Aging Free From Negative Stereotypes: Successful Memory in China and Among the American Deaf

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This study explores whether negative stereotypes about aging contribute to memory loss in old age. The research participants consisted of old and young Chinese hearing, American Deaf, and American hearing individuals. Members of the mainland Chinese and the American Deaf cultures were recruited on the basis of the belief that they would be less likely than hearing Americans to be exposed to and accept negative stereotypes about aging. The expected results were (a) an interaction in which the 3 groups of younger Ss would perform similarly on the memory tasks, whereas the older Deaf and older Chinese participants would outperform the older American hearing group and (b) a positive correlation between view toward aging and memory performance among the old Ss. The data supported both hypotheses. The results suggest that cultural beliefs about aging play a role in determining the degree of memory loss people experience in old age.

A majority of Americans believe that their memory will inevitably decline in old age (Cutler & Grams, 1988; Palmore, 1988; Ryan, 1992). Researchers disagree about the inevitability of this decline. Some argue that the cognitive deterioration that accompanies aging is wired into the nervous system. Others argue that this expectation of memory decline creates this reality, and if the expectation could be changed, many aspects of memory decline would be reduced. Scholars in the former group have been conducting research that documents trends of memory decline (Baddeley, 1986; Johansson, Zarit, & Berg, 1992; Light & Burke, 1988), whereas scholars in the latter group have been conducting research that manipulates environmental factors to improve memory functioning among old people (Holland & Rabbit, 1992; Lachman, Weaver, Bandura, Elliot, & Lewkowicz, 1992; Langer, Rodin, Beck, Weinman, & Spitzer, 1979). Although this latter trend of research suggests that permanent memory loss does not inevitably take place as part of the natural biology of aging, it has not yet offered evidence of a psychological mechanism that creates or contributes to the memory loss observed in many studies. Most of the researchers of cognitive aging, however, have been conducting their research on hearing Americans. We thought that examination of aging in other cultures might elucidate a mechanism.

In the current research, we examined a social psychological process that might contribute to memory loss in old age, particularly in the United States. We believed memory loss to be a function of negative stereotypes regarding memory in old age. To study this process, we conducted research on memory and attitude toward aging in two cultures in which we believed negative stereotypes of aging would not be as widespread and as easily accepted as they are in most of America. We selected the mainland Chinese and the American Deaf[1] cultures because of both their independence from the American mainstream and the frequent observation that these cultures hold their aged members in high esteem (Becker, 1980; Davis, 1983; Ikels, 1991; Padden & Humphries, 1988). If negative views contribute to memory loss in old age, and Deaf and Chinese people hold more positive views of aging than American hearing people, the

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[1] We use the convention described by Padden and Humphries (1988) of selecting the lower case *d* or *deaf* to refer to the audiological condition, in contrast to the upper case *D* or *Deaf* to refer to the linguistic and cultural community. Although Deaf people become deaf at different ages and they do not have special clothes or foods, under most definitions, they form a culture. They have their own language, are primarily endogamous (90% marry within the Deaf community), share many organizational networks, and have norms, traditions, and certain common goals. Not all deaf people identify with the culture. Thus, rather than defining its members by their decibels of hearing loss, many prefer to define its members by their attitude toward the Deaf community. In our study, we recruited the Deaf participants from Deaf cultural organizations, thus it is assumed that they identify to some degree with their culture.

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Deaf and Chinese individuals should show less memory loss with aging.

Negative Stereotypes About Aging in the United States

Kite and Johnson (1988) confirmed that hearing Americans hold negative attitudes toward aging. They conducted a meta-analysis of all the studies they could find that examined evaluations of old people. Almost all of the studies measured Americans' attitudes toward aging. They found that the combined effect size of the studies was .38, or more than one third of a standard deviation in the direction of more negative attitudes toward old people. The authors explained that the expressions of negative stereotypes of aging tended to increase in the studies in which the researchers asked the subjects to evaluate old people's physical attractiveness or mental competence, such as their tendency to forget, rather than their general personality traits. Perdue and Gurtman (1990) demonstrated that these views probably influence many Americans' thinking at a level below awareness.

The mechanism by which these negative stereotypes about aging may start to influence cognition as one becomes old may be understood in terms of premature cognitive commitments. Chanowitz and Langer (1981) defined *premature cognitive commitments* as beliefs that one accepts unconditionally, without considering or being aware of alternative forms that the information can take. Once a person processes information unconditionally, it freezes an individual's understanding of the accepted belief and does not come up for reconsideration, even if such reconsideration would be advantageous.

This unconditional acceptance of information occurs frequently with information that initially seems irrelevant, such as information about old age that one encounters in childhood. A child may hear about a forgetful, cranky old person and allow this image to become the foundation for everything learned about old age (Langer, 1989). Research suggests that childhood exposure to the negative images of old age present in fairy tales, television, and everyday conversations in America can influence one's level of activity and alertness in old age (Langer, Perlmuter, Chanowitz, & Rubin, 1988; Rodin & Langer, 1980). Isaacs and Bearison (1986) found that children develop negative stereotypes about old age at around 6 years of age, the same age that they develop negative stereotypes about race and sex.

During the course of aging, individuals may become unnecessarily debilitated by their culture's premature cognitive commitment about memory loss when an alternate understanding of cognition in old age would be helpful. Ryan (1992), in her research about memory beliefs of Americans across the adult life-span, writes that old adults may find that their expectations about memory decline "lead to poorer memory performance through their indirect impact on decreased effort, less use of adaptive strategies, avoidance of challenging situations, and failure to seek medical attention for disease-related symptoms of forgetfulness" (p. 41). In the present study, we looked at cultures that we believed would have more positive beliefs toward aging than the American mainstream to determine whether memory deficits would occur to a lesser degree than they do in the American culture.

Deaf and Chinese Cultural Views on Aging

By selecting two cultures that share little besides their positive views toward aging and an independence from the American mainstream culture, we tried to reduce the likelihood of cohort effects accounting for any possible enhanced memory findings among the elders of these two cultures. In other words, if we looked at only the American cultures and found the predicted interaction, we would not know whether we observed less of a difference between the memory scores of the old and young Deaf than between the old and young hearing because of the different cultural stereotypes about aging or because of another confounding factor. For example, the members of the old Deaf cohort might have preserved their memory skills because they grew up in America at a time when there was more prejudice against Deaf people than during the time when the younger Deaf cohort grew up (Higgins, 1980; Padden & Humphries, 1988). Some studies suggest that a stigmatized status can lead to the development of cognitive coping skills (Frable, Blackstone, & Scherbaum, 1990; Goffman, 1963; Langer, 1989). Fortunately, the two Chinese age cohorts do not differ in this way. By studying diverse cultures, we do not eliminate all possible cohort effects, but we reduce the likelihood of many of them.

The Chinese hearing and American Deaf cultures fit our research specifications. They differ in such varied ways as language, food, history, appearance, kin traditions, and demographic percentages of their respective societies, yet both cultures tend to be intergenerational and to hold their old people in high esteem. In America, Becker (1980) found in her anthropological study of old Deaf people living in San Francisco that Deaf adults of all ages identify and interact with each other at various social events, including the Deaf clubs, which meet several times a week. Hall (1989) reported a similar phenomenon in eastern Deaf clubs. Researchers have also found that younger members of the Deaf community often treat older Deaf adults as role models and wise leaders (Becker, 1980; Padden & Humphries, 1988).

The Chinese government and culture also have a long tradition of honoring their old people. In the 2,000 years preceding 1949, the Chinese government officially endorsed the practice of ancestor worship, the Confucian values of filial piety and respect for the old (Davis, 1983; Sher, 1984). In 1949, when the Chinese Communist Party took over leadership of the state, these official attitudes temporarily changed. The Communist leaders banned Confucianism, religious practice, and ancestor worship because they felt that these practices might threaten the expansion of state and party power (Davis, 1983).

It would seem that this change of policy would harm the status of old people and the positive expectations about aging in China, however, this has not been the case. The Chinese people still speak of advanced years with pride (Ikels, 1990; Sher, 1984). In fact, even though the original Communist leaders did not expect the position of elders to remain strong, it has turned out that "the Communist Revolution has strengthened rather than weakened traditional views of old age" (Davis, 1983, p. 13). There are several factors that draw on both the limitations of the current government and the survival of Chinese traditions that contribute to the elevated status of old people. These include the fact that the government cannot afford to provide

the goods and services many families are now giving their older members and the existence of the still popular Confucian traditions, such as multigenerational households, which are often run by the oldest family members (Davis, 1983; Ikels, 1991).

Both cultures also exist independently of the American mainstream: the Chinese because of geographical and political reasons and the Deaf because of societal and physical reasons. Hans Furth (1966), a pioneer in the study of the cognition of the deaf, has documented that the deaf live independently of the American hearing world because they are often cut off from much of the information others take for granted. Furth has found that the deaf do not perform as well as the hearing on tasks that require acquired intelligence. From an early age, deaf individuals are not exposed to the conversation that is in the background of ordinary hearing life, in part because 90% of deaf people are born to hearing parents who usually do not communicate by sign language (Jacobs, 1974; Padden & Humphries, 1988). The deaf also cannot listen to the radio and, before the technological advances of the last 10 years, were rarely able to understand the dialogue and narrative of television and movies. One advantage of this limitation of information may be the deprivation of negative information about aging.

Similar to the Deaf culture, the Chinese culture exists independently of the American mainstream. The Chinese government, while undergoing major economic and political reform, has still been hesitant about adopting American values, as symbolized by the 1989 Tiananman Square massacre of students rallying for democratic ideals (Davis & Vogel, 1990). Vogel (1993) has argued that one of the reasons the Chinese people have not overturned their government in the same way that Eastern Europeans have is because many Chinese are still content with the Confucian traditions and are not interested in adopting many American aspects of society.

In the three cultures studied, we tested the following three hypotheses:

1. Members of the mainland Chinese and American Deaf cultures hold more positive views of aging than the American hearing mainstream.

2. An interaction is predicted such that the three groups of young subjects will perform similarly on the memory tests, whereas the older Chinese and American Deaf participants will outperform the older American hearing group.

3. A relationship between positive views toward aging and better memory performance will occur among the older subjects.

Method

Subjects

We selected 30 participants from each of the American Deaf, mainland Chinese, and American hearing cultures. Half of the members of these three groups consisted of younger adults (aged 15–30 years, M = 22 years) and half consisted of older adults (aged 59–91 years, M = 70 years). We selected 59 years as the starting age for the old group because Ikels (1990) explained that in China most women retire by the age of 55 and most men retire at the age of 60, and because Becker (1980) found that 59 is about the age when people in the Deaf community begin to attend social events for older adults. We matched subjects in the three cultures by years of education, socioeconomic status, and age. Given the difficulty of data collection within the Chinese and Deaf communities, a systematic sampling across the age spectrum was not feasible.

In the United States, experimenters recruited all participants from the Boston area. We recruited the 15 younger hearing individuals from youth organizations and the 15 older hearing participants from a senior community center. We recruited the 15 younger Deaf individuals from a Deaf cultural organization and the 15 older Deaf participants from a Deaf senior community center. In China, the Chinese interviewers recruited the 30 subjects from a pencil factory located in the western district of Beijing. The 15 younger subjects worked at the pencil factory. The 15 older subjects returned to the factory once a month to collect their pension checks.

In the United States, years of education did not differ across age or cultural group (M = 11.65 years). In China, the young, who benefited from the educational reforms of the Communist Revolution, completed more years of education (M = 11 years) than the old (M = 5.94 years). Although the young Chinese did not differ significantly from the young Americans, $F(1, 44) = 3.39$, $p > .07$, the old Chinese differed significantly from the old Americans, $F(1, 44) = 27.35$, $p < .0001$. This difference should work against our hypothesis, making the predicted finding that among the old, the Chinese should outperform the American hearing subjects more interesting if found.

The Americans' median socioeconomic status was 4 on a 5-point scale with 5 representing the lowest socioeconomic level (Myers & Bean, 1968). The scale of socioeconomic status that we used in the United States did not apply in China because of the different educational and vocational systems. Thus, we matched the Chinese participants as closely as possible on socioeconomic status to the American samples by selecting old and young Chinese subjects of working-class background.

Except for one Deaf participant who reported being born to deaf parents, all the participants had hearing parents and siblings. All the participants were deafened before the age of 8 years and 87% were born deaf or became deaf prelingually (before the age of 3 years). The average age of deafness onset was 1.28 years. The main cause of deafness was from childhood diseases, such as meningitis and German measles.

Dependent Measures

We assessed the dependent variable of memory by tests of four types of memory: immediate recall, learned recall, delayed recall, and probed recall. The tests were chosen to assess the types of memory scholars have most frequently documented as declining with age. Schacter, Kasziniak, and Kihlstrom (1991), in their summary of research conducted on aging and memory, reported that recall as opposed to recognition, episodic memory (from a specific visual spatial context) as opposed to semantic memory, and explicit memory as opposed to implicit memory have been found to decline with age. *Explicit memory* refers to measures that ask subjects to intentionally retrieve information, as opposed to implicit memory, which refers to measures that tap memory without the subjects' trying to remember anything. Thus, we chose episodic recall tasks that primarily tested explicit memory. In addition, three of the four tests were nonverbal to avoid confounding memory scores with differences in language presentation. The fourth recall task, the probed recall test, asked subjects to match pictures to sentences.

The first three episodic recall tests were taken from a modified version of the 7/24 (Lezak, 1983), which measures visual spatial recall without requiring keen eyesight or good motor control. The researcher gives the subject an array of seven dots on a grid to study for 10 s. Then the experimenter removes the pattern and gives the participant a blank grid and a collection of dots. The participant is asked to reproduce the design. Four 10-s learning trials were given. Then, after 30 min of responding to other types of survey items, the experimenter, without warning the subject, asks the participant to recall the design. The test designers called the first trial the "immediate recall" measure, the four interme-

diate trials the "learning trials," and the last trial, which follows a 30-min period filled with tasks unrelated to the 7/24, the "delayed recall" measure (Lezak, 1983). We decided to use the fourth learning trial as a measure of learned recall. All of these tasks except the delayed recall measure relied on explicit recall.

We based the probed recall test on a photo-association task designed by Langer et al. (1979). Rather than associate photographed faces with names, as done in the original research, our test takers matched faces with activities. In the probed recall task, the experimenters presented to each participant a series of eight photographs of old individuals whom the participants were told they may one day meet. We decided to select photographs of old people and to add the phrase about a potential meeting to try to make the task more engaging and comfortable for the old participants, who had been removed from testing situations longer than most of the young subjects. In the hearing sample, the experimenters presented each photograph to the hearing participants for 5 s, read an activity statement about the photographed individual, and then let the subject examine the photo for an additional 5 s. In the Deaf sample, the experimenter presented each photo for 5 s, signed the activity statement, and then allowed the subject to continue examining the photo for an additional 5 s. Half of the activities were positive, such as "she swims every day" and half were negative, such as "he fell and broke his hip." Then the experimenter showed the photographs in the same order to the participant and asked him or her to recall each associated activity.

For the Chinese subjects, the interviews replaced the photographs of older Americans with pictures of older Chinese people in the probed recall task. The photographs originally appeared in the book *Photographs from New China* (1963). While keeping half of the activity statements positive and half negative, as judged by two Chinese scholars, we changed three of the statements to make them more appropriate for the Chinese participants. For example, we changed "he remembers all the presidents' names" to "he remembers all the party secretaries' names."

Attitude Toward Aging

Because stereotypes of aging have been documented to be multifaceted, we felt it important to assess several aspects of attitudes toward aging (Hummert, 1990). We selected the following aspects of views toward old age to study: internality, positivity, activity, and capacity. We measured perceptions of old people's capacities using the positive bias subscale of Palmore's (1988) Facts on Aging Quiz (FAQ). We assessed internality, positivity, and activity of people's image with the open-ended question, "What are the first five words or descriptions that come to mind when thinking of somebody old?"

We assumed that the participants with more positive views of aging would describe more positive (e.g., "wise" or "friendly" as opposed to "decrepit" or "cranky") and active (e.g., "walks a lot" or "stretches every morning" as opposed to "spends all his time sleeping" or "in bed all the time") characteristics of an old person. In addition, we thought that individuals with more positive attitudes toward aging would list more internal qualities of old people, such as their disposition (e.g., "kind" or "humorous"), as opposed to naming more external characteristics, such as physical descriptions (e.g., "wrinkled" or "wears plaid pants").

The characterizations generated by the American subjects were later coded by two raters who were blind to the age and cultural group of the participants. Raters were given three randomly ordered lists of the descriptions generated by the participants. The raters first judged the descriptions by a positive dimension with 1 signifying *positive*, .5 signifying *neutral* or *not applicable to the item*, and 0 signifying *negative*. Next they rated the items on an internality dimension with 1 signifying *internal*, .5 signifying *neutral* or *not applicable to the item*, and 0 signifying *external*. The last dimension that the raters judged was whether the items described an active description, with 1 signifying *active* and 0 signifying *not active* or *not applicable to the item*. We did not consider these ratings to be mutually exclusive. For example, the description "often teaches children" would be rated as positive, active, and neutral on the internal–external dimension. The raters' mean reliability was 95% and their effective reliability was 97% as measured by the Spearman–Brown formula (Rosenthal & Rosnow, 1991).

Because of the culturally specific phrases offered by the Chinese participants to describe old people, such as "gives remaining heat to society," "able to organize the masses," and "contributed to the Revolution," a judge born and educated in China, who was blind to the hypotheses and the age groups of the participants, rated the terms provided by the Chinese participants in terms of positivity, activity, and internality. He used the same procedure and the same scales to rate the items as the American raters. The Chinese judge achieved an 83% mean reliability with an American rater, who was blind to the age groups of the participants. These two raters achieved a 91% effective reliability, as measured by the Spearman–Brown formula (Rosenthal & Rosnow, 1991).

The FAQ consists of 25 true–false items about aging, all of which Palmore based on empirical research. We added five filler items to the FAQ to reduce its focus on aging. Of the 25 FAQ items, 5 are supposed to measure a positive knowledge bias about capacity; that is, inaccurately positive information about aging. When an individual circles *false* for the following items, which Palmore (1988) has documented to be true in the United States, it is supposed to indicate a positive bias toward aging.

1. The five senses (sight, hearing, taste, touch, and smell) all tend to weaken in old age.
2. Lung vital capacity tends to decline in old age.
3. Physical strength tends to decline in old age.
4. Old people usually take longer to learn something new.
5. Older people tend to react slower than younger people.

We decided to reverse score these items so that a higher score indicates a more positive bias. Norris, Tindale, and Mathews (1987) found these five items load on a separate factor from the rest of the scale. The main documentation of the scale's reliability comes from the fact that people of similar levels of education in the United States, as well as in other Western countries, such as Australia, obtain the same or very similar scores on the FAQ (Luszcz, 1982; Palmore, 1988, 1980). In addition, Laner (1981) and Kline and Kline (1991) found the test to have a high test–retest reliability. The FAQ also seems to be a valid measure of bias about aging because individuals who engage in positive learning experiences about old age, such as those who have been in contact with healthy old people, tend to get a higher number of the positive bias items wrong than those without such experiences (Duerson, Thomas, Chang, & Stevens, 1992; Miller & Dodder, 1984).

Self-Esteem

Self-esteem was measured by Rosenberg's Self-Esteem Index (Rosenberg, 1979) to determine whether there are any differences in self-esteem across age or cultural groups and to examine whether attitude toward aging and memory scores vary with self-esteem. Rodin and Langer (1980) hypothesized that self-esteem may mediate the influence of negative stereotypes on cognitive aging.

Procedure

When we recruited the subjects, we told them that the study concerned the ways in which people of different ages feel about various societal issues and would require them to engage in several short games. To avoid generating anxiety, we did not tell them the study involved memory tests. The three American and two Chinese experimenters individually tested each of their participants in environments in which they regularly spend time. In America, the researchers interviewed the

old subjects in quiet rooms of their senior centers and the young subjects in quiet rooms of their youth centers. The Chinese researchers interviewed the Chinese subjects in one of two quiet offices of a pencil factory. The experimenters visited the participants several times before administering the tests to both informally observe group dynamics and to help participants feel more comfortable with the procedure. The subjects each received $6, or the Chinese equivalent, for their participation.

The two Chinese and two of the three American interviewers, including the Deaf researcher, remained blind to the hypotheses during testing. There were no significant differences between the attitude and memory measure scores collected by the blinded and the informed interviewers of the American hearing group. One of the authors and two native Chinese speakers worked together to translate all the verbal tests into Mandarin Chinese, back into English, and then back into Mandarin Chinese.

The Deaf interviewer, fluent in English and American Sign Language (ASL), interviewed the Deaf participants by signing. Because the Deaf participants varied considerably in their ability to understand ASL, signed English, finger spelling, and lip reading, the Deaf interviewer communicated with each participant informally before the interview to assess how much of his ASL translations needed to be supplemented by other communication forms. The interviewer translated the Deaf subjects' signed responses to open-ended questions back into English. On the true–false items of the FAQ and the degree of agreement Likert-type scale items of Rosenberg's (1979) Self-Esteem Index, the interviewer signed these questions and their possible responses individually. Participants circled the appropriate items on their own copy of these questionnaires.

To keep the procedure constant across language groups, the American and Chinese hearing interviewers read aloud the same questions and instructions that the Deaf interviewer signed. Before beginning the interview, the hearing interviewers spoke to the hearing participants informally to assess a loudness level suitable for the interview. On the FAQ and the Self-Esteem Index, the interviewers read the questions and their possible responses, and participants circled the appropriate items on their own copies of the questionaires.

The order of presentation of the measures were: self-esteem, demographics, open-ended question about view of aging, memory with immediate, learned, probed, and delayed recall tasks following one another, and then the FAQ. On the open-ended question about aging, the interviewers encouraged the subjects to provide all five responses. First they asked the subjects to name the first five words or descriptions that come to mind when thinking of somebody old. If they stopped before naming five, the interviewers told the subjects that there are no right answers, repeated the subjects' descriptions, and asked them to try to provide the remaining characterizations.

The interviewers introduced the immediate, learned, and delayed memory measures as part of "the yellow dot game." The interviewers signed or read aloud the following instruction:

> You will now be shown a design of dots. I will give you ten seconds to study the design and will then ask you to reproduce it. Do not worry if you do not learn them all at once. I will give you five opportunities to learn them.

In the delayed recall trial, the interviewers asked the subjects to reproduce the yellow dot pattern 30 min after the fifth learning trial. In the probed recall task, the interviewers gave the following instructions:

> I will now show you some photos of people that might visit here one day. To get you ready for meeting them, as I show you the pictures, I will tell you a little about each one. Altogether, I will give you ten seconds to study each face, five seconds before I (read/sign to) you and five seconds after. Afterwards, I will show you the photos and ask you to recall the information I told you earlier.

Results

Attitude Toward Aging

The results support our first hypothesis that the American Deaf and Chinese hearing would hold more positive views of aging than the American hearing. In the three open-ended measures of attitudes toward aging, the Deaf and Chinese subjects described old people as more positive, as more active, and less in terms of externality or appearance. When we conducted three 2 × 3 analyses of variance (ANOVAs) with cultural group and age group as the independent variables and the measures of positivity, activity, and externality as the dependent variables, a significant main effect for cultural group emerged in each of the analyses. With positivity as the dependent variable, the Chinese had the most positive mean (M = .68), followed by the American Deaf (M = .48), followed by the American hearing (M = .34), to yield a significant culture effect, $F(2, 89) = 8.70$, $p < .0005$. The main effect for age, $F(1, 89) = 1.69$, $p > .10$, and the Culture × Age interaction, $F(2, 89) = .80$, $p > .40$, did not reach significance. Similarly, with activity as the dependent variable, the Chinese had the most positive mean (M = 2.27), followed by the American Deaf (M = 1.66), and followed by the American hearing (M = .87) to yield a significant culture effect, $F(2, 89) = 9.27$, $p < .0005$. Again, the main effect for age, $F(1, 89) = 1.31$, $p > .20$, and the Culture × Age interaction, $F(2, 89) = 1.70$, $p > .10$, did not reach significance.

As predicted, the Chinese and the American Deaf also described fewer external images than the American hearing. Once again there was an effect for culture, $F(2, 89) = 9.82$, $p < .0005$, with the American hearing sample reporting the most external view of aging (M = .50), followed by the American Deaf (M = .07), and followed by the Chinese (M = .00). In addition, for this measure, both an age effect and a Culture × Age interaction emerged, $F(1, 89) = 3.99$, $p < .05$, and $F(2, 89) = 4.01$, $p < .02$, respectively. In the Deaf and the Chinese samples, the young and old participants yielded the same means, whereas in the American hearing group the mean for the young was .80 and the mean for the old was .20. Therefore, the American hearing participants were more likely to generate an external image of aging, and within this sample, the young on average offered the most external image of old age.

The two-way ANOVA with the FAQ positive bias score as the dependent variable revealed no age, $F(1, 89) = 2.21$, $p > .10$, or culture, $F(1, 88) = 3.57$, $p > .06$, effects. However, when we merged the members of the two cultures we believed would have more positive views toward aging, the Chinese and the American Deaf, a culture effect emerged, with the positive cultures' mean (M = 4.15) significantly higher than the American culture's mean (M = 3.63), $F(1, 89) = 4.27$, $p < .05$. When a member of another culture marks the FAQ declining capacity items false, it may be due to two causes. The member of the culture may hold such positive stereotypes of aging that they may distort the information that they have gathered about old age. Alternatively, the cultural group members could have higher functioning old people to observe than the Americans who took part in the many studies on which Palmore based the reasoning behind his quiz.

When we performed a factor analysis with a principal-com-

Table 1
Table of Means for Positive View by Age and Culture

Age cohort	Culture		
	Hearing	Deaf	Chinese
Young	1.74	3.93*	4.26**
Old	2.90	4.53**	5.55**

Note. The scores for Positive View range from −1.49 to 7.41.
* $p < .05$. ** $p < .01$. Scheffé test for difference from the American hearing group of the same age cohort.

ponents extraction and a varimax rotation on the four measures of view toward aging, two factors emerged. The three open-ended measures of image loaded on the first factor, with the weights of .76 for positivity, .82 for activity, and .57 for internality. The FAQ measure of perception of capacity had a loading on the second factor of .96. We believed the first factor to represent salient images of aging, whereas the second factor represents a perception of specific capabilities. We standardized the four measures, multiplied them by their respective factor loadings, and then added them to create a supervariable that we named *Positive View.*

The ANOVA with Positive View as the dependent variable and the cultural and age groups as the independent variables revealed a significant culture effect, $F(2, 89) = 23.20, p < .0005$, with the Chinese ($M = 4.90$) scoring higher than the American Deaf ($M = 4.22$), who scored higher than the American hearing ($M = 2.32$). The ANOVA also revealed a significant age effect, $F(1, 89) = 9.95, p < .01$, with the young ($M = 3.31$) scoring below the old ($M = 4.32$) participants. The Culture × Age interaction did not reach significance, $F(2, 89) = .99, p > .66$. The pattern of means is presented in Table 1.

To explore how the means of the cultural group's Positive Views differ, we conducted a Scheffé test for the young and the old subjects separately. In support of our first hypothesis, the test revealed that among the young and the old, the Chinese and Deaf differ significantly from the American hearing at the .05 level.

Memory

To simplify data presentation, we explored whether we could combine the four memory measures. We found that the probed recall task, which was used for the first time in this study, correlated with the other three memory measures. All correlations reached significance at $p < .01$. The correlations of the probed recall measure were, with the immediate recall measure, .34; with the learned recall measure, .53; and with the delayed recall measure, .37. This reassured us of the validity of the probed recall task. When we performed a factor analysis with a principal-components extraction and a varimax rotation, the results indicated that the four memory variables highly load on a single factor. We created a supervariable, called *Memory,* by standardizing the scores on each of the four memory tasks—immediate, learned, delayed, and probed recall—and then by multiplying them by their factor weights from the factor analysis, which were .66, .88, .85, and .70, respectively.

The two-way ANOVA with Memory as the dependent variable and culture and age group as the independent variables yielded three significant effects (see Table 2): a culture effect, $F(2, 89) = 6.32, p < .01$; an age group effect, $F(1, 89) = 50.65, p < .001$; and an interaction effect $F(1, 89) = 8.65, p < .001$. The young performed better ($M = 1.34$) than the old participants ($M = -1.34$).

To explore the culture effect and Culture × Age interaction, we separated the subjects into their two age groups and then conducted one-way ANOVAs on the two age groups' Memory scores, with cultural group serving as the independent variable. Because the mean age of the older Chinese subjects recruited was significantly younger (by 4 years) than the mean age of older subjects in the two American samples, we decided to use age as a covariate in the analyses. In the older group, the continuous variable of age served as the covariate. The age covariate for this analysis was marginally significant, $F(1, 44) = 3.14, p > .08$. Thus, we decided to keep it in as a covariate in the remaining analyses with the older subjects.

As expected, the ANOVAs with memory as the dependent variable revealed that among the young participants there was no culture effect, $F(2, 44) = 1.34, p > .25$, but among the old, a culture effect emerged, $F(2, 44) = 9.44, p < .001$. As can be seen in Table 2, which depicts the three old and young groups' Memory means, the culture effect and the interaction effect seem to be largely due to the effect among the older participants. Among the old participants, the Chinese performed the best ($M = .50$), followed by the American Deaf ($M = -1.55$), and then followed by the American hearing ($M = -2.97$).

To explore how the means of the old people in the three cultural groups differ from each other, we first conducted a Scheffé test on the means. This test revealed that the Chinese group differs significantly from the American Deaf and the American hearing groups at the .05 level. This suggests that the greatest difference among the old participants is across countries, because among the Americans the Deaf did not differ significantly from the hearing, although the Deaf achieved a higher average Memory score. That is, the greatest difference emerged between the Chinese and the two American samples. We did not predict that the old Chinese would differ significantly from the old Deaf sample. It seems consistent with our hypotheses that the old Chinese would achieve the highest average Memory scores among the old because the Chinese sample also evidenced the most positive views toward aging among the three cultural groups studied.

Not only did the old Chinese sample score significantly higher than the old American Deaf and hearing samples, but they did

Table 2
Table of Means of Memory by Age and Culture

Age cohort	Culture		
	Hearing	Deaf	Chinese
Young	1.69	0.98	1.34
Old	−2.97	−1.55	0.50

Note. The scores for Memory range from −8.60 to 2.87.

not score significantly lower than the young Chinese, $t(28) = 1.27$, $p < .25$. This result surprised us because we selected the memory tasks to show age differences.

To further analyze the relationship between the old groups' means and to test our hypothesis that the old Chinese and old Deaf would outperform the old hearing on the memory tests, we also conducted a contrast analysis (Rosenthal & Rosnow, 1985). We developed a contrast with weights representing the prediction that the old Chinese and old Deaf would outperform the old American hearing group on the memory tasks. We selected the contrast weights −2 for the old American hearing, 1 for the old American Deaf, and 1 for the old Chinese. This contrast proved significant, $t(44) = 3.51$, $p < .01$.

Self-Esteem

Scores on Rosenberg's (1979) Self-Esteem Index were not significantly different across age or cultural groups. The finding that the old and the Deaf participants did not score lower on the measure of self-esteem agrees with the research that has found that self-esteem does not tend to be lower among stigmatized groups (Crocker & Major, 1989). Also, among the old subjects, self-esteem correlated negatively with both the Positive View scores ($r = -.29$) and the Memory scores ($r = -.32$). Thus, our results do not provide any evidence that self-esteem mediates the influence of negative aging stereotypes on cognitive decline.

Relationship Between View of Aging and Memory

To study whether views of aging influence memory performance in old age, we conducted a correlation between Positive View and Memory for the old subjects. These factors significantly correlated ($r = .49$, $p < .01$). We also conducted two path analyses, one for the old subjects and one for the young. We included the variables Positive View, Memory, culture, and age as continuous variables. The culture variable represents whether participants belong to the American Deaf or the Chinese culture. We decided to combine the members of these two cultures because we believed them to share high esteem for their old members and to influence the listed variables in a similar way. To form the positive culture variable, we scored all the American hearing participants as 0 and all the American Deaf and Chinese participants as 1.

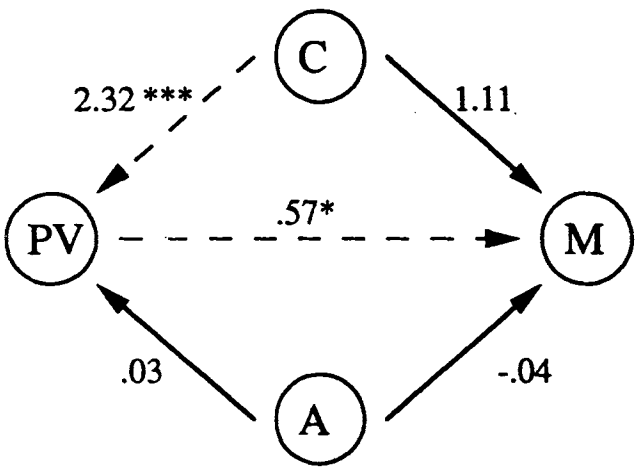

Figure 1. Path analysis for the old participants. C = positive culture; PV = positive aging view; M = memory; A = age. ⇢ = predicted path; → = unpredicted path. $*p < .05$. $***p < .001$.

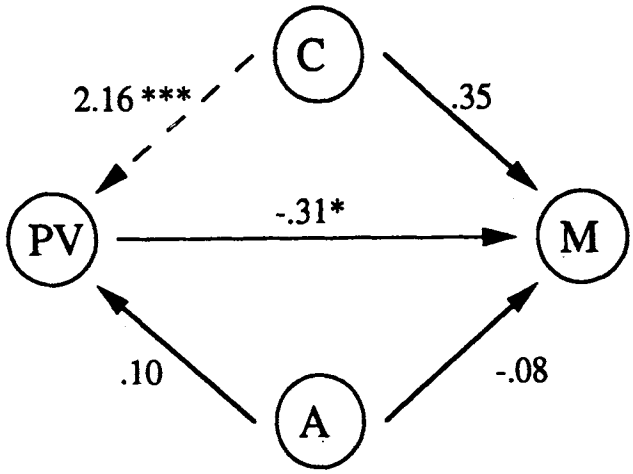

Figure 2. Path analysis for the young participants. C = positive culture; PV = positive aging view; M = memory; A = age. ⇢ = predicted path; → = unpredicted path. $*p < .05$. $***p < .001$.

We predicted that two different patterns would emerge from the two path analyses. Among the old, we hypothesized that the paths between culture and Positive View and Positive View and Memory would be positive such that the influence of culture on Memory would be mediated by Positive View. We also expected that the continuous variable of age would not directly influence memory or view toward aging. Among the young, we expected that the path between the culture and Positive View variables would also be positive because stereotypes of aging form at a young age. We did not, however, expect a positive path between the age and Memory or Positive View and Memory variables. We did not think that participants' scores on the Positive Views and Memory variables would relate until they grow older and their attitudes toward aging become more personally relevant.

As can be observed in Figure 1, the path analysis for the old matched our hypotheses about the relationships between the variables. The predicted paths between culture and Positive View and Positive View and Memory were positive, and the associated coefficients reached significance. The coefficient associated with the direct path between culture and Memory did not reach significance. This suggests that the influence of culture on Memory is mediated by Positive View.

As can be observed in Figure 2, we found the predicted positive path between culture and Positive View among the young participants. Also as predicted, the coefficient associated with the paths between age and Positive View and age and Memory

did not reach significance. We also found that the coefficient associated with the path between Positive View and Memory was significant in a negative direction. As explained earlier, the memory scores among the young do not differ significantly from one another. The reason that Positive View accounts for a significant amount of the young participants' variance in their Memory scores in a negative way is not clear. Perhaps some of the young respondents, seeking politically correct answers about aging, were more distracted during the memory tasks than those who responded to the measure more spontaneously.

Discussion

These findings may help to resolve the controversy about whether memory loss in old age inevitably occurs. In the mainland Chinese and American Deaf cultures, which share little other than high esteem for their older members and an independence from the American mainstream, the old participants outperformed the American hearing old on four memory tasks. If memory loss in old age was determined only by a biological mechanism of decay, the old of these two cultures would not be expected to demonstrate better memory skills than the old American hearing participants. The results suggest that a social psychological mechanism contributes to the often-reported memory decline that accompanies aging. That is, it is possible that in the United States, the negative stereotypes about how old people cognitively age, to which individuals starting at a young age are exposed, become self-fulfilling prophecies. In other cultures that have more positive views toward aging than the American mainstream, individuals may be able to avoid exposure to or acceptance of the negative stereotypes about old age so that they can age free of negative cognitive expectations.

Because we did not study these cultures longitudinally, we do not know whether the Chinese and Deaf experienced less memory loss than the American hearing participants or whether the older Chinese and Deaf participants' memory remained constant over time. We know, however, that the young of the three cultures did not perform differently, whereas the Chinese and Deaf old people performed better than their American hearing peers. We also found that the pattern of memory scores closely matches the pattern of the expression (or lack thereof) of positive views toward aging. The American hearing reported the least positive views toward aging, and their old members scored the worst on the memory tasks of the three cultures studied. The Chinese reported the most positive views toward aging, and their old members scored the best on the memory tasks. The Deaf participants' views toward aging scores fell between the American hearing and the Chinese, and on the memory tasks, the old Deaf scored in the middle of these two groups. Furthermore, the path analysis demonstrated that in old age, views of aging may mediate the influence of the Deaf and Chinese cultures on the memory scores.

The old Chinese performed so well on the memory tests that they produced a surprising result. The old Chinese sample performed similarly to the young Chinese sample. The two groups' scores did not differ significantly even though we selected memory tasks that traditionally, at least in the United States, reflect memory loss with age. In addition, the old Chinese participants completed fewer years of education than the young Chinese and the old and young American samples, making these results even more surprising. This memory outcome may be explained by the fact that the Chinese reported holding the most positive, active, and internal image of aging across the three cultures studied. We predicted that the old participants' memory scores would reflect their cultures' attitudes toward aging, but we never expected that the old would perform almost as well as the young. This finding suggests that the social psychological component of memory retention in old age may be even stronger than we believed.

We hope that future longitudinal and experimental research will continue to address the relationship between the process of stereotype internalization and biological mechanisms in determining cognitive changes in old age. In the meantime, the present results suggest that researchers interested in documenting the norms for cognitive aging should consider extending their samples of participants beyond the traditionally studied American hearing old people. In other cultures, which hold more positive images of aging than the United States, the old may experience higher cognitive functioning.

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