AGE DIFFERENCES IN THE BASES FOR SOCIAL JUDGMENTS: TESTS OF A SOCIAL EXPERTISE PERSPECTIVE

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Research indicates that increasing age is associated with greater use of trait-diagnostic behavioral information in making social judgments. These effects may reflect an aging-related increase in social expertise, indicative of more powerful and accessible knowledge structures. The current work is an attempt to provide further evidence in support of the social expertise view and a test of an alternative hypothesis. Results of this work indicate that age differences in the use of trait-diagnostic information were moderated by factors thought to affect the accessibility of relevant knowledge structures.

As the study of social cognition in adulthood advances, it is increasingly evident that the nature of aging-related variations in such functioning is quite different than that observed in many other areas of cognition. Whereas much empirical data demonstrates that aging is accompanied by a decline in many basic cognitive abilities (for recent review, see Craik & Salthouse, 2000), a growing body of research suggests stability or improvement with age in the social cognitive domain—at least until late in life. In fact, many studies in this area have shown that adult development is accompanied by

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increasing complexity and sophistication in social reasoning about social situations (for review, see Staudinger & Pasupathi, 2000). In addition, this research has also identified possible adaptations in later life that may help compensate for normative reductions in basic cognitive resources that place constraints on the processing of information in social situations.

**SOCIAL EXPERTISE?**

One framework that might profitably be used to characterize the observed age differences in social cognition is that of expertise. At a relatively basic level, experts are individuals who have developed a rich understanding of a specific domain (i.e., declarative knowledge) through extensive experience, training, or practice, and who are able to efficiently apply this understanding (i.e., procedural knowledge) to problems within this domain (e.g., Anderson, 1983). Expertise is also domain specific, and thus relatively independent of other abilities. Applying this general framework to the social cognitive domain, it could be argued that the natural accumulation of social experience associated with progression through adulthood results in the acquisition of declarative knowledge that is increasingly reflective of both the complexities of social behavior and culturally based belief systems regarding the factors governing such behavior. This latter point recognizes the fact that social functioning occurs within a specific cultural context, and that expert knowledge in the social domain should reflect appropriate norms and beliefs (see also Baltes & Smith, 1990). Repeated practice in using this knowledge should also result in enhanced accessibility—as reflected in ease and breadth of activation—of relevant declarative knowledge structures as well as the development of procedural knowledge representing the efficient application of this knowledge in appropriate situations. Elsewhere, Staudinger and Pasupathi (2000) have argued that such knowledge is an important component of life pragmatics.

The most notable example of an expertise framework in research on adult development in the social domain has been in the study of wisdom, which Baltes and colleagues have characterized as a type of expert knowledge in the fundamental pragmatics of life (Baltes & Smith, 1990). These researchers have found that, although not an inevitable outcome of the aging process, some studies have shown that wisdom is somewhat more prevalent in later life due, presumably due to its basis in life experience (e.g., Baltes, Staudinger, Maercker, & Smith, 1995). It is also associated with specific training and practice in the use of such knowledge (Smith, Studinger, & Baltes, 1994).
Other types of studies have also provided evidence that is consistent with an expertise viewpoint, such as those examining explanations regarding the factors underlying the behavior of others. For example, Blanchard-Fields and colleagues (Blanchard-Fields, 1994; Blanchard-Fields & Norris, 1994; Blanchard-Fields, Chen, & Norris, 1997) have shown that causal attributions emphasizing the interaction between dispositional and situational factors are more prevalent in mid-life and later adulthood than at earlier ages. Relatedly, Happé, Winner, and Brownell (1998) examined age differences in theory of mind and found that older adults were more likely than younger adults to make appropriate inferences about the behavior of others based on often complex levels of the actors’ mental states. These findings suggest an increasing recognition with age of the complexities of causal mechanisms associated with behavior in the social domain. Variations in the complexities of cognitions about the social world are also evident in observed aging-related increases in both the differentiation of representations about aging and older adults (e.g., Heckhausen, Dixon, & Baltes, 1989; Hummert, Garstka, Shaner, & Strahm, 1994) as well as the emphasis on dynamic and contextually bound aspects of self (e.g., Labouvie-Vief, Chiodo, Goguen, Diehl, & Orwoll, 1995).

Aging-related variation in social expertise can also be inferred from studies that examine the extent to which responses to social stimuli reflect culturally based beliefs or norms about everyday behavior. The acquisition and use of such knowledge can be viewed as a form of contextual intelligence (Berg & Klaczynski, 1996), and there is research suggesting that it increases with age in adulthood. For example, Cornelius and Caspi (1987) had adults aged 20 to 78 indicate the likelihood that they would chose specific responses to everyday problem situations, including those in the social realm (e.g., family, friends). They found that increasing age was associated with a greater correspondence between participant responses and those chosen as most efficacious by an independent group of individuals. Similar results have been obtained by Hess and colleagues (Hess & Auman, 2001; Hess, Bolstad, Woodburn, & Auman, 1999; Hess, Osowski, & Leclerc, 2005; Hess & Pullen, 1994), who found that middle-aged and older adults’ impressions of other people were more likely to reflect cultural norms regarding the trait diagnosticity of specific behaviors than were those of younger adults. Importantly for an expertise perspective, the age effects in both of these sets of studies were unrelated to age differences in more basic cognitive abilities, indicating that the observed effects were domain specific. In addition, Hess et al. (2005) also found that these effects were
THE PRESENT RESEARCH

The study reported here is concerned with further exploring the viability of an expertise framework for understanding certain aspects of social cognitive functioning in adulthood. We take as a starting point the aforementioned series of studies by Hess and colleagues (Hess & Auman, 2001; Hess et al., 1999; Hess & Pullen, 1994), which found that the impact of trait-diagnostic information on impression judgments increased systematically throughout adulthood. For example, Hess and Auman (2001) presented individuals ranging in age from 20 to 84 with a series of brief descriptions, each of which contained two positive and two negative behaviors performed by the same target individual. Half of the descriptions pertained to honesty (e.g., two honest and two dishonest behaviors), whereas the other half pertained to intelligence. Participants then provided impression judgments on the relevant trait domain. A simple averaging model (e.g., Anderson, 1981) would predict relatively neutral impression judgments given the identical amounts of positive and negative information in these descriptions. In contrast, Hess and Auman found that participants of all ages provided impression ratings that focused on negative information when the descriptions dealt with honesty and positive information when they dealt with intelligence. This asymmetry in judgments is consistent with past research (e.g., Skowronski & Carlston, 1987, 1992), and is hypothesized to reflect the differential diagnostictics of positive and negative behaviors across trait domains relating to competence versus morality (Skowronski & Carlston, 1989). Specifically, negative behaviors are typically viewed as more diagnostic of an individual's true nature than are positive behaviors when judging morality (e.g., honesty, helpfulness), whereas the opposite is true when assessing competence (e.g., intelligence, conscientiousness).

Importantly for present purposes, Hess and Auman (2001) also found that the trait-diagnostictics of specific behavioral information increased in importance with age, both in terms of attention allocation and in the construction of impression judgments. That is, increasing age was associated with disproportionate attention to diagnostic (i.e., intelligent or dishonest) over nondiagnostic (i.e., unintelligent or honest) behavioral information, and ratings relating to honesty became more negative with increasing age whereas those relating to intelligence became more positive.
These findings, taken in context with related results from other studies, appear to be consistent with the previously described expertise-based explanation of age differences in social cognitive functioning. First, the obtained age effects can be interpreted as indicating that, with age, individuals are less likely to base their social judgments on relatively superficial and easily processed affective information, and more likely to focus on complex interpretation of specific behavioral information. Second, the aging-related increase in the weighting of trait-diagnostic behavioral information in the construction of impression judgments can be construed as reflecting an increase in the application of socially shared implicit theories about the mechanisms underlying social behavior to interpreting the behavior of others. Of interest is the basis of this effect.

One possibility is that declarative knowledge relating to theories of trait diagnosticity increase with age in adulthood. Research has demonstrated, however, that younger adults understand the diagnostic value of individual pieces of information (Skowronski & Carlston, 1987), and that this understanding is similar to that of older adults (Hess et al., 1999). In other words, there is little evidence of adult age differences in declarative knowledge. Alternatively, it may be that the observed age differences in use of trait-diagnostic information represent increased breadth and accessibility of such knowledge with age rather than variations in declarative knowledge. Although relevant between-age comparisons have not been made, findings by Betz, Gannon, and Skowronski (1992) and Skowronski and Carlston (1992) that the impression judgments of young adults are most likely to be affected by trait-diagnostic information when such information is extreme in nature support this conclusion. The fact that stronger behavioral cues are necessary for younger adults to consistently use trait-diagnostic information can be taken as evidence of reduced accessibility associated with relevant knowledge structures. Betz et al. also found that extreme diagnostic information only influenced judgments when such information was presented last. This recency effect further underscores the fact that younger adults are most likely to attend to diagnostic cues when they are made salient. Finally, the fact that older adults are more likely to distinguish between diagnostic and nondiagnostic information at study (Hess & Auman, 2001) is suggestive of the more efficient processing of domain-specific information associated with expertise.

This work was designed with two purposes in mind. First, we wanted to further test the expertise-based explanation for age differences in the use of trait-diagnostic information by examining performance under conditions designed to differentially facilitate access to relevant knowledge. As noted before, there appears to be
little difference across adult age groups in determinations of the diagnostic value of individual pieces of behavioral information (Hess et al., 1999). From an expertise perspective, this may suggest that age differences in declarative knowledge are minimal, and that observed variations in the impact of such information on attention allocation and impression judgments reflect differences in the accessibility and generality of these structures. One implication of this is that relevant information may need to be more salient in order for linkages between knowledge and judgments to be activated in nonexperts.

We examined this possibility by having young, middle-aged, and older adults read a series of descriptions consisting of equal amounts of positive or negative behavioral information relating to either honesty or intelligence, and then provide impression ratings for each one based on this information. These descriptions also varied along two additional, independent dimensions. First, the amount of behavioral information presented was varied, with some descriptions containing one diagnostic cue and others containing three. Second, the extremity of the behavioral information was also varied, with some descriptions consisting of moderate exemplars of the relevant trait dimensions and others consisting of extreme exemplars. Linkages between information from the social world and relevant knowledge structures may be enhanced in nonexperts by increasing the salience of this information. If the expertise-based explanation of age differences is correct, then increasing the amount or descriptive extremity—and thus the salience—of diagnostic information should facilitate attention to such information. This in turn should increase the probability of trait-diagnostic inferences in younger adults and reduce age differences in trait ratings assuming that similar levels of declarative knowledge are present across groups.

A second goal of the present study was to examine an alternative explanation for previously observed age effects in the use of trait-diagnostic information. Specifically, we also investigated whether age differences in implicit theories concerning the stability of traits might account for these effects. Research has demonstrated that those who view traits as fixed entities (entity theorists) and those who view traits as malleable qualities (incremental theorists) tend to make different types of social inferences (e.g., Erdley & Dweck, 1993; Chiu, Hong, & Dweck, 1997). In short, entity theorists tend to be trait-focused, seeing a close correspondence between traits and behaviors, whereas incremental theorists tend more to be process-focused, perceiving the role of specific mediators or processes in shaping actions. Results from studies of person perception (e.g., Chiu, Hong, & Dweck, 1997; Erdley & Dweck, 1993) suggest that
individuals subscribing to an entity theory tend to make stable, dispositional trait inferences and also tend to explain the causes of behavior in trait terms. In contrast, individuals holding an incremental view tend not to infer traits as readily or as strongly, and instead tend to explain the causes of a target’s behavior more in terms of mediating factors such as goals, intentions, needs, or wishes.

Generalizing from this work, we hypothesized that those individuals who endorse an entity theory of personality will be more likely to use trait-diagnostic behavioral information in making impression judgments than will those subscribing to an incremental theory. By definition, these behaviors facilitate the accurate categorization of individuals into trait categories, and individuals who believe in the stability of internal traits should find such information especially informative. Recent research by Plaks, Stroessner, Dweck, and Sherman (2001) has also shown that, in contrast to incremental theorists, those individuals who subscribe to an entity orientation exhibit preferential attention to knowledge-consistent over knowledge-inconsistent information. This suggests that entity theorists may also selectively attend to diagnostic versus nondiagnostic information due to its relationship to existing knowledge. Of further interest was an examination of the possibility that an increase in entity-based beliefs with age in adulthood might account for previously observed age trends in the use of trait-diagnostic information.

There is some indication in the literature that, relative to younger adults, older adults may subscribe to entity beliefs. This is suggested both by their greater tendency to make dispositional attributions (e.g., Blanchard-Fields, 1994; Follett & Hess, 2002) and the finding that they are less likely to believe that negative personal attributes are controllable (Heckhausen & Baltes, 1991). In the present study, we explicitly examined age differences in entity-related beliefs to see if implicit theories mediate the relationship between age and impression judgments. If true, it would be expected that entity theorists would be more likely than incremental theorists to make inferences based on trait-diagnostic information, that aging would be associated with an increase in entity-related beliefs, and that controlling for such beliefs would eliminate the relationship between age and the processing of trait-diagnostic information.

**METHOD**

**Participants**

Participants in the young group \((M = 20.41, \text{ages 17–39, } N = 32 \text{ [23 women]})\) were recruited from Introductory Psychology classes and
received credit for an optional class assignment. Participants in both the middle-aged \( (M = 49.78 \text{ ages 40–58}, N = 32 \ [19 \text{ women}]) \) and older groups \( (M = 69.56, \text{ ages 61–78}, N = 32 \ [14 \text{ women}]) \) were recruited from the Raleigh area through newspaper advertisements and were compensated $20.00 each for their participation.

Materials

Target Descriptions

Thirty-two target descriptions were constructed using a set of 175 behaviors that were adapted from other sources (Hess et al., 1999; Skowronski & Carlston, 1987). These behaviors had previously been normed with young, middle-aged, and older adults, whereby individuals in each of these age groups rated both the valence of each behavior and how representative it was of its particular trait domain (honesty or intelligence). In order to ensure that the valence and trait representativeness of the stimuli were perceived in the same manner across age groups, behaviors were selected for use only if there were no significant age differences in either rating. Within each trait domain, 16 descriptions were created, each consisting of half positive and half negative behaviors. Of these 16 descriptions, eight contained three positive and three negative behaviors, whereas the remaining eight contained one positive and one negative behavior. A total of 128 behaviors were used to construct the descriptions. The ages of the fictitious target individuals to whom the behavioral descriptions were attached were not mentioned to avoid any possible confounding interactions between the ages of the participants and the ages of the target individuals. Target individuals were only identified by name, with the gender of the name occurring equally often as male and female across the target descriptions. Of the eight descriptions within each Trait Domain × Description Length grouping, four consisted of extreme positive and negative trait exemplars, whereas the other four consisted of moderate positive and negative exemplars. Extremity was based on mean standardized ratings from the norming sample, with extreme descriptions containing positive and negative behaviors with mean trait ratings of 1.1 and −1.1, respectively. In contrast, moderate descriptions contained positive and negative behaviors with mean trait ratings of .7 and − .7.

Target descriptions were developed such that the average rating for positive and negative behaviors in each one were approximately equal across all descriptions at each level of extremity. In addition, positive and negative behaviors within descriptions were chosen to be of
similar levels of extremity. The short and long descriptions were created so that the average extremity of behaviors was similar across description size. Four different sets of 32 descriptions were created by systematically rotating individual behaviors through descriptions, with each behavior appearing three times as part of a set of six-behavior descriptions and once as part of a two-behavior description across sets. Eight filler descriptions were also created, each of which contained four behaviors that reflected neither honesty nor intelligence.

*Implicit Theory Assessment*

Levy, Strossner, and Dweck's (1998) implicit theory questionnaire was used to assess participants' orientation along the entity/incremental continuum. This measure consists of eight statements, to each of which participants could indicate their agreement on a 6-point scale.

*Additional Measures*

A demographic questionnaire was used to obtain basic background information about each participant, and self-reported health was assessed using the SF-36 Health Survey (Ware, 1993). The Vocabulary Test 2 from the Kit of Factor-Referenced Cognitive Tests (Ekstrom, French, Harman, & Derman, 1976) was used to measure verbal ability, Salthouse and Coon's (1994) letter and pattern comparison tasks were used to assess processing speed, and the Wechsler Adult Intelligence Scale III (WAIS III; Wechsler, 1997) Letter-Number Sequencing subtest was used to assess working memory functioning.

*Procedure*

Participants were tested individually. At the beginning of each session, the background questionnaire, health survey, vocabulary test, and pattern and letter comparison tasks were administered. Participants were then presented with the impression formation task, in which they read 40 separate descriptions of fictitious people (32 target descriptions and 8 fillers). Participants were then presented with the impression formation task. Specifically, participants read each target description and then provided two impression ratings using a 5-point scale, the first relating to the relevant trait dimension (i.e., dishonest/honest, unintelligent/intelligent) and the second relating to likability. Descriptions were presented, one behavior at a time, on a computer screen, with participants controlling study times for individual behaviors using the space bar. Instructions were given to read each
behavior once, and to press the space bar when the participant understood the item. For filler items, participants rated how friendly the person was. These items were included to reduce expectancies regarding the type of judgment that would be required following each description. Four practice trials were given to ensure that participants understood the procedure.

Target descriptions were presented in one of four counterbalanced sequences, to which eight participants from each age group were randomly assigned. Within each sequence, each quartile of the list contained two filler items and one description from each Trait Domain × Behavior Extremity × Description Length condition. After the main portion of the experiment, participants completed an unrelated attitudes questionnaire, the letter-number sequencing test, and the implicit theory questionnaire. Participants were then debriefed and compensated.

RESULTS AND DISCUSSION

Sample Characteristics

Prior to conducting our main analyses, one-way analyses of variance (ANOVA)s were used to examine age differences on the various background measures. These analyses revealed relationships typical of aging (Table 1). Vocabulary scores increased with age whereas performance on the Letter-Number Sequencing task and the pattern and letter comparison tasks declined with age. Increasing age was also associated with a decline in self-reported physical health; no age differences were evident in self-reported mental health.

Impression Formation Task

Three different dependent measures were obtained from this task: study times, trait ratings, and likability ratings. Results of analyses on each of these measures are reported below. In each case, interest was in first determining whether the variables of trait diagnosticity, behavior extremity, and description size affected performance in the anticipated fashion. We then focused on the degree to which these factors moderated age differences in performance.

Study Times
We also investigated whether cognitive load affected the amount of time allocated to studying specific types of behavioral information. To do this, we examined study times for positive and negative behavioral information within each trait domain for participants in
Table 1. Participant characteristics

<table>
<thead>
<tr>
<th>Measure</th>
<th>Age group</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Young</td>
<td>Middle-Aged</td>
<td>Older</td>
<td>F(2, 93)</td>
<td>p</td>
</tr>
<tr>
<td>Years of education</td>
<td>M</td>
<td>12.75</td>
<td>16.31</td>
<td>15.84</td>
<td>29.11</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.55</td>
<td>2.29</td>
<td>2.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Letter-number sequencing</td>
<td>M</td>
<td>12.16</td>
<td>10.97</td>
<td>10.00</td>
<td>7.98</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>2.29</td>
<td>2.18</td>
<td>2.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pattern/letter comparison</td>
<td>M</td>
<td>0.48</td>
<td>0.11</td>
<td>-0.59</td>
<td>15.61</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>0.84</td>
<td>0.89</td>
<td>0.59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocabulary</td>
<td>M</td>
<td>25.34</td>
<td>28.28</td>
<td>29.98</td>
<td>10.29</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>3.28</td>
<td>5.35</td>
<td>3.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SF-36: Physical Health</td>
<td>M</td>
<td>52.30</td>
<td>49.11</td>
<td>45.94</td>
<td>7.51</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>4.58</td>
<td>5.90</td>
<td>8.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SF-36: Mental Health</td>
<td>M</td>
<td>49.77</td>
<td>52.17</td>
<td>53.68</td>
<td>1.55</td>
<td>.22</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>9.66</td>
<td>8.10</td>
<td>8.97</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Letter-number sequencing scores could range from 0 to 21. Pattern/letter comparison scores are Z scores. Vocabulary scores could range from 0 to 36. SF-36 scores are T scores.

the self-paced presentation condition. Before calculating means for each type of behavior, individual study times were divided by the number of words in the associated behavior. These per-word study times allowed a standard metric to be used across stimuli varying in length. Prior to calculating means for each participant in each condition, individual study times that reflected errors in responding (e.g., accidental key presses) or that were 3 SDs above or below the participant's mean study time were eliminated. This resulted in the exclusion of 2% of the data in each age group. Note also that there were different numbers of behaviors included in the two different description lengths, which somewhat complicates analysis of these data. Thus, we present two analyses of the study time data.

The initial analysis examined only the first two study times—one positive behavior and one negative behavior—in each description using a $3 \times 2 \times 2 \times 2$ (Age Group × Trait Domain × Behavior Valence × Behavior Extremity) ANOVA. Age was a between-participants factor, whereas the other three were within participants. With respect to our manipulated variables, the observed pattern of performance was consistent with expectations regarding the general impact of trait diagnosticity and behavior extremity on attention. Specifically, participants spent more time studying diagnostic behaviors than nondiagnostic ones within each domain, as indicated

1 Description size was not included as a variable because participants were unaware while reading the first two behaviors whether or not additional information would follow.
by a significant Domain × Valence interaction, $F(1, 93) = 156.84$, $p < .001$, $\eta^2 = .63$. Follow-up comparisons revealed that dishonest behaviors were studied significantly longer than honest ones (357 versus 335 ms), $F(1, 93) = 24.83$, $p < .001$, whereas intelligent behaviors were studied significantly longer than unintelligent ones (373 versus 311 ms), $F(1, 93) = 172.77$, $p < .001$. In addition, extremity of the behaviors in a description was found to moderate this effect, as reflected in a significant Domain × Valence × Extremity interaction, $F(1, 93) = 12.60$, $p = .001$, $\eta^2 = .12$. As can be seen in Figure 1, the salience of diagnostic over nondiagnostic information was magnified when descriptions contained extreme behaviors, with the enhancement due to extremity being significant in both trait domains ($ps < .04$).

We next turn to the examination of between-group differences in study times, where we anticipated that age would moderate the impact of trait diagnosticity. Consistent with expectations, a significant Age × Domain × Valence interaction was obtained, $F(1, 93) = 3.57$, $p = .03$, $\eta^2 = .07$. As can be seen in Figure 2, the previously described interaction between trait domain and behavior valence was enhanced with an increase in age, suggesting that the salience of trait-diagnostic information also increased with age. Whereas this effect was evident in both domains, the interaction between age and behavior valence was only significant for descriptions relating to honesty, $F(1, 93) = 3.38$, $p = .03$. It is important to note here that there were no overall

![Figure 1. The impact of behavior extremity on mean per-word study times (ms) for diagnostic and nondiagnostic behaviors.](image-url)
Figure 2. Age group differences in mean per-word study times (ms) for diagnostic and nondiagnostic behaviors.

Age differences in study times. In fact, the mean study time for older adults (347 ms) was slightly smaller than that for the younger adults (362 ms). This suggests that the obtained interaction between age and diagnosticity did not simply reflect an aging-related proportional increase in study times across conditions. Age did not moderate the impact of extremity on performance ($p = .93$), indicating that extremity increased the salience of diagnostic information in a similar manner across age groups.

Our second analysis examined only those study times associated with six-behavior descriptions. In the ANOVA conducted on these data, we included serial position in the list (first versus second versus third tertile) as an additional factor to examine how attention to diagnostic and nondiagnostic information changed as a function of the amount of prior information processed. Position was found to interact with both domain and valence, $F(2, 186) = 9.96, p < .001$, $\eta^2 = .09$, and domain, valence, and extremity, $F(2, 186) = 14.47, p < .001$, $\eta^2 = .13$, reflecting a diminution of the effects of diagnosticity and extremity on study times over serial position in the list. Importantly, serial position did not interact with age at any level in this analysis.

**Trait Ratings**

Responses on the trait rating scale were standardized within participants, and means calculated from these standardized ratings were examined using a $3 \times 2 \times 2 \times 2$ (Age Group $\times$ Trait Domain $\times$ Behavior Extremity $\times$ Description Length) ANOVA. As expected,
trait ratings were significantly higher for intelligence descriptions (.38) than for those dealing with honesty (-.39), $F(1, 93) = 306.74$, $p < .001$, $\eta^2 = .77$, once again reflecting the differential weighting of positive and negative behavioral information across trait domains. As predicted, this effect was moderated by description length, $F(1, 93) = 10.55$, $p = .002$, $\eta^2 = .10$, with the difference in ratings being greater for six-item descriptions (.43 versus -.44) than for two-item descriptions (.35 versus -.33). In other words, the diagnosticity effect was enhanced with an increase in diagnostic information.

Extremity was also found to affect ratings. First, a significant main effect of extremity was obtained, $F(1, 93) = 73.80$, $p < .001$, $\eta^2 = .44$, with ratings being lower for extreme than for moderate descriptions (-.15 versus .16). This appears to reflect the fact that the behaviors included in the target descriptions were not only descriptively, but also evaluatively extreme. Wojciszke, Brycz, and Borkenau (1993) observed similar negativity effects associated with evaluative extremity, which they attributed to a general social avoidance response toward individuals exhibiting extreme behaviors, regardless of trait domain or valence of the behaviors. The general negative impact associated with extremity was also found to increase with description length, $F(1, 93) = 6.65$, $p = .01$, $\eta^2 = .07$. For short descriptions, mean ratings were .12 for descriptions consisting of moderate behaviors versus -.11 for those with extreme behaviors. The corresponding means for long descriptions were .18 and -.21. Although a slight increase in the impact of trait-diagnostic information on ratings was observed with an increase in extremity, this interaction was not significant ($p = .35$). As reported below, however, extremity did moderate age differences in diagnosticity effects.

We now examine the extent to which previously observed age effects were moderated by description length and extremity. Note that the just-described evaluative extremity effect would be expected to exert a systematic downward effect on ratings regardless of trait domain, whereas descriptive extremity would be expected to exert its primary influence on strength of the diagnosticity effect (i.e., the difference between ratings in the two trait domains). Thus, our primary interest was in variations in the size of the diagnosticity effect in relation to these two variables rather than comparing the values of specific ratings. Consistent with past research, a significant Age × Domain interaction was obtained, $F(2, 93) = 7.03$, $p = .001$, $\eta^2 = .13$, reflecting the fact that the diagnosticity effect was greater for middle-aged and older adults than it was for young adults (Table 2). In other words, the impact of trait-diagnostic behavioral information on impression ratings increased with age.
Table 2. Mean trait ratings as a function of trait domain, description length, and behavior extremity

<table>
<thead>
<tr>
<th>Trait domain</th>
<th>Short descriptions</th>
<th>Long descriptions</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Moderate</td>
<td>Extreme</td>
<td>Moderate</td>
<td>Extreme</td>
</tr>
<tr>
<td>Young adults</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intelligence</td>
<td>.41</td>
<td>.09</td>
<td>.34</td>
<td>.26</td>
</tr>
<tr>
<td>Honesty</td>
<td>-.12</td>
<td>-.29</td>
<td>-.09</td>
<td>-.55</td>
</tr>
<tr>
<td>Diagnosticity effect*</td>
<td>.53</td>
<td>.38</td>
<td>.43</td>
<td>.81</td>
</tr>
<tr>
<td>Middle-aged adults</td>
<td></td>
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<td>.68</td>
<td>.23</td>
</tr>
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<tr>
<td>Diagnosticity effect</td>
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<td>.96</td>
<td>.94</td>
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<tr>
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<td>-.23</td>
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<td>Diagnosticity effect</td>
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*Mean rating for intelligence minus mean rating for honesty.

We hypothesized that this effect would be moderated by both description length and extremity, and consistent with this expectation, a significant Age × Domain × Length × Extremity interaction was obtained, $F(2, 93) = 3.45, p = .04, \eta^2 = .07$.

To understand this effect better, we decomposed it by conducting separate analyses within each level of extremity. For descriptions composed of moderate behaviors, the interaction between age and trait domain was significant, $F(2, 93) = 7.17, p = .001$. As can be seen in Table 2, the diagnosticity effect was larger in the two older groups than in the young, replicating previous studies that used similar types of stimuli (e.g., Hess & Auman, 2001). Although description length did not influence this effect ($p = .25$), the analogous Age × Domain interaction for extreme descriptions, $F(2, 93) = 3.46, p = .04$, was significantly moderated by this factor, $F(2, 93) = 3.40, p = .04$. This latter interaction represented the fact that age differences in the impact of trait-diagnostic information on impression ratings were significant for short descriptions ($p = .003$); for long descriptions, no significant age differences were found ($p = .33$). Thus, the age differences that existed using short or moderate descriptions disappeared when more extreme diagnostic cues were presented. The impact of the experimental manipulation in the young group was also indicated by the fact that the diagnosticity effect for long, extreme descriptions was significantly greater ($ps < .01$) than that observed in the other three conditions.
The one slight anomaly in the pattern of effects had to do with the older adults' ratings for short descriptions composed of extreme behaviors. Although the diagnosticity effect in this condition was still larger than that observed for younger adults, it was smaller relative to both middle-aged adults in that condition and to that observed for the older adults in the other three conditions. Examination of individual responses suggested that this depression in the diagnosticity effect was primarily due to two older participants, who exhibited negative diagnosticity effects (i.e., higher ratings for honest than for intelligence descriptions). When their data were eliminated, the difference in ratings between the middle-aged and older groups was no longer significant.  

Although the just-discussed age differences in performance are easy to see when the diagnosticity effects are examined in Table 2, they are less obvious when the individual ratings are examined given the general negative effect of evaluative extremity on the ratings of all participants in both trait domains. The observed impact of length and descriptive extremity of the target descriptions is more clearly illustrated when the means within each Age × Extremity × Length condition are adjusted to take into account the negative impact of extreme behaviors and the positive impact of moderate behaviors on ratings. When this is done, it is clear that increasing descriptive extremity and description length had the general effect of increasing ratings in the intelligence domain and decreasing them in the honesty domain (Table 3). In other words, our salience manipulation had the predicted impact of increasing the strength of trait-diagnostic inferences, and the observed age effects were primarily reflective of variations in the extremity of these inferences.

In sum, the results are generally supportive of an expertise-based view of age differences in the use of trait-diagnostic information when making social judgments. Specifically, age differences were in evidence when neither or only one accessibility-related cue was present. When the salience of trait-diagnostic information was increased by both adding more information and increasing the descriptive extremity of the information, younger adults exhibited the most benefit, and age differences were eliminated.

Likability Ratings
We next analyzed likability ratings in the same fashion. For the most part, the effects associated with stimulus characteristics were similar

Note that 10 of the 32 younger adults in this condition exhibited negative diagnosticity effects, further underscoring the inconsistency in use of trait-diagnostic information in this age group.
Table 3. Mean trait ratings adjusted for evaluative extremity

<table>
<thead>
<tr>
<th>Trait domain</th>
<th>Short descriptions</th>
<th>Long descriptions</th>
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<td>Extreme</td>
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<tr>
<td>Intelligence</td>
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</tr>
<tr>
<td>Honesty</td>
<td>-.40</td>
<td>-.32</td>
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</table>

to those obtained with trait ratings. Briefly, ratings were lower in the honesty domain than in the intelligence domain (−.30 versus .30), F(1, 93) = 230.81, p < .001, η² = .71, and with extreme behaviors than with moderate behaviors (−.13 versus .13), F(1, 93) = 71.83, p < .001, η² = .44. In addition, the extremity effect increased with description length, F(1, 93) = 10.40, p = .002, η² = .10, as did the effect of domain, F(1, 93) = 5.78, p = .02, η² = .06. Finally, extremity also interacted with trait domain, F(1, 93) = 19.84, p < .001, η² = .18. This interaction reflected the fact that whereas ratings were lower with extreme scores in both domains, the decrease was greater in the intelligence domain, (Mextreme = .08; Mmoderate = .51) than in the honesty domain (Mextreme = −.34, Mmoderate = −.25). These extremity effects on affective responses may once more reflect social avoidance tendencies, which become exaggerated with an increase in the number of extreme cues. The smaller reduction in likability ratings in the honesty domain when compared to the intelligence domain may simply reflect the fact that ratings were already relatively negative for descriptions of the former type.

Consistent with past research (e.g., Hess & Auman, 2001), age was not as strongly associated with variation in likability ratings as it was with trait ratings. In fact, no effects involving age were statistically significant.

Implicit Theories

We next investigated the extent to which age differences in beliefs about the malleability of personality characteristics could account for the age differences observed in the use of trait-diagnostic information. Responses on the implicit theory questionnaire (Cronbach’s
\( \alpha = .87 \) were summed to form a composite score, with higher scores representing stronger adherence to an entity orientation. According to Baron and Kenny (1986), three conditions are necessary to establish a mediational relationship. First, the mediator must be significantly related to the dependent variable. We tested for this condition using an ANOVA similar to that performed on trait ratings, but replacing age group with implicit theory score as a continuous predictor variable. After removal of a statistical outlier in the middle-aged group, the only effect involving theory was its interaction with domain and description size, \( F(1, 93) = 6.66, p = .01, \eta^2 = .07 \). Focused ANOVAs within description size revealed that implicit theories were unrelated to use of trait-diagnostic information for short descriptions \( (p = .43) \), but the interaction between theories and domain approached significance for long descriptions \( (p = .06) \). As can be seen in Figure 3, stronger identity beliefs were associated with greater weighting of diagnostic information in constructing trait inferences for the long descriptions, providing some support for the first of Baron and Kenny’s conditions. The fact the beliefs were not as strongly related to trait inferences with short descriptions may reflect individuals’ reduced willingness to make strong trait-diagnostic inferences when relevant information is limited.

The other two requirements for establishing mediation are (a) a significant relationship between the predictor (i.e., age) and the hypothesized mediator (i.e., implicit theory), and (b) the elimination of the relationship between the predictor and dependent variable when controlling for the mediator. To test for the first condition, we performed a one-way ANOVA on implicit theory scores using age group as a between-participants variable. This analysis revealed no relationship between age and implicit theory, \( F < 1.0 \). The absence of this necessary relationship is inconsistent with a mediational hypothesis, and thus no support was provided for this alternative explanation of age differences in the use of trait-diagnostic information.

**GENERAL DISCUSSION**

The present work was designed to examine an expertise view of aging-related variations in social judgments. From this perspective, it was

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\footnote{When these analyses were conducted using theory scores derived from the four increment-related items, these effects were even stronger. This is somewhat curious given the strong correlation (.65) between scores on the Entity and Increment items, which suggests responses are tapping into the same construct.}
argued that the accumulation of social experience with age results in not only the acquisition of declarative knowledge representing culturally based belief systems, but also an increase in the accessibility of this knowledge and its breadth of applicability. We tested this hypothesis by examining whether age differences in the use of trait-diagnostic information in the construction of impression judgments would be moderated by stimulus characteristics thought to facilitate accessibility to relevant knowledge structures. It was specifically hypothesized that increasing the amount of trait-diagnostic information as well as its extremity would increase the salience of such information, thereby facilitating accessibility to existing declarative knowledge structures in young adults and attenuating previously observed age differences in the impact of such information on impression. We also tested an alternative explanation for previously observed age differences in trait-diagnostic inferences.

The results are generally consistent with the aging-related expertise perspective. Specifically, the influence of trait diagnosticity on performance increased with increasing age. When reading the target descriptions, older adults spent a disproportionate amount of time studying diagnostic behaviors relative to participants in the two young groups. Middle-aged and older adults were also more likely than younger adults to incorporate trait-diagnostic information into
their impression judgments, replicating previous findings (e.g., Hess & Auman, 2001). Consistent with our expectations, however, these effects were moderated by our manipulations designed to increase the salience of trait diagnostic information.

At the attentional level, elevating the extremity of trait-related behavioral information increased the impact of diagnosticity on study times in all age groups, with extreme trait-diagnostic exemplars receiving the most attention. This supports our contention that extremity would enhance the salience of relevant knowledge underlying the diagnosticity effect. As predicted, age differences in trait ratings were also influenced by our stimulus manipulations. Specifically, elevating the salience of trait-diagnostic information by increasing both the number and descriptive extremity of target behaviors had a disproportionate impact on the performance of younger adults, significantly increasing the extent to which their trait ratings were based on this information. This also resulted in the elimination of age differences in trait-diagnostic inferences. The fact that the primary impact of description size and extremity was observed in the young group is consistent with our suggestions that increasing the salience of trait-diagnostic information would have the greatest effect on the behavior of those with lower levels of expertise.

The finding that extremity did not differentially influence the attention allocation (i.e., study times) of younger adults relative to the other two groups appears, on the surface, to be inconsistent with both the trait ratings results and our expertise perspective. In fact, it is not. There is little reason to expect that increasing the salience of relevant environmental cues should not have an effect on attention if relevant declarative knowledge is present. What is important is the fact that this attentional facilitation appeared to be more important for younger adults than for either middle-aged or older adults in terms of facilitating the use of this knowledge in making trait inferences. This is consistent with the idea that the accessibility/breadth of applicability of knowledge relating to trait diagnosticity is limited in young adulthood.

Note that age effects associated with trait ratings were not in evidence when likability responses were examined. This discrepancy in the strength of age effects associated with trait and likability ratings is similar to observations from other research (e.g., Hess & Auman, 2001; Hess et al., 1999) and may reflect the bases for these two types of judgments (e.g., Wyer & Srull, 1989). Trait ratings are thought to reflect the availability and or accessibility of relevant knowledge, and thus should be related to age to the extent that these factors are correlated with aging. In contrast, likability ratings are assumed to be more
reflective of affective responses, which in turn are assumed to be more automatic and have less of a cognitive component (Bargh, 1994). Thus, even if likability ratings are influenced by trait diagnosticity, the lack of age differences in such ratings may make sense if the associated affective information is activated in a relatively automatic fashion.

Further support for such an interpretation might also be gleaned from the effects associated with extremity. As noted earlier, extremity may not just be associated with trait-related information, but also with general approach-avoidance responses in social situations. Specifically, Wojciszke et al. (1993) hypothesized that there is a tendency for individuals to avoid those exhibiting extreme behaviors and to approach those exhibiting moderate ones. Consistent with this idea, these researchers and others (e.g., Czapinski, 1982) have shown that extremity is associated with a negative overall effect on trait ratings, even in the case of positive behaviors. This negative response to extreme behaviors is hypothesized to protect the individual by helping them avoid potentially harmful outcomes. For example, overly friendly behavior by an individual in a social situation might result in negative responses due to the suspicion that an ulterior motive may underlie such behavior.

In the present case, our use of behaviors that were not only extreme on trait representativeness but also on evaluation (as opposed to those used by Skowronski & Carlston, 1987) may have resulted in extremity having effects on both general affective responses and the accessibility of relevant knowledge. The latter type of effect was presumably related to the just-described age differences in the use of trait-diagnostic information on trait ratings, and was reflected in the impact of extremity on the use of diagnostic information varying across age groups. Note, however, that there was a also strong main effect of extremity on trait ratings that did not interact with age. In other words, individuals in all age groups appeared to incorporate this general avoidance/affective response in their ratings to the same degree (i.e., increased extremity resulted in a similar negative impact on ratings across age groups). This suggests that there is less age-related variability in affectively based responses than for those grounded in more cognitive mechanisms (e.g., declarative knowledge).

The present research project also tested a possible alternative hypothesis for the previously observed age trends in the use of trait-diagnostic information. We examined the possibility that age-related changes in beliefs about the stability of traits might account for the increase in use of trait-diagnostic information with increasing age in adulthood. Consistent with the notion that implicit beliefs about personality would be related to trait-diagnostic inferences, a positive
association was observed between degree of endorsement of an entity-based theory and the strength of such inferences. No support was obtained, however, for the hypothesis that age differences in implicit theories would mediate observed age effects on trait ratings because differences in entity-based beliefs across age groups were nonexistent.

CONCLUSIONS

The results of the present research are consistent with a growing body of evidence that suggests that development in adulthood is associated with increasing sophistication in the reasoning processes brought to bear in situations associated with everyday life. We have attempted to place the current findings within an expertise framework, in which it is argued that the normal accumulation of social experience throughout adulthood results in the establishment of sophisticated knowledge structures about the social world. As in other situations, continued experience and application of these structures should strengthen their power by increasing their breadth of application as well as their accessibility. This approach is consistent with other perspectives (e.g., Staudinger & Pasupathi, 2000), in which expertise is viewed as a component of life pragmatics involving the development of knowledge, procedures, and skills for regulating behavior.

Our developmental perspective with respect to trait-diagnostic inferences appears to be reinforced by research with children that suggests they have less well-developed theories (i.e., declarative knowledge) regarding trait-behavior relationships than adults. For example, Aloise (1993) had 3rd- to 5th-graders and young adults indicate how many behaviors they would require in order to confirm or disconfirm specific traits in people. Regardless of the type of trait or judgment, children required more behavioral evidence than did young adults. The decrease in information required for attribution with age is suggestive of the age-related development of schemas regarding the relations between behaviors and traits, resulting in young adults’ greater willingness to infer explicit linkages between the two. Importantly for the present perspective, although young adults were more willing to make trait attributions, there was little evidence of systematic use of trait-diagnostic information in making these attributions. For example, on several dimensions relating to competence, young adults required the same amount of behavioral information to confirm that someone was competent (e.g., smart) as they did to confirm that someone incompetent (e.g., dumb). For morality-related trait dimensions (e.g., rude-polite, nice mean),
inconsistent evidence of trait-diagnostic inferences was also observed. This finding supports our contention that the trait inferences of young adults are less complex than those observed later in adulthood.

Our research can be seen as a specific demonstration of one aspect of aging-related social expertise using a specific, but relevant tool (i.e., the study of trait-diagnostic inferences). It should be recognized that the current manner in which we are studying this expertise is somewhat limited, in that the performance context being examined is relatively simple. In addition, it would be useful to further validate the expertise explanation by relating performance to age-correlated and other indicators of social experience. For example, specific types of experience focused on understanding human nature should be associated with greater evidence of social expertise (e.g., Baltes et al., 1995). Such a relationship appears to be illustrated in the following commentary by Robert DeNiro, considered by many to be one of the greatest American actors. In it, he exhibits a clear understanding of the types of diagnosticity effects studied in our research and their influences on the nature of dramatic roles:

“Usually the bad guys are more interesting than the good guys; that’s just the way it is. Because they’re bad, they’re allowed to show more colors—they can show good sides, too. Whereas, if you’re a good guy, you have to represent something—in a traditional type of film.” (Boyar, 2000).

Additionally, it is important to raise the question whether other characteristics of the individual may interact with experience in determining expertise. Though the observed increase in knowledge accessibility has been shown to be associated with advancing age, future research would certainly enhance the understanding of the development of this expertise by examining alternative methods for increasing accessibility.

As is the case with all cross-sectional research, it is important to note the inherent confound between age and cohort. This study, like those similar to it, strives to increase our understanding of age-related differences in behavior, but it is unable to make specific claims regarding the intra-individual change that occurs with age. Future research would benefit by examining longitudinal data that would allow us to be better distinguish between age-related differences and the more interesting developmental trajectories.

Conceivably, the study of trait-diagnostic inferences could also have a broader impact on our understanding of social cognitive
functioning and aging. For example, performance might be examined within the context of declining general cognitive resources to test the hypothesis that the development of this expertise might be adaptive for older adults by allowing them to maintain high levels of functioning with minimal drain on resources. Within this same vein, it may be interesting to see if aging and associated cognitive declines limit the flexibility with which this expertise can be applied, as suggested by Ybarra and Park (2002). Studies that examine these interacting forces should provide us with a better understanding of the impact of aging on everyday social cognitive functioning.

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