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Does negative information about aging influence older adults' physical performance and subjective age?

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ABSTRACT

This study investigated the way negative stereotypes influence older adults' physical performance and how old they feel mentally and physically. Sixty-four older adults aged 65 years and older performed different physical tasks using a 3D optoelectronic system under a low or high stereotype threat condition. Self-perceptions of aging were considered as a moderator of the effects of threat. Overall, the effects of threat on physical performance were mostly not significant across tasks. However, threat condition influenced older adults' mental subjective age after they had performed the physical tests; people in the high-threat condition felt closer to their chronological age. Threat also influenced participants' physical subjective age, and this effect was moderated by self-perceptions of aging. More precisely, participants in the high-threat condition felt 7% physically older than their chronological age when they had more negative self-perceptions, while participants in the low-threat condition felt 13% younger. No differences emerged for participants who had more positive self-perceptions. The present findings suggest that performing physical tests under stereotype threat might worsen older people's subjective experience of their own aging by making them feel older.

1. Introduction

In modern industrialized societies, the increasing proportion of older people is associated with an idea of aging focused deeply on decline. Even if older people are perceived as warm by younger individuals, they are often considered as physically and cognitively inept (Cuddy, Fiske, & Glick, 2008). According to Levy (2003, 2009), these negative stereotypes about aging are internalized across the lifespan and become self-relevant as people grow older (i.e., self-perceptions of aging: SPA), which may affect their mental and physical health. In particular, a number of long-term follow-up studies have shown that holding negative SPA at baseline are associated with more physical health problems and an increased-mortality risk over time (for a review, see Westerhof et al., 2014). For example, Sargent-Cox, Anstey, and Luszcz (2012) found that poor SPA were associated with a steep decline of balance, gait speed, and ability to rise from a chair in older adults over a 16-year period.

Not only can SPA affect physical performance, but stereotype threat may also play a role. Stereotype threat appears when people feel a risk of confirming negative stereotypes and, consequently, underperform on stereotype relevant tasks (Steele & Aronson, 1995). Even if older adults are stereotyped as cognitively and physically incompetent (e.g., Hummert, 2011), research on stereotype threat has mostly investigated the effects of stereotype threat on cognitive abilities (for a review, see Lamont, Swift, & Abrams, 2015). To our knowledge, only two studies (Horton, Baker, Pearce, & Deakin, 2010; Swift, Lamont, & Abrams, 2012) examined stereotype threat effects on older adults' motor skills. Swift et al. (2012) found that a measure of handgrip strength and persistence was impaired among older people when they were told that the purpose of the research was to see whether older people performed various tasks differently when compared with young people. On the contrary, Horton et al. (2010) found no effect of stereotype threat (i.e., reading an article confirming decline of memory and physical abilities during aging) on measures of grip strength and flexibility. One possible explanation for this difference may be that while participants' grip strength was measured directly after the manipulation in the first study, there was a delay between the manipulation and the measures of the dependent variables in the second one. Stereotype threat effects are

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more evident when the dependent variables are measured proximally to the manipulation (Lamont et al., 2015).

These mixed findings highlight the need to conduct further research for a better understanding of the effects of stereotype threat on older adults' physical abilities. Indeed, stereotype threat has been shown to induce a prevention focus among older adults, resulting in cognitive performance that is slow and cautious (Barber & Mather, 2013b; Popham & Hess, 2015). Therefore, it would be interesting to investigate whether older adults under threat adopt a more cautious approach to physical tasks resulting in slower execution of these tasks. Moreover, if participants are vigilant and try to control step-by-step their performance to ensure a positive outcome, this could be damaging in tasks (e.g., walking) that rely more on proceduralized strategies (i.e., automatic strategies running with minimum intervention from working memory) (Beilock, Jellison, Rydell, McConnell, & Carr, 2006).

In addition, since stereotype threat and SPA have mostly been studied separately, their joint influence on physical abilities should be further examined. A recent study focusing on memory abilities showed that older people were more vulnerable to stereotype threat if they had more negative SPA (Fernández-Ballesteros, Bustillos, & Huici, 2015). However, the question remains whether such results would be similar in situations assessing physical abilities under stereotype threat.

In parallel to these questions, the effects of stereotype threat on subjective age have been insufficiently studied. Subjective age reflects the numeric age people feel like or view themselves (Stephan, Sutin, & Terracciano, 2015b). Previous studies consistently found that while adolescents and young adults tend to feel older than their chronological age, most middle-aged and older adults report feeling younger than their chronological age by an average of 20% (e.g., Montepare & Lachman, 1989; Rubin & Berntsen, 2006). Despite this trend, subjective age is somewhat malleable and people can deviate from their chronological age in response to experiences situationally and socially associated with a certain normative age (Montepare, 2009). For example, inducing an older subjective age can be achieved by simulating an age-related decline. Older adults who experience visual disfluency during a reading task and who receive no explanation for the blurriness, feel older than participants who are told the text is blurry because of a printing error and those who read clear text (Eibach, Mock, & Courtney, 2010). Situations can also be manipulated to induce a younger subjective age. Older adults who are led to believe that their test performance on a grip-strength task is higher than the performance of 80% of their peers report feeling younger after the test and have better subsequent performance in the same task compared to older adults who perform the same test with no feedback (Stephan, Chalabaev, Kotter-Grühn, & Jaconelli, 2013).

Some results also suggest that age-related stereotypes, which are likely to be activated by cognitive testing, may influence subjective age because there are cues in the environment that remind older adults of the expectation that they are not competent (e.g., one is expected to have memory problems because of aging). This in turn prevents them from maintaining a younger subjective age. For example, it has been shown that older people feel older after performing stereotyped tasks, such as memory tests (Geraci, De Forrest, Hughes, Saenz, & Tirso, 2018; Hughes, Geraci, & De Forrest, 2013). Interestingly, performing a task described as a memory test is sufficient to create a stereotype threat situation (Rahhal, Hasher, & Colcombe, 2001). In line with these results, a recent study showed that when older people are worried about confirming negative stereotypes concerning their memory abilities in a stereotype threat situation, they feel mentally (i.e., cognitive vitality) older (Marquet, Missotten, Dardenne, & Adam, 2017). Extending this logic to physical subjective age, we suggest that the activation of negative age stereotypes about physical performance in a stereotype threat situation may lead older people to feel physically older. Moreover, since there is some evidence that beliefs that age-related memory changes are inevitable predict the subjective aging effect over the course of a testing session (Geraci et al., 2018), the effect of stereotype threat on physical subjective age may also be moderated by SPA. More precisely, this effect may be particularly true for people who perceive more negatively their physical functioning.

Taking into account the previous results, the purpose of the current study was to examine the effects of stereotype threat on older adults' physical performance, measured as objectively as possible, and on their subjective age. Firstly, we hypothesized that older people under high threat would underperform in physical tests. More specifically, we hypothesized that stereotype threat would induce a prevention focus (Barber & Mather, 2013a): older adults exposed to negative age-related information would be more likely to adopt a conservative strategy when performing physical tasks, and this could disrupt their performance. Secondly, we expected that older people in a stereotype threat situation would feel older. Similarly to previous studies (e.g., Marquet et al., 2017; Uotinen, Rantanen, & Suutama, 2005), we included measures of both mental and physical subjective age. We expected a greater influence of stereotypes on physical subjective age, that is, when there was a match between the activated stereotypes and the outcome domain (Kornadt & Rothermund, 2015; Marquet et al., 2017). We also tested whether these effects were moderated by SPA (i.e., perceptions of one's own physical functioning during aging). We hypothesized that stereotype threat effects on physical performance and physical subjective age would be more pronounced among participants with more negative SPA.

2. Materials and methods

2.1. Participants

Based on sample sizes and effect sizes from previous studies (Beilock et al., 2006; Coudin & Alexopoulos, 2010; Hausdorff, Levy, & Wei, 1999; Swift et al., 2012), we recruited seventy-two older people aged 65 years and over. They agreed to participate in our study between April 2015 and February 2016. They were recruited on the basis of data collected during their last appointment in a larger ongoing longitudinal study conducted among community-dwelling elderly subjects (Beaudart et al., 2015). We contacted participants with good global cognitive functioning (i.e., Mini-Mental State Examination score $\geq$24–26, depending on participants' education; Tombaugh & McIntyre, 1992), without walking assistance, who were not diagnosed as sarcopenic in Beaudart et al.' (2015) study (according to the European Working Group on Sarcopenia in Older People; Cruz-Jentoft et al., 2010), and who did not present a risk of falling (i.e., Timed Up and Go test score $<$ 14 s; Podsiadlo & Richardson, 1991, and Tinetti test score $\geq$24 points; Tinetti, 1986).

Eight participants were removed from the analyses: one reported having Parkinson disease, three had missing data on our measure of SPA, and four reported a fall during the past 6 months, which had not been specified earlier. According to G*Power 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007) and given this sample size, the power to detect a medium to large effect size comparable to other studies (Beilock et al., 2006; Swift et al., 2012) in a multiple regression analysis varies between 1 – b = 0.71 and 1 – b = 0.98.

In the end, 29 female and 35 male were included in our analyses. Their age ranged from 65 to 90 years (M = 72.22, SD = 5.37) and on average they had completed 13 years education. Fifty-nine percent were married, 17% were widowed and the remainder were separated (13%) or single (11%).

2.2. Procedure

This study was conducted in two parts described below.

2.2.1. Part 1 – longitudinal study

First, during the last appointment scheduled in the context of the longitudinal study, participants completed different questionnaires and