# The Influencing Factors and Intervention Measures of Aging Stereotypes

## Yue Pu[1,a], Hui Wang[2,b], Juan Ma[1,c*]

[1]School of Public Health, Shaanxi University of Chinese Medicine, Xianyang, China
[2]Department of Military Medical Psychology, Air Force Military Medical University, Xi'an, China
[a] puyue199901@163.com, [b] 507260153@qq.com, [c] shximaj@126.com
*Corresponding author

**Abstract:** *Aging stereotypes refer to people's perceptions and expectations of the elderly. When the elderly become aware of these stereotypes, they may worry about confirming the negative stereotypes associated with their age group. This concern can pose a risk to the health of the elderly. In order to promote active aging, this paper focuses on aging stereotypes and utilizes a literature tracking method to categorize and analyze the classification, influencing factors, application fields, and intervention measures of aging stereotypes. This paper finds that context, perspective-taking, and culture are the factors influencing aging stereotypes. Most discussions in this field focus on organizational work and daily life. Studies have found that intervention can be achieved through role construction, intergenerational contact, and improving the perception of Aging in the elderly. Debates over age-based stereotypes continue to rage on, and the mechanisms of aging stereotypes and the factors influencing them should be further explored in the future. At the same time, new ideas are being proposed to enhance the research process, update materials, and adopt a dynamic perspective for studying aging stereotypes.*

*Keywords: Aging stereotypes, Content classification, Influencing factors, Interventions, Active aging*

## 1. Introduction

The World Health Organization predicts that by 2030, one in six people in the world will be over 60 years old, and by 2050, the number of people over 60 will double to 2.1 billion people[1]. In the context of global population aging and low fertility trends, coupled with advancements in medical care, the average life expectancy is on the rise. The global demographic center of gravity is shifting towards older age groups, indicating that older people are a demographic that cannot be overlooked. However, some scholars have recently found that during the COVID-19 epidemic, the elderly, as a vulnerable group to the disease, were also maliciously stigmatized, leading to both physical and psychological harm[2]. During the pandemic, "malicious stigma" has included conveying subjective views about the low value of life among the elderly, supporting the isolation of older people, and even maliciously ridiculing the intelligence of the elderly. This phenomenon involves aging stereotypes in the field of social psychology and is a trending research area that is highly relevant to the elderly. Paying attention to the mental health of the elderly is an unavoidable responsibility for the entire world. This article will challenge the stereotype of aging as a starting point and explore ways to guarantee a healthy and joyful life for the elderly in their later years from both societal and individual perspectives.

Aging Stereotype refers to the beliefs and expectations that people hold about older individuals as a specific social group [3]. The risk that a particular group perceives a stereotype in a situation and fears validating the negative stereotype of their group is called a stereotype threat, which can impact cognitive performance. The research in the field of stereotypes spans nearly a century. Both the theory and practice have matured significantly, resulting in a rich body of research. In this paper, we will discuss the classification, influencing factors, application fields, and interventions of aging stereotypes, and provide future prospects at the end of the paper.

## 2. Classification of Aging Stereotypes

### 2.1. Positive and Negative Aging Stereotypes

There are positive and negative stereotypes in terms of valence, so there are two types of aging

stereotypes. The positive aging stereotype suggests that older individuals are more intelligent, positive, and optimistic in their emotional experiences due to the accumulation of life experiences. Negative aging stereotypes suggest that older people tend to think more slowly, become weaker, and move more slowly as they age. Positive aging stereotypes are derived from the Socioemotional Selectivity Theory (SST), which posits that positive effects stem from emotional regulation in older adults. Most of the research on negative aging stereotypes is primarily explained by the Stereotype Threat Theory, which is a phenomenon where the performance of individuals from stigmatized groups decreases in response to negative stereotypes. People's physiological, cognitive, and behavioral aspects are significantly affected by these two types of aging stereotypes [4-6]. In terms of effects, the impact of negative stereotypes is three times greater than that of positive aging stereotypes [7].

Previous studies have suggested that positive stereotypes have positive effects, while negative stereotypes have negative effects. But more and more researchers are discovering the "paradox". The number of positive word choices was higher than that of negative words in the negative stereotype-priming group, while there was no difference in the number of positive and negative words in the control group. This suggests that negative stereotypes can also promote the perception of positive information and prioritize positive information in older adults [8]. Wang Y found that the level of activation may explain this "paradox". Moderate positive stereotypes and extreme negative stereotypes have a positive effect on the memory of older adults, while moderate negative stereotypes and extremely positive stereotypes have a negative effect on the memory of older adults [9]. In addition to the level of activation, other factors can also influence the positive effects of positive stereotypes. A study has shown that memory scores can vary based on the attitudes of older adults. Older adults with positive stereotypes exhibit lower memory scores when faced with high stereotype threats compared to low ones [10].

### 2.2. Explicit and Implicit Aging Stereotypes

According to awareness of the aging stereotype, there are two types: implicit and explicit aging stereotypes. Direct measurement methods, such as free association and questionnaire, are commonly used to study aging stereotypes. Later on, people began to pay attention to implicit aging attitudes that they were not aware of.

Explicit and implicit aging stereotypes have not been uniformly understood. In terms of the relationship between implicit and explicit attitudes, some scholars believe that they should be synergistic, but the degree of synergy may vary. Zuo B et al. found that college students' implicit and explicit attitudes toward the elderly were both negative, with the implicit attitudes being more negative [11]. Another foreign study also demonstrated that both attitudes were negative, but the explicit attitude was more negative [12]. Both studies utilized the IAT paradigm to assess implicit attitudes, while explicit attitudes were measured differently, using semantic differential measures and self-report bias severity, respectively. There are also studies that prove the inconsistency of internal and external attitudes. It has been pointed out that explicit attitudes towards aging are positive, while implicit attitudes toward aging yield negative results [13]. In terms of effect size, implicit attitudes have a more significant impact on the elderly. Some studies have found that negative implicit aging stereotypes can trigger greater physiological stress responses in older adults [14]. Hess et al. also found that positive implicit aging stereotypes can promote memory ability in older adults more than positive explicit aging stereotypes [15], and implicit attitudes have a greater positive promotion and negative damage.

The mixed results in the studies can be explained in three ways. First of all, there are some issues regarding the number and representativeness of participants, such as an incomplete age range [16], unreasonable age division [17], and a sample size that is too small [17]. Secondly, differences in experimental design, subtle variations in research paradigms, and settings of research materials may influence participants in terms of difficulty and interest. The presence or absence of a control group also affects the analysis of the data. Finally, the idiosyncrasies of the experimental environment [15] may also potentially impact the experimental results.

## 3. The Influencing Factors of Aging Stereotypes

### 3.1. Situation

A growing body of research suggests that aging stereotypes are influenced by context [18]. A questionnaire survey revealed the impact of aging stereotypes on various aspects of older adults' lives. The study found that aging stereotypes had negative effects on health and financial matters, but positive

effects on family, relationships, and spirituality [19]. Compared to the general context, the proportion of positive target words presented by college students when judging age vocabulary was higher in the professional context, suggesting that implicit aging stereotypes are reduced in the professional context [20]. Kornadt et al. found that attitudes toward aging stereotypes were positive at all ages during family contextual priming [21]. The studies above demonstrate that life and health, as well as financial background, can lead to negative aging stereotypes. Conversely, specific professional and family relationship backgrounds can result in positive aging stereotypes. In other words, various situations can lead to different perceptions of aging.

There are two main types of context initiation: one is through manipulating images, and the other is through manipulating words and sentences. Although the merits of the two presentation methods, image and text, are still inconclusive, they each have their own optimization directions. In terms of images, Casper highlights important details and blurs extraneous features. In terms of texts, to prevent subjects from strategically choosing where to focus their attention based on the word positions in the sentences. The sentences were modified to be displayed in a rapid and continuous visual presentation, and the words' positions were arranged around the image with the help of cues [22].

### 3.2. Perspective Taking

Perspective taking refers to an individual's ability to think from the perspective of others, or to put themselves in the shoes of others to understand and empathize with the thoughts and emotions of others [23]. Batson argues that when the subject uses positive empathy to understand the target group's point of view, the idea of helping the target group improve their situation will lead to the improvement of negative attitudes [24]. Participants in the perspective-taking group generally imagined themselves as elderly individuals and wrote a description of the event from a first-person perspective. Some participants were even provided with pictures of elderly individuals to enhance their imagination during the experiment.

Studies have shown that perspective-taking can improve aging stereotypes at the conscious level, but not at the unconscious level. Bian N asked the perspective-taking group and the control group to complete the semantic difference scale twice before and after imagination. The results showed that the perspective-taking group could not change the implicit stereotypes of the elderly, but the explicit negative stereotypes of the elderly were significantly improved [25]. Contrary to Bian's findings, Ruan Z found that implicit attitudes can be changed. He suggested that the perspective taking mode and the size of the target group influence the perception of stereotypes. Perspective taking modes include imagining one's own perspective, imagining other people's viewpoints, and a control group (no perspective taking). Imagining one's own point of view involves being conscious of a situation and experiencing emotions from a first-hand perspective. Imagining other people's perspectives refers to perceiving situations and emotions from a third-person viewpoint. The group that imagined themselves showed an improvement in implicit bias, whereas the groups that imagined others and the control group did not show any effect. The study also investigated the effectiveness of imagining oneself and imagining others' viewpoint at the group level. The study found that imagining one's own viewpoint can reduce implicit bias when the focus is on an individual, while imagining the perspective of others can reduce implicit bias when the focus is on a group [26]. The effectiveness of the two different approaches to bias is influenced by various factors, such as the size of the object.

### 3.3. Culture and Values

Compared with Western cultures, East Asian cultures prioritize the attribute of "warmth" in the elderly over "ability" and emphasize interpersonal and family relationships. Therefore, cultural background may influence the impact of aging stereotype threat on the cognition of the elderly. This claim is supported by a study conducted in France and India. Cultural factors can moderate the effect of stress on the performance and strategies for solving low-difficulty math problems in older adults [27]. Ching et al. found that older Chinese-Americans were less threatened by stereotypes and had better memory skills when they were intervened by traditional Confucian filial piety than without intervention [28].

## 4. Areas of Application and Interventions of Aging Stereotypes

### 4.1. Application Fields

In order to actively cope with aging, it is highly valued to maintain good occupational health and overall well-being of the elderly. The discussion on aging stereotypes is more focused on organizational work and daily life. Organizations are generally wary of the negative impact of stereotype threats on the organizational identity, turnover, and job performance of older employees. It has been found that human resource management styles can moderate the threat of negative meta-stereotypes, which refer to an individual's belief in the stereotypes held by members of an external group about the group to which they belong [29]. Meta-stereotype activation is more complex than stereotypes. An activated meta-stereotype triggers a range of emotions, cognitive effects, and behavioral responses. Studies have found that age-conscious management styles, such as training only older workers, reinforce the threat of aging stereotypes, while common management styles, such as acknowledging and respecting older adults, reduce the threat of aging stereotypes [30]. This means that managers can adopt age-weakening management strategies. In addition, the majority of older people have been hospitalized due to illness. A study has explored the phenomenon of ageism among older patients and medical students in the context of medical care. Self-reports indicated that participants' perceptions of the concept of "old age" were largely negative. Up to 47 percent of medical students reported witnessing an incident of discrimination in a hospital, while 30 percent of patients reported experiencing discrimination [31]. This indicates a need for enhanced ethical education in the healthcare industry to foster positive attitudes towards older people. In daily life, especially when experiencing stressful events, it is important to have a positive attitude towards self-aging. Erica L. et al. introduced a new concept of self-aging loss perception, focusing on personal experiences and its impact on cognitive interference of self-aging attitudes among the elderly. Studies have found that negative attitudes towards aging in the context of stressors increase cognitive interference in older adults, and only a positive perception of self-aging loss can reduce the impact of cognitive interference [32].

### 4.2. Intervention Measures

Social role theory posits that individuals interpret the behavior of others and form attitudes toward them based on their social roles and status [33]. The elderly group holds family roles, occupational roles, and other identities, and the perception of older people can be reconstructed by downplaying age and emphasizing role identities. This perspective was validated by a linguistic study conducted by Reuben Ng et al. using corpus analysis techniques, participants were requested to assess expressions related to age (older adults), family roles (grandmothers), and occupational roles (geriatricians) on a 5-point scale. The study compared each category of ratings and revealed that attitudes were predominantly negative in the age framework, slightly negative in the family role framework, and notably positive in the occupational role framework [34]. Reuben Ng's research on the context of pandemic response has yielded similar results; that is, role construction has a positive effect [35]. Role construction, especially within family dynamics, is more likely to evoke the public's perception of the "warm" characteristics of the elderly, making it easier to promote a positive image of the elderly population. Therefore, social media users and citizens should focus on role construction rather than age construction.

Intergenerational contact can enhance the positive self-perception of the elderly and reduce the impact of stereotypes, which has a positive effect on the life and occupational health of the elderly. In terms of life, Dominoc et al. discussed the impact of intergenerational exposure and stereotype threats on cognitive performance in older adults. They found that positive intergenerational exposure improves cognitive performance by reducing the threat of stereotypes in older adults [36]. Even by imagining positive interactions with grandchildren, the impact of aging stereotypes can be significantly reduced [37]. For older people with diseases, intergenerational contact also has a positive impact. Frequent family intergenerational contact has been found to improve self-rated health in older adults by alleviating depression [38]. In terms of work, the influence of contact between the elderly and young people on work engagement, and the attitudes of middle-aged and older workers play a partial mediating role [39]. The researchers suggest that the quality and quantity of intergenerational contact weaken ageist attitudes, thereby increasing employees' work engagement. Therefore, ensuring the quality and quantity of intergenerational contact is an effective way to intervene in aging stereotypes.

Aging self-perception refers to the perception or cognition of the self-aging process and one's own psychological state at the cognitive level, including the structure of subjective age and aging satisfaction [40]. At the beginning of the 21st century, experiments demonstrated that self-perception in stigmatized

groups influences longevity [41]. Hava et al. discovered that self-perception of aging impacts physical function and self-efficacy in older adults [42]. Therefore, it is necessary to pay attention to the self-awareness of aging in the elderly. We should encourage the elderly to view aging as part of lifelong development, maintain a positive attitude towards intellectual growth, continuously develop and strengthen their cognitive abilities, and uphold a positive self-perception of aging.

In summary, active aging can be promoted through role construction, intergenerational contact, and improving the perception of self-aging among the elderly.

## 5. Conclusions

This paper summarizes and analyzes the classification of research, factors influencing aging stereotypes, application fields, and interventions. From the perspective of research classification, both in terms of valence and consciousness, studies of aging stereotypes have shown inconsistent results. When considering influencing factors, aging stereotypes can be influenced by the situation, perspective taking, and cultural factors. In terms of intervention, role construction, intergenerational contact, and enhancing the elderly's self-perception of aging can have a positive impact on the organizational work and daily life of the elderly.

In this research area, this paper presents the following perspectives.

To begin with, positive stereotypes can be an effective factor in mitigating the impact of stereotypes. In the future, research on positive and negative stereotypes should be expanded. Firstly, It is necessary to refine the process of stereotypes, from activation and application, to analyze differences in valence effects [43]. Secondly, previous studies only distinguished positive and negative valences in the initiation materials of stereotypes, and future research should be refined to different levels of activation of valences. Finally, researchers should focus on exploring the boundary conditions of positive and negative stereotypes in the future. In the study of implicit and explicit stereotypes, within the context of the conflict between Confucian influence and the rapid development of the times, there is a particular interest in attitudes towards Chinese implicit stereotypes of aging. Therefore, future research needs to explore this concept in depth, while overcoming sampling limitations and standardizing experimental processes.

Furthermore, in the future, changes in various factors can be examined from a dynamic perspective. Because aging is a dynamic process that involves transitioning from one group of people to another [44], William et al. believe that the linear effect of age may be caused by the limitations of age span. Therefore, in the future, the dynamic changes of aging stereotypes within the same group and their age curve effects can be considered from a longitudinal perspective [45]. The conclusions of many branches of research in the field of aging stereotypes are still unclear, and there are many paradoxes. This suggests that we need to pay more attention to the mechanism research of stereotypes, combine brain imaging technology to deeply explore the brain's processing processes, and even investigate the impact of multimodal aging stereotypes on cognition, emotion, and behavior.

## Acknowledgements

## References

[1] Ageing and health. Available online: https://www.who.int/zh/news-room/fact-sheets/detail/ageing-and-health (accessed on 22nd, March, 2024)
[2] Xiang X, Lu X, Halavanau A, et al. Modern Senicide in the Face of a Pandemic: An Examination of Public Discourse and Sentiment About Older Adults and COVID-19 Using Machine Learning[J]. J Gerontol B Psychol Sci Soc Sci, 2021,76(4):e190-e200.
[3] Levy B, Ashman O, Dror I. To be or not to be: the effects of aging stereotypes on the will to live[J]. Omega (Westport), 1999,40(3):409-420.
[4] Levy B R, Hausdorff J M, Hencke R, et al. Reducing cardiovascular stress with positive self-stereotypes of aging[J]. J Gerontol B Psychol Sci Soc Sci, 2000,55(4):P205-P213.
[5] Levy B R, Myers L M. Preventive health behaviors influenced by self-perceptions of aging[J]. Prev Med, 2004,39(3):625-629.
[6] Lemaire P, Brun F, Regner I. Negative Aging Stereotypes Disrupt both the Selection and Execution

of Strategies in Older Adults[J]. Gerontology, 2018,64(4):373-381.

[7] Meisner B A. A meta-analysis of positive and negative age stereotype priming effects on behavior among older adults[J]. J Gerontol B Psychol Sci Soc Sci, 2012,67(1):13-17.

[8] Zhou L, Lu J, Chen G, et al. Is There a Paradox of Aging: When the Negative Aging Stereotype Meets the Positivity Effect in Older Adults[J]. Exp Aging Res, 2017,43(1):80-93.

[9] Wang Y. The Aging Stereotype Effect from a Comparative Perspective in Society: The 20th National Conference on Psychology - Psychology and National Mental Health[C], Chongqing, China, 2017.

[10] Marquet M, Missotten P, Dardenne B, et al. Interactions between stereotype threat, subjective aging, and memory in older adults[J]. Neuropsychol Dev Cogn B Aging Neuropsychol Cogn, 2019,26(1):121-143.

[11] Zuo B, Wen F, Zhu X. College Students' Age Stereotypes toward Young and Elderly People [J]. Chinese Journal of Applied Psychology, 2007(03):231-236.

[12] Chopik W J, Giasson H L. Age Differences in Explicit and Implicit Age Attitudes Across the Life Span[J]. Gerontologist, 2017,57(suppl_2):S169-S177.

[13] Qin L, Yang X. Positive or negative?　A review of research on the polarization of aging stereotypes: The 21st National Conference on Psychology[C], Beijing, China, 2018.

[14] Levy B R, Hausdorff J M, Hencke R, et al. Reducing cardiovascular stress with positive self-stereotypes of aging[J]. J Gerontol B Psychol Sci Soc Sci, 2000,55(4):P205-P213.

[15] Hess T M, Hinson J T, Statham J A. Explicit and implicit stereotype activation effects on memory: do age and awareness moderate the impact of priming?[J]. Psychol Aging, 2004,19(3):495-505.

[16] Axt J R, Ebersole C R, Nosek B A. The rules of implicit evaluation by race, religion, and age[J]. Psychol Sci, 2014,25(9):1804-1815.

[17] Hummert M L, Garstka T A, O'Brien L T, et al. Using the implicit association test to measure age differences in implicit social cognitions. [J]. Psychol Aging, 2002: 17, 482-495.

[18] Ren N, Zuo B, Hou F, et al. Context Effect or Automatic Process?The lmplicit Attitude of Undergraduates to Old People[J]. Acta Psychologica Sinica, 2012,44(06):777-788.

[19] Kornadt A E, Rothermund K. Contexts of aging: assessing evaluative age stereotypes in different life domains[J]. J Gerontol B Psychol Sci Soc Sci, 2011,66(5):547-556.

[20] Yao Y, Yang J, Zhang X. The Context Effect of College Students' lmplicit Ageing Stereotypes[J]. Journal of Hangzhou Normal University(Natural Science Edition), 2014,13(06):591-595.

[21] Kornadt A E, Meissner F, Rothermund K. Implicit and Explicit Age Stereotypes for Specific Life Domains Across the Life Span: Distinct Patterns and Age Group Differences[J]. Exp Aging Res, 2016,42(2):195-211.

[22] Casper C, Rothermund K, Wentura D. The Activation of Specific Facets of Age Stereotypes Depends on Individuating Information[J]. Social Cognition, 2011,29:393-414.

[23] Galinsky A D, Ku G, Wang C S. Perspective-Taking and Self-Other Overlap: Fostering Social Bonds and Facilitating Social Coordination. [J]. Group Processes & Intergroup Relations, 2005: 8, 109-124.

[24] Batson C D, Early S, Salvarani G. Perspective Taking: Imagining How Another Feels Versus Imaging How You Would Feel[J]. Personality and Social Psychology Bulletin, 1997,23(7):751-758.

[25] Bian N. The Effect of Perspective Taking on the College Students' Elderly Stereotype [D]. Central China Normal University, 2015.

[26] Ruan Z. The Influence of Perspective taking mode and Object scale on Implicit Prejudice against the elderly [D]. Soochow University, 2015.

[27] Nicolas P, Regner I, Lemaire P. Cultural Differences in Susceptibility to Stereotype Threat: France versus India[J]. J Gerontol B Psychol Sci Soc Sci, 2021,76(7):1329-1339.

[28] Tan S C, Barber S J. Confucian Values as a Buffer Against Age-Based Stereotype Threat for Chinese Older Adults[J]. J Gerontol B Psychol Sci Soc Sci, 2020,75(3):504-512.

[29] Vorauer J D, Main K J, O'Connell G B. How do individuals expect to be viewed by members of lower status groups? Content and implications of meta-stereotypes[J]. J Pers Soc Psychol, 1998,75(4):917-937.

[30] Oliveira E A D S, Cabral-Cardoso C J. Buffers or Boosters? The Role of HRM Practices in Older Workers' Experience of Stereotype Threat[J]. The Journal of psychology, 2018,152(1):36-59.

[31] Dobrowolska B, Jedrzejkiewicz B, Pilewska-Kozak A, et al. Age discrimination in healthcare institutions perceived by seniors and students[J]. Nurs Ethics, 2019,26(2):443-459.

[32] O'Brien E L, Torres G E, Neupert S D. Cognitive Interference in the Context of Daily Stressors, Daily Awareness of Age-Related Change, and General Aging Attitudes[J]. J Gerontol B Psychol Sci Soc Sci, 2021,76(5):920-929.

[33] Eagly A H. Sex differences in social behavior: A social-role interpretation[M]. Lawrence Erlbaum Associates, Inc, 1987.

[34] Ng R, Indran N. Reframing Aging: Foregrounding Familial and Occupational Roles of Older Adults

*is Linked to Decreased Ageism Over Two Centuries[J]. J Aging Soc Policy, 2023:1-18.*

*[35] Ng R, Indran N. Reframing aging during COVID-19: Familial role-based framing of older adults linked to decreased ageism[J]. J Am Geriatr Soc, 2022,70(1):60-66.*

*[36] Abrams D, Eller A, Bryant J. An age apart: the effects of intergenerational contact and stereotype threat on performance and intergroup bias[J]. Psychol Aging, 2006,21(4):691-702.*

*[37] Abrams D, Crisp R J, Marques S, et al. Threat inoculation: experienced and imagined intergenerational contact prevents stereotype threat effects on older people's math performance[J]. Psychol Aging, 2008,23(4):934-939.*

*[38] ZHANG M, WU J, CHENG X, et al. Relationship between family intergenerational contact, depressive symptoms and self-reported health status in the elderly [J]. China Preventive Medicine Journal, 2023,35(10):840-843.*

*[39] Lagace M, Donizzetti A R, Van de Beeck L, et al. Testing the Shielding Effect of Intergenerational Contact against Ageism in the Workplace: A Canadian Study[J]. Int J Environ Res Public Health, 2022,19(8).*

*[40] Macia E, Lahmam A, Baali A, et al. Perception of age stereotypes and self-perception of aging: a comparison of French and Moroccan populations[J]. J Cross Cult Gerontol, 2009,24(4):391-410.*

*[41] Levy B R, Slade M D, Kunkel S R, et al. Longevity increased by positive self-perceptions of aging[J]. J Pers Soc Psychol, 2002,83(2):261-270.*

*[42] Tovel H, Carmel S, Raveis V H. Relationships Among Self-perception of Aging, Physical Functioning, and Self-efficacy in Late Life[J]. J Gerontol B Psychol Sci Soc Sci, 2019,74(2):212-221.*

*[43] Remedios J D, Chasteen A L, Packer D J. Sunny Side Up: The Reliance on Positive Age Stereotypes in Descriptions of Future Older Selves[J]. Self and Identity, 2010,9(3):257-275.*

*[44] Levy B. Stereotype Embodiment: A Psychosocial Approach to Aging[J]. Curr Dir Psychol Sci, 2009,18(6):332-336.*

*[45] Chopik W J, Kim E S, Smith J. Changes in Optimism Are Associated with Changes in Health Over Time Among Older Adults[J]. Soc Psychol Personal Sci, 2015,6(7):814-822.*