



## FlashReport

## Age-related decline in executive function predicts better advice-giving in uncomfortable social contexts

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## ABSTRACT

Conventional wisdom suggests that older adults are more likely than young adults to speak their mind. Age-related executive function (EF) decline is believed to underlie this tendency by weakening older adults' capacity to inhibit responses. While age-related EF decline disrupts social and cognitive functioning in many domains, such degeneration may also carry the unforeseen benefit of improving communication in uncomfortable social contexts. We examined the performance of relatively low and high EF older adults and young adults on the socially distressing task of providing critical advice to a troubled obese teenager. Relative to higher EF older adults and younger adults, lower EF older adults were more open, provided more advice, and were seen as more empathic. Moreover, doctors specializing in obesity treatment rated lower EF older adults' advice to the teen as having greater potential for prompting a lifestyle change. Our findings suggest a potential silver lining to age-related cognitive decline.

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## Introduction

Normal human aging is often accompanied by the deterioration of executive functions (EFs; Dempster, 1992)—high-level processes involved in monitoring and controlling responses (e.g., resisting impulses, overriding dominant tendencies; Logan, 1994). EFs have elicited considerable interest among psychologists and neuroscientists, and their decline over time in adults has become increasingly implicated in a host of altogether negative effects, ranging from deficits in memory and attention to impaired decision-making and increased expression of racial bias (Craig & Salthouse, 2000; Stewart, von Hippel, & Radvansky, 2009). It is clear upon closer inspection of such effects that older adults with lower (versus higher) EF perform worse on laboratory tasks that rely on one's capacity to inhibit (e.g., managing intrusive thoughts, learning new rules to familiar tasks, processing relevant and irrelevant information simultaneously; McDowd, Oseas-Kreger, & Filion, 1995). But it is not clear that possessing diminished inhibitory capacity necessitates poorer outcomes, more generally. Indeed, it stands to reason that inhibition is only constructive to the extent that individuals successfully discern those circumstances in which such efforts are adaptive. And when individuals tend to misinterpret the value of inhibition, diminished EF may have the beneficial effect of minimizing the likelihood of acting upon such misguided tendencies.

Based on this interpretation, one domain that may directly benefit from age-related EF decline is that of uncomfortable social exchange. Consider, for instance, the anecdotal experience of witnessing an older adult, seemingly unfazed by the threat of social discomfort, openly address someone's lifestyle or physical appearance when others dare not comment. Despite a general reluctance to express these opinions, such candor can actually be advantageous for furthering a difficult social exchange. In uncomfortable social exchanges such as these, individuals' dominant tendency is often to inhibit their responses and behavior. Yet an emerging body of work suggests that the inclination to suppress in these settings is frequently an ineffective means to eliciting optimal outcomes, and can even be counterproductive. Research has found, for example, that individuals often believe in the curative properties of suppressing discussion of emotionally upsetting events even though these efforts actually predict poorer health outcomes than openly confronting such trauma (Kennedy-Moore & Watson, 1999; Pennebaker, 1997). In a similar vein, other investigations have found that many White individuals seeking to make a positive impression on their interracial interaction partners tend to avoid mention of race, yet doing so actually leads them to appear less friendly than Whites who openly acknowledge race (Apfelbaum, Sommers, & Norton, 2008; Norton, Sommers, Apfelbaum, Pura, & Ariely, 2006). Given the potential for inhibitory efforts to backfire in these difficult social contexts, age-related decline in EF may have the positive effect of encumbering misguided inhibition, allowing for more open and constructive communication. Recent work has documented preliminary evidence for this possibility in young adults: White undergraduates who completed a computer task that temporarily impaired EF before the socially stressful

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experience of discussing diversity with a Black partner communicated more directly and were perceived as less prejudiced by Black observers than Whites who completed a control task (Apfelbaum & Sommers, 2009).

In sum, we explore a potentially important age-related anomaly situated at the intersection of two research literatures—EF decline and communication in uncomfortable social contexts. Given that older adults with naturally occurring age-related EF deficits are less capable of inhibiting responses, they may be particularly adept at communicating in unnerving social situations. Thus, despite being regarded a uniformly maladaptive effect across myriad studies and measures, we expect moderate EF decline to engender positive outcomes in this domain. To test this hypothesis, we examined the performance of relatively low and high EF older adults and young adults on a socially distressing advice-giving task in which an obese teenager seeks guidance.<sup>1</sup>

## Method

### Participants

Nineteen young adults (mean age = 19.26 years,  $SD = 1.10$ ; 12 female) and 32 older adults (mean age = 72.53 years,  $SD = 6.10$ ; 26 female) were recruited from the same communities in the Boston metropolitan area. Young adults were undergraduates recruited via campus announcements; older adults were recruited via e-mail and newspaper advertisements. Older adults possessed similar levels of education to one another, and in a preliminary health screening, none reported medical conditions (e.g., diabetes, history of stroke or heart attacks) that could independently influence EF.

### Measures and design

Older participants completed five diagnostic measures to assess EF: Wisconsin Card Sorting Task, FAS word fluency, WAIS-R mental arithmetic, WMS-R mental control, and WMS-R backward digit span (Glisky, Polster, & Routhieaux, 1995).<sup>2</sup> No participants exhibited extensive EF deficits, but the measures captured considerable variability in EF decline within the scope of normal functioning. Performance on each measure was z-scored across participants. Scores associated with each measure were then weighted according to Glisky et al. (1995), before being averaged across measures to produce one global executive function value per participant. We conducted a median split to allow for direct comparisons between three experimental groups of interest: lower EF older adults, higher EF older adults, and young adults. Consistent with previous investigations, young adults were considered to possess relatively high EF by virtue of selective admission standards at the university from which they were sampled (e.g., Salthouse & Miles, 2002; Uekermann, Channon, & Daum, 2006).

### Procedure

Participants arrived at the laboratory for a study exploring cognition and decision-making over the lifespan. Upon receipt of consent, an experimenter administered the series of tasks described above to older participants, left the room, and gave them an opportunity to rest. Shortly after, the experimenter spontaneously reentered with news of an immediate study opportunity, occurring in a nearby location, for which participants could receive additional

payment. All participants in the first study indicated their willingness to complete the impromptu second study.

A different experimenter<sup>3</sup>—blind to hypothesis and condition—led participants to a separate laboratory located on a different floor. The experimenter described the study as a “community-based interview initiative to counsel struggling teenagers.” The ostensible aim of the initiative was to gather advice regarding issues previously submitted by teenagers with the intention of forwarding this feedback to the actual teens in question. The experimenter asked participants to randomly select one of several folders to carefully review, unaware that each folder contained the same document displaying a photograph of a visibly obese female and a description of her daily struggles with lack of energy, abnormal sleep patterns, decreased social engagement, and lack of interest in school—symptoms often associated with childhood obesity. The correspondence concluded with a plea for assistance (e.g., “Why is this happening to me?”).

Once participants indicated that they were prepared to begin the interview, they were seated in a chair that opposed the experimenter and a videocamera, further bolstering the impression that their responses were identifiable and of real import to the teenager in question. The experimenter asked two questions: “What do you think may be causing her to feel and behave this way?” and “What advice would you offer her to improve her situation?” Following each question, participants were allowed to respond without interruption and responses were videorecorded. Participants then completed a brief questionnaire regarding the interview. Finally, the experimenter administered a funneled suspicion check before debriefing and thanking participants. No participants correctly guessed the study's hypotheses, suspected the two experimental tasks were related, doubted the authenticity of the target or the interview initiative.

## Results

### Overview of analyses

We first performed one-way analyses of variance on each dependent measure to facilitate direct comparisons among low EF older adults, high EF older adults, and young adults. We then conducted regression-based analyses targeted at older adults, treating EF as a continuous predictor, to more closely examine the relationship between variable EF decline and our outcomes measures.

### Mention of weight

We began by investigating group differences in participants' diagnosis of the teen. We coded whether or not participants explicitly referenced weight (i.e., using terms such as “heavy,” “obese,” or “overweight”) as a potential source of her troubles. As Fig. 1 displays, weight was identified at a similarly modest frequency among young adults (32%) and higher EF older adults (44%), but was implicated a full 80% of the time by lower EF older adults,  $\chi^2(2) = 8.23$ ,  $p < .02$ ,  $\phi = .41$ —nearly double the rate exhibited by their higher EF older counterparts,  $\chi^2(1) = 4.29$ ,  $p < .04$ ,  $\phi = .37$ . Closer inspection of older adults using logistic regression confirmed that declining levels of EF predicted greater likelihood of mentioning weight,  $B = -2.68$ ,  $SE = 1.42$ ,  $p = .058$ .

### Nature of advice

Preliminary analyses of the advice participants offered to the teen revealed that the sheer number of pieces of advice communicated by

<sup>1</sup> In general, young adults possess relatively high EF with considerably less variability than older adults, thus we did not include a sample of lower EF young adults.

<sup>2</sup> One participant did not complete these measures.

<sup>3</sup> One of three different experimenters was employed. No differences emerged among experimenters on any dependent measures.

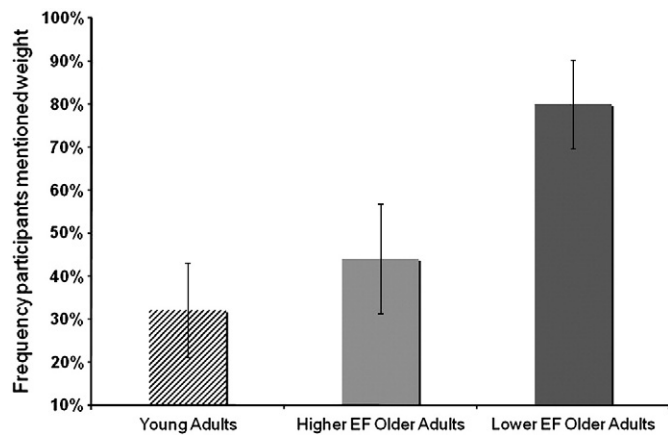


Fig. 1. Frequency with which young adults, higher EF older adults, and lower EF older adults mentioned weight as a possible source of the teen's struggles. Error bars represent standard error.

lower EF older adults ( $M=3.87$ ,  $SD=2.32$ ) surpassed that of both young adults ( $M=2.37$ ,  $SD=1.61$ ) and higher EF older adults ( $M=2.25$ ,  $SD=1.44$ ),  $F(2, 47)=3.90$ ,  $p<.03$ ,  $r=.28$ . The conclusion that EF underlies such effects was strengthened by subsequent analyses indicating, that as older adults' EF scores decreased, the quantity of advice they provided increased,  $r(31)=-.36$ ,  $p<.05$ .

Interestingly, further investigation illustrated that lower EF older adults were not only generating more advice—they were also viewed as more empathic advisors. Two naïve coders' ratings (intraclass reliability coefficient = .69) on a 7-point response scale (1 = *not at all*, 4 = *neutral*, 7 = *very much*) of the extent to which participants "displayed empathy" and "seemed approachable" ( $\alpha=.85$ ) were averaged. In a similar pattern, the advice offered by lower EF older adults ( $M=4.53$ ,  $SD=1.03$ ) was viewed as more empathic than the advice provided by young adults ( $M=3.62$ ,  $SD=.94$ ) and higher EF older adults ( $M=3.60$ ,  $SD=1.03$ ),  $F(2, 47)=4.47$ ,  $p<.02$ ,  $r=.30$ . Consistent with such interpretation, a significant negative relationship emerged between older adults' EF values and ratings of empathy,  $r(31)=-.37$ ,  $p=.04$ .<sup>4</sup>

#### Subjective experience of advice-giving

Next, we examined participants' self-reports to explore the possibility that the beneficial effects of moderate EF decline also carried over to participants' subjective experience during the advice-giving task. Indeed, lower EF older adults ( $M=7.73$ ,  $SD=1.33$ ) reported feeling significantly more comfortable than did young adults ( $M=5.79$ ,  $SD=1.51$ ) and higher EF older adults ( $M=5.94$ ,  $SD=2.21$ ),  $F(2, 47)=6.28$ ,  $p<.005$ ,  $r=.34$ . For older adults, declining levels of EF predicted greater comfort with navigating the interview task,  $r(31)=-.39$ ,  $p=.03$ .

Further analyses revealed no differences in participants' concern about responding inappropriately, in the perceived seriousness of the teen's condition, or in the perceived importance of obesity at the societal level,  $F_s<1.19$ . Such null effects are noteworthy insofar as they are inconsistent with an alternative, motivation-based account of our results—that low EF older adults were less bothered by self-presentational concerns or less driven to offer assistance than other participants. In short, at least in the context of the present study, there

<sup>4</sup> It is worth noting that the relationship between EF decline and perceived empathy may be somewhat more complex. Namely, the emergence of an age-related "positivity effect," characterized by decreased focus on negative emotions through adulthood (e.g., Mather & Carstensen, 2005), may partially explain why low EF adults' advice was both uninhibited and empathic.

is no evidence to suggest that decreases in EF are accompanied by decreases in motivation.

#### Impact of advice

Finally, we sought to gauge the real world impact of participants' advice to the teen. To do so, we recruited two doctors from an internationally recognized university medical center for obesity research and treatment. Blind to hypothesis and condition, these doctors received the same stimulus provided to participants. The doctors were then asked to rate the likelihood that participants' advice would prompt a change in the teen's lifestyle, using the same 7-point response scale described above (intraclass reliability = .66). As Fig. 2 displays, lower EF older adults' advice was considered to have significantly greater potential for inducing real change than the advice of young adults and higher EF older adults,  $F(2, 47)=3.53$ ,  $p<.04$ ,  $r=.26$ . Notably, as EF levels decreased among older adults, doctors' impression that their advice would inspire a lifestyle change increased,  $r(31)=-.34$ ,  $p=.06$ , bolstering the conclusion that EF decline was adaptive in this context.

#### Discussion

Across dependent measures and analytic approaches, age-related EF decline consistently predicted positive outcomes, underscored by increased quantity and quality of communication in this uncomfortable social context. Such findings lend considerable support to the contention that EF plays a central role in these processes. Further, the similar pattern of results among young adults and higher EF older adults suggests our findings are unlikely to reflect a generational difference in communication whereby all older adults tend to reference outdated social conventions. Rather, it was only those older adults with relatively impoverished EF who displayed a more open and authentic manner of communicating in this stressful social context. And these older adults with low EF were just as motivated to help and driven by self-presentational concerns as the other participants.

Noteworthy as well, the advice generated by lower EF older adults not only differed in style, but blind evaluations by obesity doctors indicated that it was more constructive than the advice generated by participants with superior cognitive capacity. While EF declines impair social and cognitive functioning in many domains, these results suggest that moderate forms of such degeneration can have socially adaptive effects in uncomfortable social contexts. Future research in which these effects are examined alongside a sample of lower EF young adults may offer additional support to this interpretation.

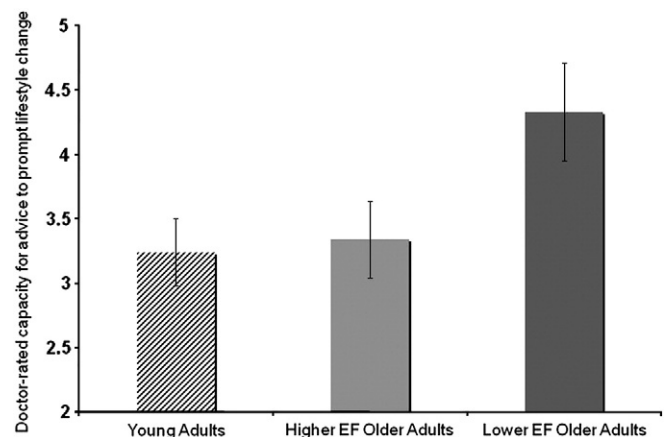


Fig. 2. Obesity doctors' ratings of the likelihood that the advice provided by young adults, higher EF older adults, and lower EF older adults would prompt a lifestyle change in the teen. Error bars represent standard error.

In closing, though not an intended focus of our investigation, our findings call attention to a striking practical observation: while young adults and higher EF older adults both recognize the teen is obese and that obesity poses a serious health threat to its bearers, they tend not to vocalize their concerns. That most individuals resisted offering straightforward advice even when faced with an explicit plea for help raises basic questions, beyond the scope of this paper, as to precisely what is needed to stimulate honest dialogue in the face of an epidemic labeled the biggest contemporary threat to U.S. public health (American Medical Association, 2009).

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