

Expectations in Aging: Impacts on Health, Cognition, and Well-Being

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Executive Summary

The National Institute on Aging (NIA) and the National Academy of Sciences, Engineering, and Medicine (NASEM) Board on Behavioral, Cognitive, and Social Sciences (BBCSS) jointly hosted a hybrid seminar titled *Expectations in Aging: Impacts on Health, Cognition, and Well-Being* on May 31, 2023. Meeting participants discussed several approaches to addressing negative expectations on aging as one pathway to improving health outcomes in individuals and communities. Five presentations explored various research methodologies and study designs involving negative expectations of aging, including the differences between studying individuals and groups, the influence of stereotypes, the role of education in changing behavior, how individuals recover from stressful life events, and age discrimination in the workplace.

Research Opportunities using the Within-Person Approach

The “within-person” approach to behavioral research explores variable features of individuals, or “states,” and the causal factors precipitating changes in these states. By defining small units of behavior change over short periods of time, this approach generates testable hypotheses about what forms of behavior change are generalizable and across what scales. The within-person approach may thus be a useful complement to large “between-person” studies that are more common in aging-related research. Studies using the within-person approach may provide insights on the behavioral signatures of individuals and hence the malleability of expectations on aging, which can lead to more effective and tailored intervention design. However, consideration of a within-person approach alone has limitations on how much information it can provide about group behavior, or about how individuals influence each other.

Research Opportunities

1. Apply the within-person approach to study fluctuations in attitudes toward aging in order to understand the fundamental malleability of these expectations.
2. Measure the mechanistic processes by which expectations of aging link to health outcomes and the time scales over which these processes unfold.
3. Explore the use of smartphone and other digital technologies in within-person-design studies to collect granular, short time scale data.

Clinical and Research Implications of Stereotype Threat

Stereotype threat occurs when an individual is concerned that poor performance could confirm a negative stereotype, which leads people to underperform, creating a self-fulfilling prophecy or belief or expectation that causes an individual to act in a way that ultimately leads to the fulfillment of that belief or expectation. This behavior cycle has real-world implications that lead older people to avoid healthy behaviors, like seeking preventative care. However, these health threats for aging individuals can be minimized by intentionally reducing stigma in clinical interactions and designing health care spaces that minimize stereotypes.

Research Opportunities

1. Explore underlying mechanisms of stereotype threat, particularly how integrative process and regulatory process models are involved in underperformance.

2. Conduct more research on how differences in individuals' susceptibility to stereotype threat undermines their performance.
3. Consider how the design of studies of aging can be improved to avoid inadvertently inducing stereotype threat and biasing research results.

Aging Expectation Interventions for Healthy Aging

Negative expectations of aging can lead to a host of negative health outcomes, including a decline in physical and cognitive functioning, increased risk of cognitive impairment and Alzheimer's disease, slower recovery from disability, and reduced longevity. Studies show that interventions involving health education and addressing lifestyle factors that promote healthy aging can reduce negative expectations on aging and lead to improved long-term health outcomes.

Research Opportunities

1. Conduct a version of the AgingPLUS [study](#) in more diverse groups of participants in order to test whether the effects of interventions on negative expectations of aging will generalize to other demographic groups. This study would also provide additional data on group differences that may inform the identification and assessment of risk configurations that need to be considered in intervention development.
2. Develop more rigorous definitions of healthy aging to inform the identification and assessment of risk configurations and their relevance for intervention development.

Resilience and Serious Life Events

If people are fortunate enough to reach later life, the likelihood of serious life events, such as loss of a job or a change in health status increases. The amount of time it takes for an individual to recover from these events varies depending on the baseline resilience or capacities of individuals within their social and cultural context. More negative, depressive symptoms lead to longer and poorer recovery trajectories.

Research Opportunities

1. Explore how durable resilience is to a range of different serious life events, differences between race and genders, and whether adult-stage interventions could decrease the consequences of these serious events.
2. Study how social supports may work in coordination with psychological resilience to shape the dynamics of recovery from serious life events.
3. Examine positive domains of resilience such as life satisfaction, optimism, and skill mastery to assess effects on health trajectories.

Age Discrimination in the Workplace

Ageism is one of the most commonly experienced forms of discrimination in the workplace. The effects of ageism can be far reaching, including reduced access to health care, fewer economic opportunities, and social isolation. There are significant insights to be drawn from other types of anti-discrimination work to reduce bias and reduce its negative effects. Age discrimination can be reduced through intergenerational mentorship opportunities.

Research Opportunities

1. Consider racial, gender, and other forms of discrimination in studies on ageism to understand the health effects of the intersection of these biases.
2. Explore the benefits of intergenerational programming in reducing stigma around age and negative expectations on aging.
3. Examine how social policies at the federal level can protect individuals against age discrimination to promote health and productivity.

Insights from Workshop Participants

Panelists focused on several topics during open discussion, including intervention design, ways to combat ageism, reverse stereotypes, and embrace the concept of healthy aging. Using datasets from health systems and insurers, large-scale studies could be designed to test several interventions simultaneously to determine which are most effective. However, intervention development must proceed carefully in order to avoid embedding and reinforcing existing biases. Crafting interventions around health education and well-known lifestyle factors (e.g., physical activity, nutritional education) has a successful track record, and may be most effectively deployed in demographic groups that are just beginning to enter later stages of life (40s and 50s). These interventions may also help reduce negative stereotypes about aging more broadly. Nevertheless, negative stereotypes about older adults are widespread in the United States. Social contact theory suggests that public exposure to individuals from diverse backgrounds (including age) may help reduce biases and negative views of aging. In order to change attitudes most effectively about aging, conceptions of healthy aging are needed. There is currently no research consensus or shared terminology on healthy aging, but decoupling aging from preventable diseases appears to be a starting point for consensus building.

Research Opportunities

1. Utilize large datasets from health systems and insurers to simultaneously test several interventions for negative expectations on aging to determine which are most effective.
2. Design studies using social contact theory to test interventions for reducing age-related stigma.
3. Build consensus to identify shared conceptual frameworks and shared terminology on healthy aging.

Meeting Summary

Introduction

Terrie Moffitt, Ph.D., Duke University and Chair, BBCSS; Daniel Weiss, Ph.D., Director, BBCSS; Luke Stoeckel, Ph.D., NIA, Program Director, Division of Behavioral and Social Research Division

Expectations on aging exert profound effects on health, cognition, and wellbeing. These expectations shape the way individuals construct their identities, behaviors, and the social environment. Expectations on aging can also affect decisions about preventative health care, which can shape health outcomes later in life.

The National Institute on Aging (NIA) commissioned the National Academies of Sciences, Engineering, and Medicine (NASEM) Board on Behavioral, Cognitive, and Social Sciences (BBCSS) to convene a meeting and present findings on expectations on aging, which is a priority research area for NIA and the Division of Behavioral and Social Research (BSR). The goal of this seminar is to explore best research approaches to improve understanding of the mechanisms underlying expectations on aging and how they contribute to health outcomes. The meeting was held in a hybrid format on May 31, 2023. The meeting agenda and list of participants are included as Appendices 1 and 2, respectively.

The study of mechanisms by which aging expectations affect health behavior aligns with two research priorities and related goals within [NIA's Strategic Directions for Research for 2020-2025](#), including Goal B: Improving our understanding of the effects of personal, interpersonal and societal factors on aging, including the mechanisms through which these factors exert their effects, and Goal C: Developing effective interventions to maintain health, well-being, and function and preventing or reducing the burden of age-related diseases, disorders, and disabilities.

The study of mechanisms is also consistent with NIA's commitment to the National Institutes of Health (NIH) Stage Model for Behavioral Intervention Development, which is meant to facilitate scientific development of potent and implementable interventions. The NIH Stage Model calls for examining mechanisms of behavior change at every stage of intervention development. This approach enables researchers to define the most essential ingredients of candidate interventions and to accurately consider the ease and fidelity of implementation early in the intervention development process.

This seminar convened researchers studying negative expectations on aging through a variety of constructs, such as ageism, stereotypes, and attitudes. To focus the seminar discussion, Dr. Stoeckel introduced five questions for consideration:

- What are the outstanding mechanistic questions regarding expectations and aging health that should be addressed?

- What do we know (or not know) about how expectations about aging arise (e.g., their source, content, social reinforcement, etc.) that might influence their malleability and how and when we might intervene on them to enhance health in aging?
- Why aren't these questions being investigated and what are the barriers to pursuing these questions?
- What are fruitful future directions for expectation-based interventions to address health and aging?
- What are the bioethical implications of this work?

Setting the Stage

Manfred Diehl, Ph.D., Colorado State University; Sarah Barber, Ph.D., Georgia State University

Several social-cognitive theories underpin the idea that expectations motivate and direct individuals' behavior. Expectancy value theory and self-efficacy theory both explain that individuals have expectations about outcomes of their behaviors, and that these expected outcomes motivate behavioral choices. The key assumption in these social-cognitive theories is that individuals' outcome expectations *predict* their motivation to engage in behaviors.¹

The general public's expectations regarding aging are mostly negative, even across cultures.² People typically believe that (1) aging is defined by uncontrolled loss and decline; (2) the process of aging runs its course; and (3) age-related losses are irreversible.³ These negative public views do not match the views held by experts, who generally argue that aging is normal and distinct from disease and decline.⁴ Negative aging expectations are explained by stereotype embodiment theory: negative views about aging are internalized across an individual's lifespan from the surrounding culture, beginning when individuals are too young for the stereotypes to be self-relevant, and setting the stage for the stereotypes to ultimately be directed against the individuals themselves at a later age.⁵

These negative expectations are significant because they are associated with actual poorer health outcomes, including declines in memory and cognition, higher rates of mild cognitive impairment (MCI) and dementia, higher rates of physical inactivity and obesity, reduced

¹ Bandura A. (1997). Self-Efficacy: The Exercise of Control. W.H. Freeman and Company.

² Levy B.R. (2003). Mind matters: Cognitive and physical effects of aging self-stereotypes. *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 58, P203–P211; Levy, B. (2009). Stereotype Embodiment: A Psychosocial Approach to Aging. *Current Directions in Psychological Science*, 18(6), 332–336; Löckenhoff, C. E., et al., (2009). Perceptions of aging across 26 cultures and their culture-level associates. *Psychology and aging*, 24(4), 941–954.

³ Diehl M, Smyer MA, Mehrotra CM. Optimizing aging: A call for a new narrative. *Am Psychol*. 2020 May-Jun;75(4):577-589.

⁴ Lindland, E., Kendall-Taylor, N., Haydon, A., & Fond, M. (2016). Gauging aging: Expert and public understandings of aging in America. *Communication and the Public*, 1(2), 211–229.

⁵ Levy, B. (2009). Stereotype Embodiment: A Psychosocial Approach to Aging. *Current Directions in Psychological Science*, 18(6), 332–336.

longevity, and poorer overall health. According to stereotype embodiment theory, expectations about aging have health effects through three pathways of harm:

- Physiological: Heightened response stressors.
- Psychological: Self-fulfilling prophecies that reinforce negative expectations.
- Behavioral: Less engagement in preventative health measures.

Negative expectations about aging can also manifest in more widespread harms in the form of ageism. Studies show that ageism is common and leads to poorer health, decreased access to health care, poorer social relationships, and reduced employment opportunities.⁶ In order to optimize the health and well-being of older adults, interventions should target negative perceptions about aging and instill more positive and more realistic expectations regarding aging.

Utility of the Within-Person Approach in Generating Novel Insights about Views on Aging and their Implications for Health

Erica O'Brien, Ph.D., Pennsylvania State University

Overview of Within-Person and Between-Person Study Approaches

The Between-Person (BP) and Within-Person (WP) approaches are two research approaches that can provide insights on the malleability of attitudes toward aging. These approaches differ in the types of research questions they seek to answer. BP, which is most commonly used in studies of aging, examines relatively stable individual traits (such as demographic characteristics) and assesses differences in these traits across individuals, typically using large sample sizes to identify correlational associations and perform cross-sectional analyses.

The WP approach, by contrast, focuses on variable features of individuals, or “states,” and explores the causal factors precipitating changes in these states, including potential systematic links between variations across different features. These causal factors can be assessed in real-world studies using repeated, intensive, micro-longitudinal designs (e.g., multiple timepoints in a day) with small sample sizes. Importantly, although the BP approach cannot shed light on within-person processes, the WP approach—when adequately powered—*can* examine BP differences.

Within-Person Study Approaches

The WP approach can help answer broad questions about expectations and behavior by enabling researchers to test specific predictions about generalizability. Various factors limit the generalizability of research findings on behavior: large-sample correlational studies cannot generalize findings to behavior in individuals; multi-year longitudinal studies cannot generalize findings to behavior on smaller time scales; and of course, results from one person or group cannot be generalized to other individuals or groups. However, because the WP approach

⁶ Chang, E. S., Kanno, S., Levy, S., Wang, S. Y., Lee, J. E., & Levy, B. R. (2020). Global reach of ageism on older persons' health: A systematic review. *PloS one*, 15(1), e0220857.

begins by identifying variational patterns and processes, it can then test whether those patterns and processes differ by time scale, level of analysis, or moderators such as age.

WP studies can be conducted via a variety of study designs. One such design is the Ecological Momentary Assessment (EMA), which is a micro-longitudinal study that measures activity changes in an individual within a day, or several days. The WP approach can also be used through daily diary studies, in which researchers collect measures once per day. Measurement burst studies are hybrid short- and long-term studies, which enable assessments on both shorter and longer time scales. In intensive contexts, short batteries of measures that capture single answers from questions focused on specific behaviors are useful. The timing and intensity of collected measures should depend on the expected frequency of change, which could be momentary, daily, or weekly. These types of study designs typically utilize regression analysis or structural equation modelling that accounts for variabilities both within individuals and between individuals.

The Within-Person Approach and Malleability in Expectations on Aging

The WP approach aligns well with data about individual expectations of aging and can explore malleability in these expectations. For example, the fact that expectations on aging fluctuate over time but become increasingly negative speaks to the centrality of within-person variation to aging. Such variations can occur on both shorter- and longer-term time scales, which may be tied to transient stress, major life events or role transitions, and chronic changes in health or functioning.

Studies that use the WP approach can also measure the mechanistic processes by which expectations of aging link to health outcomes—including psychological, physiological, and behavioral processes. Additionally, the approach can help answer questions about when and over what time scales these processes unfold—and possibly accumulate over time.

Implications of the Within-Person Approach

Beyond empirical questions about aging, the WP approach can also help address fundamental theoretical questions in the study of malleability and mechanisms. For example, this approach can help consider which constructs or measures that capture expectations show short-term variation and on what time scale; can define how researchers *know* which measures are malleable; and can help separate signal from noise in collected data to determine the reliability of fluctuations in measures of interest. One initial study by Dr. O'Brien suggested that 10 to 40 percent of variation in different measures of expectations could be attributed to within-person fluctuation, but further study is needed. Researchers can also investigate which measures relate to which mechanistic pathways and health outcomes and on what time scales, the potential heterogeneity of within-person associations in relation to moderators (such as age), and which relationships among these factors may be bidirectional and lead to positive or negative health outcomes.

Future studies based on the WP approach can identify malleable measures and assess how the measures vary among individuals. Researchers will need to identify constructs, appropriate timepoints for intervention, and the environments in which interventions occur. Intensive,

repeated measurements may increase the rigor of this approach in order to effectively design interventions that promote positive expectations in aging that lead to improved health outcomes.

Discussion

Panelists considered various potential challenges to studies using the WP approach, including the fact that not all aspects of aging may be amenable to this methodology. Dr. O'Brien noted that some measures, such as awareness of age-related change, may be less variable from moment to moment—which could require longer time scales in a WP-designed study or an entirely different approach. Data are currently limited regarding how variable some measures are. Causal questions about how long behavior changes take to transpire also present methodological challenges; WP-designed studies may need time-scale adjustments to identify these intervals.

Digital means of data collection (such as with smartphones) have not yet been used in WP-designed studies, but the prospect is promising—provided bioethical considerations, including privacy, drive study designs.

The Effects of Age-Based Stereotype Threat on Older Adults' Performance Outcomes

Sarah Barber, Ph.D., Georgia State University

Dr. Barber studies performance-based outcomes in older adults, with a focus on memory. Studies of cognitive aging show reliable cognitive declines as people age; however, these results are affected by motivational expectations—or the ways in which people perceive their abilities based on their age. The stereotype threat framework helps investigate questions of how negative perceptions of age affect performance, and how performance might be affected if these perceptions were replaced with positive ones.

Stereotype Threat Framework

Stereotype threat occurs when an individual is concerned that poor performance could confirm a negative, self-relevant stereotype, and that concern causes underperformance.⁷ Stereotype threat can adversely affect older adults' performance across a wide variety of domains, including subjective cognitive abilities, workplace outcomes, gait speed, subjective hearing, grip strength, math performance, driving performance, and technology use.

In laboratory settings, age-related stereotype threat about memory can be studied in at least three ways. For example, participants can be primed with a stereotype that memory declines with age; participants can be told a study involves age-related differences; or younger individuals can be invited to complete tasks alongside other people. All three study designs induce stereotype threat and cause underperformance. Results from stereotype threat studies

⁷ Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology*, 69(5), 797–811

show that older adults consistently underperform in threat situations where negative expectations about aging are accentuated.

Clinical Implications

Researchers and clinicians may overestimate the amount of decline in cognitive performance in aging people by interpreting the product of stereotype threat as inherent ability. Studies on memory and aging may contribute to evaluative pressure (and stereotype threat) by using advertising that talk explicitly about targeting older adults in memory studies and by inviting them into labs filled with younger people. These evaluative pressures can have clinically meaningful effects; in one study, a significant number of people fell below screening thresholds for dementia in a cognitive status exam in a stereotype threat experiment.⁸ Outside of research settings, older adults regularly report feeling stereotype threat from healthcare providers, who are frequently unaware of these detrimental effects.

Stereotype threat also has clinical implications for disclosure of Alzheimer's disease risk factors. In one study, older adults who knew they were APOE ε4 carriers underperformed on a verbal memory test and rated their abilities more harshly.⁹ Ongoing studies have replicated these findings, although the adverse effects of disclosing Alzheimer's disease risk factors were limited only to memory tests. These studies also found that individuals expected significantly more stigma than they actually experienced once their risk factors were disclosed, which demonstrates the influence of negative individual perceptions.

In laboratory studies, not all adults are equally affected by stereotype threats. Greater effects are observed for people at earlier stages of older age, women, and older adults who self-identify as worried about memory loss, incompetence, dementia, and decline.

Intervention Design

Ways of reducing stereotype threat are understudied, but some work suggests that this approach can have a beneficial effect. In one study that recruited American and Chinese participants, each group was split into stereotype threat and controls; however, the Chinese group also included an intervention that took the form of a reminder about Confucian traditions of filial piety that honor aging people. The study results showed major improvements in the intervention group and reductions in the negative effects induced by stereotype threats.

Future research could explore the underlying mechanisms of stereotype threat. Two models of these mechanisms are the integrative process model and the regulatory focus model. The integrative process model suggests that stereotypes increase the cognitive load of those

⁸ Mazerolle, M., Régner, I., Barber, S. J., Paccalin, M., Miazola, A. C., Huguet, P., & Rigalleau, F. (2017). Negative Aging Stereotypes Impair Performance on Brief Cognitive Tests Used to Screen for Predementia. *The journals of gerontology. Series B, Psychological sciences and social sciences*, 72(6), 932–936.

⁹ Lineweaver, T. T., Bondi, M. W., Galasko, D., & Salmon, D. P. (2014). Effect of knowledge of APOE genotype on subjective and objective memory performance in healthy older adults. *The American journal of psychiatry*, 171(2), 201–208.

expecting or experiencing them¹⁰; the regulatory model suggests that stereotypes may contribute to risk aversion in decision making.¹¹ Dr. Barber acknowledged that both models may be involved in underperformance due to stereotype threat and recommended further study of these models.

Discussion

Meeting participants considered the possibility of a study that would alter the appearances of participants to make them appear younger in order to examine perceptions of aging and stereotype threat. Dr. Barber noted that she was not aware of any studies utilizing this design.

Dr. Barber noted that stereotypes do not have to be internalized to have an effect—others' judgments can also affect performance. However, internal attitudes about aging appear to strongly affect behaviors. Further research in individual differences in susceptibility to stereotype threat may improve understanding of precisely how it undermines performance.

Changing Adults' Negative Views of Aging: A Potential Avenue to Optimize Healthy Aging

Manfred Diehl, Ph.D., Colorado State University

The Health Impact of Negative Views on Aging

Most middle-aged and older adults' have negative views of aging (NVOA) that are associated with a host of negative health outcomes. Experimental studies of NVOA show associations with poorer memory performance, increased cardiovascular reactivity, slower walking speed, decreased grip strength, and a reduced desire to live. One prospective study demonstrated that people with NVOA experienced faster declines in functional health and on average died 7.5 years earlier than people with positive views.¹² Prospective observational studies also show that NVOA are associated with negative behaviors and outcomes, including:

- Greater decline in physical functioning over time.
- Less engagement in preventative health behaviors.
- Steeper decline in cognitive functioning over time.
- Increased risk of MCI and Alzheimer's disease diagnosis.
- Higher rate of hippocampal volume loss.
- Amplification of the effects of genetic factors (APOE ε4) on dementia risk.
- Slower recovery from disability.
- Reduced longevity.

¹⁰ Schmader T, Johns M, Forbes C. An integrated process model of stereotype threat effects on performance. *Psychol Rev.* 2008 Apr;115(2):336-56.

¹¹ Crowe, E., & Higgins, E. T. (1997). Regulatory focus and strategic inclinations: Promotion and prevention in decision-making. *Organizational Behavior and Human Decision Processes*, 69(2), 117–132.

¹² Levy, B. R., Slade, M. D., Kunkel, S. R., & Kasl, S. V. (2002). Longevity increased by positive self-perceptions of aging. *Journal of Personality and Social Psychology*, 83(2), 261–270.

NVOA represents a major motivational barrier, undermining or blocking behaviors that can facilitate healthy and successful aging. At the same time, research has found that positive views of aging can have the opposite effect, enabling individuals to seek more healthy behaviors and experience better outcomes. New interventions could thus be developed to replace NVOA with more positive expectations about aging. Research questions can be framed around the degree of malleability in aging expectations, and the ways in which reduction of negative expectations can yield more positive health outcomes.

Previous Work on Aging Expectation Intervention

In one study, an intervention was designed to train participants to hold positive expectations of aging, through health education linked with physical activity classes.¹³ Training took place through conversations about study participants' health and the idea that health can be associated with behavior instead of age. The study resulted in improved physical activity, mental health, and quality of life indicators (reduced pain and increased energy and sleep quality).

In another study, participants were exposed to either negative or positive age stereotypes.¹⁴ The participants exposed to positive stereotypes expressed more positive expectations on aging. The positive stereotype group also demonstrated improved physical functioning and performance.

In a randomized controlled trial (RCT) in Germany, investigators designed a physical activity for aging participants, with an intervention group that received information about misconceptions of aging and positive aspects of growing older.¹⁵ Positive views on aging increased in the intervention group. Investigators conducting this trial were also able to predict improvements in physical activity for the intervention group ten months later.

The AgingPLUS Intervention Program

The AgingPLUS study is a motivation-based training program that addresses a risk cluster of three motivational factors: NVOA, belief in low personal control, and deficient goal-planning skills. These factors were chosen because they are known to be motivational barriers for adults to become more physically active. AgingPLUS is divided into an educational component and an experiential component. In the educational component, participants are first given positive information about aging whereas in the experiential component they are encouraged to engage in self-directed physical activity. This study followed the NIH Stage Model of behavioral intervention development, using the experimental medicine approach.

¹³ Sarkisian, C. A., Prohaska, T. R., Davis, C., & Weiner, B. (2007). Pilot test of an attribution retraining intervention to raise walking levels in sedentary older adults. *Journal of the American Geriatrics Society*, 55(11), 1842–1846.

¹⁴ Levy, B. R., Pilver, C., Chung, P. H., & Slade, M. D. (2014). Subliminal strengthening: improving older individuals' physical function over time with an implicit-age-stereotype intervention. *Psychological science*, 25(12), 2127–2135.

¹⁵ Wolff, J. K., Warner, L. M., Ziegelmann, J. P., & Wurm, S. (2014). What do targeting positive views on ageing add to a physical activity intervention in older adults? Results from a randomised controlled trial. *Psychology & health*, 29(8), 915–932.

Using a randomized pretest-posttest control group design, AgingPLUS recruited 335 participants (173 intervention, 162 control) aged 45-75 years old.¹⁶ The AgingPLUS treatment group engaged in a four-week educational program addressing the three key motivational factors (i.e., NVOA, control beliefs, goal-planning skills), whereas the control group took part in a generic health education program for middle-aged and older adults. At the end of the four-week intervention, participants were tested on several outcomes, including their general age stereotypes, personal views of aging, beliefs of personal control, and behavioral intentions to engage in regular physical activity.

The study demonstrated positive results in aging expectations for study participants in the treatment group immediately after the intervention, and continued improvement in the weeks following. By contrast, participants in the control group showed no change in their expectations on aging. The most prominent results in the intervention group were positive changes in generalized views of aging (i.e., age stereotypes), compared to more limited changes in individuals' perceptions of their own aging. Dr. Diehl noted that culture-based negative age stereotypes are the most difficult to change, which makes the study's results particularly interesting. Overall, AgingPLUS demonstrated that through increased activity and information about the capacity for behavior change to improve health, individual expectations on aging were malleable in a positive direction.

Discussion

Meeting panelists discussed how diverse study participant populations may affect study outcomes that examine expectations on aging. Dr. Diehl noted that the majority of study participants in AgingPLUS were white and of European ancestry despite attempts to recruit from more diverse populations. Panelists agreed that more diverse study participants were needed to generalize the study results.

Psychological Resilience, Stressful Life Events, and Expectations Of Aging

Dawn Carr, Ph.D., Florida State University

Dr. Carr studies aging expectation and life course trajectories. Individual expectations of aging are formed early in life and are strongly influenced by local social environments and the life trajectories of familial relations. The formation of these individual attitudes are important because they can be a predictive factor in the degree of recovery from stressful events later in life.

Aging Expectations and Stressful Life Events

Expectations of aging typically shift over individual life paths. In early stages of life, these expectations often revolve around preparation for positive events, such as marriage, children, and professional goals. Later in life, stressful life events (SLEs) are more likely, and in fact may

¹⁶ Diehl, M., et al. (2021). The AgingPLUS trial: Design of a randomized controlled trial to increase physical activity in middle-aged and older adults. *Contemporary Clinical Trials*, 96, 106105.

often stem from earlier successes. For example, relationships formed early in life may result in the loss of a loved one, or successful employment can be followed by unemployment. Individuals may also experience new health diagnoses or injury. All these events can have a major impact on an individual's future expectations of aging. Positive later-life changes can also influence expectations, including retirement, remarriage, and moving to a new home.

Defining Resilience to Stressful Life Events

Individuals' capacity to handle stressors, or resilience, depends on a combination of factors, including processes, outcomes, and characteristics. First, life processes shape people's expectations of their own resilience. When individuals successfully achieve life events, they gain insights into their ability to accomplish goals; as SLEs accumulate over time, individuals also have opportunities to assess their capacity to handle difficult situations. When experiencing stressors, individuals consider this accumulated experience of what they have handled in the past and take stock of available resources, including financial means, network, and skills to form an expectation of possible outcomes. The outcomes of SLEs also contribute to resilience by contributing to individuals' baseline health. Finally, resilience is also a set of more stable individualized personality traits that are measurable and that influence ability to manage stress.

SLEs can be important inflection points in people's health. After an SLE, the recovery period is crucial, because it not only sets a new baseline for resilience to future stressors, but also influences long-term health trajectories. Some individuals may fully recover, while others may recover at lower rates of health—or continue to decline. Research has been conducted to help define resilience in aging,¹⁷ and researchers are currently evaluating the most effective measures to assess individual resilience. The Wagnild and Young Resilience Scale (RS) used by social workers can help measure resilience, but it is limited to individuals and cannot be scaled to the population level.

Population-Level Research on Resilience

Dr. Carr and her team conducted research using the NIA Health and Retirement Study (HRS) to assess population-level resilience in aging. HRS has collected longitudinal biennial data for adults over 51 years old from several different retirement cohorts, starting in 1992. In 2006, psychosocial factors were added to the study's collected measures to provide insights on resilience to stressors. With these data, Dr. Carr's study team developed and tested a simplified resilience score (SRS).

The findings from the first study using SRS were published in 2016.¹⁸ These findings suggest that the SRS could predict how disabled individuals would become after experiencing a new chronic condition, and that in individuals with higher levels of resilience, a chronic condition led to less impairment in daily life compared to those with lower levels of resilience. This work has

¹⁷ Manning L. K. (2013). Navigating hardships in old age: exploring the relationship between spirituality and resilience in later life. *Qualitative health research*, 23(4), 568–575.

¹⁸ Manning, L. K., Carr, D. C., & Kail, B. L. (2016). Do Higher Levels of Resilience Buffer the Deleterious Impact of Chronic Illness on Disability in Later Life?. *The Gerontologist*, 56(3), 514–524.

led to ongoing research looking more deeply into the role of resilience in shaping these outcomes.

Ongoing research on resilience focus on several questions, including how robust resilience is to a range of different SLEs, differences between race and genders, and whether adult interventions could decrease SLEs' consequences. Research suggests that early life factors have a significant influence on baseline resilience scores.

Through studies of widowhood, which is a common later-life SLE, Dr. Carr's team has drawn preliminary inferences on resilience and recovery periods. On average, widowers saw a three-year decline in mental health followed by opportunities for improvement. Depending on resilience levels, some individuals improved during that recovery period while others developed poorer health baselines—or continued to decline. Depressive symptoms were a significant risk factor for poorer health outcomes during the recovery period. There were some slight differences across race and gender, as males expressed higher levels of resilience and whites experienced much more pronounced effects of depressive symptoms on resilience scores than their Black and Hispanic counterparts. Future research could consider social supports that may work in coordination with psychological resilience to shape the dynamics of recovery from SLEs.

Discussion

Panelists discussed the mechanisms through which resilience affects health trajectories, as well as differences between demographic groups. Dr. Carr noted that resilience can be viewed as a stable, trait-like factor, which lays a foundation in advance for people to achieve better outcomes after an SLE, rather than as a modifier of the recovery process after an SLE. Qualitative studies suggest that such psychological factors may manifest differently depending on racial groups, but on average, recovery outcomes are fairly similar at the population level. Ongoing research is more closely examining resilience differences across demographic groups.

Domains of resilience do not involve only depressive symptoms. Evidence suggests that depressive symptoms decrease the likelihood of recovery from an SLE, but positive factors have an influence, as well. Life satisfaction, optimism, and skill mastery are all factors that appear to have an effect on health trajectories.

Promoting Health, Economic, and Social Well-Being through Productive Activities: A Focus on Inclusive Research

Ernest Gonzales, Ph.D., MSSW, New York University

Dr. Gonzales studies age discrimination in the workplace. This discrimination is partially the result of two competing expectations: we expect long lives but have negative expectations about the decline of our abilities when we reach our later years. Dr. Gonzales conducts research on age discrimination in order to help advance productive and equitable aging in which individuals not only live a long life, but do so with strong economic foundations and social bonds. Researchers studying ageism should conduct their research carefully and acknowledge

competing principles in productive aging to avoid reinforcing biases, foment intergenerational conflict, and deny lived experiences.

Integrated Model of Productive Aging

Under optimal conditions, productive participation of older adults in society saves billions of dollars per year and provides societal benefits across generations. The integrated model of productive aging studies how actual conditions may lead to age discrimination that thwarts these and other benefits.¹⁹ This model explores root causes of discrimination, social determinants of health, individual-level mechanisms of action, and health outcomes. Socio-demographics, laws, and public policy influence individual, local, and institutional capacities to facilitate healthy aging. All of these dynamics shape the productive behavior of individuals and express themselves as health outcomes.

Age Discrimination at Work

Dr. Gonzales noted that age discrimination at work is widespread, covert, and harmful to health and occupational wellbeing. According to AARP, ageism resulted in \$850 billion in lost GDP in 2018 alone. To conduct research on the root causes of age discrimination, three gaps in knowledge must be investigated:

- What is the frequency of perceived age-based discrimination across the working life span?
- What is the possible impact on individual health, job satisfaction, and organizational commitment?
- How does membership in a lower social status (age, race, gender, income, educational attainment) result in more vulnerability and worse outcomes for older adults?

To help answer these questions, Dr. Gonzales' team designed a qualitative study with interviews of 1,217 individuals age 18 or older working at least 20 hours per week.²⁰ Based on these interviews, the study team developed the Workplace Age Discrimination Scale (WADS). Those on the youngest and oldest ends of the WADS score distribution reported the highest levels of age discrimination at work. WADS is also meant to be a predictor of mental health and job satisfaction. Study findings showed that older individuals experienced the most pronounced negative effects of age discrimination. A follow-up cross-sectional study was conducted to explore the trajectories of workplace age discrimination and association with self-reported

¹⁹ Gonzales, E. et al., 'Integrating AASWSW's Grand Challenges of Productive Aging with Anti-Racism and Health Equity Lenses to Improve Population Health', in Martell L. Teasley, Michael S. Spencer, and Melissa Bartholomew (eds), *Social Work and the Grand Challenge of Ending Racism: Concepts, Theory, and Evidence Based Approaches* (New York, 2023; online edn, Oxford Academic, 22 June 2023).

²⁰ Marchiondo, L. A., Gonzales, E., & Ran, S. (2016). Development and validation of the Workplace Age Discrimination Scale. *Journal of Business and Psychology*, 31(4), 493–513.

health outcomes.²¹ This study showed that, over time, age discrimination led to more depression, poorer self-perceptions of health, lower job satisfaction, and earlier retirement.

Heterogeneity of Work Discrimination

Environmental factors such as neighborhoods and workplaces, in concert with interpersonal relationships, can either improve or worsen mental health—which can also vary based on race and ethnicity. A survey of 958 people examined structural discrimination they faced in addition to ageism.²² Questions involved major experiences of lifetime discrimination, chronic workplace discrimination, and everyday discrimination. Hispanics reported the highest rates of discrimination in their neighborhoods, followed by Blacks and whites. Black individuals reported the highest rates of structural and major lifetime discrimination, followed by Hispanics and whites. Whites reported the highest rates of workplace discrimination.

Individuals in this study were also asked to report the perceived basis of the discrimination that they experienced. The largest group believed that discrimination was due to age. When data were stratified by ethnicity, age was the most commonly cited reason for discrimination for Hispanics and whites, and the second most commonly cited reason (after race) for Blacks. Mental health resilience was shown to be the most dominant factor in dealing with varying types of discrimination. Those with less resilience or socioeconomic advantages retired earlier.

Covert Discrimination

Dr. Gonzales observed that ignoring or erasing other types of discrimination in ageism research is itself a form of discrimination, which can deepen age discrimination's harms. For example, both Black and Hispanic people are more likely to develop Alzheimer's disease and related dementias (AD/ADRD) compared to their white counterparts. Moreover, approximately one third of AD/ADRD cases are attributed to preventable environmental factors that often disproportionately affect underserved populations, such as smoking, depression, physical inactivity, social isolation, diabetes, hearing loss, hypertension, obesity, and low educational attainment. Yet a recent scoping review of race and ethnicity in the context of AD/ADRD revealed only seven studies on the topic, demonstrating the limited research in this area.²³

Discussion

Panelists discussed how the design of behavioral interventions can help ensure that discrimination and biases are not being reaffirmed in the interventions themselves. Dr. Gonzales responded that multilevel interventions are required to promote a societal environment where ageism is not tolerated, which could be achieved in part through civil rights legislation. Robust institutional responses are also needed to combat ageism; however, Dr.

²¹ Marchiondo, L. A., Gonzales, E., & Williams, L. J. (2019). Trajectories of Perceived Workplace Age Discrimination and Long-Term Associations With Mental, Self-Rated, and Occupational Health. *The journals of gerontology. Series B, Psychological sciences and social sciences*, 74(4), 655–663.

²² Gonzales, E., Lee, Y. J., & Marchiondo, L. A. (2021). Exploring the Consequences of Major Lifetime Discrimination, Neighborhood Conditions, Chronic Work, and Everyday Discrimination on Health and Retirement. *Journal of applied gerontology: the official journal of the Southern Gerontological Society*, 40(2), 121–131.

²³ Gonzales, E., Whetung, C., Lee, Y. J., & Kruchten, R. (2022). Work Demands and Cognitive Health Inequities by Race and Ethnicity: A Scoping Review. *The Gerontologist*, 62(5), e282–e292.

Gonzales noted that employers typically avoid ageism studies and research in community settings is a more advantageous setting for designing effective interventions.

Panelists also discussed stereotypes about older workers, such as the idea that older workers are less productive or more absent than younger counterparts. There are no data demonstrating support for these stereotypes. In fact, a low correlation has been observed between the average age of workers and the financial performance of companies. In addition, studies refute the stereotype that older workers are holding up the advancement of younger ones. To dispel such stereotypes and reduce disparities, Dr. Gonzales recommended intentional intergenerational mentoring.

Moderated Discussion

Moderator: Terrie Moffitt, Ph.D., Duke University

Panelists discussed the implications of the presentations, in which several questions and related discussions emerged: What interventions related to expectations on aging help achieve healthier outcomes in older adults? What are the best ways to combat ageism? How can research be harnessed to reverse harmful stereotypes about aging? And what does healthy aging look like?

Intervention Development

Panelists discussed the need for more intervention development to foster more positive expectations on aging and to improve health outcomes and wellbeing; however, they debated the level (individual, community) at which interventions should be aimed. Some panelists noted that these levels are connected and should thus be targeted together. Panelists agreed that interventions to set people on a path toward healthy older life should begin in midlife.

Interventions for expectations on aging should also be tested and compared to ensure that they are optimized to reduce harm, rather than inadvertently increase it by reinforcing negative biases. Large-scale studies could be implemented to simultaneously test several interventions discussed during the workshop. Such a study could partner with a health system or insurer to utilize large-scale longitudinal data.

Combatting Ageism

Panelists recognized that ageism is pervasive and often not recognized as a problem. One panelist noted that everyone can experience ageism if they are fortunate to live long enough to be considered elderly, and emphasized that it should not be considered more permissible than other types of discrimination.

To help immunize people from the negative effects of ageism that are so commonly experienced, interventions should target individuals who are just entering periods in their lives where negative age stereotypes become relevant and ingrained, which is typically in their 40s and 50s. Educational opportunities extolling the benefits of certain lifestyle factors for healthy aging, such as engagement in physical activity in healthy aging, could help minimize harm from

negative stereotypes about aging-related decline and improve long-term beneficial health outcomes.

Panelists agreed that investigation into mechanisms by which negative age stereotypes impact health at the community level should be studied to produce interventions that can benefit people at larger scales. Studies in diversity, equity, and inclusion (DEI) that investigate the mechanisms of discrimination's manifestations in individuals, small groups, and institutions could be redesigned to specifically study ageism.

Reversing Stereotypes

Panelists noted that the United States culture is youth-centric, but other parts of the world have varying attitudes towards aging. Research in other regions may therefore provide insights on positive aging stereotypes. However, there are some commonly shared negative stereotypes about older adults even in cultural contexts where older adults are expected to be revered. Some meeting participants suggested a growth in such negative attitudes may be due to the sharply increasing populations of older adults in multiple countries. To address the potential harms of these widespread attitudes, Dr. Gonzales recommended application of the parasocial contact hypothesis, which posits that individuals' exposure to people different from them (including in age) can help reduce negative stereotypes.

Panelists discussed whether or not interventions that help immunize individuals from negative expectations about aging might also reduce the prevalence of negative age stereotypes. Some studies suggest that positive stereotypes about wisdom gained from age may be a useful theme in future interventions; however, negative attitudes about and expectations regarding cognitive decline may be difficult to overcome.

Concepts of Healthy Aging

Panelists were concerned about how to define healthy aging, noting that the field is not unified behind any particular theory or terminology. A central tenet of the field is that healthy aging can be conceptually decoupled from disease and disease risk, particularly because illness also results in part from an individual's environment, stress, and discrimination. However, it is difficult to formulate this tenet in a way that completely eliminates any sense of decline from the notion of aging. For example, the goal of healthy aging could be conceptualized as a full life lived in a way that reduces risk of disease, but even this formulation retains some sense of tie between disease and aging.

Final Reflections

Daniel J. Weiss, Ph.D., Director, BBCSS

Dr. Weiss thanked members of the NIA, panelists, and attendees for their participation in the workshop and presentation of relevant and timely research. He observed that expectations on aging will likely feature prominently in the upcoming 2024 presidential election and that further discussion and exploration is clearly warranted by the BBCSS.

Appendix 1. Meeting Agenda

Day 1

- 1:00** **Welcome and Introductions**
Terrie Moffitt, Duke University and Chair, BBCSS
Daniel Weiss, Director, BBCSS
- 1:10** **Introductory Remarks from NIA**
Luke Stoeckel, Program Director, Division of Behavioral and Social Research
- 1:20** **Setting the Stage for the Seminar**
Manfred Diehl, Colorado State University
Sarah Barber, Georgia State University
- 1:30** **Lessons from Recent Research**
Utility of the Within-Person Approach in Generating Novel Insights about Views on Aging and their Implications for Health
Erica O'Brien, Pennsylvania State University
- The Effects of Age-Based Stereotype Threat on Older Adults' Performance Outcomes
Sarah Barber, Georgia State University
- Changing Adults' Negative Views of Aging: A Potential Avenue to Optimize Healthy Aging
Manfred Diehl, Colorado State University
- 2:45** **Break**
- 3:00** **Lessons from Recent Research, Continued**
Psychological Resilience, Stressful Life Events, and Expectations of Aging
Dawn Carr, Florida State University
- Productive Activities as Possible Mechanisms to Brain Health and Cognitive Functioning: A Focus on Inclusion
Ernest Gonzales, New York University
- 3:50** **Moderated Discussion**
Terrie Moffitt, Duke University and Chair, BBCSS
Daniel Weiss, Director, BBCSS

4:45

Wrap-Up

Terrie Moffitt, Duke University and Chair, BBCSS

Daniel Weiss, Director, BBCSS

5:00

Adjourn

Day 2

12:00

Rhythms in Brains and Languages

David Poeppel, New York University

1:45

Adjourn

Appendix 2. List of Participants

Presenters

Sarah Barber, Georgia State University
Dawn Carr, Florida State University
Manfred Diehl, Colorado State University
Ernest Gonzales, New York University
Erica O'Brien, Pennsylvania State University

BBCSS Members

Richard Aslin, Haskins Laboratories
Wilson S. Geisler, University of Texas, Austin
Michele Joy Gelfand, University of Maryland, College Park
Mara Mather, University of Southern California
Terrie Moffit, Duke University and King's College, London
Ulrich Mayr, University of Oregon
Katherine L. Milkman, University of Pennsylvania
Don Operario, Emory University
Elizabeth A. Phelps, Harvard University
Davide E. Poeppel, New York University and the Ernst Struengmann Institute for Neuroscience
Karl W. Reid, Northeastern University
Stacey Sinclair, Princeton University
Mo Wang, University of Florida

National Institute on Aging

Lisbeth Nielsen, Division Director, DBSR
Melissa Gerald, Program Director, DBSR
Lisa Onken, Program Director, DBSR
Dana Plude, Deputy Director, DBSR
Janine Simmons, Branch Chief, DBSR
Luke Stoeckel, Program Director, DBSR
Allie Walker, Analyst, DBSR

BBCSS Staff

Daniel J. Weiss, Director
Alexandra Beatty
Sharon Britt
Molly Checksfield
Jacqueline Cole
Ashton Ray
Dylan Rebstock
Layne Scherer
Emily Vargas

Tina Winters

Rose Li and Associates (Contractor)

Jay Weixelbaum, Science Writer