

## BRIEF REPORTS

# Aging, Inhibition, and Social Inappropriateness

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This study explores the hypothesis that age-related declines in inhibitory ability are associated with increases in socially inappropriate behavior. Consistent with this hypothesis, older participants were less likely than younger participants to differentiate between public and private settings when inquiring about potentially embarrassing issues, according to their peers. Additionally, this indiscriminate public inquiry was associated with decreased closeness with participants' peers, particularly for older adults. Finally, this age-related increase in social inappropriateness was mediated by inhibitory deficits associated with aging. These results suggest that age-related deficits in inhibitory ability may cause people to become socially inappropriate against their will.

A common stereotype of older adults is that they are more likely than young adults to state their mind in a blunt and sometimes socially inappropriate fashion. Why might people become more blunt or socially inappropriate with age? One possible answer to this question can be found in cognitive aging research initiated by Hasher and Zacks (1988). According to these researchers, many of the cognitive deficits known to occur in old age are caused by losses in the ability to inhibit information. Because inhibition plays a critical role in comprehension and memory, deficits in inhibitory ability have the potential to lead to a host of cognitive consequences, and the literature provides general support for this possibility.

Disruptions in cognitive functioning are not the only consequence of inhibitory deficits, however, as various social phenomena also rely on inhibitory processes. For example, older adults often exhibit excessive and off-target verbosity when they suffer from inhibitory deficits (Arbuckle & Pushkar Gold, 1993). Inhibitory deficits have also been implicated in increased stereotyping and prejudice among older adults (von Hippel, Silver, & Lynch, 2000), as older adults appear to have lost the ability to inhibit unintentionally activated stereotypes. The fact that older people are more likely than younger people to voice socially unpopular ideas (e.g., prejudice against African Americans), despite being more motivated to be unprejudiced and more concerned about impression management (von Hippel et al., 2000), provides logical support for a model that suggests that lapses in social control among older adults are caused in part by inhibitory deficits.

If inhibitory deficits can lead older adults to increased verbosity and prejudice, perhaps it can also lead to socially inappropriate

behavior. After all, social interactions provide numerous daily opportunities to say something blunt or overly straightforward to others (e.g., "That is a terrible haircut," "Have you gained weight?"), but for reasons of politeness most people appear to inhibit these inappropriate reactions and replace them with milder or more ambiguous statements (Brown & Levinson, 1987). If aging leads to losses in inhibitory ability (Hasher & Zacks, 1988), and if inhibitory ability is important for preventing oneself from making occasional inappropriate remarks (von Hippel & Gonsalkorale, 2005), then perhaps older people are not being intentionally blunt or inappropriate but rather have become socially inappropriate against their will.

It should be noted that such a role for inhibition does not preclude sociocultural reasons why older adults might become more socially inappropriate. For example, older adults might feel that others value their advice, and thus that they should attempt to be more honest and forthcoming. Additionally, such changing social goals might interact with different aspects of older adults' personality, whereby extraversion (for example) might become more predictive of bluntness among older than younger adults. The effect of age on social inappropriateness is likely to be multiply mediated, and thus the goal of the current research is not to examine social/personality causes of increased social inappropriateness but rather to test the possibility that aging leads to social inappropriateness as a consequence of losses in the ability to inhibit information.

Because different measures of inhibition are often uncorrelated with each other and are often differentially correlated with other cognitive functions (Kramer, Humphrey, Larish, Logan, & Strayer, 1994), we deemed it worthwhile to use several measures of inhibitory functioning to test the current hypothesis. In particular, because age-related social inappropriateness should be caused by a deficit in response inhibition, we believed it was important to measure the *restraint* aspect of inhibition, or those qualities of inhibitory functioning that "operate to restrain strong responses from being emitted before their appropriateness can be evaluated" (Yoon, May, & Hasher, 2000, pp. 155). To measure the restraint aspect of inhibition, we chose a measure designed by May, Hasher,

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& Bhatt (1994; reported in Yoon et al., 2000), in which people are presented with relatively easy trivia questions. Embedded among the genuine trivia items are *illusion* questions that resemble legitimate questions. For example, one item asks participants, "What color are a tiger's spots?" Participants are forewarned that the trivia test contains several such items. This measure provides an indicator of restraint because participants must inhibit the well-known answer to the item that the illusion question resembles and instead respond that the question cannot be answered (Yoon et al., 2000).

Finally, although it is possible that increased social inappropriateness among older people may be regarded as charming or quirky, we expected that people might be relatively unforgiving of social inappropriateness. Indeed, it is possible that social inappropriateness might be particularly damaging to the social relations of older people. Older adults tend to have smaller circles of closer friends than younger adults, in part because older adults are more likely to terminate relationships with individuals who do not offer positive emotional rewards (Fredrickson & Carstensen, 1990). One consequence of this increased social selectivity that emerges with age is that older people might feel particularly distant from peers who are socially inappropriate.

To test these possibilities, we asked small groups of acquaintances whether their participant peers would inquire about potentially embarrassing or personal events when alone with the participant versus in the presence of other people. Previous research suggests that public inquiry regarding personal events is considered socially threatening (Sharkey, 1997), and such violations of privacy are experienced as highly embarrassing (Sharkey & Stafford, 1990). According to predictions, older adults should be less likely than young adults to differentiate between public and private settings in their inquiries regarding personal issues. Furthermore, if this inappropriate behavior is unintentional, then it should be mediated by losses in the ability to inhibit information. In addition to the trivia task, this mediational hypothesis was tested with two other measures of inhibitory functioning; the Stroop task (which has predicted a different type of socially inappropriate behavior among young adults; von Hippel & Gonsalkorale, 2005) and the 64-card version of the Wisconsin Card Sorting Task (WCST; Greve, 2001).

Last, as an initial test of the possibility that personality might differentially predict social inappropriateness as a function of age, or in a manner that may coincidentally correlate with inhibition, the Ten-Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003) was administered.

## Method

### Participants

Forty-one young (age, 18–25,  $M = 21$ ,  $SD = 2.1$ ; 28 women) and 39 older adults (age, 65–93,  $M = 78$ ,  $SD = 7.3$ ; 34 women) in Sydney, Australia, participated in return for \$30 Australian (~\$20 U.S.). Participants were recruited in groups of four to six acquaintances from social clubs, retirement communities, apartment complexes, work sites, and the campus of our university and were tested individually. The goal of this recruitment procedure was to create small groups of people who knew each other reasonably well but who did not regard all of their fellow group members as close friends. This recruitment was typically accomplished by approaching one member of a targeted group and asking if this description

fit the group members. Participants were tested at a time of their choosing between 9:00 and 17:00, with younger adults nonsignificantly choosing later times on average,  $M = 13:00$  hr,  $SD = 1:40$ , than older participants,  $M = 12:30$  hr,  $SD = 2:00$ ,  $F(1, 74) = 2.02$ ,  $MSE = 3.35$ ,  $p > .15$ .

### Measures and Procedure

Participants first completed the Stroop color-naming task and the WCST. The Stroop task required participants to name aloud the ink colors of 44 blocks followed by 44 words whose letters were printed in a color that was predominantly inconsistent with the word meaning (e.g., the word "red" printed in green ink). The WCST required participants to discover a rule according to which cards must be sorted, with the examiner only permitted to give accuracy feedback to each response. After 10 consecutive correct sortings, the examiner shifted the sorting rule, indicating the shift to the participant only by a changed pattern of feedback.

Participants were then asked to report whether each of their participant acquaintances would inquire about four potentially embarrassing or personal issues in private and in public on a 5-point scale ranging from 1 = *Definitely not* to 5 = *Definitely*. The scenarios involved two situations pertaining to invisible issues (a medical condition and a personal or family problem) and two situations that involved visible issues (a noticeable scar and weight gain). For each of these four situations and for each of their acquaintances who participated in the study, participants were asked the likelihood that the acquaintance would inquire about the situation in a public setting (e.g., across the table in front of friends at a dinner party) and in a private setting (e.g., when alone having coffee). These ratings were then collapsed by target so that each participant had an average peer rating of his or her own assessed likelihood of asking about personal issues in public and in private.<sup>1</sup> Participants were then asked to rate how close they felt to each of their participant acquaintances on a 5-point scale ranging from 1 = *Not at all close* to 5 = *Very close*, and again these ratings were collapsed so that each participant had an average rating of how close others felt to him or her. Depending on the size of the group, these peer ratings represented the average judgments of three to five other individuals. Participants then completed the trivia task, which contained 16 legitimate questions and 4 illusion items, and ended the session with the TIPI.

## Results

### Inhibitory Measures

Illusion scores were computed as the number of illusion trivia items that participants answered rather than stating that they were trick questions. Stroop scores were computed as the difference in time in the color-naming test between color words and color blocks, divided by the time required to name color blocks. Perseverative errors are the primary measure of inhibition in the WCST and are defined as a repetition of an incorrect response despite feedback. Table 1 provides means and standard deviations of these inhibition measures.

<sup>1</sup> Pretesting with 12 older (age, 66–85) and 15 younger (age, 18–27) adults indicated that private inquiry is not considered socially inappropriate with close friends ( $M = 1.18$ ,  $SD = .34$ ; on a scale from 1 = *Not at all inappropriate* to 7 = *Extremely inappropriate*) and is considered somewhat inappropriate with acquaintances ( $M = 3.46$ ,  $SD = 1.72$ ). In contrast, public inquiry is considered highly socially inappropriate among close friends ( $M = 6.65$ ,  $SD = .55$ ) and acquaintances ( $M = 6.94$ ,  $SD = .16$ ) alike. No effects emerged for the age of respondent in these judgments ( $F_s < 1$ ), suggesting that young and old agree that public inquiry is socially inappropriate.

Table 1  
*Age Differences in Inhibition Measures*

Variable	Younger Adults	Older Adults	Analysis
Actual trivia items answered correctly	$M = 9.78$ $SD = 1.44$	$M = 9.69$ $SD = 1.00$	$F(1, 77) = .09, MSE = 1.55, p > .75$
Answers provided to illusion items	$M = 1.20$ $SD = .99$	$M = 3.18$ $SD = .76$	$F(1, 77) = 99.06, MSE = .78, p < .001$
Stroop performance	$M = .80$ $SD = .38$	$M = 1.94$ $SD = .80$	$F(1, 78) = 65.17, MSE = .39, p < .001$
Perseverative errors	$M = 8.08$ $SD = 4.09$	$M = 15.15$ $SD = 7.10$	$F(1, 78) = 29.72, MSE = 33.30, p < .001$

Illusion scores, perseverative errors, and Stroop scores were correlated with one another ( $r_s > .40, p_s < .001$ ), but these correlations appeared to be a function of their common association with age, as the inhibition measures did not correlate with each other among either younger or older participants and partial correlations controlling for age were nonsignificant (all  $p_s > .15$ ). This pattern of findings is common with inhibitory measures (Kramer et al., 1994), as different measures appear to tap different aspects of inhibitory functioning (Yoon et al., 2000).

### *Social Inappropriateness*

Social inappropriateness was computed by comparing participants' likelihood of asking about the scenarios in public ( $\alpha = .78$  among younger adults,  $\alpha = .82$  among older adults) versus private ( $\alpha = .76$  among younger adults,  $\alpha = .82$  among older adults). Consistent with predictions, younger participants' peers reported that they showed greater discrimination than older participants between public and private settings when asking about potentially embarrassing events, as reflected by the interaction between age and the public versus private nature of the setting,  $F(1, 78) = 17.63, MSE = .09, p < .001$ . Simple effects analyses revealed that older adults were marginally more likely to make public inquiries,  $M = 1.82, SD = .54$ , than younger adults,  $M = 1.62, SD = .39, F(1, 78) = 3.62, MSE = .22, p = .06$ . In contrast, younger adults were nonsignificantly more likely to make private inquiries,  $M = 3.60, SD = .46$ , than older adults,  $M = 3.41, SD = .67, F(1, 78) = 2.33, MSE = .32, p > .10$ . When the age difference in the tendency to make private inquiries was controlled in a simple effects analysis of covariance,  $F(1, 78) = 69.21, p < .001$ , the age difference in public inquiries became significant,  $F(1, 78) = 15.89, MSE = .12, p < .001$ . Additionally, a main effect emerged for public versus private inquiry,  $F(1, 78) = 1440.31, MSE = .09, p < .001$ , but not for age,  $F(1, 78) = .00, MSE = .46, p > .95$ .

The next step in the analyses was to assess whether this age difference in public versus private inquiry was mediated by inhibitory deficits. The goal of this analysis was to assess whether participants' age and inhibitory functioning predicted the degree to which their peers reported that they were likely to ask about personal issues in public versus private. This analysis was accomplished by examining residuals, whereby variance in public inquiry that is accounted for by private inquiry was first removed, and residual variance in public inquiry was the criterion variable.<sup>2</sup> Because people are more likely to privately discuss personal issues when in a close relationship (Harvey & Omarzu, 1997; see also

pretesting results), this analysis of residuals allowed us to eliminate the variance accounted for by socially appropriate (i.e., private) inquiry to focus on variance accounted for solely by socially inappropriate (i.e., public) inquiry.

Regression analyses confirmed that age was a significant predictor of asking about personal events in public, after controlling for the likelihood of asking about such events in private (see Figure 1). To assess whether inhibitory ability mediated this age effect on residual variance in public inquiry, we examined scores on the illusion task as a possible mediator.<sup>3</sup> For this analysis, public inquiry was regressed on age and private inquiry in the first step, performance on the illusion items was regressed on age in the second step, and public inquiry was regressed on age, private inquiry, and performance on the illusion items in the third and final step.

Results of the mediational analyses were consistent with predictions (see Figure 1). Older participants' peers reported that they were more likely than younger participants to inquire about potentially embarrassing events in public, and participants' own performance on the illusion task mediated this evaluation from their peers. A Sobel test revealed that performance on the illusion task was a significant mediator of the age difference in residual variance in public inquiry ( $z = 2.12, p < .04$ ). Additionally, age no longer had a significant direct effect on public inquiry when the inhibitory measure was included in the model. Finally, it should be noted that none of these effects emerged when the regression equations were reversed, and the criterion variable was residual variance in private inquiry, controlling for public inquiry.

The last step in the model was to assess whether public inquiry was damaging to relationships. To address this issue, we regressed closeness on public and private inquiries. Consistent with predictions, this analysis revealed that public inquiry was negatively associated with closeness, whereas private inquiry was positively associated with closeness (see Figure 1). To test whether age moderated this effect of public inquiry on closeness, we centered age and public inquiry and computed the interaction between them. This interaction term was entered into a regression equation pre-

<sup>2</sup> The results of these analyses are essentially the same if the criterion variable is a difference score between public and private inquiry.

<sup>3</sup> Performance on the illusion task correlated with peer-reported tendencies to ask about these events in public,  $r = .28, p < .02$ , but performance on the other inhibitory measures did not,  $r_s \leq .11, p_s > .30$ , indicating that they could not mediate the effect of age on public inquiry.

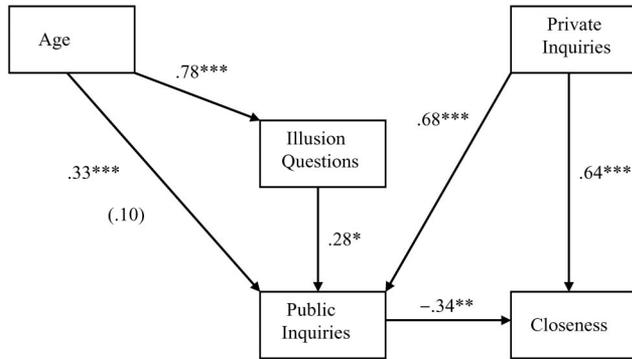


Figure 1. Mediation model depicting relationship between age, inhibitory ability, and social inappropriateness. Path coefficients are beta weights, and the path coefficient in parentheses from age to public inquiry represents the effect when the mediator is included in the model. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

dicting closeness, after the main effects for age and public and private inquiries, and proved to be marginally significant ( $\beta = -.18, p < .07$ ). To examine the shape of this interaction, we separately estimated regression equations for younger and older participants. For the older participants, public inquiry significantly predicted decreased closeness ( $\beta = -.55, p < .03$ ), whereas for the younger participants it did not ( $\beta = -.15, p > .30$ ). Additionally, analysis of variance revealed that the younger participants felt closer to each other ( $M = 3.64, SD = .65$ ) than the older participants did ( $M = 3.05, SD = .70$ ),  $F(1, 78) = 14.99, MSE = .46, p < .001$ .

Finally, of the five personality factors, only extraversion predicted residual variance in public inquiry ( $\beta = .21, p < .01$ ), and this relationship did not differ by age. Because extraversion was uncorrelated with all of the other variables in the model, its inclusion or exclusion in the analyses did not affect any of the other path coefficients.

## Discussion

This study provides evidence for age-related increases in social inappropriateness, whereby older adults' peers reported that older adults were less likely than younger adults to differentiate between public and private settings when asking about personal issues.<sup>4</sup> This failure to sufficiently differentiate between public and private settings emerged despite the fact that older adults were not more likely to inquire about personal issues across the board. Rather, younger adults were (nonsignificantly) more likely than older adults to inquire about these personal issues in private, apparently due to the greater closeness among younger adults (Harvey & Omarzu, 1997). Thus, younger adults appeared to have greater social sensitivity than older adults regarding the contexts in which personal issues are appropriately discussed. Furthermore, when people failed to differentiate between public and private settings, this inappropriate behavior appears to have had important consequences. Particularly among older adults, peers reported feeling less close to those individuals who publicly inquired about personal issues.

This study also provides evidence for inhibitory mediation of this socially inappropriate behavior, as performance on the illusion task was a significant mediator of the effect of age on public inquiry. Because the other measures of inhibitory ability failed to mediate increases in social inappropriateness, these findings must be interpreted with caution. Nevertheless, the path analyses suggest that age-related increases in inappropriateness may indeed be unintended, as socially inappropriate behavior may emerge as a consequence of inhibitory failure.

Although these studies provide evidence for increased social inappropriateness among older participants, the correlational nature of this research makes it impossible to know whether aging causes inappropriateness. In addition, although inappropriateness was associated with decreased closeness, the design of the current research leaves open the possibility that participants simply reported greater inappropriateness among people to whom they felt less close. Given the specific nature of the questions concerning inappropriateness, this possibility seems unlikely, yet it cannot be ruled out. Additionally, because the measure of social inappropriateness was designed for this experiment, it awaits further validation. Future research, including longitudinal samples, manipulations of inhibitory ability, and additional measures of social inappropriateness and cognitive ability, will be necessary to provide clear evidence that social inappropriateness is causally associated with inhibitory losses brought about by aging.

Finally, it is worth noting that the current results appear inconsistent with the common perception of older people as *intentionally* forthright. This apparent inconsistency may be illusory, however, as the current research was concerned with a domain in which intentional forthrightness may be largely irrelevant. After all, a person can be brutally honest but still not humiliate others by asking about their private concerns in public. Forthrightness may emerge in an increased likelihood of addressing such issues in private, but honesty does not require that we ask people about their personal lives when others are around who may be unaware of the issues.

<sup>4</sup> These peer reports might appear to represent a source monitoring task, but we suggest that the analogy from recall of public versus private questioning to source monitoring is mistaken. Source monitoring errors in older adults appear to be a function of the fact that older adults focus on the gist rather than the details of the message. In contrast, forgetting whether one is asked about personal events in public versus private would represent a substantial change in meaning, from an event that represents humiliation to an event that represents possible concern and interest (see Footnote 1).

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