (2002). Harvesting implicit group attitudes and beliefs from a demonstration web site. *Group Dynamics: Theory, Research, and Practice, 6*, 101–115.

Rosano, C., Aizenstein, H., Cochran, J., Saxton, J., De Kosky, S., Newman, A., et al. (2005). Functional neuroimaging indicators of successful executive control in the oldest old. *Neuroimage, 4*, 881–889.

Sherman, J. W. (2006). On building a better process model: It's not only how many, but which ones and by which means. *Psychological Inquiry, 17*, 173–184.

Sherman, J. W., Gawronski, B., Gonsalkorale, K., Hugenberg, K., Allen, T. J., & Groom, C. J. (2008). The self-regulation of automatic associations and behavioral impulses. *Psychological Review, 115*, 314–335.

von Hippel, W., Silver, L. A., & Lynch, M. E. (2000). Stereotyping against your will: The role of inhibitory ability in stereotyping and prejudice among the elderly. *Personality & Social Psychology Bulletin, 26*, 523–532.

Wegner, D. M. (1994). Ironic processes of mental control. *Psychological Review, 101*, 34–52.

Wilson, T. C. (1996). Cohort and prejudice: Whites' attitudes toward Blacks, Hispanics, Jews and Asians. *Public Opinion Quarterly, 60*, 253–274.