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Disconfirmation of Person Expectations by Older and Younger Adults: Implications for Social Vigilance

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The research examined whether age-related cognitive declines affect performance when people form impressions of others. The results from Experiment 1 showed that young and old participants who held positive expectancies about an individual spent more time processing and had better memory for information that was inconsistent rather than consistent with their expectancies. But participants who held negative expectancies tended to focus on information that was consistent rather than inconsistent with their expectancies. In Experiment 2 the task was made more demanding by limiting the amount of time participants had to form their impressions. Under these conditions, older participants who had positive expectations showed deficits in memory for negative information compared with young participants. As expected, both groups performed similarly when they held negative expectancies for the target. The results suggest that although both older and younger adults process social information similarly under self-paced conditions, older adults may be at a disadvantage processing negative information about positively characterized individuals when the context in which impression formation occurs is cognitively demanding.

IT seems that with alarming frequency stories appear in the newspapers and the news programs reporting that an elderly person has fallen victim to a con man promising them excellent investment opportunities or convincing them to sink money into an unneeded home improvement or medical treatment that is quackery. Indeed, it has been suggested that older adults are more susceptible to frauds and confidence games than younger adults are (Cox, 2001). These disturbing reports suggest that there may be social and cognitive factors that make older adults easy to exploit and prey upon for would-be crooks.

In this research, we focus on the manner in which older and younger adults process information about others thought to be moral or immoral to understand potential factors that might contribute to the exploitation of older adults. In doing so, we integrate basic mechanisms of cognitive aging with recent research in social cognition.

A noncontroversial premise of the present research is that there are cognitive resource declines as a person grows older, although general knowledge tends to remain stable (see Park, 2000, for a review). As people grow older, their general ability to process information is reduced (Craik & Byrd, 1982), and they experience declines in speed of processing and working memory (for a review see Park, 2000). *Speed of processing* refers to how rapidly people perform mental operations (Salthouse, 1991, 1996), whereas *working memory* is the on-line processing capacity available to store, retrieve, and manipulate information. There is evidence that age-related decreases in speed of processing and working memory account for age differences in a broad range of behaviors including long-term memory tasks (Park et al., 1996; Park et al., in press), memory for news (Frieske & Park, 1999), and medical decisions (Zwahr, Park, & Shifren, 1999). We hypothesize that cognitive resources, as measured by speed of processing and working memory, are important in person perception and that people process information and make judgments of others in a manner consistent with social vigilance tendencies.

Social vigilance is defined as the tendency for individuals to readily ascribe negative qualities to a target person who acts in negative ways while simultaneously being reluctant to ascribe positive characteristics to the target person when he or she behaves positively (see Ybarra, 2002, for a review). For example, studies have found that in judging how much evidence is required before imputing different traits to others, people judged that considerably less evidence was required to ascribe negative compared with positive dispositional characteristics (Rothbart & Park, 1986; also see Aloise, 1993). Other studies have shown that in selecting candidates for various positions and roles, people requested significantly less information before making a decision about a person who had been described with negative information than for a person described with positive information (e.g., Yzerbyt & Leyens, 1991). In investigating how people form impressions of others, Carlston (1980) showed that after a week's delay, participants' confidence in their impression judgments declined to a greater extent when their impressions were based on positive rather than negative information about the person. These findings converge to strongly suggest that people more readily infer (or are quick to judge) the dispositional qualities of target individuals when learning negative compared with positive information.

Another type of social information processing that is related to social vigilance has to do with how people process information about others thought to possess negative and positive characteristics. It might be expected that people would not bother in trying to ascertain whether a person already thought to be immoral does indeed possess immoral

qualities and tendencies. However, it would seem that people would be interested in determining whether a supposedly positive person is indeed positive, and would be willing to engage in sustained interactions with them. Research by Ybarra, Schaberg, and Keiper (1999) is consistent with these characterizations.

In the Ybarra and colleagues (1999) research, young adults who learned about a person who supposedly possessed positive characteristics indicated that they needed more information about the person and that they were more cognitively engaged when forming impressions than were people who learned about a person who supposedly possessed negative characteristics. In addition, participants who learned about the person with positive qualities emphasized information that disconfirmed their beliefs about the person, whereas participants who learned about a supposedly negative person emphasized information that confirmed their beliefs about the person.

On the basis of these social cognition findings, we expected that there would be little difference in social information processing (encoding, memory, judgments) between older and younger adults for negative individuals because the manner in which people approach information about negative others (confirmatory, less systematic) appears to require few cognitive resources. However, when learning about a person who supposedly has positive qualities, differences in cognitive resources between older and younger adults may have important consequences. To be vigilant and skeptical about a person who is thought to have positive qualities (integrate disconfirming information), people process information under such circumstances more carefully and analytically. Thus, the cognitive declines that come with older age may leave older adults at a disadvantage when learning information about a person thought to possess positive characteristics. This should be the case because the encoding and integration of belief-disconfirming information (being vigilant of positive others) requires more cognitive resources than the integration of belief-confirming evidence (e.g., Srull, 1981; Stangor & Duan, 1991).

Recent studies with younger adults are consistent with this suggestion. Sherman and Frost (2000) obtained findings in line with the findings of Ybarra and colleagues (1999). Further, these investigators found that under low cognitive capacity conditions, conditions that may mimic reduced cognitive resources in older age, expectancy-confirming rather than expectancy-disconfirming information was more likely to be recalled, especially in the positive expectancy condition. If people are more likely to seek belief-disconfirming information when they hold positive compared with negative expectancies, as we have proposed, then it is expected that the detrimental influence of reduced cognitive capacity on the encoding and integration of disconfirming information would be more apparent in the former compared with the latter expectancy condition.

The possibility that low cognitive resources can preclude the consideration of expectancy-disconfirming information when people hold initial positive expectations appears to run counter to the findings obtained by Hess and Pullen (1994) with younger and older adults. These researchers did not find many differences between the younger and older adults, save for degree of impression change. But there is one aspect of the Hess and Pullen research that may have masked potential differences as a function of age. In this research, participants formed impressions by reading about behaviors the target had enacted in the past, and they could take as long as they wanted to read the behavioral statements. Under such conditions the older adults may have compensated for age-related declines by taking longer to process the behavioral information. The first experiment of the present research was conducted as an attempt to replicate these findings.

For the second experiment, we made an attempt, albeit a modest one, to make the impression task more cognitively demanding. Because cognitive outcomes differ when people experience cognitive strain versus when they do not (e.g., Bodenhausen, 1990; Fiske & Neuberg, 1989; Pendry & Macrae, 1994), it is possible that older adults will be disadvantaged in forming impressions. We hypothesize this to be especially true when forming impressions of people thought to possess positive characteristics.

Experiment 1

In this study older and younger adults paced themselves as they formed impressions of a person thought to possess either positive or negative characteristics. We used a procedure similar to that of Hess and Pullen (1994) to examine whether in the absence of cognitive strain the older and younger adults would or would not differ in their social cognitive outcomes. In continuing their impressions, the participants read through statements presented on a computer monitor describing behaviors performed by the target that supported or disconfirmed their initial beliefs about the person. Participants also completed measures of speed of processing and working memory. The main social–cognitive measures included latencies while reading the behavioral information and the information (consistent or inconsistent) participants tended to remember about the person.

Methods

Participants

Twenty-seven young adults (*M* age = 18.84 years, range = 18–22) from introductory psychology classes at the University of Michigan were given course credit for their participation. Twenty-eight older adults (*M* age = 70.15 years, range = 65–76) were recruited from the greater Ann Arbor, MI, area and were paid $25 for their participation. As can be seen in Table 1, the two groups of participants differed in amount of

Table 1. Level of Education and Level of Cognitive Resources as a Function of Age Group for Experiment 1

Age Group	Education		Vocabulary		Working Memory		Speed	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Younger	2.92	0.73	5.16	2.45	12.69	3.04	48.11	9.81
Older	3.57	1.37	7.55	2.33	8.68	3.20	34.81	6.47

education (1 = less than high school grad, 4 = bachelor's degree, 7 = MD, JD, or PhD), $F(1,53) = 4.69$, $p < .03$, with the older adults reporting higher levels of education than the younger adults. Because of experimental control problems, data from the vocabulary test (Salthouse, 1993) were not available for 9 young adults and 7 older adults. Nevertheless, the older adults showed higher vocabulary scores (range = 1–10) than the younger adults (M of 5.16 and 7.55 for young and old, respectively), $F(1,37) = 9.75$, $p < .003$. This finding is consistent with other research in the cognitive aging literature (see Park, 2000, for a review). A set of analyses on the main dependent measures (described below) was conducted controlling for both education and vocabulary. The inclusion of these variables did not alter the nature of the results.

Measures of Cognitive Resources

Participants completed a speed of processing task and a working memory task to verify age-related differences in cognitive resources. The speed of processing task was developed by Park and colleagues (in press) for another project and involved making same or different judgments as quickly as possible about two patterns of dots that were presented side by side. Participants compared various pairs of patterns and were given 2 min and 15 s to perform as many as possible. The number of correct comparisons made in the allotted time is shown in Table 1 of this study. The speed of processing scores were submitted to a between-participants analysis with age group as the between-participants factor. These measures were not available for 2 of the participants. The analysis yielded a reliable difference, $F(1,51) = 34.63$, $p < .0001$. Older adults had reduced speed of processing compared with the younger adults.

The working memory task (reading span task) required participants to answer questions about sentences read aloud (processing component) while maintaining an element from each sentence in memory (storage component; Park et al., 1996; Salthouse & Babcock, 1991). Initially participants had to retain one item and received three trials. Then, they had to retain two items, and received three trials; this was repeated for up to six items. The number of sentences correctly answered while being able to remember the test item served as the measure of working memory with a maximum score of 18 possible. Working memory measures were submitted to a between-participants analysis as a function of age group. The analysis produced a reliable difference (see Table 1). Older adults demonstrated less working memory capacity than younger adults did, $F(1,53) = 22.45$, $p < .0001$.

Health Questionnaire

Prior to beginning the experimental session, participants completed a health questionnaire that we created. Because participants would be learning about a physician during the upcoming impression task of the experiment, responses to the health questionnaire were used to control for any differences in preexisting experiences with health problems, health care, and attitudes toward physicians and the medical establishment. In both experiments the health questionnaire produced few differences as a function of age. In addition, controlling for the health questionnaire variables in subsequent analyses did not affect the results in both studies. Therefore, the health questionnaire is not discussed further.

Research Design

The participants were randomly assigned to conditions in which they learned about a person with positive or negative characteristics, and then they were presented with behavioral information that was consistent or inconsistent with their expectancies. Thus, the design of the study was a 2 (age group: older adults, younger adults) × 2 (expectancy: positive, negative) × 2 (behavior type: consistent, inconsistent) mixed design, the first two factors varying between participants and the last factor varying within participants. Participants were run in same-age groups of 2 to 4, with each participant in an individual computer carrel.

Materials and Procedure

Participants were recruited to take part in a social information processing study. After completing the health questionnaire, participants were led to a different lab and introduced to the impression formation task. The participants were seated in front of a computer monitor. A precondition for participating in the study was that participants have previous experience using a computer. The first screen to appear on the computer monitor provided background information about a fictitious doctor. The introductory paragraphs were created to induce different beliefs about the doctor. The paragraph or paragraphs read

> Dr. Brown lives in a small community. He moved here about a month ago after moving from the East coast. Dr. Brown is trying to get a job with one of the area hospitals. The people with whom he was interviewing for a job thought that Dr. Brown was looking for a change of pace and that is why he decided to move to their community. The interviewers contacted the hospital administrator where Dr. Brown used to work out East to get some additional information about Dr. Brown. Dr. Brown's ex-boss told the people who were interviewing Dr. Brown that they tried for a long time to [keep Dr. Brown from leaving the hospital/to have Dr. Brown leave the hospital]. The ex-boss said that Dr. Brown was [good with patients/abrupt with patients], that they had received a lot of [praise about Dr. Brown/complaints about Dr. Brown], and that a patient had even submitted a letter to the editor in a local newspaper [applauding Dr. Brown's ethical character/questioning Dr. Brown's ethical character]. Dr. Brown's old boss finished the conversation by saying ["It was very hard for us all to see Dr. Brown leave. He left because he wanted to. Dr. Brown thought he might be able to better serve people in a smaller community."/"It was a relief for us all to see Dr. Brown leave. He left because he was fired. Dr. Brown thought he might be able to get a job in a smaller community."]

After the participants read the background information, they continued forming their impressions. The participants read through 21 statements that described different behav-

iors the doctor had enacted. These behaviors were presented one per screen, and the experimental program assessed how long it took participants to read each statement as they paced themselves through the presentation. Seven of the behaviors were consistent with the initial beliefs about the doctor, and seven were inconsistent. The remaining seven behaviors were filler behaviors and were neutral with respect to the initial beliefs held about the doctor. The behaviors selected to be consistent with the positive expectancies about the doctor were inconsistent with the negative expectancies, whereas the behaviors that were consistent with the negative expectancies about the doctor were inconsistent with the positive expectancies.

Pilot testing confirmed the equivalence of the behavioral stimuli in favorability and in their consistency with the initial beliefs about the doctor. Pilot-test participants (n = 20) were presented the different behaviors in a randomized order and were asked to rate their favorability on a scale that ran from 1 (Unfavorable) to 7 (Favorable). A repeated measures analysis of variance (ANOVA) was conducted on the favorability judgments. The analysis produced the main effect for favorability, $F(1,19) = 887.77$, $p < .0001$, indicating that positive behaviors were regarded positively ($M = 6.73$), whereas the negative behaviors were regarded negatively ($M = 1.79$). More importantly, both types of behaviors were similar in evaluative extremity.

For the second rating task, participants were given either the positive or the negative paragraph to read about the doctor. Then they rated the behaviors in terms of their consistency (inconsistency) with the paragraph they had read using scales that ranged from 1 (Inconsistent) to 7 (Consistent). The consistency judgments were submitted to a mixed-design ANOVA. The analysis yielded a main effect only for consistency, $F(1,18) = 315.61$, $p < .0001$, which indicated that expectancy-consistent behaviors ($M = 6.66$) were indeed regarded as consistent with the beliefs about the doctor, whereas the expectency-inconsistent behaviors ($M = 2.03$) were regarded as inconsistent with beliefs about the doctor.

Examples of the behaviors that were consistent with the positive expectancy (inconsistent with negative expectancy) included "Dr. Brown took time to explain the potential side effects of the procedure to the patient" and "Dr. Brown conducted a free physical exam on a custodian who had no insurance." Examples of the behaviors consistent with the negative expectancy (inconsistent with positive expectancy) included "Dr. Brown would perform unnecessary procedures in order to overcharge Medicare" and "Dr. Brown yelled at a new nurse who was a couple of minutes late for her shift." Examples of the filler behaviors included "Dr. Brown listened to the radio while driving home from work" and "Dr. Brown cooked a lot of pasta and sauce for dinner after missing lunch." The computer program controlled the random order (different for each participant) in which the behavioral statements were presented. The randomization was constrained so that one of each of the three types of behaviors appeared once in each of seven blocks.

After completing the impression formation task, the participants were presented with the speed of processing task. Following this task, the participants were presented with a surprise, free recall task. They were given 6 min to recall, in any order, as many of the behavioral statements previously read about the doctor during the second phase of the impression formation task as they could.

Once participants completed the recall task, they were presented with a judgment task to assess their impressions of the doctor. The task was composed of four items that assessed the favorability of participants' impressions and how truthful, considerate, and sociable they thought the doctor was. These questions were answered on 7-point scales that ran from 1, Extremely Unfavorable (untruthful, inconsiderate) to 7, Extremely Favorable (truthful, considerate). In addition, participants were asked to judge how consistent they thought the doctor was. This judgment was made on a 7-point scale that ranged from 1 (Extremely Inconsistent) to 7 (Extremely Consistent). After making these judgments about the doctor, participants were presented with the reading span task. Participants were then debriefed, given course credit or paid, and thanked for their participation.

Results

Reading Latencies

Participants' latencies while reading the behavioral information about the doctor were submitted to a 2 (age group: older adults, younger adults) × 2 (expectancy: positive, negative) × 2 (behavior type: consistent, inconsistent) mixed-design ANOVA. The former two factors varied between participants and the latter factor varied within participants (see Table 2 for means). Although the statements did not vary in length by more than a couple of words, a second set of analyses was conducted controlling for statement length. These analyses produced the same results as the ones reported here.

The analysis revealed a main effect for age group. $F(1,51) = 17.06$, $p < .0001$. This effect indicated that older adults (M = 13,164 s) took longer to read through the behavioral information than the younger adults did (M = 9,446 s), consistent with other research findings (Balota & Duchek, 1989; Thompson & Kliegl, 1991). There was also an interaction of Expectancy × Behavior Type, $F(1,51) = 54.12$, $p < .0001$. This effect indicated that participants took longer to read through expectancy-inconsistent information than expectancy-consistent information when they held positive expectancies (Ms of 5,250 s for consistent and 6,339 s for inconsistent), $F(1,27) = 44.85$, $p < .0001$. In contrast, when participants held negative expectancies, they spent more time reading expectancy-consistent than -inconsistent information (Ms of 5,878 s and 5,133 s, respectively), $F(1,26) = 13.28$, $p < .001$.

Table 2. Mean Reading Latencies for Experiment 1 as a Function of Age, Expectancy, and Type of Behavior Processed

	Positive Expectancy				Negative Expectancy			
	Young		Old		Young		Old	
Behavior	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Consistent	4,300	1,271	6,201	2,396	5,182	1,329	6,575	1,661
Inconsistent	5,369	1,123	7,310	2,827	4,023	604	6,243	1,508

Note: The larger the number, the longer the reading latencies.

The tendency to preferentially encode and elaborate expectancy-inconsistent over consistent information when participants hold positive expectancies is a cognitively demanding type of information processing, which might affect older adults to a greater degree than it affects younger adults. A planned contrast of the means represented in Table 2 for the positive expectancy condition (simple interaction of age and consistency) was not significant, $F(1,26) < 1.00$. Both the older and younger adults spent more time encoding and elaborating expectancy-inconsistent than -consistent information when they believed the doctor to possess positive characteristics. Although no differences were expected between the two age groups in the processing of consistent and inconsistent information in the negative expectancy conditions, the planned contrast (simple interaction of age and consistency) revealed a reliable effect, $F(1,25) = 5.39, p < .05$. This occurred because younger adults took more time to process expectancy-consistent than -inconsistent information, $F(1,12) = 20.45, p < .001$. There was no difference in reading times for the expectancy-consistent and -inconsistent information for the older adults, $F(1,13) = 1.81$, *ns*.

Memory for Behavioral Information

A judge, blind to the experimental conditions, scored participants' recall using a gist criterion, as done in other research (e.g., Srull, 1981). A recalled item was considered fully correct and was assigned 1 point if its general meaning was the same as that of the original behavior statement. An item was scored as 1/2 of a point if it deviated from the original statement by at most one important word without affecting the meaning of the phrase. The means for the recall data are presented in Table 3.

The recall memory data were submitted to a 2 (age group: older adults, younger adults) × 2 (expectancy: positive, negative) × 2 (behavior type: consistent, inconsistent) mixed-design ANOVA, with age and expectancy type varying between participants and the last factor varying within participants. The filler items were not analyzed. The analysis revealed a main effect for age group, $F(1,51) = 19.20, p < .0001$, which indicated that older adults ($M = 5.00$) remembered less information overall than younger adults did ($M = 7.82$).

The only other effect to emerge from the analysis was the Expectancy × Behavior Type interaction, $F(1,51) = 18.85$, $p < .0001$. Consistent with previous research in social cognition (e.g., Ybarra et al., 1999) and social cognition and aging (Hess & Pullen, 1994), this effect indicated that participants who held positive expectancies were more likely to remember expectancy-inconsistent information than expectancy-consistent information (*M*s of 3.57 and 2.66 respectively), $F(1,27) = 18.99, p < .0002$. In contrast, when holding negative expectancies, the participants had better memory for expectancy-consistent compared with -inconsistent information (*M* of 3.61 for consistent and 2.98 for inconsistent), $F(1,26) = 4.94, p < .03$.

Table 3. Mean Recall Performance for Experiment 1 as a Function of Age, Expectancy, and Type of Behavior Recalled

	Positive Expectancy				Negative Expectancy			
	Young		Old		Young		Old	
Behavior	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Consistent	3.18	1.22	2.14	1.57	4.54	1.45	2.68	1.22
Inconsistent	4.14	1.41	3.00	1.39	3.78	1.20	2.18	1.38

Note: The larger the number, the more items recalled.

We conducted two planned contrasts to evaluate differences between old and young adults in processing expectancy-consistent and expectancy-inconsistent information in the positive and negative expectancy conditions. The planned contrast (simple interaction of age and consistency) within the positive expectancy condition revealed no difference between the older and younger adults, $F(1,26) < 1.00$. Both older and younger adults remembered to a greater extent expectancy-inconsistent rather than -consistent information. The planned contrast (simple interaction) within the negative expectancy condition was also nonsignificant, $F(1,15) < 1.00$. These findings indicate that under self-paced instructions, old and young adults showed similar information elaboration and memory patterns, consistent with the research by Hess and Pullen (1994).

Impression Judgments

Participants' impression favorability judgment, and how truthful, considerate, and sociable they judged the doctor to be, were combined and then averaged (Cronbach's $\alpha = .61$). One participant failed to provide these judgments. The impression scores were submitted to a 2 (age group: older adults, younger adults) × 2 (expectancy: positive, negative) between-participants factorial ANOVA. The analysis did not reveal any effects. Judgments in general tended to be neutral ($M = 4.08$ on a 7-point scale), reflecting an equivalent integration of the affective implications of the negative and positive behavioral information across all conditions. All of the analyses for reading latencies, memory, and impressions were also conducted as analyses of covariance (ANCOVAs) controlling for speed and working memory. The inclusion of these measures did not affect these findings.

Target Consistency

The pilot testing of the behavior stimuli ensured that the specific behavioral items were equivalent in consistency (or inconsistency) regardless of expectancy. The question dealing with the perceived consistency of the doctor is more relevant to the idea that perceivers hold different beliefs about how consistent people are in general when it is believed that they have positive or negative characteristics. This question is important because the findings could be caused by people's beliefs of how consistent the target was judged to be rather than the different approaches to the information induced by positive and negative expectancies.

The participants' responses to the consistency question were submitted to a 2 (age group: older adults, younger adults) × 2 (expectancy: positive, negative) between-participants factorial ANOVA. The analysis revealed no significant effects (all Fs < 1.00). Regardless of age group and, more importantly, expectancy, the target was rated equivalently (i.e., moderately inconsistent) in all conditions (older, negative expectancy, $M = 2.71$; younger, negative expectancy, $M = 2.92$; older, positive expectancy, $M = 2.93$; younger, positive expectancy, $M = 3.07$). ANCOVAs were conducted on

the latency, memory, and impression measures controlling for target consistency. These analyses produced similar results as when this measure was not included.

Discussion

Although older adults showed poorer function in speed of processing and working memory, they nevertheless demonstrated an equivalent capacity to young adults in remembering information about others thought to possess positive or negative characteristics. These findings replicated research with young adults (Ybarra et al., 1999) and research that compared older and younger adults (Hess & Pullen, 1994). Participants from both age groups tended to preferentially process and remember information that was inconsistent rather than consistent with positive expectancies. However, when the participants held negative expectancies about the target, they tended to preferentially remember information that was consistent rather than inconsistent with the expectancies. The findings suggest that both younger and older adults aim to test and disconfirm beliefs that an unknown other has a positive character, but appear to want to maintain and reinforce beliefs than an unknown other has a negative character. These findings are consistent with the social vigilance tendencies described at the beginning of this article and much research in social cognition (Ybarra, 2002).

Experiment 2

The factor that may underlie the similarity in social–cognitive processing (memory, judgments) between the older and younger adults in Experiment 1 and in other studies (Hess & Pullen, 1994) may have to do with the cognitive demands of the impression task. In Experiment 1, older and younger adults were allowed to pace themselves through the presentation of the behavioral information. The reading latency findings indicated that older adults took longer to form their impressions than younger adults did. Thus, the opportunity to take as much time as needed by the participants may have allowed older adults to compensate for their lower level of cognitive resources and may have served to permit older adults to process information in a manner that did not differ from younger adults.

The second experiment was conducted to determine whether limiting the amount of time participants had to process the behavioral information would or would not differentially affect the social cognitive performance of younger and older adults. We increased the cognitive demand of the impression task by limiting the amount of time participants had to process the behavioral statements.

Limiting the amount of time participants have for elaborating the behavioral information is more likely to impair the ability of older adults than that of the younger adults to elaborate the available information, especially information that requires resource-intensive processing (expectancy-inconsistent information; e.g., Bodenhausen, 1990; Pendry & Macrae, 1994; Srull, 1981; Stangor & Duan, 1991). Therefore, under such conditions, the ability to preferentially process expectancy-inconsistent over expectancy-consistent information when learning about a positive other should be impaired for the older but not for the younger adults. However, if participants' expertise in thinking about others (forming impressions, knowing what information to pinpoint) increases as a person grows older, then older adults may still be able to perform as well as the younger adults when the impression task is made more demanding. We propose this alternative hypothesis tentatively given that some research indicates that expertise can be compensatory in cognitively demanding conditions in some nonsocial domains (Charness & Bosman, 1990).

It is important to note that in the negative expectancy conditions, little difference was expected between the older and younger adults. Because people are more likely to maintain and reinforce their negative expectancies, they are less likely to attend to positive information when they hold negative beliefs about a person. Thus, limiting the time available to process the information should be less likely to affect information processing (cf. Bodenhausen, 1990; Pendry & Macrae, 1994; Srull, 1981; Srull et al., 1985; Stangor & Duan, 1991).

Methods

Design and Participants

Twenty-six young adults (M age = 19.04 years, range = 18–20) were given course credit for their participation in the study. Twenty-six older adults (M age = 68.83, range = 61–76) were recruited from the greater Ann Arbor, MI, area and were paid $25 for their participation. As can be seen in Table 4, the older adults had higher levels of education than the younger adults did, $F(1,50) = 6.37, p < .01$, and higher vocabulary scores, $F(1,50) = 52.85, p < .0001$. We used these variables as control variables in all results subsequently reported. These analyses produced results equivalent to those reported below. Experiment 2 used the same materials and the same procedure as Experiment 1, save for minor changes described below.

Measures of Cognitive Resources

The speed of processing scores were submitted to a between-participants analysis with age group as the between-participants factor (see Table 4 for means). One participant failed to complete this measure. The analysis yielded a reliable difference, $F(1,49) = 23.05, p < .0001$. Older adults had lower speed of processing scores than the younger adults did.

Participants' reading span scores were submitted to a between-participants analysis as a function of age. The analysis produced a reliable difference (see Table 4). Older adults did worse on the reading span task than younger adults did, $F(1,50) = 24.55, p < .0001$.

Table 4. Level of Education and Level of Cognitive Resources as a Function of Age Group for Experiment 2

Age Group	Education		Vocabulary		Working Memory		Speed	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Younger	2.92	0.27	4.35	1.76	11.31	3.21	48.77	9.68
Older	3.81	1.77	8.19	2.04	7.15	2.82	37.48	6.80

Research Design

Participants were randomly assigned to conditions in which they learned about a positive or negative person, and then they were presented with behavioral information that was consistent or inconsistent with their expectancies for this person. Thus, the design of the study was the same as that of Experiment 1.

Materials and Procedure

The only difference between the two studies occurred in Phase 2 of the impression formation task. In this experiment, pilot testing was conducted with both younger and older adults to determine how many seconds on average it took them to read the behavioral statements comfortably, while limiting the amount of elaboration they could engage in. The pilot-test findings indicated that this average time was 4.5 s. The presentation of the stimuli was controlled by the experimental control program. This type of manipulation has been shown to produce similar outcomes to cognitive load manipulations in young adults (see Bargh & Thein, 1985; Ybarra & Stephan, 1996, Experiment 3). The remaining aspects of the procedure were the same as those from Experiment 1.

Results

Given that the experimental program controlled the time participants had to process the behavioral information, the time participants took to read through the behavioral information was of course no longer available for analysis.

Memory for Behavioral Information

The recall responses were coded as done in Experiment 1. The means for the recall data are presented in Table 5. The recall scores were submitted to a 2 (age group: older adults, younger adults) × 2 (expectancy: positive, negative) × 2 (behavior type: consistent, inconsistent) mixed-design ANOVA, with age and expectancy type varying between participants and the last factor varying within participants. Consistent with the findings from Experiment 1, the analysis yielded a main effect for age group, $F(1,48) = 22.26, p < .0001$. This effect indicated that older adults ($M = 4.01$) remembered less information overall than did younger adults ($M = 6.42$). In addition, it is apparent that limiting participants' reading times had the intended effect of decreasing participants' capacity to elaborate the information, as indexed by the mean number of items recalled overall in Experiment 1 and in this experiment ($M = 6.38$ for Experiment 1; $M = 5.30$ for Experiment 2), $F(1,111) = 5.14, p < .02$.

Table 5. Mean Recall Performance for Experiment 2 as a Function of Age, Expectancy, and Type of Behavior Recalled

	Positive Expectancy				Negative Expectancy			
	Young		Old		Young		Old	
Behavior	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Consistent	2.69	1.03	2.15	1.25	3.04	0.97	1.88	0.71
Inconsistent	4.11	1.42	2.54	1.39	3.00	1.19	1.46	0.83

Note: The larger the number, the more items recalled.

The analysis produced a marginally reliable main effect for behavior type, $F(1,48) = 3.50, p < .07$, with expectancy-inconsistent behaviors ($M = 2.78$) being better recalled overall than expectancy-consistent behaviors ($M = 2.44$). This main effect was qualified by the Expectancy × Behavior Type interaction, $F(1,48) = 9.96, p < .003$. This effect indicated that participants who held positive expectancies were more likely to remember expectancy-inconsistent information than expectancy-consistent information (*M*s of 3.32 for inconsistent and 2.42 for consistent), $F(1,25) = 8.63, p < .007$. In contrast, participants showed no difference in their memory for expectancy-consistent and -inconsistent information when they held negative expectancies about the target (2.23 for inconsistent and 2.46 for consistent), $F(1,25) = 1.28, p < .27$.

The overall analysis produced two other effects, a main effect for expectancy, $F(1,48) = 4.31, p < .04$, and an interaction of age and behavior type, $F(1,48) = 3.92, p < .05$. The expectancy main effect indicated that participants who held positive expectancies remembered more information overall than participants who held negative expectancies did (*M*s of 2.87 for positive and 2.34 for negative, findings similar to Ybarra et al., 1999). The interaction of age and behavior type indicated that the older adults tended to remember expectancy-inconsistent and -consistent behaviors to a similar extent (*M*s = 2.00 and 2.01, respectively), $F(1,25) < 1.00$. However, the younger adults tended to preferentially remember expectancy-inconsistent over -consistent behaviors (*M*s = 3.55 and 2.86, respectively), $F(1,25) = 5.32, p < .03$. Previous research has shown that expectancy-inconsistent information requires more cognitive effort to process than expectancy-consistent information does (e.g., Bodenhausen, 1990; Pendry & Macrae, 1994; Srull, 1981; Srull, Lichtenstein, & Rothbart, 1985; Stangor & Duan, 1991). Such memory differences might thus be expected given the lower level of cognitive resources in the older compared with the younger adults.

The interaction above indicates that the older adults compared with the younger adults were less likely to disconfirm their expectancies. However, the hypothesis regarding social vigilance suggests that this should be the case only when learning information about supposedly positive others. We conducted two planned contrasts that examined memory for expectancy-consistent and -inconsistent information as a function of age within each of the expectancy conditions. The first contrast (simple interaction) within the positive expectancy condition revealed a reliable effect, $F(1,24) = 4.17, p < .05$. More importantly, as shown in Table 5, younger adults had better memory for expectancy-inconsistent than for expectancy-consistent information about the doctor when they held positive expectancies, $F(1,12) = 15.67, p < .002$, consistent with Experiment 1. However, in a pattern different from that in Experiment 1, the older adults did not preferentially process expectancy-inconsistent over consistent information under these conditions, $F(1,12) = 1.14$, *ns*. As expected, the planned contrast (simple interaction effect) within the negative expectancy condition did not produce any differences between the older and the younger adults, $F(1,24) < 1.00$.

Impression Judgments

Participants' impression judgments were summed and then averaged (Cronbach's $\alpha = .74$). One participant failed

to provide these judgments. The impression scores were submitted to a 2 (age group: older adults, younger adults) × 2 (expectancy: positive, negative) between-participants factorial ANOVA. The analysis revealed a marginally significant interaction of the two factors, $F(1,47) = 3.15, p < .08$. The means for this effect indicate that younger adults rendered similar judgments for the positive and negative targets ($M = 4.04$ vs. $M = 3.85, p < .62$), indicating an equivalent integration of the affective implications of the behavioral information in both conditions. However, the older adults differed as a function of expectancy condition. Older adults tended to retain (relatively) more positive judgments of the positive than the negative target ($M = 4.46$ vs. $M = 3.29$, $p < .005$). Unlike the younger adults, these findings suggest that the older adults relied to a greater extent on the primacy cue provided by the expectancy information. The analyses for memory and impressions were also conducted as ANCOVAs controlling for speed and working memory. The inclusion of these measures did not alter these findings.

Target Consistency

As found in Experiment 1, the analysis revealed no significant effects for this measure (all $Fs < 1.00$). Regardless of age group or expectancy, the doctor was rated similarly in all conditions (older, negative expectancy, $M = 3.16$; younger, negative expectancy, $M = 3.00$; older, positive expectancy, $M = 2.92$; younger, positive expectancy, $M = 2.53$). A set of ANCOVAs conducted on the memory and impression judgments produced almost equivalent results as when this measure was not included.

Discussion

Expectancy-inconsistent information is more difficult to process than expectancy-consistent information (e.g., Bodenhausen, 1990; Pendry & Macrae, 1994; Srull, 1981; Srull et al., 1985; Stangor & Duan, 1991). Such differences in encoding and memory should become apparent under conditions in which people are under cognitive load or have reduced cognitive capacity. Consistent with this suggestion, the findings from Experiment 2 showed that younger adults preferentially processed expectancy-inconsistent over -consistent information under positive expectancy conditions, whereas the older adults did not distinguish between the two types of information in their memory performance. In addition, the impression judgments in Experiment 2 also suggested differences in how the older and younger adults processed the available information. Younger adults appeared to integrate the affective implications of the information equivalently for both positive and negative others, whereas the older adults appeared to rely more on their expectancies in rendering overall judgments. Together, the findings indicate that when older and younger adults had limited time to process the information, the memory performance and judgments of the older adults were affected to a greater extent than were those of the younger adults. The negative expectancy conditions did not produce these types of differences between the older and the younger adults.

In the present study all participants were able to comfortably read the behavioral information with which they were presented. Because older adults were slower overall at reading (as demonstrated in Experiment 1), they had less time to elaborate the information. It is possible that adding greater load to the task would result in even greater disruption of information processing, especially for the older adults.

General Discussion

The main findings from the two experiments can be summarized as follows. First, in both experiments younger adults had greater cognitive resources available to them than older adults did. Despite these differences, the findings from Experiment 1 indicated that when the impression formation process was self-paced, no differences in information processing (latencies, memory, impressions) emerged between the younger and older adults. All participants tended to emphasize information that disconfirmed their positive expectancies or that confirmed their negative expectancies. Second, in Experiment 2 participants were no longer able to control the impression process and were given a limited amount of time to process the information. Under these more demanding conditions, differences emerged between the younger and older adults. When learning about a positive target, younger adults preferentially encoded and remembered information that disconfirmed rather than confirmed their beliefs, whereas the older adults did not engage in this type of processing. As predicted, no differences as a function of age were obtained under the negative expectancy conditions. In addition, the impression judgments suggest that older compared with younger adults retained more positive impressions of the positive target than of the negative target.

These findings help to confirm the suggestion that processing information when a person holds positive expectancies is more analytic in nature, and any shortages in cognitive resources (e.g., cognitive aging) affect this type of analytic approach to the information. In contrast, the approach taken when learning about a negative person is more shallow in nature. Therefore, differences in cognitive resources are less likely to affect how information about negative expectancy targets is encoded and elaborated.

The findings from Experiment 2 differ not only from those of Experiment 1 but also from those obtained by Hess and Pullen (1994, Experiments 2 and 3). In Experiment 1 we obtained memory findings that were in general similar to those of Hess and Pullen (1994, Experiment 2 and 3), when participants had control over the impression formation process, just as in Hess and Pullen. In the present Experiment 2, however, the time participants had to process the information was controlled and limited, making the impression task more demanding. Under these conditions, differences were obtained between the older and younger adults in their memory and impression judgments. Hess and Pullen did obtain some differences in impression change between younger and older adults, and these investigators attributed those findings to differences in the beliefs or lay theories of trait-behavior relations between the two groups of participants. Although it is probably the case that as people grow older their beliefs about behavior and related trait dispositions do change (cf. Heckhausen & Baltes, 1991), the present findings indicate that resource demands of a target affect the social cognition of older and younger adults.

In general, individuals rely on information congruent with their expectancies in cognitively demanding situations (e.g., Bodenhausen & Lichtenstein, 1987). One potential problem with doing this, however, is that relying on such shortcuts may put a person in a vulnerable position. If a person holds the tentative hypothesis that a stranger has positive qualities and good intentions and fails to notice behaviors that would indicate otherwise, the perceiver may be a prime candidate for exploitation.

In conclusion, people regardless of age tend to process information about positive others systematically and carefully but tend to process information about negative others less carefully and in a shallow fashion. However, because the former type of processing is more cognitive-resource intensive, older compared with younger adults may be at a disadvantage when learning about people who supposedly have positive qualities. Such outcomes are likely to be found when information processing is more demanding, which may be more typical of daily life. This disadvantage in information processing by older adults may contribute to the victimization of older adults. We recognize that other factors also likely contribute to such vulnerabilities, including people's conceptions of self and people's perceived efficacy in discerning others' dispositional qualities and intentions.

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