

ABSTRACT

Leclerc, Christina M. Age-Related Differences in the Use of Diagnostic Information in Social Judgments. (Under the direction of Thomas M. Hess)

The purpose of this research was to provide further evidence for a social expertise view of adult age differences in social cognitive functioning. Of specific interest was the extent to which such a perspective can be used to explain the differential use of trait-diagnostic information by young and older adults in the construction of social judgments. The use of such information has been shown to increase with age (Hess & Auman, 2001), suggesting the presence of superior social expertise in older adults when compared to younger adults. In the current research, factors associated with accessibility to relevant knowledge—extremity of trait-relevant behaviors and the amount of diagnostic information—was manipulated to determine if the differences between presumed experts (i.e., older adults) and nonexperts (i.e., younger adults) were attenuated when the salience of trait-diagnostic information was increased. Young, middle-aged, and older adults studied a series of behavioral description describing fictitious target individuals. Study times for individual behaviors contained in these descriptions and impression ratings for each target person were examined. Results of this study replicate past research; specifically, diagnostic information was studied longer and had a stronger impact on impression ratings than did nondiagnostic information, and the impact of diagnosticity increased with age. Further, extreme cues served to enhance the already present diagnostic effects in study time, while also causing ratings of target individuals to be more negatively rated overall. The expected moderation of age differences in the use of diagnostic information based on the extremity of cues did not follow the expected direction. The relationship between

age, extremity of cues, and the use of diagnostic information was not significant, suggesting that extremity did not serve to differentially enhance the accessibility of knowledge structures across age groups as originally expected. In addition, larger amounts of diagnostic information actually resulted in greater age differences in the impact of diagnostic information on impression ratings. This, along with the absence of age differences when minimal diagnostic information was available, may suggest that those with expert knowledge are only willing to use it when sufficient cues are presented. I additionally tested an alternative explanation for observed age differences in the use of diagnostic information. Specifically, I investigated whether age differences in implicit beliefs regarding the stability of traits might mediate age differences. No support was obtained for this hypothesis. In sum, although the results were not entirely consistent with expectations, they were generally supportive of an aging-related increase in social expertise as an explanation for age differences in social judgments.

AGE-RELATED DIFFERENCES IN THE USE OF
DIAGNOSTIC INFORMATION IN SOCIAL JUDGMENTS.

by

CHRISTINA M. LECLERC

Signed: _____

A thesis submitted to the Graduate Faculty of
North Carolina State University
in partial fulfillment of the
requirements of the Degree of
Master of Science

DEPARTMENT OF PSYCHOLOGY

Raleigh, North Carolina

April 4, 2003

APPROVED BY:

Lynne Baker-Ward, Ph.D

Christopher Mayhorn, Ph.D

Chair of Advisory Committee
Thomas M. Hess, Ph.D.

BIOGRAPHY

Christina Leclerc is originally from Saco, Maine. She graduated from Thornton Academy in 1997. In 2001, she graduated from Stonehill College with a B.A. in psychology. Later that year she enrolled in a combined M.S. and Ph.D. program in developmental psychology at North Carolina State University in Raleigh. Christina's research for her master's program focused on the use of diagnostic information in older adults, and she earned her M.S. in developmental psychology in May, 2003.

TABLE OF CONTENTS

	Page
LIST OF TABLES.....	iv
LIST OF FIGURES.....	v
INTRODUCTION.....	1
LITERATURE REVIEW	
Summary of previous aging and cognition research.....	1
Social Expertise.....	1
Diagnosticity.....	3
Extremity Bias.....	5
Age Differences in Trait Diagnostic Inferences.....	6
The Current Study.....	14
The Role of Implicit Theories.....	16
METHOD	
Design Statement.....	19
Participants.....	20
Materials.....	20
Target Descriptions.....	20
Implicit Theory Questionnaire.....	22
Background Measures.....	23
Procedure.....	24
RESULTS	
Participant Characteristics.....	25
Impression Formation Task.....	26
Study Time.....	26
Impression Ratings.....	31
Theoretical Orientation.....	37
DISCUSSION	
Moderators of the use of Diagnostic Information.....	39
Age as a Moderator to Diagnosticity.....	44
Theoretical Orientation.....	46
Conclusions.....	47
LIST OF REFERENCES.....	49
APPENDIX.....	53

LIST OF TABLES

	Page
Table 1. Mean Target Description Ratings.....	22
Table 2. Theoretical Orientation Items.....	23
Table 3. Participant Characteristics.....	27
Table 4. Trait Inferences by Domain and Extremity.....	34
Table 5. Age Group Differences as a Function of Domain and Set Size.....	36
Table 6. Interactions Between Age and Domain within Extremity.....	37

LIST OF FIGURES

	Page
Figure 1. Mean Study Time for Diagnostic vs. Nondiagnostic Cues.....	29
Figure 2. Study Times by Domain for Each Level of Valence and Extremity.....	31
Figure 3. Mean Study Time for Age Group x Domain x Valence.....	32

One of the most important goals in the study of adult development and aging is to understand how individuals adapt to changes in their environments and within themselves. Within the cognitive domain, it had been hypothesized that there is a reduction in the processing resources that make up the foundation of many aspects of cognition. In spite of such changes, older adults appear to function quite effectively in real life. Of interest are the mechanisms associated with adaptation to changes in basic cognitive resources that allow the maintenance of function.

Hess (2000) has suggested that there are at least two ways in which individuals may adapt to resource reductions in the social cognitive domain. First, resource allocation may become more selective, with the extensiveness of processing being related to the meaning that the individual attaches to the situation (Hess, Rosenberg, & Waters, 2001).

Social Expertise. Another mechanism discussed by Hess (2000), and the one most closely related to the current research, is that aging-related resource reductions may also be dealt with through knowledge-based processes. As one ages, one naturally accumulates social experience about the world, which allows for the construction of knowledge structures that characterize socially relevant information, such as types of people and social situations. As these structures increase in strength through further experience, their ease of accessibility also increases, this in turn leads to a greater probability that these structures will be activated in the appropriate situations. As individuals gain more experience in the world, they also accumulate practice in the use of these structures as well as increase the breadth (and limitations) of their application. These interpretive structures should then ease the demand on

resources as they enable the individual to make relatively complex inferences while bypassing the resource allocation phase.

One way to think about this notion is in terms of gaining social expertise throughout the lifetime. This can be related to Staudinger and Pasupathi's (2000) idea of "life pragmatics." Social expertise refers to the accumulated social experience gained with advancing age, and can be characterized as the accumulation of knowledge across time and the ability to apply this knowledge to everyday living. Thus, the experience older adults acquire from their environment becomes the adaptive ability to organize and apply this gained knowledge. The knowledge acquired over time and associated with social expertise may originate from one of several areas. Idiosyncratic knowledge may be gained from a particular individual's personal life circumstances. Hence, schemas may be formed based on context-specific life experience (e.g., religion, social class). Social knowledge structures may also be based on experiences related to specific group membership, reflecting expertise associated with age-graded social structures (e.g., Hess, 1992). A third type of knowledge that is expected to develop over the course of the lifespan is that of culturally shared beliefs about the social world. This knowledge about the culturally shared theories regarding the causal factors underlying behavior (Hess & Auman, 2001) is of particular interest to this research. Hess and his colleagues (Hess & Auman, 2001; Hess, Bolstad, Woodburn, & Auman, 1999; Hess & Pullen, 1994) have shown that, as we age, the application of gained social experience becomes more effective, resulting in more accurate trait inferences made from a target's behavior. With increasing age and expertise, increasingly elaborated knowledge structures that permit sophisticated inferences about

the social world with minimal strain on processing resources may develop. The idea is consistent with Fiske's notion that individuals are "cognitive misers" (Fiske & Taylor, 1991), striving to minimize cognitive effort. This development and organization of knowledge may be a particularly adaptive feature for older adults who experience decrements in both physical and cognitive resources that constrain their ability or motivation to engage in complex processing operations.

The goals of this research were to further test the notion of social expertise by examining the impact of the accessibility of diagnostic information. It is thought that more extreme and larger amounts of diagnostic information will increase the knowledge structures causing the age-differences in the use of diagnostic information to be attenuated.

Diagnosticity. The present research was focused on further examination of age-related social expertise as reflected in the use of trait-diagnostic information on impression formation. Originally discussed by Rosch (1978), a diagnostic cue is defined as an attribute that allows for categorization in a specific category while also disqualifying those stimuli that possess the attribute from being members of alternative categories. In the case of trait diagnosticity, behaviors are cues, and people consider these cues in the context of all the information available to them to determine which trait category (e.g., prototype of a dishonest person) best describe the target individuals. The behaviors are not diagnostic in and of themselves, however, but are considered diagnostic because their related trait categories hold diagnostic qualities. While forming impressions, it is often found that some behaviors are inherently more informative than others because they tap into trait categories possessing high diagnostic value. This

suggests that some behaviors are more diagnostic for assigning people to trait categories than are others. These trait-diagnostic behaviors allow individuals to make inferences about target people quickly, easily, and accurately.

Skowronski and Carlston (1989) hypothesized that the perceived informativeness of a behavior is related to its category diagnosticity. The category diagnosticity of a given behavior depends in part on its degree of category exclusivity; the more likely a behavior is to be a member of just one of multiple categories, the more diagnostic a behavior tends to be. Earlier work by Skowronski and Carlston (1987) established that a cue's exclusivity contributes to its category diagnosticity, and that category diagnosticity is then related to a cue's impact on impression formation.

In their work, Skowronski and Carlston (1989) argued that two major domains exist in which behavior can be categorized: competence (ability) and morality. Their research has shown that the types of behaviors classified as diagnostic in the morality domain are not the same as those in the competence domain. Specifically, positive behaviors are considered diagnostic in the competence domain (the positivity bias), whereas negative behaviors are diagnostic in the morality domain (the negativity bias). For example, if a student receives an "A" on his Chemistry exam, we are fairly confident when we say that he is intelligent, since there are relatively few competing explanations for the outcome. If, however, he fails the exam, we cannot be as confident in inferring a lack of intelligence since a number of other factors could conceivably contribute to the outcome (e.g., illness, lack of studying, fatigue). In contrast, if an individual steals a car, we are fairly confident in saying that he is a dishonest person as there are few alternative explanations. If the same person does not lie about his age when asked, we

cannot be as certain in inferring honesty since this behavior could be observed in both honest and dishonest individuals. In general, trait-diagnostic behaviors are considered diagnostic because they are unlikely to be performed by someone not possessing the attribute (e.g., people with poor verbal skills rarely succeed in public speaking venues) and therefore allow more accurate categorization of an individual along that relevant trait dimension. Nondiagnostic behaviors on the other hand can be observed in individuals on both ends of a specific trait dimension and are then less informative in making accurate categorizations.

Extremity Bias. Skowronski and Carlston (1987) also discuss the existence of an extremity bias, with more extreme behaviors being more diagnostic than more moderate behaviors of either positive or negative valence. Past research has indicated that overall extreme behaviors are seen as characteristic only of people who have extreme traits, while moderate behaviors may be characteristic both of people who have extreme and moderate traits (Reeder, 1985; Reeder & Brewer, 1979). Consequently, knowing that someone has committed an extreme act is informative; knowing that someone has performed a moderate act is less so. Stealing money, for example, is considered an extreme behavior and is therefore viewed as characteristic only of extremely dishonest actors. A more moderate behavior, such as lying about one's age is then viewed as characteristic of both extremely dishonest actors and moderately dishonest actors. Furthermore, because extreme behaviors are perceived as more diagnostic than are more moderate behaviors, judgments based on multiple cues, some of which are extreme and some of which are moderate, typically demonstrate extremity biases.

Skowronski and Carlston (1987) found that, with increasing extremity, the probability that behaviors could be classified into an opposing trait category decreased substantially, with the decrease being particularly noticeable for diagnostic behaviors (positive-intelligent and negative-morality). When a target was described in terms of behaviors that were opposite in valence but equal in level of extremity, judgments tended to be biased more toward the diagnostic end of the trait domain when the behaviors were extreme than when they were moderate. For example, a target was rated as more intelligent when described by one behavior implying high intelligence and one implying low intelligence than when described by one behavior implying moderate intelligence and one implying moderate stupidity. Thus, the impact of diagnostic cues seems to become even greater with increasing cue extremity; the extremity of a behavior, however, is not sufficient to override the positivity and negativity diagnosticity effects.

Throughout their work, Skowronski and Carlston have shown consistently the existences of the positivity, negativity, and extremity biases. Research in the area of impression formation based on behavioral cue diagnosticity, however, has mainly focused on younger adults. In an attempt to extend this work into the later half of the life span, Hess and his colleagues have conducted numerous studies comparing the use of diagnostic trait information across adulthood.

Age Differences in Trait-Diagnostic Inferences. In an initial study, Hess and Pullen (1994) asked both younger and older adults to read descriptions of fictitious target individuals who were depicted in either a positive or negative manner. Participants were then presented with additional behavioral information about the

targets, some being inconsistent with the original information. Impression ratings of the target individuals were collected both before and after presentation of the additional information. The researchers were interested in determining the factors associated with impression change.

Age differences in impression ratings of target persons obtained by Hess and Pullen (1994) suggest that, with age, there are increases in knowledge-based processing. According to this work, it seems that older adults are more likely than their younger counterparts to interpret events in terms of normative belief systems associated with diagnosticity. Specifically, young adults tended to change their impression ratings regardless of the additional information presented, while older adults were likely to change their ratings only if the additional information was diagnostic in nature. The authors hypothesized that the increases in older adults' social expertise resulting from accumulation of experience with the social world results in strong belief systems and therefore a higher degree of chronic accessibility of these systems for older than for younger adults.

Subsequent research has provided additional support for older adults' increased emphasis on diagnostic trait behaviors in making judgments in comparison to younger adults. Hess et al. (1999) investigated the impression ratings of various-aged adults using behaviors that were either highly diagnostic of trait categories or low in diagnosticity. Similar to the previously described study, Hess et al. (1999) had both younger and older adults read descriptions of target individuals that were either positively or negatively valenced. In the Hess and Pullen (1994) study, however, all stimuli related to the morality domain. In contrast, half of the behaviors in this study

related to the honesty domain, while the other half was related to the intelligence domain. Thus, some people read information with high trait diagnosticity (negative-honesty or positive-intelligence) and some with low diagnosticity (positive-honesty or negative-intelligence). The researchers were again interested in how impressions changed with the addition of behavioral information that was of the opposite valence.

Results of this study indicated that age differences exist in the extent to which the trait diagnosticity of behavioral information is considered in modifying impressions. Specifically, young adults once again tended to modify their original impressions based mainly on the additional contradictory information presented about the target. That is, younger adults changed their impression in response to the consistency of the new information with the initial target description, regardless of the diagnosticity of the original or new information. This indicates that younger adults were engaging in very little inferential processing aside from that needed to derive evaluative implications from behaviors.

In contrast, impression change in the two older groups was based on the trait diagnosticity of the original and new information, suggesting greater use of inferential, knowledge-based processing with age. Middle-aged and older adults in the same experiment tended to display more selective responses to the target's behavioral inconsistencies. Participants in these two older age groups altered their original responses based on presentation of additional inconsistent behavioral information, but also based on supplementary trait diagnostic cues about each target individual.

Middle-aged adults display greater impression change when the additional information was higher in diagnosticity than that of the originally presented information.

Specifically, when dishonest behaviors were presented in addition to a target that had originally been portrayed as honest, changes in impression ratings were greater than when honest behaviors were presented in addition to a target that had originally been portrayed as dishonest. In the same light, impression change was greater when intelligent behaviors were presented in addition to the original unintelligent target description than if unintelligent behaviors presented in addition to an originally intelligent target. These results indicate that participants are in fact responding to the diagnosticity of the additional behavioral information rather than their positive or negative valence since the positivity bias is found in the ability domain while the negativity bias is found the morality domain.

Older adults displayed a similar pattern of response, but the patterns of impression change were not as clear as those of the middle-aged participants. Older adult participants displayed obvious diagnosticity effects in their impression change, with the effect being more evident in the morality domain. In the ability domain, older adults' impression change was consistent with expectations connected with cue diagnosticity, but the effects were not as strong as those found in the morality domain.

Overall, the findings suggest that there are qualitative differences in the impression change processes across adulthood. It seems that with age, the type of information considered when constructing and adapting social judgments changes.

Since no significant age differences were found in the performance on items such as the behavior recall or the rating of the diagnostic value of individual behaviors it is thought that the age effect is attributable to participants' use of such information rather than to differences in the understanding of diagnosticity. Consistent with the

social expertise perspective of social-cognitive functioning, Hess and Pullen (1994)

speculated that differences in the breadth or accessibility of knowledge regarding the trait diagnosticity of behaviors were the cause of the differences in ratings. More simply put, the researchers posit that older adults, due to their increased amount of social experience, are better able to organize, integrate, and apply information to a social situation in comparison to younger adults. This may also explain the conflicts found between this research and that of Skowronski and Carlston (1987, 1992), who have shown that young adults do indeed attend to diagnostic information. Skowronski and Carlston (1992) found, however, that younger adults mainly use diagnostic information when forming impressions based on extreme exemplars. These extreme cases may be more likely to activate links to diagnostic structures in those individuals who do not have the well-developed knowledge bases gained from years of social experience.

Discrepancies found between Skowronski and Carlston's (1992) work and that of Hess et al. (1999) may be due to these extremity issues. In their work, Hess et al. purposely used more moderate behaviors, which may not have been strong enough to elicit the use of diagnostic information in younger adult participants. In the present study, I include both moderate and extreme behaviors in order to further investigate this phenomenon.

However, Skowronski and Carlston (1987, 1992) found that nondiagnostic as well as diagnostic information influences impressions in their younger, "non-expert" adult participants. Hess et al. (1999) postulate that the accessibility of diagnostic information may change with age, which would explain differential judgment ratings across younger and older age groups. If this were in fact the case, accessibility would

reflect a clear connection between the trait implications and the trait diagnosticity of specific behaviors, which in turn would be reinforced by relevant social experiences. Since the cumulative amount of social experience increases with age according to the social expertise view, the accessibility of diagnosticity-related information would increase as well due to practice associated with application, resulting in trait diagnostic information having more of an impact on impressions with increasing age. Skowronski and Carlston (1992) found that diagnostic behavioral cues affect the impression formation of younger adults most when using extreme exemplars of behavioral traits. This could then be reflective of generally lower levels of expertise in young adults, with reduced accessibility of such information being observed across more moderate exemplars of behavioral traits. Extreme behaviors are thought to make knowledge structures more readily available to those with less social expertise, enhancing the already present diagnostic information.

Recent research by Hess and Auman (2001) further investigated age differences in the use of diagnostic information by examining both ratings and patterns of study time. They found that participants of all ages attend significantly longer to negative morality traits and positive ability traits, again providing support for the negativity and positivity biases respectively. This pattern of findings, however, was more extreme in the older adult group. This finding of differential attention was replicated across various age groups. These results, however, further suggest that age differences exist in the perception of the information value of different behaviors when presented with the context of an impression formation task. Hess and Auman also observed an age-

related increase in the use of diagnostic information in impression ratings in both the morality and competence domains.

Hess and his colleagues have investigated several alternative explanations for the differential use of trait-diagnostic information across age groups. Hess and Pullen (1994) adopted a viewpoint that conceptualized age differences in social cognition in terms of variations in functions associated with both processing skills and knowledge systems (Hess, 1994). More specifically, these authors suggested that older adults possess poorer cognitive resources due to normative changes in cognitive skills associated with age. This, in turn, may cause these individuals to attend more to negative than to positive information in the morality domain due to the attention grabbing aspects of the former (e.g., Pratto & John, 1991). They found no support for this hypothesis, however, in that differences in basic cognitive skills could not account for variations in the representation of social events in memory.

Another factor that might explain some of the age-related variability in the use of diagnostic information has to do with the interpersonal aspects of behavior. Wojciszke (1997) discussed the idea that morality-related behavioral cues are more likely to have consequences for others, whereas ability behaviors have direct consequences on the self. Given the hypothesized aging-related increase in salience of affective outcomes associated with interpersonal interaction, consequences of behaviors performed by others may have a greater effect on the older adult individual. For example, Carstensen's (1992) Socioemotional Selectivity Theory posits that achievement and career issues become relatively less important with age, whereas emotional goals associated with interpersonal and family relationships increase in salience.

Brycz and Wojciszke (1992) found that, overall, behavior traits in the morality domain tend to be other-profitable (i.e., primary impact on others) in nature, while traits related to abilities and accomplishments are mainly self-profitable (i.e., primary impact on the self) in character (Peeters, 1979; Wojciszke & Pienkowski, 1991). Since morality-related traits, such as honesty, have strong implications for those in contact with the possessor, they may hold rewards when present and punishments when absent. Accomplishments and skills, such as intelligence, hold rewards or punishments solely for the possessor of such traits, as the intelligence of an individual rarely has effects on others. Hess et al. (1999) did find a tendency for older adults to attend to diagnostic information more in the morality domain than in the competence domain, suggesting that older adults' greater use of diagnostic information in this domain may have, in part, been related to interpersonal factors.

It has also been found that morality impressions are more saturated with affect than ability judgments, as often morality-related behaviors of others have greater resulting consequences. Consistent with this theorizing, Wojciszke et al. (1991) found that participants rated target individuals more extremely when their behavioral acts were related to morality than when these acts exemplified skills and abilities. Results of the work done by Brycz and Wojciszke (1992) indicate that impression changes took place quickly in overcoming the influence of information on intelligence whereas slow changes were found for honesty. These changes took place, however, regardless of the direction of change. Hess and Auman (2001) examined impression formation using target behaviors that focused on self- versus other-profitable outcomes could, but found that age differences in the use of diagnostic information were present regardless of the

focus of the behavioral information. This suggests that age differences in the use of trait diagnostic information are not due to direction that consequences occur (self or other).

Hess and Auman (2001) also investigated whether effects due to in-group or out-group biases affected the use of diagnostic information and the nature of trait inferences across age groups. Research conducted by Hess, Rosenberg, and Waters (2001) indicated that impressions based on trait-diagnostic information are somewhat more probable for out-group members (targets of dissimilar age) than for in-group members (targets of similar age). This pattern of results was expected because out-group members are more likely to cause perceivers to commit the fundamental attribution error by forming impressions based mainly on dispositional information and less so on situational factors. Hess and Auman (2001) hypothesized that it was possible that targets were perceived as younger adults in both their study and in an earlier study by Hess and Pullen (1994). With this in mind, they hypothesized that older adults might be more likely to see the fictitious younger adult target individuals as out-group members and would therefore be more likely to commit the fundamental attribution error (i.e., be more likely to incorporate trait diagnosticity into their impression ratings). In fact, Hess and Auman (2001) found that the age of the target had no significant effect on the use of diagnostic information, suggesting that differences between age groups were not related to in-group/out-group biases.

The Current Study. The current study was designed to further test the social expertise view regarding the increased use of diagnostic information with age. Specifically, I attempted to further examine the impact of factors that could be

associated with the accessibility and application of social knowledge on the differential use of trait diagnostic information in impression formation across adult age groups. Participants were presented with an impression formation task in which I examined age differences in the use of diagnostic information as a function of behavioral extremity, number of pieces of diagnostic information, and behavioral domain.

I hypothesized that because of increasing amounts of social experience and the associated development of expertise in the form of more accessible and better articulated social schemas, the use of trait-diagnostic information will increase with age, with the age trend most conspicuous for moderate exemplars of both morality and ability traits. As discussed previously, it is expected that with extreme behavioral cues, individuals of all age groups will base their judgments on the trait diagnosticity of the cues, bridging the gap usually found between the younger and older adult samples. These extreme cues are more likely to make knowledge structures accessible in those participants with less social experience.

This research also examined the impact of the number of behavioral cues on the use of trait-diagnostic information. It is postulated that younger adults with less social experience and therefore less developed schemas about the social world may be more likely to use trait diagnostic information when greater amounts of such information are present. This suggests that more cues would result in a greater probability that the necessary knowledge structures would be available. For example, a younger adult participant may be more likely to use the trait diagnosticity of behavioral cues if presented with three positive ability behaviors than if presented with only one.

Therefore, I hypothesized that age differences in the use of diagnostic information in forming impressions of others will decrease as the amount of relevant behavioral information increases.

The Role of Implicit Theories. I also tested an alternative hypothesis associated with implicit theories concerning the stability of traits and their possible effect on the use of trait-diagnostic information. Research has consistently shown that those who view traits as fixed entities (entity theorists) and those who view traits as malleable or increasable qualities (incremental theorists), tend to draw different social inferences (e.g., Erdley & Dweck, 1993; Chiu, Hong, & Dweck, 1997). Specifically, entity (fixed) theorists tend to draw trait inferences from social information far more readily than incremental (malleable) theorists, even when information is sparse, when the task does not solicit trait inferences, or when alternative interpretations for a behavior or outcome are made explicit. In contrast, incremental theorists, not believing in fixed traits and taking a more dynamic view of human nature, are more likely than entity theorists to take other things (besides dispositions) into account in describing themselves and others in explaining behaviors. Specifically, they tend to make more process-oriented interpretations of behaviors, focusing more on aspects of behavior that may have led to an outcome (e.g., the amount of effort exerted), or on psychological mediators within the actor (goals, needs, emotional states) that may have motivated a behavior. 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 interested in person perception suggest that individuals holding an entity theory tend to make stronger, more 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 also tend to instead explain the causes of a target's behavior more in terms of mediating processes such as goals, intentions, needs, or wishes. For example, Chiu, Hong, and Dweck (1997) found that entity theorists rated both positive and negative behaviors, even those that were mildly valenced, as significantly more indicative of the target's moral traits than did incremental theorists. Despite these differences, Chiu et al. found that entity and incremental theorists' evaluative ratings of the behaviors themselves were virtually identical, both for the positive and negative behaviors. This suggests that, although entity theorists tend to make stronger trait inferences from behavioral information than their incremental counterparts, this is not because they evaluate the behaviors as being more positive or more negative.

These findings suggest that when both entity and incremental theorists make trait attributions, their attributions appear to mean different things. For entity theorists, affixing a trait refers to identifying an enduring dispositional label whereas for incremental theorists, affixing a trait refers to offering a temporary, descriptive label. Based on this, I hypothesized that entity theorists would be more likely to use trait-diagnostic behaviors in forming their impressions as these behaviors by definition refer to the probability that a person can be easily and accurately categorized into a given trait domain. In this research, I was interested in examining if implicit theories affected

judgments made about individuals, and whether age differences in the nature of such theories may mediate age effects found in the use of diagnostic information.

As a result of their life experience, older adults may have different beliefs than younger adults about personality (e.g., its situational specificity or its plasticity), the specific indices of its underlying nature, and the causal factors associated with behavior (e.g., Blanchard-Fields, 1986; Heckhausen & Baltes, 1991). If age differences in beliefs about the nature of specific personality attributes do exist (e.g., entity beliefs increase with age), then it is possible that previously observed age differences in the use of diagnostic information might be traced to such differences. There is some suggestion in the literature that old age is associated with greater entity-related beliefs. For example, Heckhausen and Baltes (1991) found that, although high agreement exists between age groups regarding the desirability of specific personal attributes, older adults are less likely than younger adults to believe that negative personal attributes are controllable, suggestive of a somewhat greater entity orientation.

Additional research on attribution also appears to suggest the possibility of entity related beliefs in later life. Follett and Hess (2002) found that older adults display a higher level of the fundamental attribution error. Older participants in this research were likely to ignore the situation and attribute behavior to internal or dispositional states. Earlier research conducted by Blanchard-Fields (1994) also indicates that older adults are more likely than middle-age and younger adults to make dispositional attributions, with little emphasis in this age group being placed strictly on the situational attributions. These dispositional attributions also suggest an entity based theoretical perspective.

If the alternative hypothesis is correct, then advancing age should be associated with an increase in beliefs relating to the entity orientation, with these increases accounting for age differences in the use of diagnostic information. That is, the implicit theoretical perspective should mediate the relationship between age and the use of trait-diagnostic information.

I included a middle-aged group in this study a middle-aged group in order to get a better picture of the developmental course of impression formation processes. The inclusion of this group was hoped to facilitate distinguishing between competing explanations. For example, if the expected age differences reflect a shift from behavioral consistency to diagnosticity due to increasing experience with social interactions, we expected that middle-aged adults would perform more like older adults because of their additional years of social experience compared to younger adults.

Method

Design Statement

This study used a 3 X 2 X 2 X 2 (Age Group X Trait Domain X Behavior Extremity X Set Size) design. Young, middle-aged, and older adults read a series of 32 target descriptions that contained either two or six behaviors. The behaviors across descriptions varied in terms of the trait domain they represented (honesty or intelligence) and the degree to which they were representative of the trait domain, with half the descriptions composed of extreme trait exemplars and half composed of moderate exemplars. Participants read through each description, one behavior at a time, and then provided impression ratings based on the behavioral information

contained in the descriptions. Independent variables were the amount of information presented, the extremity of the information, and the diagnosticity of the information.

Dependent variables that were measured were the mean per-word study time for each behavioral cue and the trait ratings assigned to each target.

Participants

Participants in the young group ($M = 20.41$, ages 17-39, $N = 32$, 23 females, 9 males) were recruited from introductory psychology classes at North Carolina State University and received two credits towards completion of an optional class assignment. Participants in both the middle-aged ($M = 49.78$ ages 40-58, $N = 32$, 19 females, 13 males), and older groups ($M = 69.56$, ages 61-78, $N = 32$, 14 females, 18 males respectively) were recruited from the Raleigh and surrounding areas through newspaper advertisements and were compensated \$20.00 each for their participation.

Materials

Target Descriptions. Thirty-two target descriptions, consisting of two or six behaviors were constructed using 175 behaviors (88 honesty related, 87 intelligence related) 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 domain (honesty or intelligence). These ratings were made on a 7-point Likert scale, with 1 = very negative, dishonest, or unintelligent and 7 = very positive, honest, or intelligent. The ratings obtained were standardized for each participant on each scale (trait, valence), with the mean trait-representativeness score and mean valence being

calculated for each behavior using these standardized ratings. These scores were averaged within age groups for each behavior, resulting in age-group specific normative scores on these two dimensions. These scores were then used in selecting positive and negative behaviors for each trait domain for inclusion in the target descriptions.

In order to ensure that the trait representativeness and valence of the stimulus behaviors were perceived in the same manner across age groups, only those behaviors for which there were no significant age-group differences in either rating were considered for use in the study. Within each trait domain, sixteen descriptions were created, each consisting of half positive and half negative behaviors. Of the sixteen target descriptions in each domain, half contained three positive behaviors and three negative behaviors, while the remaining half contained one positive and one negative behavior. A total of 128 target behaviors were used to construct the descriptions. Of the eight descriptions within each Domain x Set Size grouping, half consisted of extreme trait exemplars, while the other half consisted of moderate exemplars. Table 1 contains mean normed representativeness values for behaviors as a function of domain, valence, and level of extremity.

Target descriptions were developed such that the average ratings for positive and negative behaviors were approximately equal across all descriptions at each level of extremity. In addition, positive and negative behaviors with descriptions were chosen to be of similar levels of extremity. Sets of either two or six behaviors were created, each with approximately the same average rating based on prior norming data. Behaviors within each Domain x Extremity condition were systematically rotated through descriptions such that each behavior appeared at least three times as part of a set of six

Table 1

Mean Target Description Ratings

Condition	Honesty	Intelligence
Negative Extreme	-1.10	-1.09
Negative Moderate	-0.66	-0.70
Positive Moderate	0.71	0.73
Positive Extreme	1.04	1.12

behaviors and once as part of a set of two behaviors. This counterbalancing procedure produced four separate sequences of 32 target behavior sets. Included with the experimental sets were 8 neutral behavior sets, each containing four behaviors per set. These fillers were intended to minimize expectations regarding the nature of judgments.

Implicit Theory Questionnaire. The implicit theory questionnaire (Levy, Strossner, & Dweck, 1998) was utilized to assess participants' orientation along the entity/incremental continuum. This measure consisted of eight statements. (See Table 3) Participants' responses reflected their agreement with each statement. Each item was accompanied by a scale ranging from 1 to 6 (1 = strongly agree, 2 = agree, 3 = mostly agree, 4 = mostly disagree, 5 = disagree, 6 = strongly disagree). Responses to the items were used to place participants along the entity and incremental continuum, with higher scores indicating a higher incremental orientation. Levy and Dweck (1997) reported that the measure shows high internal reliability (α s ranging from .93 to .95).

The test-retest reliabilities were .82 over a 1-week interval and .71 over a 4-week interval.

Background Measures. A demographic questionnaire was used to gain basic background information about each participant and various unrelated background measures were given to each participant. The SF-36 Health Survey (Ware, 1993) was given to assess each participants' reported level of physical and emotional health. 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

Table 2

Theoretical Orientation Items

-
1. The kind of person someone is, is something basic about them, and it can't be changed very much. **
 2. Everyone, no matter who they are, can significantly change their basic characteristics.
 3. People can do things differently, but the important parts of who they are can't really be changed. **
 4. Everyone is a certain kind of person, and there is not much that they can do to really change that. **
 5. People can substantially change the kind of person they are.
 6. No matter what kind of person someone is, they can always change a great deal.
 7. As much as I hate to admit it, you can't teach an old dog new tricks. People can't really change their deepest attributes. **
 8. People can change even their most basic qualities.

Levy, Strossner, & Dweck (1998) ** Indicates reverse scored items.

(1994) letter and pattern comparison tasks were used to assess processing speed, and the Weschsler Adult Intelligence Scale – III (WAIS III; Wechsler, 1997) Letter-Number Sequencing subtest was used to assess working memory.

Procedure

Testing was completed on an individual basis. At the beginning of each test session, participants completed the background questionnaire, the health survey, the vocabulary test, and the pattern and letter comparison tasks. Participants were then told that they would be completing an impression-formation task in which they will be asked to make judgments about people based on limited information. They were instructed that the information about each target would be displayed one behavior at-a-time on the computer screen, and that each description contained typical behaviors engaged in by the fictitious target. Participants were told to read each piece of information on the screen and to make sure that they had understood it before moving on to the next behavior. Participants controlled the pace of reading by pressing the space bar. After all the information about a specific target person had been viewed, participants were asked to make judgments about the person's characteristics based on the information they had read using the two rating scales that appeared on the screen. The first scale asked participants to rate the target individual on the relevant trait dimension (honesty or intelligence for the target sets, and friendliness for the neutral sets). Each scale was constructed using a 5-point Likert scale (e.g., dishonest = -2 and honest = 2). The second scale assessed the participants impressions of the target's likability, again using a 5-point Likert scale, with unlikable = -2 and likable = 2.

Responses were entered using a response box with five clearly marked buttons.

Four practice trials were given to ensure that participants understood the procedure.

Target descriptions were presented in one of the four counterbalanced sequences, to which equal numbers of participants from each age group were randomly assigned. Because the behaviors were presented using E-Prime computer software (Schneider, Eschman, & Zuccolotto, 2002), participants were not allowed to look back at the original behaviors while making their ratings. Participants were encouraged to work at their own pace until all behavior sets were completed. Following the main portion of the experiment, participants completed the various unrelated background measures and the WAIS – III Letter-Number sequencing subtest, followed by the implicit theory questionnaire. It was hoped that confounding effects due to the main task on responses would be minimized by placing a task that requires significant attention and time between it and the implicit theory questionnaire. After completing these final measures, participants were debriefed, compensated, and dismissed.

Results

The alpha level for all statistical tests in this report was set at .05.

Participant Characteristics

Prior to conducting the main analyses, one-way analyses of variance (ANOVA) were performed in order to compare the age groups on the background measures that were collected. These analyses revealed relationships that are typical of aging (see Table 3). Specifically, the younger adults did not perform as well as the older and middle-aged adults on the vocabulary test. Older and middle-aged adult participants completed fewer correct sequences on the WAIS task than did the younger adults. A

composite measure of processing speed was obtained by standardizing and then averaging the scores on the pattern and letter comparison tasks. Examination of the resulting scores indicated that younger adults had higher processing speeds than their middle-aged and older adult counterparts. In terms of health measures, younger adults reported better physical health than their older adult counterparts, as reflected in the general physical health section of the SF-36 Health Survey, but no significant age differences were found in the general mental health score from the same survey. Older and middle-aged adult participants also reported more medical problems, and more prescription medications than the younger adults. Finally, the younger adult group had significantly lower levels of education compared to both the middle-aged and older adult groups, reflecting their current student status as well as the relatively high levels of education in the two older groups.

Impression Formation Task

Response data from each subject was logged in two forms from the primary task: study times for individual behaviors and impression ratings for each description. In the two sections that follow, the results of analyses on each type of data are reported. In each section, I first discuss general effects on performance associated with the manipulated variables. The moderating effects of age on these effects are then examined. As a note, the impacts of gender and counterbalancing sequence were examined. There were no systematic effects on performance and they were therefore dropped from further analyses.

Study Time. Study times for each participant were examined using per-word reading times, which controlled for the fact that sentences describing individual

Table 3
Participant Characteristics

	Age Group				
	Young	Middle-Aged	Older	<i>F</i> (2,93)	<i>p</i>
Education (in years)					
<i>M</i>	12.75	16.31	15.84	29.11	<.001
<i>SD</i>	1.55	2.29	2.17		
Letter-Number Sequencing					
<i>M</i>	12.16	10.97	10.00	7.98	<.001
<i>SD</i>	2.29	2.18	2.02		
Speed					
<i>M</i>	0.48	0.11	-0.59	15.61	<.001
<i>SD</i>	0.84	0.89	0.59		
Vocabulary					
<i>M</i>	25.34	28.28	29.98	10.29	<.001
<i>SD</i>	3.28	5.35	3.48		
SF-36: General Health					
<i>M</i>	52.30	49.11	45.94	7.51	<.001
<i>SD</i>	4.58	5.90	8.57		
SF-36: Mental Health					
<i>M</i>	49.77	52.17	53.68	1.55	0.22
<i>SD</i>	9.66	8.10	8.97		
Medical Problems					
<i>M</i>	0.16	0.81	0.94	8.32	<.001
<i>SD</i>	0.45	0.97	0.95		
Prescription Drugs					
<i>M</i>	0.38	1.78	1.81	6.74	<.002
<i>SD</i>	0.71	2.01	2.25		

Note: WAIS-III Letter-Number Sequencing scores could range from 0 – 21. Speed values were z-scores. Vocabulary scores could range from 0 – 36. Scores on the SF-36 were t-scores.

behaviors varied in length. In order to control for atypical reading times, outliers were eliminated. On the first pass, study times that were obvious errors, such as accidental key presses or occasions where the participant asked a question before responding, were deleted. On the second pass through the study time data, I eliminated statistical outliers, specifically, those behaviors whose study times fell three *SDs* above or below the mean study time of all behaviors for each participant. Approximately 2% of the individual data points were eliminated with this process in each of the three age groups. Given the unequal numbers of behaviors across the two and six behavior descriptions, I decided to examine the study time variable in two ways. The primary analysis looked simply at the data for the first positive and negative behaviors in each set. Mean reading times using just the first two behaviors within each set for each participant were calculated within each Trait Domain x Behavior Extremity x Behavior Valence condition. These means were then examined using a 3 x 2 x 2 x 2 (Age Group x Domain x Extremity x Valence) ANOVA. Age was a between-participants factor, whereas domain, valence, and extremity were within-participants factors.

The most basic of my hypotheses states that diagnostic information will be attended to longer than nondiagnostic behavioral cues. If the trait diagnosticity of specific behaviors had an effect on participants' study time, I would expect to see that dishonest behaviors would be studied longer than honest behaviors and intelligent behaviors would be studied longer than unintelligent behaviors. Although these diagnostic cues serve as impression formation shortcuts, they are also more salient in terms of informational value and thus should be attended to more. This hypothesis was

in fact supported. As Figure 1 indicates, I found a significant Domain x Valence interaction, $F(1,93) = 156$ ms, $p < .001$, reflecting the fact that behavioral cues that are considered diagnostic (positive intelligence, negative honesty) are in fact studied for longer periods of time than nondiagnostic cues (negative intelligence, positive honesty). Focused analyses revealed that the effect of behavior valence was significant within each trait domain: $F(1,93) = 24.83$, $p < .001$ for honesty, $F(1,93) = 172.77$, $p < .001$ for intelligence.

A second general hypothesis predicted that extreme behavioral cues should increase the accessibility of relevant knowledge structures related to trait diagnosticity. In other words, extreme cues were expected to enhance the diagnostic value of a behavioral cue when compared to moderate cues. Analysis of the data revealed a

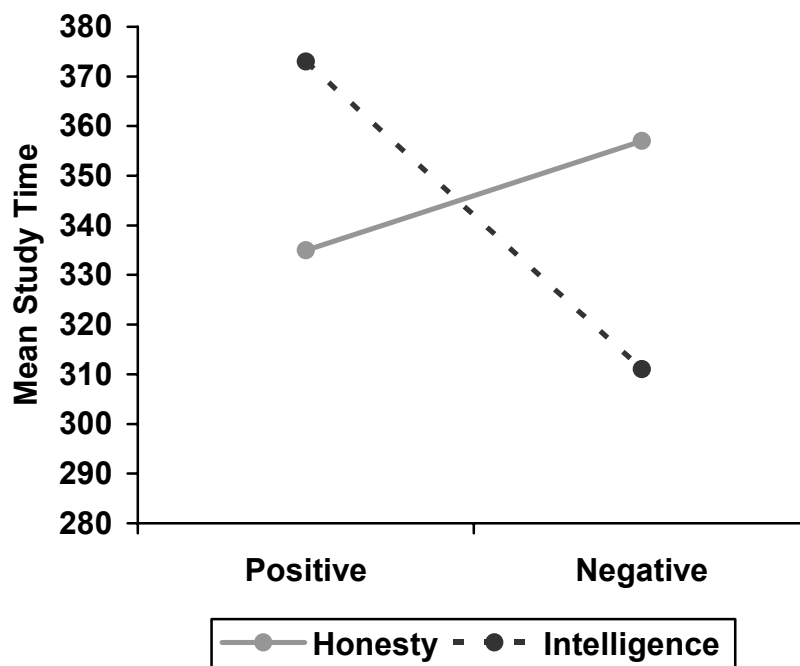


Figure 1. Mean study time for diagnostic (positive intelligence and negative honesty) vs. nondiagnostic (negative intelligence vs. positive honesty) information.

significant Domain x Extremity x Valence interaction, $F(1,93) = 12.60, p = .001$. In support of this hypothesis, extremity of the behaviors did moderate sensitivity to trait-diagnostic information, with extremity exacerbating the impact of diagnosticity on study times (see Figure 2). Separate analyses revealed a significant Extremity x Valence interaction in both the honesty and intelligence domains, $F(1,93) = 4.42, p = .04$, and $F(1,93) = 10.90, p = .001$, respectively. This indicates that, across domains, descriptions containing extreme behaviors produced larger differences in study times across levels of diagnosticity than did descriptions containing moderate behaviors.

With respect to age, I hypothesized that the impact of trait diagnosticity should be moderated by age. Specifically, I expected that the diagnosticity effect on reading times would increase with age. In support of this prediction, a significant Age Group x Domain x Valence interaction was obtained, $F(1,93) = 3.57, p = .03$. As can be seen in Figure 3, the differences in study times between diagnostic and nondiagnostic behaviors increased in both domains with age. After examining each domain independently, however, it was discovered that the Age Group x Valence interaction was significant in the honesty domain, $F(1,93) = 3.38, p = .04$, but not in the intelligence domain, $F(1,93) = 1.11, p = .33$.

In addition to the age-related differences reported above, I also expected that the extreme behavioral cues would attenuate these age differences in the use of trait diagnostic information by increasing the accessibility of relevant knowledge structures in the young group. However, the four-way interaction between age group, domain, valence, and extremity was not significant, $F(1,93) < 1$, providing no support for this hypothesis.

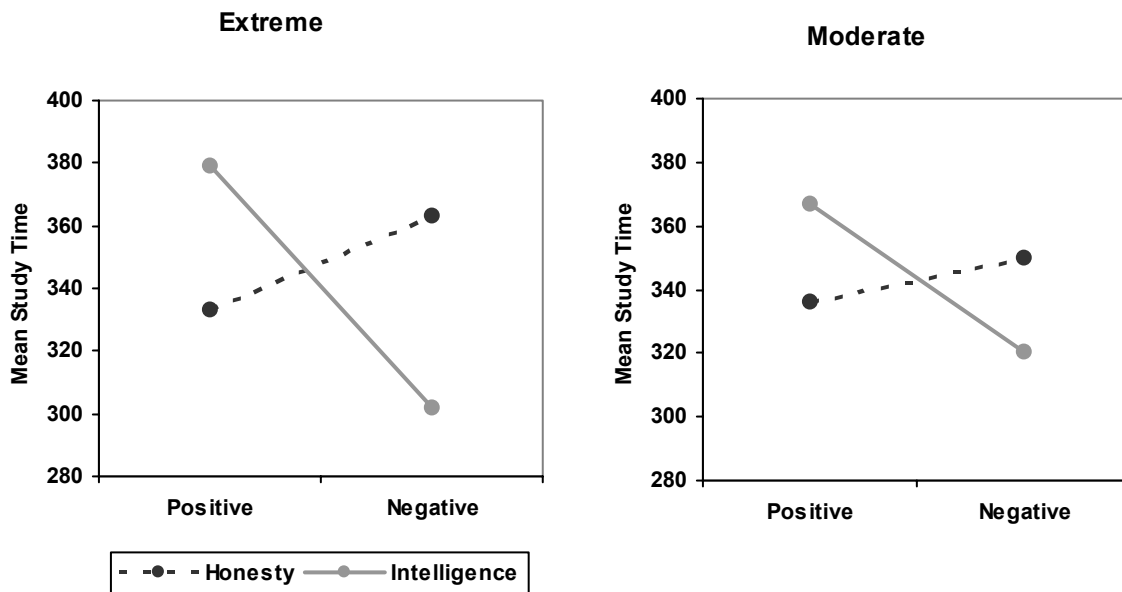


Figure 2. Study times as a function of Domain x Valence for each extremity level.

Study time data was also examined using a second method in which changes in times for specific types of behaviors a function of serial position were examined in those behavioral descriptions that contained six behaviors. A 3 x 2 x 2 x 2 x 3 (Age Group x Domain x Extremity x Valence x Serial Position) ANOVA was conducted with age as a between-participants factor and domain, valence, extremity, and serial position as within-participants factors. The most notable finding that resulted from this analysis indicated that the first behavior is studied the longest in the description, as reflected by the position main effect, $F(1,93) = 115.91, p < .001$. This finding was consistent across all of the previous significant results already reported in this study. Although the serial position variable did interact with several other variables, it did not interact with age, and therefore is of little interest in terms of this study.

Impression Ratings. Past research in this area (Hess & Auman, 2001) has used standardized rating scores to control for differences in the manner in which participants

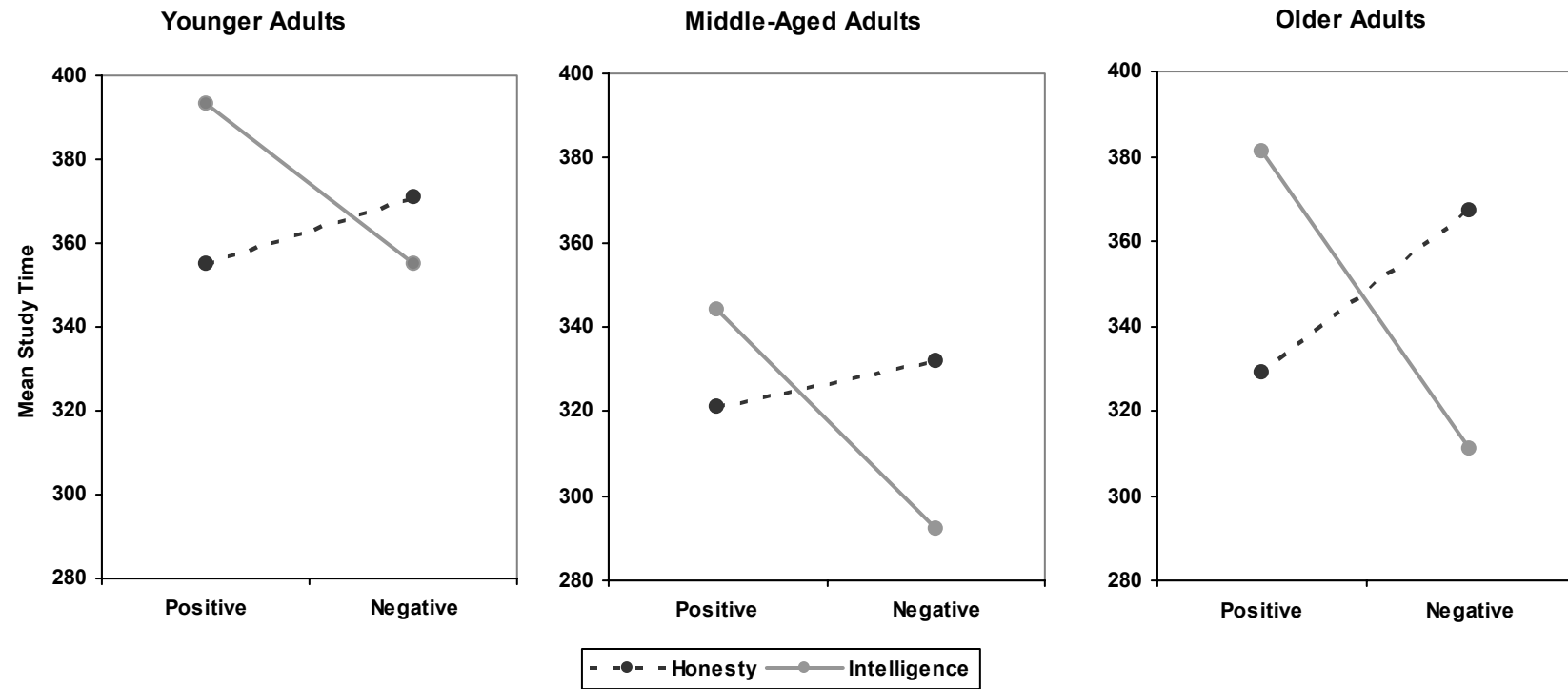


Figure 3. Mean study time as a function of Domain x Valence x Age Group.

utilize the 5-point rating scale. Following this precedent, I also standardized responses within each participant on each rating scale, and the two ratings for each description were combined to create a single impression rating. These ratings were then used to calculate mean ratings within each condition, which were examined using a 3 x 2 x 2 x 2 (Age Group x Domain x Extremity x Set Size) ANOVA.

I hypothesized that, similar to the study time data, impression ratings would vary as a function of domain. These scores should follow the direction of the diagnostic information, with ratings regarding intelligence being more positive than those regarding honesty. Consistent with this expectation, a significant main effect was found for domain, $F(1,93) = 380.25$, $p < .001$, with descriptions relating to intelligence ($M = .51$) being rated more positively than those relating to honesty ($M = -.51$).

I also hypothesized that the extreme behaviors would accentuate already present diagnostic effects in comparison to more moderate behaviors, with descriptions containing extreme behaviors being rated as more negative than those containing moderate behaviors in the honesty domain and the opposite being true in the intelligence domain. Analyses revealed a significant main effect for extremity, $F(1,93) = 124.38$, $p < .001$. More importantly however, I found a significant Domain x Extremity interaction, $F(1,93) = 5.18$, $p = .03$. Results in the honesty domain followed the expected pattern, with extreme descriptions rated as more negative than moderate descriptions. Contrary to my prediction, however, moderate descriptions were rated as more positive than extreme descriptions in the intelligence domain. In other words, extremity resulted in lower ratings in both domains, with the effect being somewhat

stronger for intelligence than for honesty. This does not fit with the previously stated hypothesis (see Table 4).

The number of behaviors in a description was also expected to affect the salience of diagnostic information, with the accessibility of schemas based on diagnosticity increasing as more trait-diagnostic behavioral information about the target becomes available. I therefore expected that ratings would decrease with set size in the honesty domain and increase with set size in the intelligence domain. I found a significant Domain x Set Size interaction, $F(1,93) = 13.22, p < .001$. Focused tests indicated that this hypothesis was supported in the honesty domain, with descriptions in the larger set size rated as more negative than those in the smaller set size, $F(1,93) = 21.07, p < .001$. This hypothesis was not supported in the intelligence domain ($F < 1$), however, where descriptions were rated approximately equally across set sizes (honesty--set-size 6: $M = -.67$ and set-size 2: $M = -.36$; intelligence--set-size 6: $M = .50$ and set-size 2: $M = .52$).

Table 4

Trait Inferences by Domain, and Extremity

	Extreme		Moderate	
	M	SD	M	SD
Honesty	-0.70	0.40	-0.33	0.43
Intelligence	0.22	0.44	0.81	0.36

Finally, an unexpected significant interaction was observed between extremity and set size, $F(1,93) = 12.02, p = .001$. This effect was due to the fact that extreme behaviors were rated more negatively when part of a larger description than when they were part of a smaller description, $F(1,93) = 17.89, p = .001$. Set-size did not have an effect on moderate behaviors, $F < 1.0$.

Of primary interest in the present study was how previously observed age differences in the use of trait-diagnostic information in impression judgments would be moderated by the amount of diagnostic behavioral information contained in a description and the extremity of this information. In following with the hypotheses of the study, I expected to find that age differences in the use of diagnostic information would be moderated by set size. Specifically, I expected to see age differences in the use of diagnostic information with the smaller descriptions, but no differences in the larger descriptions. I did indeed find a significant Age Group x Domain x Set Size interaction, $F(1,93) = 3.79, p = .03$. Mean values appeared to indicate, however, that greater age differences were present in the larger descriptions, which would be the opposite of what I predicted (see Table 5). In order to tease apart this interaction, I conducted separate analyses within each set size to examine the effects of domain and age. This analysis revealed that there were no significant differences between age groups in the smaller description lengths, $F < 1.0$, whereas a significant Age X Domain interaction was found in the larger set sizes, $F(1,93) = 4.94, p = .01$. These effects indicate that, contrary to expectations, larger descriptions enhanced the age-related diagnosticity effects.

Table 5

Age Group Differences as a Function of Domain and Set Size

Trait Domain	Set Size			
	2		6	
Younger Adults				
	M	SD	M	SD
Honesty	-0.32	0.48	-0.59	0.46
Intelligence	0.59	0.33	0.33	0.51
Middle-Aged Adults				
Honesty	-0.39	0.48	-0.70	0.40
Intelligence	0.55	0.40	0.55	0.45
Older Adults				
Honesty	-0.36	0.37	-0.71	0.33
Intelligence	0.44	0.41	0.64	0.41

I also hypothesized that extremity of behavioral information would moderate age effects in the use of diagnostic information. Specifically, extreme cues were expected to increase the accessibility of relevant knowledge structures, thereby enhancing the use of diagnostic information in those with relatively lower levels of expertise (i.e., young adults). This was expected to eliminate previously observed age differences found using descriptions containing moderate behaviors. The expected interaction between age, domain, and extremity, however, was not significant, $F(1,93) = 1.64$, $p = .20$. Separate

analyses within levels of extremity indicated a tendency toward the anticipated effect.

Specifically, the interaction between age and trait domain was marginally significant for moderate behaviors, $F(1,93) = 2.72$, $p = .07$, whereas the same effect was not evident for extreme behaviors, $F < 1.0$ (see Table 6).

Theoretical Orientation

I also investigated the relationship between age, theoretical orientation, and the use of diagnostic information. Of specific interest was whether implicit beliefs mediate

Table 6

Interaction between Age and Domain within Extremity

Trait Domain	Extremity			
	Extreme		Moderate	
	M	SD	M	SD
Younger Adults				
Honesty	-0.66	0.39	-0.25	0.45
Intelligence	0.24	0.49	0.67	0.33
Middle-Aged Adults				
Honesty	-0.74	0.43	-0.36	0.47
Intelligence	0.26	0.44	0.84	0.39
Older Adults				
Honesty	-0.69	0.37	-0.38	0.38
Intelligence	0.16	0.40	0.91	0.31

the relationship between age and the use of diagnostic information in the construction of trait inferences. Theoretical orientation would function as a mediator if a) age group was significantly related to entity orientation, b) strength of entity beliefs was a significant predictor of the use of diagnostic information, and c) controlling for theoretical orientation eliminated the previously obtained significant relationship between age and the use of diagnostic information (Baron & Kenny, 1986).

Entity beliefs were calculated by summing the eight items from the beliefs scale after reverse scoring half of the questions. Cronbach's alpha test of reliability revealed a reasonably high level of association among these items, $\alpha = .87$. A one-way ANOVA was then performed on these scores to test for age differences. This analysis revealed a nonsignificant main effect for age group on the entity scores, $F(2,93) < 1.0$, providing no support for the hypothesis that age is related to implicit beliefs. Note that a nonmediating role would be bolstered by showing that entity beliefs were in fact related to the use of diagnosticity. Therefore, I conducted an ANOVA on impression ratings in which entity scores were included as a continuous variable. In this analysis, the only effect involving beliefs that approached significance was the interaction between theoretical orientation and domain, $F(1,66) = 1.53$, $p = .08$. Although this relationship was consistent with the expected pattern of performance (i.e., the use of diagnostic information increased with entity-related beliefs), the relationship was not strong. In order to better examine this relationship, I conducted separate analyses with the entity-related items and the incremental-related items. Items on the questionnaire that were incremental theory based however, were significantly related to diagnostic information, as was reflected by the significant Domain x Incremental Item interaction, $F(1,78) =$

5.09, $p < .001$. This result permits me to argue that the implicit theory questionnaire is in fact valid to test the construct I originally intended.

Discussion

The purpose of this research was to further examine social expertise in adulthood as reflected by the use of trait-diagnostic information when forming impressions of others. Specifically, I was interested in providing further evidence for the social expertise perspective by replicating past research, and testing two new predictions consistent with the expertise hypothesis as well as one based on an alternative hypothesis.

With respect to the expertise hypothesis, I was interested in examining factors associated with the accessibility of social information as a means of understanding age differences in the use of diagnostic information. Based on past research, it was hypothesized that if knowledge structures were made more accessible, those participants with less social expertise (i.e., younger adults) would use diagnostic information to the same degree as experts (i.e., middle-aged and older adults). In this study, it was specifically expected that increasing the extremity of trait exemplars and the amount of diagnostic information would increase the accessibility of these social knowledge structures, which would, in turn, increase the use of diagnostic information by the younger participants.

Moderators of the use of Diagnostic Information. In reference to the most basic of my hypotheses, I predicted that diagnostic behavioral cues would be attended to longer, and would have a stronger impact on impression ratings than nondiagnostic

cues. Consistent with the past research of Hess and Auman (2001), diagnostic information in this study was studied longer, with negative honesty cues and positive intelligence cues attended to more than positive honesty and negative intelligence, respectively. This follows the logic that individuals with knowledge in a given area are more likely to pay attention to informative versus uninformative information related to that area (e.g., Friedman, 1979). Related effects were found in the impression ratings of the target individuals, with ratings being more negative in the honesty domain and more positive in the intelligence domain. These data provide further support for Skowronski and Carlston's (1989) theory that diagnostic cues are more informative than nondiagnostic information and therefore are weighted more heavily when forming an impression of a target individual.

The major interests of this study were the moderators of the use of diagnostic information. Behavioral extremity was thought to be one of these moderators, with extreme cues expected to increase the accessibility of associated knowledge structures related to trait diagnosticity, allowing less experienced participants to benefit from the use of diagnostic information. The study time data suggests that extreme cues did enhance the salience of diagnostic information. Specifically, extreme behaviors produced larger differences in study times between diagnostic and nondiagnostic behavioral cues than did moderate behaviors.

Much like the study time data, I expected to find that extremity would serve as a moderator of the use of diagnostic information during impression formation. Extreme cues were expected to enhance the diagnostic effects of the ratings, meaning that honesty ratings would be more negative and intelligence behaviors more positive in the

presence of extreme versus moderate behavioral cues. This was not the case, however. Extreme cues tended to make the impression ratings more negative overall across both domains with little impact on the use of diagnostic information.

Skowronski and Carlston (1992) originally stated that a cue's exclusivity is one of the major factors contributing to its category diagnosticity. The less a behavior implies membership in an alternative categorization, the more diagnostic the cue tends to be, and the more exclusive it is of the category to which it belongs. Skowronski and Carlson hypothesized that with increasing extremity, the probability that these behaviors would be categorized as members of the opposite alternative category would decrease significantly. With this in mind, they further suggest that since a cue's level of diagnosticity is drawn from its exclusivity, and exclusivity is then affected by extremity, diagnosticity will be affected by extremity in that cues classified as more extreme and therefore more exclusive will naturally be considered more diagnostic.

The data in this study, however, do not follow such hypothesizing. Wojciszke, Brycz, and Borkenau (1993) have offered an alternative explanation that may help explain the findings of this research. They suggest that the evaluative meaning of behavioral cues - the goodness or badness - and more importantly whether the target individual should be approached or avoided is another important piece of information used when making ratings. These researchers hypothesized that perceivers avoid targets that produce extreme positive or negative behaviors, while they approach targets that produce moderate behaviors. Importantly, Wojciszke et al. suggest that this effect is independent of the content (i.e., domain) of the behaviors. With this in mind,

they speculated that there would be a tendency of ratings toward negativity when the information about a target is evaluatively extreme.

Interestingly, Skowronski and Carlston (1987) used behavioral information that was descriptively extreme, but only moderate in evaluative extremity. Wojciszke et al. (1993) found that extreme evaluative information results in negativity effects, whereas moderately evaluative information results in positivity effects. This finding may illustrate the major difference between the work of Skowronski and Carlston (1987) and that of this study and of Wojciszke et al. Though Wojciszke et al. found the same results as Skowronski and Carlston (1987) in terms of the morality domain, with extreme behaviors causing honesty-related ratings to become more negative, the results of the two studies diverge in the competence domain. Wojciszke et al. found that the positivity effect in intelligence-related behaviors decreased with extremity, while Skowronski and Carlston found the opposite effect. The contradiction in findings appear to be due to differences in the evaluative extremity of the cues used in each study. As Wojciszke et al. (1993) state, “the descriptive meaning is processed to categorize people, and to accurately infer their traits and intentions, whereas evaluative meaning is processed to direct the perceiver’s responses concerning the approach or avoidance of the target person” (p. 328). It was my intent in this study to provide information that was rated as very extreme, without crossing the boundaries of traumatic, and in so doing, the behavioral cues in this study were rated as extreme on both representativeness as well as evaluativeness. In comparison to the stimuli used in Skowronski and Carlston’s (1987) study, the behavioral cues in this study were similar in trait extremity, but more extreme in terms of evaluative extremity. Perhaps the more evaluatively extreme

behaviors in this study increased the salience of the affective response to the stimuli, accounting for the negativity effect associated with extreme cues.

Yet another moderator of the use of trait-diagnostic information was hypothesized to be the size of the behavioral descriptions. I suggested that providing more diagnostic cues about an individual should also enhance the use of diagnostic information, by making relevant social schemas and knowledge structures more accessible. Results were only partially consistent with expectations. Impression ratings were different between the two set sizes only in the honesty domain, while remaining approximately the same within the intelligence domain. This result may again relate back to the Wojciszke et al. (1993) finding. These researchers propose that honesty behaviors elicit a larger affective response from participants than those related to competence. Wojciszke et al. suggest that this may be the reason why honesty behaviors, and dishonest behaviors in particular, may be weighted more heavily than intelligence-related behaviors.

Interestingly, I also found an unexpected significant relationship between extremity and number, with larger descriptions containing extreme behaviors being rated more negatively than smaller descriptions containing extreme behaviors. This trend may simply reflect a multiplicative effect of the two previously found significant effects of extreme behaviors and larger set sizes influencing diagnosticity levels. Since extreme behaviors have been shown to cause ratings to be more negative and larger set sizes have been shown to increase attention to cues, one would expect to see that large amounts of extreme behavioral cues would be rated more negatively than smaller amounts of extreme behaviors.

Age as a Moderator of Diagnosticity. The major interest of this study was the impact of age on the use of diagnostic information. Research by Hess and colleagues (Hess & Pullen, 1994; Hess et al., 1999; Hess and Auman, 2001) suggests that significant age differences exist in the use of this information. It was the goal of this study to further examine the moderators of the age-related diagnosticity effects. In line with the past research of Hess and Auman (2001), this study found significant age differences in the amount of time spent studying diagnostic behaviors, although the effect was only significant in the honesty domain; more specifically, older adults spent significantly more time studying diagnostic behaviors relative to nondiagnostic behaviors in comparison to the two younger groups. This suggests that age differences exist in the salience of diagnostic cues.

I also predicted that extremity would alter previously observed age differences in attention to diagnostic information. It was expected that extreme cues would attenuate age differences found in the amount of time studying trait diagnostic information, whereas moderate cues would continue to elicit age differences in the use of diagnostic information. This hypothesis was not supported in that extremity did not affect the strength of observed age effects. I also expected extremity to attenuate previously observed age differences in the use of diagnostic information in the constitution impression judgments. This hypothesis was also not supported, in that the strength of age-related domain effects on ratings did not vary as a function of extremity. These findings could be based on a more general avoidance tendency of extreme individuals. The pattern of results is inconsistent with my original hypothesis that extremity increases accessibility of knowledge, which would enhance the already present

diagnostic effects. Instead, they appear to be more in line with the work of Wojciszke et al. (1993), which suggests that ratings also reflect affective reactions to the behavioral cues. In this light, it seems that the extremity of cues is more of a general affective response to the target, while the diagnostic effects that I originally predicted are more cognitively based on past social experience.

As I discussed previously, Wojciszke et al. (1993) suggest that cues that are evaluatively extreme cause participants to rate target individuals more negatively regardless of the domain due to their approach avoidance theory. Individuals who commit evaluatively extreme acts, positive or negative, should be avoided while evaluatively moderate behaviors increase the approachability of the target. This can be interpreted as consistent with the expertise if we think of diagnosticity and extremity as having two different bases. Diagnosticity effects can be thought of as cognitive responses based in knowledge, and thus related to expertise, whereas, extremity effects can be thought more as affective responses reflecting avoidance tendencies. Thus the fact that age effects were associated with diagnosticity, but not extremity is consistent with the aging-based expertise view.

I also hypothesized that the size of behavioral descriptions would attenuate age differences in the use of diagnostic information when making trait judgments, with more diagnostic information increasing the accessibility of knowledge structures. This was expected to attenuate the typical age differences in the use of trait diagnostic information. This hypothesis was not supported by the data in this study in that age differences in the use of diagnostic information occurred only in the larger set sizes and not the smaller. It seems that more information, instead of attenuating age differences,

actually accentuated them. Perhaps in the smaller set size, which contained only one positive and one negative behavioral cue, participants were information-deprived causing the diagnosticity of cues to be less salient even to presumed experts. In these cases, participants may have been reluctant to make judgments about the targets based primarily on diagnosticity due to the minimal information provided. In the larger set size, however, the use of diagnostic information increased with age. This may suggest that, as the amount of diagnostic information increases, those with more relevant expertise weigh it more. In other words, in situations where participants are information-deprived even experts may be reluctant to make strong judgments about the target based on limited information. When behavioral information is more prevalent, however, these multiple diagnostic cues may allow expertise to be exhibited more clearly as the salience and informativeness also increases.

Theoretical Orientation. In this study, I also attempted to test an alternative to the social expertise view in order to either provide further support for the phenomenon or provide an alternative explanation for the findings of research in this area. I was interested in examining implicit theories regarding the stability of traits and their role in the use of trait-diagnostic information. I predicted that theoretical orientation would mediate the relationship between age and the use of diagnostic information to the extent that age was related to theoretical orientation. If such a relationship were found, and it subsequently eliminated the relationship between age and the use of diagnostic information, this would argue against an expertise-based explanation.

The implicit theory questionnaire was related to the use of diagnostic information, which suggests that it was tapping into the intended construct. However, analysis of

these data revealed that entity-related beliefs did not systematically vary across age groups, which is inconsistent with the hypothesis that age is related to theoretical orientation. Since the relationship between age and theoretical orientation was not significant, no mediational relationship was possible, providing no support for the alternative hypothesis.

Conclusions

This study serves to further elaborate on the work already conducted in the area of cognitive aging. By examining the use of diagnostic information, I was better able to understand the age differences that exist in social cognitive functioning. Emerging trends in the literature suggest an overall decline in basic cognitive abilities, including processing speed (Craik & Salthouse, 2000). Results of this study, and others, however, suggest that social cognitive functioning is an ability that older adults can maintain or improve upon as they age (see Staudinger & Pasupathi, 2000).

The findings of the study provide further support for a social expertise view of aging, and for the general idea that aging brings benefits along with the declines in cognitive functioning. The results of my study suggest that aging-related expertise effects may help overcome some of the previously mentioned declines in cognitive functioning that accompany advancing age. In the present study, the data indicated that older adults performed better in the social judgment task than younger adults in spite of the fact they exhibited the typical cognitive trends associated with age (i.e., relative to younger adults, less working memory capacity, slower processing speed). It may be that expertise helps minimize demands on cognitive capacity by facilitating the direction of attention and interpretation of information in the environment. Results such as these

indicates that our understanding of the impact of aging on everyday functioning may

be best understood by considering an array of factors beyond cognitive skill, such as

goals, motivation and knowledge.

References

- Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.
- Blanchard-Fields, F. (1986). Attributional processes in adult development. *Educational Gerontology*, 12, 291-300.
- Blanchard-Fields, F. (1994). Age differences in causal attributions from an adult development perspective. *Journal of Gerontology: Psychological Sciences*, 49, 43-51.
- Brycz, H., & Wojciszke, B. (1992). Personality impressions on ability and morality trait dimensions. *Polish Psychological Bulletin*, 23, 223-236.
- Carstensen, L.L. (1992). Social and emotional patterns in adulthood: Support for socioemotional selectivity theory. *Psychology and Aging*, 7, 331-338.
- Chiu, C., Hong, Y., & Dweck, C.S. (1997). Lay dispositionism and implicit theories of personality. *Journal of Personality and Social Psychology*, 73, 19-30.
- Craik, F.I.M., & Salthouse, T.A. (Eds.) (2000). *The Handbook of Aging and Cognition*. (2nd ed.) Mahwah, NJ: Lawrence Erlbaum Associates.
- Ekstrom, R.B., French, J.W., Harman, H., Derman, D. (1976). *Kit of factor-referenced cognitive tests* (rev. ed.) Princeton, NJ: Educational Testing Service.
- Erdley, C.A., & Dweck, C.S. (1993). Children's implicit personality theories as predictors of their social judgments. *Child Development*, 64, 863-878.
- Fiske, S.T., & Taylor, S.E. (1991). *Social cognition*. New York: McGraw-Hill.
- Follett, K.J., & Hess, T.M. (2002) Aging, cognitive complexity, and the fundamental attribution error. *Journal of Gerontology: Psychological Sciences*, 57, P312-P323.
- Friedman, A. (1979). Framing pictures: The role of knowledge in automatized encoding and memory for gist. *Journal of Experimental Psychology: General*, 108, 316-335.
- Heckhausen, J., Baltes, P.B. (1991). Perceived controllability of expected psychological change across adulthood and old age. *Journal of Gerontology: Psychological Sciences*, 46, P165-P173.

- Hess, T.M. (1992). Adult age differences in script content and structure. In R.L. West & J.D. Sinnott (Eds.), *Everyday memory and aging: Current research and methodology* (pp. 87-100). New York: Springer-Verlag.
- Hess, T.M. (1994). Social cognition in adulthood: Aging-related changes in knowledge and processing mechanisms. *Developmental Review*, 14, 373-412.
- Hess, T.M. (2000). Aging-related constraints and adaptations in social information processing. In U. Von Hecker, S. Dutke, & G. Sedek (Eds.), *Generative mental processes and cognitive resources: Integrative research on adaptation and control*. (pp. 129-155). Dordrecht, The Netherlands: Kluwer.
- Hess, T.M., & Auman, C. (2001). Aging and social expertise: The impact of trait-diagnostic information on impressions of others. *Psychology and Aging*, 16, 497-510.
- Hess, T.M., Bolstad, C.A., Woodburn, S.M., & Auman, C. (1999). Trait diagnosticity versus behavioral consistency as determinants of impression change in adulthood. *Psychology and Aging*, 14, 77-89.
- Hess, T.M., & Pullen, S.M. (1994). Adult age differences in informational biases during impression formation. *Psychology and Aging*, 9, 237-250.
- Hess, T.M., Rosenberg, D.C., & Waters, S.J. (2001). Motivation and representational processes in adulthood: The effects of social accountability and information relevance. *Psychology and Aging*, 16, 629-642.
- Levy, S.R., & Dweck, C.S. (1997). *Implicit theory measures: Reliability and validity data for adults and children*. Unpublished raw data, Columbia University.
- Levy, S.R., Strossner, S.J., & Dweck, C.S. (1998). Stereotype formation and endorsement: The role of implicit theories. *Journal of Personality and Social Psychology*, 74, 1421-1436.
- Peeters, G. (1979). Person perception and the evaluative-meaning concept. *Communication and Cognition*, 12, 201-216.
- Pratto, F., & John, O.P. (1991). Automatic vigilance: The attention-grabbing power of negative social information. *Journal of Personality and Social*, 61, 380-391.
- Reeder, G.D. (1985). Implicit relations between dispositions and behaviors: Effects on dispositional attribution. In J. Harvey & G. Weary (Eds.), *Attribution in contemporary psychology* (pp. 87-116). New York: Academic Press.

- Reeder, G.D., & Brewer, M.B. (1979). A schematic model of dispositional attribution in interpersonal perception. *Psychological Review*, 86, 61-79.
- Rosch, E. (1978). Principles of categorization. In E. Rosch & B.B. Lloyd (Eds.), *Cognition and categorization* (pp. 27-48). Hillsdale, NJ: Erlbaum.
- Salthouse, T.A., & Coon, V.E. (1994). Interpretation of differential deficits: The case of aging and mental arithmetic. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 20, 1172-1182.
- Schneider, W., Eschman, A., & Zuccolotto, A. (2002). *E-Prime Software*. Pittsburgh: Psychology Software Tools, Inc.
- Skowronski, J.J., & Carlston, D.E. (1987). Social judgment and social memory: The role of cue diagnosticity in negativity, positivity, and extremity biases. *Journal of Personality and Social Psychology*, 52, 689-699.
- Skowronski, J.J., & Carlston, D.E. (1989). Negativity and extremity biases in impression formation: A review of explanations. *Psychological Bulletin*, 105, 131-142.
- Skowronski, J.J., & Carlston, D.E. (1992). Caught in the act: When impressions based on highly diagnostic behaviors are resistant to contradiction. *European Journal of Social Psychology*, 22, 435-452.
- Staudinger, U.M., & Pasupathi, M. (2000). Life-span perspectives of self, personality, and social cognition. In F.I.M. Craik & T.A. Salthouse (Eds.), *The handbook of aging and cognition* (2nd ed., pp.633-688). Mahwah, NJ: Erlbaum.
- Ware, J.E., Jr. (1993). *SF-36 Health Survey*. Boston: The Health Institute, New England Medical Center.
- Wechsler, D. (1997). Letter-Number Sequencing Test. *Wechsler Adult Intelligence Scale* (3rd ed.). New York: Psychological Corporation.
- Wojciszke, B. (1997). Parallels between competence- versus morality-related traits and individualistic versus collectivistic values. *European Journal of Social Psychology*, 27, 1251-1263.
- Wojciszke, B., Brycz, H., & Borkenau, P. (1993). Effects of information content and evaluative extremity on positivity and negativity biases. *Journal of Personality and Social Psychology*, 64, 327-335.
- Wojciszke, B., & Pienkowski, R. (1991). Prototypical structure of personality trait concepts and person perception. *Current Psychology of Cognition*, 11, 213-228.

Wyer, R.S., Jr., & Srull, T.K. (1989). *Memory and cognition in its social context*. Hillsdale, NJ: Erlbaum.

Appendix

Behavioral Set Stimuli – 4 Counterbalanced Sequences

BEHAVIOR SET – SEQUENCE 1

Sally sold a used car through the classifieds, although she neglected to mention

Sally realized she was responsible for her own feelings.

Sally paid her employees under the table.

Sally was tempted, but never cheated on her diet.

Sally told herself the dog was mean after she taunted it and it bit her.

Sally realized she wasn't getting promoted because she needed a college degree.

Bruce ruined his computer when using software he obtained illegally.

Bruce accidentally ran over a dog and called the owners to tell them.

Laura passed the pharmacist licensure exam on the first try.

Laura did not look both ways while crossing the street.

Scott rarely makes error when he balances his checkbook.

Scott compared prices at different stores before buying.

Scott couldn't understand the instructions on his spouse's cough medicine.

Scott couldn't figure out how to install the safety locks on the cabinets to protect

Scott organized a successful committee for his company.

Scott couldn't understand the programming instructions on his VCR, and he

Andy pocketed the tip off another table as he was leaving the restaurant.

Andy did not read his friend's journal even though it was lying open on the table.

Joan sold her defective stereo to an unsuspecting neighbor.

Joan took the magazine without paying for it.

Joan left a note on the car she backed into.

Joan told her boss she was responsible for the accounting error.

After depositing 50¢ into the newspaper machine, Joan took five papers

Joan told her friend he was drinking too much and needed to get counseling.

Amy understood the equations presented in math class.

Amy burnt her hand on the stove after forgetting to turn the burner off.

John won a creative writing contest.

John set off a bug bomb in his house while people were still inside.

John never gave his dogs rabies shots.

John learned to speak fluent Spanish in two months.

John was hired at IBM to design a new computer for the company.

John needed a calculator to add two numbers of any kind.

Jennifer won the game of Monopoly because she cheated.

Jennifer returned the extra change the grocery store clerk gave her.

After 35 years, Frank admitted to himself that he couldn't read and enrolled in a

Frank refuses to believe that he is not a pleasant person.

Brenda invented a device that allowed her disabled friend to drive a car.

Brenda knew how to remove the virus on her company's computer.

Brenda went to change the oil in her car and put water in instead.

Brenda had to plagiarize the final paper in order to avoid failing the course.

Brenda's short story was accepted for publication.

Brenda ate a candy bar knowing she was allergic to chocolate.

Sarah picked up the wrong luggage at the baggage claim.
Sarah created a new recycling program for her city.

Doug realized he had a problem and joined Alcoholics Anonymous.
Doug admitted to the police officer that he had caused the accident.
Doug turned the odometer back before selling his car.
Doug took the money from his fiancée and never told her.
Doug acknowledged to his boss that his co-worker's idea was better.
Doug lost his job after he lied about the hours he had worked.

Dan bought himself clothes that were the wrong size.
Dan made money for his friends in the stock market.
Dan missed the train because he didn't check the time schedule.
Dan got lost on his way home from work.
Dan reorganized the entire filing system in his office.
Dan devised a way for his church to save money.

Bob attended one of the top medical schools.
Bob got F's on most of his final exams in high school.

After wearing the clothes, Ruth returned them to the store for a full refund.
Ruth convinced herself that keeping her smoking down to a pack a day would not
Ruth accurately marked down her calories on her diet chart.
The greatest love of Ruth's life left her, and she told herself that she didn't care.
Ruth finally admitted to herself that she no longer looked good in a two-piece
Ruth told Mary that she didn't like her new haircut.

Patrick taught his nephew how to solve the calculus equation.
Patrick thought if 2 tablets could cure his spouse's headache, then 4 would work
Patrick reorganized the budget to save for a family vacation.
Patrick spends \$100 each week on lottery tickets because he just knows it's his
Patrick created new applications for the database program on his computer.
Patrick stood too close to the grill while adding lighter fluid and singed his

Hannah creates new recipes for herself weekly.
Hannah missed her sister's birthday party because she wrote it down on the

Chad hates his job but is too afraid to quit, and tells himself it will get better.
Chad admitted to his wife that he broke her tennis racket.

Amanda put her name as author on a report that a co-worker had written.
Amanda told her friend that she had lost the book so she could keep it for herself.
Amanda reported all of her taxable income to the IRS.
Instead of taking sole credit for the idea, Amanda pointed out that friends had
Amanda kept the money from a wallet she found.

Amanda admitted she broke the expensive vase.

Michelle taught herself how to program a computer.

Michelle lost all of her money when she invested in a get rich quick scheme.

Tom put too much fertilizer on his garden and killed all the plants.

Tom did the electrical wiring in his house by himself.

Tom washed his new blue jeans with his wife's white shirt and ruined it.

Tom completed the New York Times crossword puzzle.

Tom neglected to bring the keys to the meeting room and everyone was left

Tom took his mother to the grocery store on triple coupon day.

On her personal checklist, Judy put down 10 pounds more than she actually lifted.

Judy convinced herself that slugs had ruined her vegetable garden when she knew

Judy waited for the traffic light to turn green, even though the streets were deserted.

Judy has never taken anything from a hotel room.

Judy cheated when playing solitaire and still lost.

Judy accepted she was over 55 and bought a senior citizen movie ticket.

Richard refused to take money for work he hadn't done.

Richard lied about his qualifications on the job application.

Steve made a rash decision and spent too much money for a new car.

Steve figured out a way to get his friend's car financed without any down payment.

Steve taught his niece an easy way to calculate the tip at a restaurant.

Steve turned the wrong way on a one-way street and bumped another car.

Steve entered the wrong data and ruined the report his group had been putting

Steve figured out how to fix the broken toaster.

David mapped out a new, quicker route to work for his carpool.

David developed a successful advertising campaign for the community orchestra.

David never learned how to use the security system in his house and ended up

David put gasoline in his neighbor's diesel car and ruined the engine.

David figured out how to repair his computer.

David didn't know how to use the camera and ruined his friend's wedding pictures.

Fred has always treated his friends fairly.

Fred will not admit to himself that he can't keep a secret.

Peter tried to get a student ticket with his expired school ID and was caught.

Peter told the clerk he had been undercharged for the item.

Heather cut in front of people waiting in line at the theater.

Heather acknowledged she had gained weight and finally bought her jeans a size

Heather told herself she failed the test because her teacher didn't like her even

Heather read the entire book for class, even though a summary was available.
Heather doesn't feel safe living where she does, but rather than moving she tells
Heather filled out the magazine self-help questionnaire truthfully.

While in college, Melissa was given a full scholarship to study abroad.
Melissa caused an accident because she was driving too close to the car in front

Tara wrote a bad check to pay the plumber.
Tara got an extra \$50 in her paycheck because she told her boss she worked
Tara has always been faithful to her spouse.
Tara admitted to her boyfriend that she had spent time in jail.
Tara told her family that she quit smoking even though she hadn't
Tara admitted to herself that she was a bad driver and signed up for driving lessons.

While varnishing the floor, Alison suddenly realized that she was trapped in a
Alison designed the floor plan for her friend's house.

BEHAVIOR SET – SEQUENCE 2

Jennifer lost her job after she lied about the hours she had worked
Jennifer realized she had a problem and joined Alcoholics Anonymous.

Frank accurately marked down his calories on his diet chart.
The greatest love of Frank's life left him, and he told himself he didn't care.

Brenda attended one of the top medical schools.
Brenda went to change the oil in her car and put water in instead.

Brenda's short story was accepted for publication.
Brenda had to plagiarize the final paper in order to avoid failing the course.
Brenda got F's on most of her final exams in high school.
Brenda knew how to remove the virus on her company's computer.

Sarah got lost on her way home from work.
Sarah devised a way for her church to save money.

Doug returned the extra change the grocery store clerk gave him.
Doug turned the odometer back before selling his car.
Doug acknowledged to his boss that his co-worker's idea was better.
Doug admitted to the police officer that he had caused the accident.
Doug took the money from his fiancée and never told her.
Doug won the game of Monopoly because he cheated.

Dan bought himself clothes that were the wrong size.
Dan reorganized the entire filing system in his office.
Dan created a new recycling program for his city.
Dan missed the train because he didn't check the time schedule.
Dan made money for his friends in the stock market.
Dan picked up the wrong luggage at the baggage claim.

Bob invented a device that allowed his disabled friend to drive a car.
Bob ate a candy bar knowing he was allergic to chocolate.

After wearing the clothes, Ruth returned them to the store for a full refund.
Ruth convinced herself that keeping her smoking down to a pack a day
After 35 years, Ruth admitted to herself that she couldn't read and enrolled
Ruth refuses to believe that she is not a pleasant person.
Ruth finally admitted to herself that she no longer looked good in a two-
Ruth told Mary that she didn't like her new haircut.

Patrick taught himself how to program a computer.
Patrick thought if 2 tablets could cure his spouse's headache, then 4
Patrick taught his nephew how to solve the calculus equation.
Patrick reorganized the budget to save money for a family vacation.
Patrick spends \$100 each week on lottery tickets because he just knows
Patrick lost all of his money when he invested in a get rich quick scheme.

Hannah did the electrical wiring in her house by herself.
Hannah neglected to bring the keys to the meeting room and everyone

Chad cheated when playing solitaire and still lost.
Chad has never taken anything from a hotel room.

Amanda put her name as author on a report that a co-worker had written.
Amanda told her friend that she had lost the book so she could keep it for
Amanda admitted she broke the expensive vase.
Amanda reported all of her taxable income to the IRS.
Amanda lied about her qualifications on the job application.
Amanda refused to take money for work she hadn't done.

Michelle created new applications for the database program on her
Michelle stood too close to the grill while adding lighter fluid and singed

Tom put too much fertilizer on his garden and killed all the plants.
Tom took his mother to the grocery store on triple coupon day.
Tom washed his new blue jeans with his wife's white shirt and ruined it.
Tom completed the New York Times crossword puzzle.
Tom missed his sister's birthday party because he wrote it down on the
Tom creates new recipes for himself weekly.

On her personal checklist, Judy put down 10 pounds more than she
Judy accepted she was over 55 and bought a senior citizen movie ticket.
Judy convinced herself that slugs had ruined her vegetable garden when
Judy hates her job but is too afraid to quit, and tells herself it will get better.
Judy waited for the traffic light to turn green, even though the streets were
Judy admitted to her husband that she broke his tennis racket.

Instead of taking sole credit for the idea, Richard pointed out that his co
Richard kept the money from a wallet he found.

Steve made a rash decision and spent too much money for a new car.
Steve turned the wrong way on a one-way street and bumped another car.
Steve figured out how to fix the broken toaster.
While varnishing the floor, Steve suddenly realized that he was trapped in
Steve figured out a way to get his friend's car financed without any down
Steve designed the floor plans for his friend's house.

David mapped out a new, quicker route to work for his carpool.
While in college, David was given a full scholarship to study abroad.
David never learned how to use the security system in his house and
David put gasoline in his neighbor's diesel car and ruined the engine.
David figured out how to repair his computer.
David caused an accident because he was driving too close to the car in

Fred filled out the magazine self-help questionnaire truthfully.
Fred doesn't feel safe living where he does, but rather than moving he tells

Peter told his family that he quit smoking even though he hadn't.
Peter admitted to himself that he was a bad driver and signed up for driving

Heather cut in front of people waiting in line at the theater.
Heather has always treated her friends fairly.
Heather told herself she failed the test because her teacher didn't like her
Heather acknowledged she had gained weight and finally bought her jeans
Heather will not admit to herself that she can't keep a secret.
Heather read the entire book for class, even though a summary was

Melissa developed a successful advertising campaign for the community
Melissa didn't know how to use the camera and ruined her friend's wedding

Tara wrote a bad check to pay the plumber.
Tara got an extra \$50 in her paycheck because she told her boss she
Tara admitted to her boyfriend that she had spent time in jail.
Tara told the clerk she had been undercharged for the item.
Tara tried to get a student ticket with her expired school ID and was caught.
Tara has always been faithful to her spouse.

Alison entered the wrong data and ruined the report her group had been
Alison taught her niece an easy way to calculate the tip at a restaurant.

Sally sold a used car through the classifieds, although she neglected to
Sally was tempted but never cheated on her diet.
Sally did not read her friend's journal even though it was lying open on the
Sally paid her employees under the table.
Sally pocketed the tip off another table as she was leaving the restaurant.
Sally realized she wasn't getting promoted because she needed a college

After depositing 50¢ into the newspaper machine, Bruce took five papers.
Bruce told his boss he was responsible for the accounting error.

Laura was hired at IBM to design a new computer for the company.
Laura needed a calculator to add two numbers of any kind.

Scott compared prices at different stores before buying.
Scott couldn't understand the instructions on his spouse's cough medicine.
Scott rarely makes error when he balances his checkbook.
Scott couldn't understand the programming instructions on his VCR, and
Scott understood the equations presented in math class.
Scott burnt his hand on the stove after forgetting to turn the burner off.

Andy told himself the dog was mean after he taunted it and it bit him.
Andy realized he was responsible for his own feelings.

Joan sold her defective stereo to an unsuspecting neighbor.
Joan took the magazine without paying for it.
Joan told her friend he was drinking too much and needed to get counseling.
Joan left a note on the car she backed into.
Joan ruined her computer when using software she obtained illegally.
Joan accidentally ran over a dog and called the owners to tell them.

Amy organized a successful committee for her company.
Amy couldn't figure out how to install the safety locks on the cabinets to

John learned to speak fluent Spanish in two months.
John passed the pharmacist licensure exam on the first try.
John set off a bug bomb in his house while people were still inside.
John won a creative writing contest.
John never gave his dogs rabies shots.
John did not look both ways while crossing the street

BEHAVIOR SET – SEQUENCE 3

Patrick taught his nephew how to solve the calculus equation.
Patrick thought if 2 tablets could cure his spouse's headache, then 4 would
Patrick lost all of his money when he invested in a get rich quick scheme.
Patrick stood too close to the grill while adding lighter fluid and singed his
Patrick taught himself to program a computer.
Patrick created new applications for the database program on his computer.

Hannah completed the New York Times crossword puzzle.

Hannah washed her new blue jeans with her husband's white shirt and ruined

Chad convinced himself that slugs had ruined his vegetable garden when he
Chad waited for the traffic light to turn green, even though the streets were

Amanda put her name as author on a report that a co-worker had written.
Amanda admitted she broke the expensive vase.
Amanda refused to take money for work she hadn't done.
Amanda lied about her qualifications on the job application.
Amanda kept the money from a wallet she found.
Instead of taking sole credit for the idea, Amanda pointed out that friends had

Michelle reorganized the budget to save money for a family vacation.
Michelle spends \$100 each week on lottery tickets because she just knows

Tom put too much fertilizer on his garden and killed all the plants.
Tom missed his sister's birthday party because he wrote it down on the w
Tom took his mother to the grocery store on triple coupon day.
Tom neglected to bring the keys to the meeting room and everyone was left
Tom creates new recipes for himself weekly.
Tom did the electrical wiring in his house by himself.

On her personal checklist, Judy put down 10 pounds more than she actually
Judy accepted she was over 55 and bought a senior citizen movie ticket.
Judy hates her job but is too afraid to quit, and tells herself it will get better.
Judy admitted to her husband that she broke his tennis racket.
Judy cheated when playing solitaire and still lost.
Judy has never taken anything from a hotel room.

Richard reported all of his taxable income to the IRS.
Richard told his friend that he had lost the book so he could keep it for

Steve made a rash decision and spent too much money for a new car.
While varnishing the floor, Steve suddenly realized that he was trapped in a
Steve figured out how to fix the broken toaster.
Steve designed the floor plan for his friend's house.
Steve entered the wrong data and ruined the report his group had been putting
Steve taught his niece an easy way to calculate the tip at a restaurant.

David figured out how to repair his computer.
David never learned how to use the security system in his house and ended
David caused an accident because he was driving too close to the car in front
While in college, David was given a full scholarship to study abroad.
David developed a successful advertising campaign for the community
David didn't know how to use the camera and ruined his friend's wedding

Fred read the entire book for class, even though a summary was available.
Fred told himself he failed the test because his teacher didn't like him even

Peter got an extra \$50 in his paycheck because he told his boss he worked
Peter admitted to his girlfriend that he had spent time in jail.

Heather cut in front of people waiting in line at the theater.
Heather will not admit to herself that she can't keep a secret.
Heather acknowledged she had gained weight and finally bought her jeans a
Heather has always treated her friends fairly.
Heather doesn't feel safe living where she does, but rather than moving she
Heather filled out the magazine self-help questionnaire truthfully.

Melissa mapped out a new, quicker route to work for her carpool.
Melissa put gasoline in her neighbor's diesel car and ruined the engine.

Tara wrote a bad check to pay the plumber.
Tara has always been faithful to her spouse.
Tara tried to get a student ticket with her expired school ID and was caught.
Tara told the clerk she had been undercharged for the item.
Tara told her family that she quit smoking even though she hadn't
Tara admitted to herself that she was a bad driver and signed up for driving

Alison turned the wrong way on a one-way street and bumped another car.
Alison figured out a way to get her friend's car financed without any down .

Sally sold a used car through the classifieds, although she neglected to
Sally realized she was responsible for her own feelings.
Sally told herself the dog was mean after she taunted it and it bit her.
Sally did not read her friend's journal even though it was lying open on the
Sally pocketed the tip off another table as she was leaving the restaurant.
Sally realized she wasn't getting promoted because she needed and college

Bruce took the magazine without paying for it.
Bruce left a note on the car he backed into.

Laura learned to speak fluent Spanish in two months.
Laura never gave her dogs rabies shots.

Scott understood the equations presented in math class.
Scott organized a successful committee for his company.
Scott couldn't understand the instructions on his spouse's cough medicine.
Scott compared prices at different stores before buying.
Scott burnt his hand on the stove after forgetting to turn the burner off.

Scott couldn't figure out how to install the safety locks on the cabinets to

Andy paid his employees under the table.

Andy was tempted but never cheated on his diet.

Joan sold her defective stereo to an unsuspecting neighbor.

Joan told her friend he was drinking too much and needed to get counseling.

Joan ruined her computer when using software she obtained illegally.

After depositing 50¢ into the newspaper machine, Joan took five papers

Joan accidentally ran over a dog and called the owners to tell them.

Joan told her boss she was responsible for the accounting error.

Amy rarely makes errors when she balances her checkbook.

Amy couldn't understand the programming instructions on her VCR, and she

John won a creative writing contest.

John passed the pharmacist licensure exam on the first try.

John set off a bug bomb in his house while people were still inside.

John was hired at IBM to design a new computer for the company.

John did not look both ways while crossing the street.

John needed a calculator to add two numbers of any kind.

Jennifer took money from her fiance and never told him.

Jennifer admitted to the police officer that she had caused the accident.

Frank told Mary that he didn't like her new haircut.

Frank convinced himself that keeping his smoking down to a pack a day

Brenda attended one of the top medical schools.

Brenda invented a device that allowed her disabled friend to drive a car.

Brenda went to change the oil in her car and put water in instead.

Brenda knew how to remove the virus on her company's computer.

Brenda got F's on most of her final exams in high school.

Brenda ate a candy bar knowing she was allergic to chocolate.

Sarah missed the train because she didn't check the time schedule.

Sarah reorganized the entire filing system in her office.

Doug acknowledged to his boss that his co-worker's idea was better.

Doug turned the odometer back before selling his car.

Doug returned the extra change the grocery store clerk gave him.

Doug won the game of Monopoly because he cheated.

Doug realized he had a problem and joined Alcoholics Anonymous.

Doug lost his job after he lied about the hours he had worked.

Dan bought himself clothes that were the wrong size.
Dan picked up the wrong luggage at the baggage claim.
Dan created a new recycling program for his city.
Dan devised a way for his church to save money.
Dan got lost on his way home from work.
Dan made money for his friends in the stock market.

Bob's short story was accepted for publication.
Bob had to plagiarize the final paper in order to avoid failing the course.

After wearing the clothes, Ruth returned them to the store for a full refund.
Ruth refuses to believe that she is not a pleasant person.
Ruth finally admitted to herself that she no longer looked good in a two-piece
After 35 years, Ruth admitted to herself that she couldn't read and enrolled in
The greatest love of Ruth's life left her, and she told herself that she didn't care.
Ruth accurately marked down her calories on her diet chart.

BEHAVIOR SET – SEQUENCE 4

While varnishing the floor, Steve suddenly realized that he
Steve designed the floor plans for his friend's house.
Steve figured out a way to get his friend's car financed without any
Steve turned the wrong way on a one-way street and bumped another
Steve entered the wrong data and ruined the report his group had been
Steve taught his niece an easy way to calculate the tip at a restaurant.

While in college, David was given a full scholarship to study abroad.

David mapped out a new, quicker route to work for his carpool.
David caused an accident because he was driving too close to the car
David put gasoline in his neighbor's diesel car and ruined the engine.
David developed a successful advertising campaign for the community
David didn't know how to use the camera and ruined his friend's

Fred acknowledged he had gained weight and finally bought his jeans
Fred cut in front of people waiting in line at the theater.

Peter wrote a bad check to pay the plumber.
Peter has always been faithful to his spouse.

Heather will not admit to herself that she can't keep a secret.
Heather told herself she failed the test because her teacher didn't like
Heather has always treated her friends fairly.
Heather read the entire book for class, even though a summary was
Heather doesn't feel safe living where she does, but rather than moving
Heather filled out the magazine self-help questionnaire truthfully.

Melissa figured out how to repair her computer.
Melissa never learned how to use the security system in her house

Tara tried to get a student ticket with her expired school ID and was
Tara told the clerk she had been undercharged for the item.
Tara admitted to her boyfriend that she had spent time in jail.
Tara got an extra \$50 in her paycheck because she told her boss she
Tara told her family that she quit smoking even though she hadn't
Tara admitted to herself that she was a bad driver and signed up for

Alison made a rash decision and spent too much money for a new car.
Alison figured out how to fix the broken toaster.

Sally pocketed the tip off another table as she was leaving the
Sally did not read her friend's journal even though it was lying open
Sally was tempted, but never cheated on her diet.
Sally paid her employees under the table.
Sally told herself the dog was mean after she taunted it and it bit her.
Sally realized she was responsible for her own feelings.

Bruce sold his defective stereo to an unsuspecting neighbor.
Bruce told his friend he was drinking too much and needed to get

Laura won a creative writing contest.
Laura set off a bug bomb in her house while people were still inside.

Scott understood the equations presented in math class.
Scott rarely makes error when he balances his checkbook.
Scott burnt his hand on the stove after forgetting to turn the burner off.
Scott couldn't understand the programming instructions on his VCR,
Scott organized a successful committee for his company.
Scott couldn't figure out how to install the safety locks on the cabine

Andy sold a used car through the classifieds, although he neglected
Andy realized he wasn't getting promoted because he needed a

Joan ruined her computer when using software she obtained illegally.
Joan took the magazine without paying for it.
Joan accidentally ran over a dog and called the owners to tell them.
Joan left a note on the car she backed into.
After depositing 50¢ into the newspaper machine, Joan took five
Joan told her boss she was responsible for the accounting error.

Amy compared prices at different stores before buying.
Amy couldn't understand the instructions on his spouse's cough

John passed the pharmacist licensure exam on the first try.
John did not look both ways while crossing the street.
John learned to speak fluent Spanish in two months.
John was hired at IBM to design a new computer for the company.
John needed a calculator to add two numbers of any kind.
John never gave his dogs rabies shots.

Jennifer turned the odometer back before selling her car.
Jennifer acknowledged to her boss that her co-worker's idea was

Frank finally admitted to himself that he no longer looked good in a
After wearing the clothes, Frank returned them to the store for a full

Brenda attended one of the top medical schools.
Brenda's short story was accepted for publication.
Brenda got F's on most of her final exams in high school.
Brenda invented a device that allowed her disabled friend to drive a
Brenda had to plagiarize the final paper in order to avoid failing the
Brenda ate a candy bar knowing she was allergic to chocolate.

Sarah bought herself clothes that were the wrong size.
Sarah made money for her friends in the stock market.

Doug returned the extra change the grocery store clerk gave him.
Doug admitted to the police officer that he had caused the accident.

Doug won the game of Monopoly because he cheated.
Doug realized he had a problem and joined Alcoholics Anonymous.
Doug took the money from his fiancée and never told her.
Doug lost his job after he lied about the hours he had worked.

Dan picked up the wrong luggage at the baggage claim.
Dan created a new recycling program for his city.
Dan reorganized the entire filing system in his office.
Dan missed the train because he didn't look at the schedule.
Dan got lost on his way home from work.
Dan devised a way for his church to save money.

Bob knew how to remove the virus on his company's computer.
Bob went to change the oil in his car and put water in instead.

Ruth refuses to believe that she is not a pleasant person.
After 35 years, Ruth admitted to herself that she couldn't read and
Ruth convinced herself that keeping her smoking down to a pack a
Ruth told Mary that she didn't like her new haircut.
The greatest love of Ruth's life left her, and she told herself that she
Ruth accurately marked down her calories on her diet chart.

Patrick taught himself to program a computer.
Patrick reorganized the budget to save for a family vacation.
Patrick lost all of his money when he invested in a get rich quick
Patrick created new applications for the database program on his
Patrick spends \$100 each week on lottery tickets because he just
Patrick stood too close to the grill while adding lighter fluid and

Hannah took her mother to the grocery store on triple coupon day.
Hannah put too much fertilizer on her garden and killed all the plants.

On his personal checklist, Chad put down 10 pounds more than he
Chad accepted he was over 55 and bought a senior citizen movie ticket.

Amanda lied about her qualifications on the job application.
Amanda refused to take money for work she hadn't done.
Amanda reported all of her taxable income to the IRS.
Amanda told her friend that she had lost the book so she could keep
Amanda kept the money from a wallet she found.
Instead of taking sole credit for the idea, Amanda pointed out that

Michelle taught her nephew how to solve the calculus equation.
Michelle thought if 2 tables could cure her spouse's headache, then 4

Tom missed his sister's birthday party because he wrote it down on
Tom washed his new blue jeans with his wife's white shirt and ruined it.
Tom creates new recipes for himself weekly.
Tom completed the New York Times crossword puzzle.
Tom neglected to bring the keys to the meeting room and everyone
Tom did the electrical wiring in his house by himself.

Judy hates her job but is too afraid to quit, and tells herself it will get
Judy admitted to her husband that she broke his tennis racket.
Judy convinced herself that slugs had ruined her vegetable garden
Judy cheated when playing solitaire and still lost.
Judy waited for the traffic light to turn green, even though the streets
Judy has never taken anything from a hotel room.

Richard admitted he broke the expensive vase.
Richard took credit for a report that a co-worker had written.