Attentional allocation strategies while processing syntactically challenging sentences: The influence of self-efficacy

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University Abstract: Cognitive effort expended for sentence comprehension and self-efficacy were examined. The auditory moving window paradigm, principally developed for on-line language comprehension, enabled assessment of strategy use by syntactic complexity. High self-efficacy individuals strategically allocated more time for comprehension, particularly at important linguistic clause boundaries, and under the most challenging conditions. The present study examined the relationship between the amounts of cognitive effort expended in a sentence comprehension task and perceived self-efficacy, particularly when sentences were syntactically complex. Since Bandura defined self-efficacy in 1982, it has been a factor associated with numerous domains and protection of cognitive abilities. Furthermore, processing declines, such as deficits in working memory, speed, and comprehending language have been associated with aging, but this has not been uniform. Some older adults continue to fare better than others. Few studies, however, have examined whether self-efficacy may be a protective factor, particularly for the comprehension of speech, as we age and may experience other declines. Participants were healthy older adult volunteers, aged 65-90 years old (M = 74, SD = 4.25). Using the auditory moving window (AMW) paradigm, expressly developed to assess on-line spoken language comprehension, this study examined cognitive effort for two levels of syntactically complex sentences, which differed in demands on resources. Each participant heard 48 sentences, blocked into 6 segments. They were instructed to self-pace by pressing the computer keyboard space bar, and also to receive a true/false comprehension probe. The sentences differed by having either a subject-relative or object-relative center embedded clause. The latter is a much more difficult type of sentence to process and requires more working memory resources. Individuals were also tested with a cognitive battery and an assessment of perceived efficacy. We found that individuals with high vs. lower self-efficacy strategically allocated more time, particularly at linguistic clause boundaries, in order to fully understand the meaning of the sentences. This was especially true for object-relative sentences. Thus, higher self-efficacy was related to effective strategy use and cognitive effort, particularly under the most challenging conditions. The present study adds to the understanding of influence of beliefs on real-world consequences for language comprehension. Psychosocial variables such as self-efficacy are also important factors in that they are modifiable, thus, it is never too late to invest in personal strategies that may protect complex cognitive processes.
Effortful processing of spoken sentences in younger and older adults: Effects of age and hearing

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In previous work we have demonstrated how the increased perceptual effort required for older listeners with poor hearing to process spoken language can impair memory for speech, even when listeners can demonstrate that they are able to hear (and repeat back) speech at the same sound intensity (Wingfield, Tun, & McCoy, 2005). This study investigates whether low sound levels might produce a similar effect of effortfulness in listeners with good hearing, as well as those with poor hearing. Specifically, we asked whether the greater perceptual effort required to process spoken sentences heard at low sound levels would be reflected downstream in speed of comprehension. Moreover, we examined whether decreased sound level would produce greater effects in comprehension of syntactically complex sentences as compared to syntactically simpler sentences. Younger and older adults with good hearing, and older adults with poor hearing gave speeded responses to comprehension questions about simpler and more complex sentences. Spoken sentences were presented at four listening levels that were determined based on each individual’s audiometric threshold. Results showed that response accuracy and latency were sensitive to both sound level and syntactic complexity, and varied as a function of age and hearing. Our findings demonstrate the dynamic interplay between sensory function and language processing abilities across adulthood.
Age and hearing loss modulates the extraction of main ideas from spoken discourse

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A group of younger and older adults with good hearing and a group of older adults with mild-to-moderate hearing loss were tested for recall of narratives. The narratives were heard without interruption or in a self-paced condition. The poor hearing older adult group recalled significantly fewer main ideas than the better hearing older adult group while listening to the passages without interruption. In addition, the poor hearing older adult group was aided by intermittent pauses in the speech. Results were taken as support for an “effortfulness hypothesis”: the notion that the extra effort that a hearing-impaired listener must expend to achieve perceptual success comes at the cost of processing resources that might otherwise be available for encoding the speech content in memory.
Older adults’ reactivity to facial masking when forming first impressions of individuals with Parkinson’s Disease

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Difficulties with communication and social interaction are common complaints among individuals with Parkinson’s disease (PD). Facial masking, diminished ability to express oneself facially, may contribute to difficulties by leading perceivers to form overly negative impressions of individuals with higher facial masking, which could threaten quality of life. We used repeated measures ANOVAs to examine the reactivity of 55 older adults' first impressions to facial masking in men and women with PD. Accuracy for impressions of how supportive and straining perceivers believed targets to be was the focus because these impressions could affect social relationships, which are important for both physical and psychological health. As predicted, older adults formed more accurate impressions of strain when judging lower masking individuals with PD (F(1,51)=7.90, p<.01); in addition, men's impressions of supportiveness for higher masking individuals were less accurate than women's (F(1,53)=4.14, p<.05). Older adults of both sexes formed more accurate impressions of support and strain for men with PD than women (p’s<.10). Therefore, higher masking may interfere with non-verbal social cues in PD. Additionally, the usual advantage of women over men in non-verbal expression was reversed for individuals with facial masking due to PD; however, the usual advantage of women over men in interpreting non-verbal behavior was retained when older adults judged individuals with higher masking.
Are preferences in emotional processing affected by distraction? Examining the age-related positivity effect in visual fixation within a dual-task paradigm

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Recent research has suggested that age-related positivity effects are eliminated under conditions of dual-task load (Knight et al., 2007; Mather & Knight, 2005), because the cognitive control resources necessary to enact such preferences are not available when individuals are distracted by competing information. We further examined how older adults’ emotional information processing preferences are affected by distracting information by utilizing a within-subjects dual-task measure. Younger and older adults viewed a series of positive, negative, and neutral images both in conditions of full and divided attention. Fixation preferences to valenced images were assessed through eye tracking. Regardless of whether images were viewed in full or divided attention conditions, older adults demonstrated a preference in their fixation for positive and neutral in comparison to negative images. These results provide evidence that older adults’ positive fixation preferences may not always necessitate full, cognitive control.
Age differences in attention in the decision making process

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Previous studies have associated the aging process with a heuristic decision making pattern. However, it is not clear if this age-related shift in decision making patterns is also reflected in processes of selective attention to the decision-relevant information. This study directly examined what type of information (heuristic cues vs. factual information) young and older adults look at while they respond to decision making questions. Eye tracking was used to record participants’ visual fixation to decision stimuli, and self-reports of their attentional patterns were also examined. Fixation data revealed that older adults (M = -0.10, SD = 0.16) looked more at the factual information compared with their younger counterparts (M = 0.05, SD = 0.11), t(48) = 3.82, p < .01, d = 1.09. Self-report measures indicated that both young and older adults reported they looked more at the factual information than the heuristic cues, suggesting that older adults were more accurate at reporting their own attentional patterns in the decision making process. The results suggest that older adults do not necessarily rely more on heuristic cues as they gather information and make decisions.
Age-Related differences in profiles of mood change trajectories

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Young and older adults reported their moods repeatedly while viewing emotional and neutral faces. Cluster analysis revealed four subgroups of mood change trajectories. The most positive and the most negative subgroups both included more older than younger adults, suggesting that not all older adults are better regulators than young adults. If you need a longer abstract, see summary below: As a group, older adults often display better emotion regulation skills than young adults (e.g., Blanchard-Fields, 2007; Gross et al., 1997). The extent to which there are subgroups of older adults who are less effective than others is less well known. The aim of the present study was to identify and characterize different subgroups of adults who exhibit distinct trajectories of mood change across a relatively short time period. Seventy-nine young adults and 103 older adults were induced into one of three moods: positive, negative, or neutral. In the 25 minutes following the mood induction, participants rated their mood on a potentiometer about every two minutes while viewing pairs of emotional and neutral faces. A cluster analysis conducted on the 14 mood ratings suggested four distinct subgroups of mood change trajectories: two groups regressed toward the mean over time, one group became more positive, and one group became more negative. Consistent with past work, the most positive group consisted of more older adults than young adults, suggesting that more older adults were able to regulate themselves into a positive mood than young adults. However, the most negative group also consisted of more older adults than young adults. Interestingly, it appears that the young adults were less varied in their trajectory of mood change; most exhibited a pattern of regressing toward the mean. Thus, there is a subgroup of older (and younger) adults who report continuous negative moods. Multivariate analyses of variance revealed that this negative group exhibited slower processing speed, more state anxiety, and looked less at happy faces, compared to neutral faces, than other groups, ps < .05. Thus, participants who were able to regulate their mood to either a neutral or positive state were more likely to look at happy faces than participants who maintained a negative mood state, suggesting that successful mood regulators were more likely to utilize their gaze as a regulatory tool than those who did not positively regulate their moods. In addition, the characteristics of the negative group, although correlational, suggest that some adults may be hindered by fewer resources (e.g., slower processing speed) to devote toward regulating their emotions, and affective barriers such as greater anxiety, that may render the task more difficult. It may be that participants in the negative group would regulate their moods if given more time, or if more motivated to do so. In addition, individuals may differ in the types of emotion regulation strategies they rely upon. Thus, in a study designed to capture gaze as a regulatory tool, individuals who use other regulatory strategies may not have the opportunity to engage in regulatory processes. Overall, the results suggest that some older adults do experience negative emotions, even more so than young adults. The results are discussed from an adult developmental perspective, focusing on the increased variability of mood trajectories in the older adults and whether this is a reflection of adaptive functioning, differences in the temporal processes related to mood regulation, or a potential indicator of dysfunction.
Stabilization of dimeric Uch-L1 as a therapeutic for Parkinson's Disease. The mammalian neuronal protein Uch-L1 is unique in that a natural variant, Uch-L1 S18Y, has demonstrated neuroprotective effects in models of Parkinson's, Huntington's, and Alzheimer's Diseases

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The functions of Uch-L1 in normal neurons, in neuroprotection, and in neurodegeneration are unknown. In an effort to determine the function of wild-type Uch-L1, we performed affinity chromatography using neuronal cell lysates to trap Uch-L1 interacting proteins. Edman degradation and mass spectrometry were used to identify two of these proteins as monoubiquitin and hemoglobin. Protein stability assays confirm that binding of monoubiquitin increases the melting temperature of Uch-L1, suggesting formation of a strong interaction. Structural studies of Uch-L1 show that the wild-type protein crystallizes in a monomeric form, while the neuroprotective S18Y variant forms a physiologically relevant dimer. We hypothesize that this dimeric protein form represents the neuroprotective species. We have employed computational screening to discover drug-like small molecules that are expected to stabilize the dimer interface. In vitro tests of the stabilizing effects of these compounds on Uch-L1 are currently underway. We anticipate that compounds demonstrating consistent stabilizing effects could be developed into one or more lead compounds for oral therapeutics capable of preventing or reversing the effects of neurodegeneration.
Inhibiting protein aggregation as a therapeutic strategy for Parkinson Disease

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A point mutation in the α-synuclein gene was the first discovery linking genetics to pathogenesis of Parkinson’s disease (PD). Subsequently, other mutations and multiplications of the α-synuclein gene have been identified in familial PD. A pathological hallmark of PD is the presence of toxic aggregated proteinaceous inclusions called Lewy bodies (LB) in the brain of PD patients. The major component of LB is α-synuclein, both full-length and truncated forms. The truncated forms were long thought as artifact introduced by postpathogenic or postmortem processes. Recently, in vitro data showed that C-terminus truncated forms of α-synuclein aggregated more readily than the full-length counterparts and suggested that the C-terminus of α-synuclein has a regulatory role in preventing aggregation. In vivo data showed that the amount of LB found in postmortem brain correlates with the amount of C-terminus truncated forms of α-synuclein; furthermore, these truncated forms are shown to readily aggregate and promotes the aggregation of full-length α-synuclein. Taken together, this suggests that truncation of α-synuclein leads to aggregation and this may contribute to PD pathogenesis.

Therefore, inhibiting the process of α-synuclein fragmentation may prevent or reduce aggregation and reduce toxicity to neurons; thus, a potential therapeutic strategy for PD. Our plans are simple and clear; a) seek out the protease(s) that cleaves α-synuclein into the aggregation-promoting fragments and screen/design compounds to specifically modulate its activity, b) to keep full-length α-synuclein in it’s biological and non-toxic state by chemical chaperones that bind that stabilize the protein.
Eating and arguing: The sisterhood and serious sociability

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Georg Simmel wrote that sociability is the “play form of real life. “freed of substance” (1949: 255). Yet, Simmel understood that sociability is a symbolic form of real life, and it can become “entangled with real life” (258). Simmel continues, “...The social game has a deeper double meaning -- that it is played not only in a society as its outward bearer but that with the society actually ‘society’ is played” (258). On one hand, Simmel’s identification of this double role of sociability – a form of play simultaneously derived from and mimicking the conventions of society – offers an instructive model when exploring the some older Jewish women’s argumentative style of sociability. But, on the other hand, Simmel seems to view sociability, like play and art, as somehow removed from “real life,” a non-serious antidote to the pressures of modern living. Deborah Schiffrin, in her work with urban Jewish adults and argument as a form of sociability, concurs with Simmel that while argument can be a sign of closeness (1984: 329), and a culturally normative form of sociability (332), the substance of the interactions cannot be serious if the arguments are deemed forms of sociability (331).

I propose, however, that contentious, chaotic interactions while socializing among some older Jewish American women, are, in fact, critical, life-sustaining, and gendered strategies deployed by women to protect tenuous Jewish American female identities and to counter loss through the cultural re-production of familiar forms of social connection. Further, I suggest that arguments about food and money, two areas of great concern to older, Jewish American women who are health conscious and living on fixed incomes, act as both symbolic and material means to enhance personal self-esteem and to produce value, individually and collectively.
Cognitive and physical activity attenuate age and education differences in executive functioning

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There is robust evidence for aging-related declines in cognitive functioning especially for the domains of working memory, processing speed, and attention switching. Nevertheless, there is wide variability in the patterns and rates of change. We examined whether those who have low education but engage in cognitively stimulating activities would show benefits for their executive functioning. Using the Midlife in the United States (MIDUS) survey, we investigated the role of both physical and cognitive activity in relation to performance on an attention switching task, the Stop and Go Switch Task (SGST), and a broad composite measure of cognitive mechanics, the Brief Test of Adult Cognition by Telephone (BTACT). The sample included 2,876 adults (54.5% women) ranging from 32 to 84 with average education of 14.42 years. We assessed cognitively stimulating activity by asking participants how often they read, did word games, played cards or other games, attended lectures, wrote, and used the computer using a 6-point scale ranging from ‘Never’ to ‘Daily.’ Physical activity was operationalized as the frequency of vigorous or moderate physical exercise: either on the job, at home, or for leisure in winter and summer months, using a 6-point scale ranging from ‘Never’ to ‘Several times a week.’ As predicted, cognitive functioning was negatively related to age and positively related to educational level, and to frequency of engaging in vigorous physical exercise and cognitively stimulating activities. Using multiple regressions, with health and sex as covariates, we entered age, education, physical activity, cognitive activity, and all interactions among the predictors. We found significant interactions showing evidence for moderation of age and education effects. Physical exercise was not related to latencies for attentional switching for young adults, but among middle-aged and older adults those who engaged more frequently in vigorous exercise showed faster reaction times. A three way interaction of physical exercise, cognitive activity, and education showed those with low education levels who also frequently engaged in cognitive activity showed faster switch latencies similar to those with high education. The quickest reaction times were found for those with high education, high cognitive activity, and high physical activity. For the composite measure of cognitive mechanics, the effects of age, education, and activity were significant, but there were no significant interactions. Thus, the benefits of physical exercise and cognitively challenging activities were consistent across all age and education levels. This research has implications for understanding the role of modifiable behavioral factors for enhancing cognitive aging and reducing educational disparities.
Beliefs about memory in a national sample: Who is accurate about their abilities?

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Studies have shown that subjective evaluations of memory are often inaccurate. We were interested in identifying factors that contribute to individual differences in accuracy regarding memory abilities. We used data from the second wave of the Midlife in the United States (MIDUS) survey, with 3,352 participants between 32 and 84 years of age. Consistent with past work we found a low correlation (r = .11) between ratings of perceived memory ability and actual memory performance on a word list. We examined subjective views of memory, which were rated in comparison to others one’s age, in relation to actual episodic memory performance relative to others in the same age group. On this basis, we formed four groups: underestimation (18.85%), low-accurate (people who are accurate while performing poorly- 25.24%), high-accurate (people who are accurate while performing well- 28.16%) and overestimation (27.74%). Analyses revealed that the four groups correspond to different socio-demographic profiles. We also investigated what factors differentiated these groups using multivariate general linear models including cognitive performance, the Big Five personality traits, subjective and objective health, sense of control, perceived age, perceived stability of memory, negative affect, depression, stress reactivity, and life satisfaction, while controlling for age, level of education, and gender. Low-accurate and high-accurate appear to be two different profiles in terms of affective, cognitive and socio-cognitive functioning. Low-accurate seems to be the most psychologically vulnerable group, followed by the group that underestimates their good memory performance.
Personality change & cognitive functioning: The stable are more able

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The literature provides compelling evidence for the stability of personality in adulthood, yet there is some evidence for mean level changes. The current study examined individual differences in stability and change in personality over 9-10 years and examined whether personality changes were associated with cognitive functioning. The Midlife in the United States Study (MIDUS) consists of a sample of 4974 young, middle aged and older adults given a series of interviews and questionnaires in 1994-1995 (Time 1) and 2004-2005 (Time2). At Time 1 participants completed the MIDI personality questionnaire, which was reassessed at Time 2 along with a cognitive battery consisting of reasoning (number series), short term memory (WAIS Backward Digit Span), episodic memory (Rey Auditory-Verbal Learning Test), verbal fluency (category fluency), and speed of processing (backwards counting & complex reaction time). Multiple Regression revealed personality at time 2: neuroticism (-), openness (+) and conscientiousness (+), to be a significant predictor of several cognitive domains, including reasoning, short term memory, episodic memory, verbal fluency, and speed of processing. Three personality change groups were created (decrease, stable, increase), and ANOVAs revealed significant main effects of personality change groups and interactions with age for reaction time. Across age, those remaining stable in conscientiousness, openness and neuroticism had better cognitive performance than those who changed on those traits. Although, older adults who increased in extraversion had better performance than those who remained stable. Personality stability is discussed as a protective factor for cognitive functioning in later life.
Waking up ready to go: Individual differences in the cortisol awakening response

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The cortisol awakening response (CAR) is a surge in cortisol after waking, which lasts for about 30 minutes. Previous research suggests that a large CAR is an indicator of a healthy transition from sleep to daily activity. Past work has also suggested that the CAR may be larger on days when important events are anticipated, as compared with other days, and may be related to anticipation of upcoming events of the day. We were interested in whether CAR would vary across two days, one of which involved a challenging interview and cognitive testing. We also examined whether there are personality differences in CAR. A subsample from the Boston Longitudinal Study (n=59) supplied self-collected salivary cortisol samples upon waking the day of and the day before an anticipated cognitive testing session. Although the average CAR level did not vary across days, we found individual differences made a difference on the testing day. Personality traits (neuroticism, openness, and agreeableness, and achievement motivation), assessed 9 months earlier, were found to be related to the magnitude of CAR on the day of anticipated cognitive testing, but not on the day before, when no testing was expected. Results support the anticipation effect of CAR, and highlight the importance of examining individual differences in this response.
The view from here: A comparison of frontline worker and manager perceptions of nursing home safety culture

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Nursing home quality and safety has been a cause for concern for over three decades. It is estimated that medication errors occur in nearly one in five medication doses in nursing homes. A recent trend in healthcare quality and safety improvement is to learn from high-reliability organizations (HROs), or those with complex processes and high risk for failure but very low error rates. A common feature of HROs is that these organizations have a culture that prioritizes and supports proactive safety. Nursing home researchers and administrators have begun to examine the extent to which long term care facilities support safety and identify weaknesses in their cultures in order to improve quality of care. Because the majority of nursing home resident care is delivered by an entry level workforce, the buy-in of these workers to a culture of safety is critical. Using exploratory survey data collected from eight nursing homes in Massachusetts, this analysis examines the extent to which the frontline workforce perceives a culture of safety in their organizations. This study also compares the frontline workers and managers opinions about safety culture in order to understand how perceptions of culture differ across organizational hierarchy.
Living longer on less in Massachusetts: The new economic (in) security of seniors

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Despite the growth of social insurance programs for seniors in the past century, more recent fundamental changes in the lives of older Americans, such as increasing longevity, weakening of pension incomes, and dramatically rising expenses for healthcare and housing make it more difficult for seniors to enter retirement with financial security and remain economically stable throughout retirement. This poster is based on the recent IASP report: Living Longer on Less in Massachusetts: The New Economic (In) Security of Seniors which assesses how the social contract is holding up into the Twenty-First Century for seniors residing in Massachusetts. To measure the long-term financial stability of senior households in the Commonwealth throughout their retirement years, we created a measure that encompasses the fundamental components that frame financial stability for older Americans. The key factors incorporated in the measure are Housing Costs, Healthcare Expenses, Household Budget, Home Equity, and Household Assets. Using the Survey of Income and Program Participation (SIPP), our findings suggest that 68 percent of all Massachusetts senior households are financially vulnerable. That is, close to seven in ten senior households do not have sufficient economic security to sustain them throughout their lives. This risk is especially pronounced for single senior households – with 82 percent among them facing financial insecurity. To address these challenges for seniors, the poster will present several policy recommendations that could enhance the ability of Massachusetts households at different life stages to prepare for long-term financial stability and retirement.
Older adults’ response to negative mood induction: An examination of individual differences

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In the current study, 36 older adults (age 58 to 82 years, M = 72 years) were induced into a negative mood using the Eich Mood Induction Technique. In this technique, participants listened to music that had previously shown to reliably induce negative moods while encouraged to think mood-congruent thoughts. Approximately 3 min after the mood induction, participants were asked to rate their moods again using an analog slider which measured mood on a scale of 0 to 100. When moving the slider to indicate their current mood 17 participants rated themselves as being either in a neutral (slider ratings of 50-69) or positive (ratings of 70-100) affective state, while 19 still reported their mood as negative (ratings of 10-49). In the current study, we examined the personality characteristics and affective traits of those who successfully regulated out of their induced negative mood. Prior to the mood induction procedure, participants had completed self-report ratings of state and trait anxiety, depressive symptoms, and levels of optimism and neuroticism. We found that successful mood regulators, those had rapidly regulated out of the negative mood, had both significantly lower trait anxiety (p < .05) and higher levels of optimism (p < .01) as compared to non-regulators, as well as trends towards fewer depressive symptoms (p = .06) and less neuroticism (p = .07). These results highlight the importance of taking into account individual differences in personality and affective traits when examining older adults’ ability to regulate their mood state in real-time.