

# Aging and Stereotype Suppression

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## ABSTRACT

Recent work in social cognitive aging has suggested that older adults are more likely than younger adults to activate and use stereotypic information, even when they intend not to. Furthermore, evidence suggests that older adults have difficulty altering their interpretation of a situation, even when it has become clear that their initial interpretation is incorrect. In the current study, younger and older adults read a series of narratives in which a character had a sex-stereotyped occupation (e.g., a plumber is stereotypically male), and the character's gender was either consistent or inconsistent with that stereotype. Explicit labeling of gender was also varied. Results revealed that with explicit labeling, older adults were able to discount their stereotypes and avoid processing difficulties when subsequent stereotype-inconsistent information was encountered. These data suggest that when counter-stereotypic information is explicitly provided at encoding, older adults are no more likely than younger adults to rely on stereotypes, and are similarly capable of altering their interpretation of a situation when information suggests that interpretation is incorrect. These findings indicate that although older adults are more prone to the influence of unwanted stereotypes, this effect can be averted and judgments can be made more egalitarian by providing older adults with explicit stereotype contradiction at encoding.

**Keywords:** Aging; Inhibition; Stereotypes; Social cognition; Inferences.

## INTRODUCTION

Older adults are more likely than younger adults to rely on social stereotypes (von Hippel, Silver, & Lynch, 2000). There are likely a number of factors that contribute to increased stereotyping in late adulthood (e.g., Craik & Grady, 2002); however, an issue of central importance is the suppression of unwanted

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information from the current stream of thought (e.g., Hess, Vandermaas, Donley, & Synder, 1987). The aim of the current study was to assess whether older adults are able to suppress stereotype-consistent information when presented with information that clearly contradicts the stereotype.

Older adults appear to have difficulty suppressing stereotype information (Hess, 1985). For example, when people read stories in which the main characters are members of minority groups (e.g., African-Americans), older adults are more likely to show evidence of inefficient suppression of stereotypic information (Radvansky, Copeland, & von Hippel, 2008). In Radvansky et al. (2008), the activation of stereotype information was assessed by presenting people with lexical decision probes during the course of reading. Relative to unrelated words, stereotype-consistent words were responded to more slowly by the younger adults (indicating active suppression of these concepts), but were responded to faster by the older adults (indicating continued activation of these stereotypic concepts). Thus, overall, older adults appear not to be suppressing the activation of their stereotypes as well as the younger adults (see also, von Hippel et al., 2000).

Older adults also have difficulty altering their interpretations of a situation. In a study by Hamm and Hasher (1992), older adults were presented with passages that were initially biased toward a specific interpretation. However, later in the passage it was made clear that another interpretation was correct. For example, people could be reading a passage about a big game hunter. At one point during the passage the hunter takes a shot. It is then made clear that this is a camera shot and that this is a photographic safari. Data from this study show that while younger adults readily switch from one interpretation to another, older adults continue to maintain the original interpretation, often alongside the new one.

Previous research related to the question of flexibility of interpretive bias is equivocal in terms of age-related differences (Hess, Hinton, & Statham, 2004; Rabbitt, 1977). Some research has shown significant cognitive and memory performance decline between age groups suggesting that older adults are less able than younger adults to shift perspectives even when presented with contextually disambiguating information (Hess, 1982). Other studies, however, have found no such age differences (e.g., Korchin & Basowitz, 1957). Our question was whether failure to inhibit an inappropriate interpretation would also be seen when a social stereotype had been automatically activated, but then required suppression.

To this end we borrowed an experimental paradigm developed by Duffy and Keir (2004). In their study, young adults were given stories to read that contained a secondary character that had a profession associated with a strong gender stereotype (e.g., babysitter). For half of the experimental

stories, the gender of the secondary character matched the stereotype and for half it did not. Additionally, for half of the experimental stories, in a scene-setting sentence the gender of the character was either made clear or was left ambiguous, with only the stereotyped occupation mentioned. Thus, while the occupation may activate the stereotype, when the setting sentence explicitly conveys the gender of the secondary character, this information should immediately supersede the stereotype.

The critical measure in this paradigm is the reading time for a later sentence that has an anaphoric reference to the secondary character. Not surprisingly, when the gender of the secondary character was not explicitly identified earlier, people had longer reading times for anaphors that referred to the stereotype-inconsistent gender. Importantly, however, when people had been explicitly informed of the gender in the setting sentence, this reading time slow-down did not occur for the critical anaphor. Thus, younger adults were able to keep stereotype information from intruding on processing when that stereotype had been previously disconfirmed. More recently Kreiner, Sturt, and Garrod (2008) have replicated this finding and have further shown that, for stereotypical gender, this process is operating at the situation model level. This is in comparison to lexically marked gender, as would occur with definition gender markings (e.g., king, bridesmaid, or actress).

The question addressed here is whether the same pattern of stereotype control would be observed with older adults. This finding is of interest because, as described earlier, older adults have more difficulty suppressing stereotypic information (Radvansky et al., 2008; von Hippel et al., 2000). As such, it is expected that older adults will initially activate their gender role stereotypes for these occupations, possibly even when the gender of the secondary character is explicitly identified as being inconsistent with the stereotype. Further, it has been shown that when older adults have been presented information that requires them to alter their interpretation of a set of circumstances, they may retain the original interpretation along with the new one (Hamm & Hasher, 1992). Thus, in this paradigm, it may be that older adults will continue to maintain the stereotype-consistent gender information along with the inconsistent information. This continued activation of stereotypic information would then cause some processing difficulty when the stereotype-inconsistent anaphor is encountered.

## METHOD

### Participants

Twenty-four people were tested in each of the two age groups. The younger adults ranged from 18 to 22 years of age ( $M = 19.2$ ,  $SD = 1.1$ , 50%

female), were recruited from the University of Notre Dame, and received partial course credit. The older adults ranged from 60 to 87 years of age ( $M = 74.5$ ,  $SD = 7.7$ , 71% female), were recruited from a local senior citizen organization, and were paid \$10 each for their time. As is typical with samples from these age groups, the older adults scored higher on the Shipley (Zachary, 1986) vocabulary test ( $M = 35.0$ ,  $SD = 3.4$ ) than the younger adults ( $M = 30.7$ ,  $SD = 3.4$ ),  $t(46) = 4.54$ ,  $p < .001$ , and had more years of education ( $M = 14.8$ ,  $SD = 2.4$ ) than the younger adults ( $M = 13.3$ ,  $SD = 0.8$ ),  $t(46) = 2.89$ ,  $p = .006$ .

## Materials

A set of 48 stories were adopted from Duffy and Kerr (2004). Twenty-four of these stories were experimental stories and 24 were filler. Each experimental story had seven sentences, and each filler story had three sentences. An example experimental story with each condition is shown in Table 1. There were four versions of each experimental story: (a) Labeled-Consistent, (b) Labeled-Inconsistent, (c) Unlabeled-Consistent, and (d) Unlabeled-Inconsistent.

The Labeled-Consistent condition contained a setting sentence that explicitly labeled the gender of the secondary character, and this gender was consistent with the profession stereotype (e.g., The babysitter was a young *girl* who always took the job seriously and got along with Paul very well). The Labeled-Inconsistent condition also contained a disambiguating setting sentence. However, in this case the gender of the secondary character

TABLE 1. Sample stimulus paragraph

### Prior Disambiguating Context

Paul [Anna] couldn't wait for the babysitter to arrive.

The babysitter was a young girl [boy] who always took the job seriously and got along with Paul [Anna] very well.

While the parents got ready to leave, Paul [Anna] waited anxiously.

Paul [Anna] loved watching his [her] parents get ready to go out.

Tonight there was a big dinner party.

Paul [Anna] wanted his [her] parents to hurry up and go out.

The babysitter found himself [herself] humming while walking up to the door.

### Neutral Context

Anna [Paul] couldn't wait for the babysitter to arrive.

The babysitter was a young teenager who always took the job seriously and got along with Anna [Paul] very well.

While the parents got ready to leave, Anna [Paul] waited anxiously.

Anna [Paul] loved watching her [his] parents get ready to go out.

Tonight there was a big dinner party.

Anna [Paul] wanted her [his] parents to hurry up and go out.

The babysitter found himself [herself] humming while walking up to the door.

Note: Critical regions are in brackets.

was inconsistent with the profession stereotype (e.g., The babysitter was a young *boy* who always took the job seriously and got along with Anna very well.). The gender of the primary and secondary characters was always different so that the referent of the pronoun in the critical sentence would be unambiguous.

The Unlabeled-Consistent condition contained no disambiguating information in the setting sentence (e.g., The babysitter was a young teenager who always took the job seriously and got along with Anna very well). The gender of the secondary character was not revealed until the pronoun in the critical reference sentence, which in this condition was consistent with the stereotype gender (The babysitter found *herself* humming while walking up to the door). Finally, the Unlabeled-Inconsistent condition also contained no disambiguating information in the setting sentence. In contrast, the critical reference sentence contained a pronoun that referred to the secondary character using the counter-stereotypical gender pronoun (e.g., The babysitter found *himself* humming while walking up to the door).

The critical reference sentence for the experimental stories was always the last one in the vignette. This sentence always used a pronoun to refer back to the secondary character that matched the professional stereotype in the Consistent conditions, but mismatched it in the Inconsistent conditions. Filler stories contained none of these characteristics.

As a measure of social conservatism, the revised Wilson Conservatism scale (Henningham, 1996) was given to participants. This scale presented people with topics that are strongly associated with traditional social issues (e.g., Gay Rights, Church Authority). Participants indicated whether they agreed or disagreed with each issue. Responses were made by clicking the appropriate radio button in the center of the screen (i.e., Agree, Disagree, or Not Sure).

## Procedure

Participants were tested individually. After consent forms were completed and demographic information collected, people read the experimental and filler stories. The study was presented on various brands of PC-compatible desktop computers running Windows XP using a Visual Basic program developed in our laboratory that used the available millisecond timing routines in the Visual Studio programming environment. The text was in black Times New Roman 24 font on a white background, and appeared left-justified at the top of the screen. The experimental and filler stories were presented in different random order for each participant, although younger and older adults' orders were yoked based on participant number. Reading was self-paced. The texts were presented one sentence at a time. To advance through the stories people pressed the space bar on the computer, and reading times

were collected. The absence of an increase in reading times for the critical sentence was used as an indicator of successful stereotype suppression. After reading each story, one true or false comprehension question was presented and responses were made using with computer mouse, with the right mouse button (marked 'Y', for 'Yes, this happened in the story'), and the left mouse button (marked 'N', for 'No, this did not happen in the story'). However, due to a programming error, responses to the comprehension questions were not recorded. Following comprehension questions, participants completed the vocabulary and conservatism measures.

## RESULTS

The reading time data were trimmed by first dropping any reading times faster than 300 ms to eliminate impossibly fast responses. Following this procedure, the reading time data were further trimmed using the method developed by Van Selst and Jolicoeur (1994) to set the standard deviation cut-off based on number of observations. This trimming procedure eliminated 3% of the data.

The reading time are presented in Table 2 and were submitted to a 2 (Age)  $\times$  2 (Labeled vs. Unlabeled)  $\times$  2 (Consistent vs. Inconsistent) mixed ANOVA, with the first variable manipulated between participants, and the other two within. There was a significant main effect of Age,  $F(1, 46) = 19.51$ ,  $MSE = 2200526$ ,  $p < .001$ ,  $\eta_p^2 = .30$ , with older adults taking longer to read than younger adults. There was also a main effect of Label,  $F(1, 46) = 8.18$ ,  $MSE = 282129$ ,  $p = .006$ ,  $\eta_p^2 = .15$ , with people reading the critical reference sentences more slowly when the gender was not explicitly labeled in the setting sentence. Finally, there was a significant main effect of Consistency,  $F(1, 46) = 10.84$ ,  $MSE = 212674$ ,  $p = .002$ ,  $\eta_p^2 = .19$ , with people reading the critical reference sentences slower when the pronoun was inconsistent with the gender stereotype of the occupation. These last two effects were qualified by a significant Label  $\times$  Consistency interaction,  $F(1, 46) = 5.04$ ,  $MSE = 372155$ ,  $p = .03$ ,  $\eta_p^2 = .05$ .

**TABLE 2.** Mean reading times by age group and story condition (standard deviations are in parentheses)

	Labeled		Unlabeled	
	Consistent	Inconsistent	Consistent	Inconsistent
All	2829 (832)	2851 (1010)	2851 (958)	3268 (1141)
Young	2416 (668)	2401 (794)	2399 (700)	2690 (1001)
Old	3242 (784)	3301 (1016)	3302 (979)	3845 (981)

Simple effects tests showed that for the Labeled condition there was no effect of Consistency,  $F < 1$ ,  $\eta_p^2 < .01$ . Thus, when people were explicitly told the sex of the secondary character (with the stereotyped profession) in the setting sentence, anaphoric sentence reading times were unaffected by stereotype consistency. In contrast, for the Unlabeled condition, there was an effect of Consistency,  $F(1, 46) = 11.58$ ,  $MSE = 360164$ ,  $p = .001$ ,  $\eta_p^2 = .20$ . Here, reading times were slowed when the pronoun gender was stereotypically inconsistent. Importantly, there were no significant interactions with Age, all  $F$  values  $< 1.06$ ,  $\eta_p^2 < .03$ .

### Conservatism

According to the Conservatism scale the older adults were more conservative ( $M = 40.4$ ,  $SD = 4.2$ ) than the younger adults ( $M = 34.6$ ,  $SD = 3.5$ ),  $t(46) = 5.13$ ,  $p < .001$ . To explore the influence of Conservatism on reading times, we compared Conservatism scores with the degree to which reading times were affected by stereotype inconsistent information in the reference sentence. To account for general differences in processing speed, a proportion score was calculated involving the Labeled Consistent and Labeled Inconsistent conditions and the Unlabeled Consistent and Unlabeled Inconsistent conditions by dividing each expected condition by its corresponding unexpected counterpart. None of the correlations with Conservatism were significant, all  $p$  values  $\geq .16$ .

### Education

Finally, it is possible that the ability to control the influence of unwanted stereotype information is related to level of education. Because the older adults in our sample had higher education levels than the younger adults, this might have provided them with greater cognitive flexibility and thus a greater ability to overcome unwanted stereotype influences. To assess this possibility, we correlated education level with our measure of stereotype influence (the degree to which reading times were affected by stereotype inconsistent information in the reference sentence). These correlations were not significant either in the total sample,  $r = .15$ , or when considering the younger adults,  $r = .26$ , and older adults separately,  $r = .08$ , all  $p$  values  $\geq .20$ .

## DISCUSSION

This experiment examined the ability of older adults to suppress stereotype information when other information explicitly indicates that the stereotype is incorrect. Prior research has shown that older adults are more likely than younger adults to rely on stereotypes and to show prejudiced attitudes, despite a strong desire to avoid prejudice (von Hippel et al., 2000). Moreover, older adults often have greater difficulty changing their interpretations once

they have been established (Hamm & Hasher, 1992). The current study brought these two lines of research together to assess whether older adults would differ from younger adults in the ability to disregard stereotypes that are obviously irrelevant.

The results showed that for both age groups, when there was no initial explicit identification of the character's gender, there was a significant increase in reading time for the stereotype mismatch sentences. Of particular interest were those cases in which the mismatched gender was explicitly marked beforehand. In these cases there was no increase in reading times in this condition for either younger or older adults.

The results of this study support other findings that suggest that when text and gender stereotyped knowledge conflict, reading time increases to allow for the processing of contradictory information (Banaji & Hardin, 1996; Duffy & Keir, 2004; Kreiner et al., 2008). Readers initially activate gender stereotypes upon presentation of the profession information. When they encounter anaphors that contradict this stereotype they engage in additional processing effort to resolve this discrepancy, hence the increase in reading time. The primary difference between our study and the Duffy and Keir (2004) and Kreiner et al. (2008) studies is that we used reading times instead of eye-tracking as our dependent measure. Reading time has been widely used, however, to assess processing in the face of counter-stereotypic information, and has been shown to be sensitive to a variety of factors that lead people to engage in inconsistency resolution (e.g., Albrecht & Meyers, 1995; Belmore, 1987; Myers, O'Brien, Albrecht, & Mason, 1994; Sherman, Lee, Bessenof, & Frost, 1998; Stern, Marrs, Millar, & Cole, 1984).

Although there are well documented declines in inhibitory processing on the part of older adults (e.g., Hasher & Zacks, 1988; Radvansky, Zacks, & Hasher, 2005), the older adults had no trouble keeping their stereotypes suppressed after they had been explicitly marked as irrelevant. Thus, this finding illustrates a limit on the unwanted activation of stereotype information by older adults. Also, our findings show that under some circumstances (i.e., when clear and contradictory information is provided at encoding), older adults can successfully disregard alternative interpretations.

The ability to keep inappropriate stereotype information from entering the current stream of processing may have occurred for a variety of reasons. First, it has been well documented that although older adults often show evidence of cognitive decline, they generally do not have trouble processing at the situation model level (see Radvansky, 1999; Radvansky & Dijkstra, 2007 for reviews). Previous research that revealed difficulties on the part of older adults in suppressing stereotype information has involved adding components to the situation model (Radvansky et al., 2008; von Hippel et al., 2000), such as a stereotypic attribute of one of the characters (e.g., intelligence) or a

stereotypic item (e.g., recalling basketball shoes when only shoes were mentioned earlier). In comparison, in the present study, the critical component of the situation model was already present, and only needed to be modified in terms of gender.

It is also possible that successful stereotype suppression emerged in the current research because the marking of the stereotype knowledge occurred early in the presentation of the material. Previous research suggests that the effects of stereotypes on information processing tends to be at encoding (von Hippel, Sekaquaptewa, & Vargas, 1995), and thus it might be the case that the availability of countervailing information at encoding is particularly helpful in facilitating stereotype suppression.

## CONCLUSION

The current findings suggest that although older adults have difficulty managing the contents of cognition, this difficulty is not entirely unavoidable. The current findings also suggest that although older adults have difficulty suppressing their stereotypes, this difficulty is not insurmountable. Rather, explicit contradiction of the stereotype at encoding can eliminate the impact of stereotypic information in working memory. There is probably no way to completely eliminate the intrusion of unwanted information into the current stream of thought among older adults, but the current data suggest that when they are provided sufficient external sources that directly contradict their stereotypes, they are able to ignore the stereotypic information. These results also indicate limits in the degree to which older adults continue to maintain incorrect interpretations of a situation in working memory. As such, older adults may not be as confused and conflicted about how to interpret and understand complex sets of information as some of the prior literature has suggested.

In summary, this research shows that although older adults are more likely than younger adults to activate and maintain stereotypes, when the context explicitly contradicts the accessible stereotype, older adults are just as capable as young adults of assimilating this counter-stereotypic information. Thus, these data suggest that older adults are able to avoid reliance on stereotypes when the context at encoding indicates that the stereotype is incorrect. In so doing, these data provide a promising avenue for future research designed to help older adults avoid reliance on social stereotypes. Given that older adults sometimes express a stronger desire than young adults to avoid prejudice, while simultaneously showing greater stereotyping and prejudice than young adults (von Hippel et al., 2000), the current findings might provide a first step in enabling older adults to achieve their egalitarian goals.

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