

Growing Old or Living Long

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Aging. To many people it's wrinkles, retirement communities, and a steady decline in the ability to remember things. But before you reach for the Botox or buy a sports car, you might be interested in research by APS Fellow and Charter Member Laura Carstensen, Stanford University. In her recent lecture, "Growing Old or Living Long: Take Your Pick," this year's Henry and Bryna David Lecture at the National Academies of Sciences, Carstensen presented evidence that the future is not so grim.

Aging is an undeniable issue in today's developed nations. According to Carstensen, "More years were added to average life expectancy in the 20th century than all increases in all other millennia combined." For most of human existence, life expectancy hovered around 27. It increased during the 18th and 19th centuries, hitting about 47 at the turn of the 20th century. During the 20th century, life expectancy almost doubled, reaching 77 at the century's close. This shift has created an entirely new life stage which essentially did not exist 100 years ago. Today, the health of older adults affects almost all aspects of society, from family life to finances and politics. It's time to use what Carstensen describes as our "breathtaking" scientific capacity to create a world in which this new set of older people can thrive.

Most research on aging focuses on and affirms a steady decline in cognitive ability as we get older. (Keep in mind that this decline is a lifelong process; as Carstensen likes to remind her undergraduate students, the slope is just as steep from 20 to 40 as it is from 60 to 80.) Studies have shown that working memory, perceptual speed, comprehension of text and language, and word finding ability do decline with age. But it is important to remember that while these abilities to process new information may be degraded, they are not eliminated. People continue to learn, increasing in expertise and knowledge as they age. It is not just a simple story of decline.

Carstensen's aging research has focused on motivation. Her Socioemotional Selectivity Theory describes how goals change as we age based on two key concepts. First, humans are the only species whose members have a sense of where they are in the life cycle, which they are consciously and subconsciously aware of throughout their lives. Second, we always consider the temporal context when setting goals. If you ran into a friend unexpectedly and only had a few minutes to chat, for example, you would have a different conversation than you would if you were sitting down to an hour-long lunch. Therefore, because we are aware of our position in the life cycle and because our goals are affected by temporal context, our goals will change throughout our lifetime as our temporal context changes.

For young people, the future seems expansive. They tend to seek out new things and new people. Everything is interesting because it could be useful in some unforeseen future situation. For older people, however, the future is more limited. They tend to turn their attention to the present, focusing on relationships with important people already in their lives, rather than new things; they are motivated to pursue emotionally meaningful goals. This difference is supported by experiments in which people are asked to identify their goals or pick from a set of goals. When the experiment constrains the future (e.g. imagine you are about to move across country alone, now choose your goals) both the young and the old

pick more emotional goals. When the future is expanded (your doctor just called about a new treatment that will add 20 years to your life), both groups pick more informational goals.

So why is this important? Because our goals affect cognitive processes. To demonstrate this, Carstensen gave her audience a task: watch a video of students, some wearing black shirts and some wearing white, passing basketballs and count how many times a student in a white shirt passes a basketball to another student in a white shirt. While the viewers busily counted passes, a person in a gorilla suit walks through the basketball-passing students, pausing in the middle of them to thump his chest in typical gorilla fashion. Many people (including a large portion of the lecture audience) are so focused on watching the basketball that they completely miss the gorilla! Clearly, having a goal affects what gets processed.

Similarly, elders' preference for emotionally rewarding goals affects their cognitive processes. Older people are more likely to remember emotional rather than informational slogans and photographs (younger people show no preference). In particular, older people are more likely to remember positive emotional stimulation. But is this a processing issue or a retrieval issue? Is it attention or memory? To find out, Carstensen and her colleagues showed old and young people negative, positive, and neutral images while participants were in a brain scanner. Younger people's amygdala showed higher activity in response to both positive and negative images. Older amygdalas also showed response, but overwhelmingly to positive images. So, the amygdala is working just fine. This phenomenon has something to do with attention.

Do older people intentionally miss negative stimuli? In another study, subjects were briefly shown two images on a computer screen, one always neutral and the other either positive or negative. When the images disappear, a dot appears where one of the images had been. The participant's task is to hit one of two keys on the keyboard to indicate the dot's position. This is a very easy task, but accuracy is not the interesting result, reaction time is. If the participant is already looking at the photo where the dot appears, they will pick the correct location quicker. Older people are slower to respond when the dot is placed behind a negative image. They are choosing not to look at the negative images.

This phenomenon has myriad implications. First, this may help account for the lower rates of psychological problems in older people. If you focus on the positive, you will be a generally happier person. But it's not always good to ignore the negatives. In a recent study in which participants had to decide between two health insurance plans, older adults did not make good decisions when they were encouraged to rely on the information presented. However, they did make good decisions when asked to rely on how they felt. So aging is not simply about decline. Processing changes associated with age are more plastic and malleable than many realize — a source of intrigue for scientists and policy makers, and a comfort to all.

You can watch a webcast of Carstensen's lecture at www.nationalacademies.org.