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Cognitive and Affective Influences on Decision-Making Strategies and Outcomes

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Cognitive and Affective Influences on Decision-Making Strategies and Outcomes

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**Thesis submitted to the
Eberly College of Arts and Sciences
at West Virginia University**

in partial fulfillment of the requirements for the degree of

Master of Science in
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ABSTRACT

Cognitive and Affective Influences on Decision-Making Strategies and Outcomes

Michaela S. Reardon

This study examines how factors such as emotion and planning abilities, determine decision-making strategies and outcomes. Consumer-based decision tasks are one way for researchers to measure the decision-making process and outcomes of individuals, while bringing an element of reality to the task through the utilization of decisions about everyday items that someone might purchase (e.g., a car, apartment, etc.). Using these types of tasks, researchers can measure the quality of a decision (e.g., did the participant come up with the best solution?), as well as the decision or search strategy. Previous research shows that cognitive factors are important when individuals make decisions (Engle, 2018). Emotional components are also important to consider when addressing decision making in adulthood. Older adults have a better memory for emotion-laden content compared to younger adults (Yoon et al., 2009). Older adults also tend to display a bias toward positive information when making decisions (Carstensen et al., 1999). The current study uses emotional variables such as decision importance and task difficulty, as well as measures of cognitive functioning, such as the digit symbol substitution task, to predict decision making quality and strategies in a consumer-based task. While previous research shows that cognitive abilities (Engle, 2018; Patrick et al., 2013) and affective components (Carstensen et al., 1999) are both important for predicting decision-making outcomes, the research regarding affective components is less well established. Results found that those who relied on a particular search strategy were more than twice as likely ($OR = 2.34$) to be classified as making a good decision in choosing a home. Results from this study have implications for alternate routes of intervention in the decision-making process.

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Previous research has found a link between cognitive factors and decisional strategies and outcomes (Patrick, Steele, & Spencer, 2013). Affective factors have also been shown to influence both strategies (Isen & Means, 1983) and outcomes (Forgas, 1989; von Helversen & Mata, 2012); however, the research on affective factors is less established. The aim of this paper is to further the research on the influence of cognitive and affective factors on decisional outcomes and strategies. First, the link between cognition and decision-making will be established, followed by a review of the use of consumer-based decision matrices in research. Additionally, research on affective components of decision making, as well as individual difference factors will be addressed.

A Framework for Aging, Cognition, and Decision-Making

Cognition is a multidimensional construct that incorporates activities such as thinking, perceiving, remembering, knowledge acquisition, and even understanding language (Ginsburg & Koslowski, 1976). Two important components of cognition are executive function and reaction time. Reaction time reflects how quickly an individual is able to respond to a stimulus. Executive functioning involves an individual's ability to set goals, plan, switch attention, and adjust their behavior accordingly (Salthouse, 2009). As people age, a decline is often noticed in some mental abilities, such as those related to executive functioning, memory, and processing speed (Hartshorne & Germine, 2015). Processing speed is an ability that peaks in young adulthood and then begins to decline after the 20s (Hartshorne & Germine, 2015); however, despite some of these losses, there are ways that adults cope with some of the age-related changes in order to compensate (Salthouse, 2009). Engle (2018) discusses working memory and fluid intelligence in relation to individuals' ability to perform complex, real-world tasks. Research shows that higher-order cognitive processes (e.g., executive functioning) and more basic cognitive abilities (e.g.,

reaction time) are needed to control attentional resources in order to complete complex tasks (Engle, 2018). Because older adults are sometimes unable to inhibit extra information (an aspect of executive functioning), they often have fewer working memory resources to devote to a task at hand (Hartshorne & Germine, 2015). As adults age, it becomes more difficult to selectively attend to stimuli, but age-related declines are not uniform across all older adults. There are individual differences (Salthouse, 2009). While the influence of aging will not be tested in this study, it is important to note that there is a connection between cognitive processing abilities and decision-making strategies and outcomes (for another theory on cognitive components that underlie decision-making see Reyna & Brainerd (2011)).

Experience and other knowledge-related abilities can counteract some of the attentional declines that are characteristic of aging and may explain some of the individual differences in cognitive performance. Research on decision-making suggests that there is a role for expertise or experience in determining both strategies used and decisional outcomes (Patrick et al., 2013; Patrick & Strough, 2004; Yoon et al., 2009). Yoon and colleagues (2009) have suggested that older adults use less information when making a decision in a task with which the adult has experience because they are able to draw on previous search strategies in order to make a decision. This experience and knowledge that helps individuals in later problem-solving tasks may compensate for some losses in other cognitive skills. Repeated exposure to similar problems may also lead to more automatic responses. This reduces the cognitive demands placed on an individual which may result in fewer decision-making strategies used by older adults. While experience does not assure that a good decision will result, research suggests that experience may help (Patrick & Strough, 2004). Other research suggests that task complexity is minimized when adults have experience, therefore they are able to lead a more focused search during a task

of decision making (Queen, Hess, Ennis, Dowd, & Gruhn, 2012). While the literature suggests there might be some age-related changes, experience, expertise (Patrick & Strough, 2004), and cognitive abilities (Engle, 2018) affect decision-making strategies.

Consumer Decisions

Decision making is an important task in everyday life; adults make financial decisions, health decisions (Finucane, Mertz, Slovic, & Schmidt, 2005), and decisions as consumers, such as what car to buy (Mather, Knight, & McCaffrey, 2005; Patrick et al., 2013; Queen et al., 2012). There are various ways to appraise decision-making outcomes. For example, researchers may examine individuals' preferences in a decision task, such as "Which item do you prefer?" (Strough et al., 2015). Early research on decision outcomes by Forgas (1989) examined the information participants used to select a research partner by having the participants classify the information in hypothetical personnel files as important, not important, or not useful in their decision-making process.

Von Helversen and Mata (2012) used another method, a sequential decision-making task, that asked participants to view multiple different consumer products and find the best deal for each one. For each item, participants viewed up to 40 advertisements and had to make a decision when they came across what they believed would be the best decision (cheapest option/best deal). Participants could not re-view an advertisement once they passed up the option; they had to pick the next best one. The total number of advertisements viewed was recorded for each participant.

Another way to examine decision making is through the use of consumer-based decisions. Consumer-based decisions ask individuals to make a selection of a product (e.g., a car) for themselves (Mather et al., 2005; Queen et al., 2012) or others (Patrick et al., 2013), given a

set of criteria such as lifestyle, budget, etc. That is, they take into account the person and the contextual factors involved in the decision. Consumer-based tasks also bring an element of reality to a task because they involve making decisions about everyday items that someone might purchase (e.g., a car, apartment, etc.). Thus, the objects are likely to be familiar to most individuals (e.g., most people would have purchased or rented a home or car). Additionally, the item features are reflective of reality, so an individual with more experience in a given content domain might not need to view all pieces of information available.

It is possible to evaluate the decision an individual makes in comparison to an expert group in order to survey the decision quality (Patrick et al., 2013). Because consumer-based tasks take into account a hypothetical individual's need, individuals' selections are determined to be correct or incorrect based on whether or not they matched expert decision rankings (Patrick et al., 2013). In the standard decision-making task, materials are developed to reflect those found outside the lab. A panel of experts from each domain (car and home industry) rank the "best choice" given the vignette. Then participants are asked to select the best choice and agreement between the experts and participants is calculated. By combining the knowledge of the expert outcome with the matrix format, each piece of information can be evaluated for whether it is relevant or important for the "best" answer (Patrick et al., 2013; Queen et al., 2012). Relevant pieces of information are determined by experts using the information given in a vignette that describes the individual's lifestyle, budget, etc. The proportion of relevant information a participant uses is determined by how many relevant pieces are viewed out of the total number of relevant pieces as established by the experts (Patrick et al., 2013); if there were eight pieces of relevant information and the participant viewed four of those, their proportion would be .50. Researchers can also calculate a correlation between the participant rated importance of an

attribute dimension (e.g., safety) and the number of times cells on that attribute were opened (Queen et al., 2012).

In addition to its increased ecological validity and ability to assess decision quality, expertly-developed materials allow the researcher to evaluate what information was used and evaluate the strategic search process involved in making a decision. Information search strategies have focused on how much information a person uses, how long they take to consider the choices, and how they combine information to make a decision (Parker, Bruine de Bruin, & Fischhoff et al., 2007; Patrick et al., 2013; Queen et al., 2012). Building on work by Johnson (1990), Queen and colleagues (2012) used a matrix-decision task to look at the time spent on the entire search, the average time a participant viewed a cell within the matrix, the proportion of cells opened at least one time, and the number of times a cell was opened after the first viewing.

Alternative-based searches are exhaustive; each feature is evaluated and weighed for each alternative before a decision is made (Mata, von Helversen, & Rieskamp, 2010; Patrick et al., 2013). For example, an individual might assess every quality about each car offered before making a purchase. Simpler strategic search processes involve a feature-based comparison; this has often been referred to as a non-compensatory search strategy. Feature-based comparisons are more efficient and are less cognitively taxing in that individuals focus on just a few alternatives (e.g., car models) that they believe are high or suitable in value on a chosen feature (e.g., safety rating or fuel efficiency), rather than taking all of the information into account (Mata et al., 2010; Patrick et al., 2013).

Patrick and colleagues (2013) used a ratio of repetition to determine if participants used a non-compensatory search strategy. The ratio of repetition examines the number of times a participant opens cells within a column and row. If a participant searched a column of features to

look for an alternative on one particular feature (e.g., different houses based on the feature of location), they would have a high ratio of repetition for features. This means the participant would have repeatedly opened the same column several times and the number of times that column was examined would be recorded. This is indicative of a non-compensatory search strategy (Patrick et al., 2013). Alternatively, if a participant wants to view all information for one particular home, they would repeatedly look along the same row (viewing price, location, etc.). This would give the participant a high ratio of repetition for alternatives, indicative of a compensatory strategy. In consumer-based decision tasks, information is presented in a matrix so that researchers can evaluate whether participants gather information moving from feature to feature (comparing different choices on a single, important feature) or from alternative to alternative (gathering all of the information for a specific alternative before moving to the next alternative; Patrick et al., 2013; Queen et al., 2012).

Alternative-based comparisons are consistent with maximizing strategies. Individuals who rely on maximizing strategies tend to look at all of the information available before making decisions; these individuals also have been shown to have a higher need or liking for cognitively demanding tasks (Parker et al., 2007; Queen et al., 2012). Maximizers also are more likely to question their decision choices. The notion that participants who engage in maximizing strategies question their decisions more is another possible explanation for why these individuals engage in alternative-based searches; they cannot determine what information is most important to them in a purchasing decision (Parker et al., 2007). Satisficing is consistent with feature-based searches. Participants who engage in satisficing do not necessarily find the “best” option or the option most consistent with their preferences in attribute dimension, but they pick an option that is

“good enough” to meet the needs of the individual for whom they are making a decision (Parker et al., 2007; Queen et al., 2012).

Decision-Making and Affective Factors

When older adults have a limited time perspective, they prefer emotion-related goals, in contrast to younger adults, who focus on knowledge gaining goals (Carstensen, Isaacowitz, & Charles, 1999). Older adults also have a better memory for emotion-laden content rather than non-emotionally charged content. Age related decreases in cognitive resources may result in an increased dependence upon emotional strategies in decision making. For example, older adults may quickly eliminate options that they find to be negative or associated with a negative memory (Yoon et al., 2009). In one study older adults adopted a feature-based comparison and were more likely to pay attention to positive features of cars and focus less on negative features of cars (Mather et al., 2005). Younger adults did not display this same bias toward positive features. The results of this study highlight Carstensen’s (1999) socioemotional selectivity theory which states that as adults age, they attempt to maximize social and emotional gains and minimize social and emotional losses because they realize that time is limited. This limited time perspective often results in a bias toward positive information and a focus is placed on people and events that individuals find emotionally meaningful and important (Carstensen, et al., 1999).

Affect has also been shown to play a role in search strategy (Isen & Means, 1983; Schwarz, 2000) and outcomes (Forgas, 1989; von Helversen & Mata, 2012). Previous research shows that positive affect specifically is related to the use of existing knowledge and a top-down processing strategy in which less attention is paid to details. Conversely, negative affect has been linked with bottom-up processing and more attention to details in a task at hand. Search strategies involving a focused search examining one feature at a time is also more common with

negative affect (Schwarz, 2000). Studies by Isen and Means (1983) and Forgas (1989) found that positive affect elicited faster decisions which is consistent with Schwarz's (2000) finding that individuals higher in positive affect use less exhaustive search processes than those higher in negative affect. Forgas (1989) used an analysis of variance to examine differences in search process between happy and sad participants. Happy participants reached a decision faster and in fewer steps than did sad participants. Isen and Means (1983) also found that those with higher positive affect were less likely to recheck older information that they had previously examined, quickly reducing the number of alternatives to search through on a consumer-based task regarding a fictional vehicle purchase.

The literature regarding affect has mainly been focused on the valence, whether the overall affective state of the participant is positive or negative. This is important when examining mood-congruent decisions where individuals are more likely to make an appraisal about a decision that is positive if they have or are induced to feel positive affect (Lerner & Keltner, 2000). Lerner and Keltner (2000) found support for the appraisal-tendency hypothesis which states that not all emotions with a similar valence will have the same impact on judgements and decisions because they have different appraisal themes. For example, anger and fear are similar in that they are negative emotions; however, fear has components of uncertainty and external control whereas anger is generally associated with having a greater sense of certainty and internal control over situations (Lerner & Keltner, 2000). While Lerner & Keltner tried to expand the research using more specific positive and negative affective states, other aspects of affect such as importance or meaningfulness of a decision have yet to be explored.

Individual Difference Factors and Decision-Making as a Function of Cognition and Affect

Numerous studies have examined decision-making strategies as they relate to differences among younger and older adults; however, results from these studies reveal conflicting evidence (Mata, et al., 2010; Patrick et al., 2013; Queen et al., 2012). Some research shows that search strategies differ by age when adults analyze information. Younger adults tend to make decisions after analyzing all information on the topic at hand in order to make the best possible decision; they are more likely to use an alternative based strategy (Mata et al., 2010). These alternative-based search strategies (also referred to as compensatory search strategies) are cognitively demanding since they require that all information made available to the consumer is processed and evaluated (Mata et al., 2010; Patrick et al., 2013). Older adults have been observed to view fewer pieces of information and focus only on features that they deem to be important or relevant when making a decision; they are more likely to use feature-based search strategies (also referred to as non-compensatory search strategies; Mata et al., 2010).

Von Helversen and Mata (2012) found similar results examining sequential decision-making with adults. Sequential decision-making requires that participants view ads for several of the same items, only differing in price. The object of the task is to not conclude the search too early or too late in order to obtain the best deal on a product (products were ranked in terms of the best possible deal through the worst possible deal). Their results showed that older adults selected offers that were ranked about two places below younger adults, and that a higher positive affect was related to decreased performance on the sequential decision-making task, less search in both age groups, and a lower threshold for accepting an offer (von Helversen & Mata, 2012). While the research shows that sometimes quickly narrowing down a search works against

and individual, those with experience and expertise in a given area can also narrow their search options fairly quickly and make a good decision (Queen et al., 2012).

Other studies have found minimal or no differences in decision making strategies among different age groups. Queen and colleagues (2012) used discriminant analyses to determine important participant characteristics that were associated with decision-making strategy. They found that a non-compensatory search strategy was more common among those with higher education, increased physical health and ability, and individuals who place a stronger importance on attributes. Compensatory strategies were also more common among participants who had a preference for thinking and being challenged. A strategy where all information is viewed and working memory is tested fits with those abilities and preferences. Yoon and colleagues (2009) note that age is important because many cognitive resources change as one ages; however, research is not always consistent about what constitutes old age. They also consider that it may not be age that is important, but functional ability of the individual completing the task.

There are other individual difference factors that influence cognitive ability and decision making outcomes. For example, health status decreases as individuals age and it is closely tied to cognition (Yoon et al., 2009). As people age, there are decreases in both sensory and physiological functioning. These decreases are dependent upon other factors such as lifestyle and medical conditions (Yoon et al., 2009). Individual differences such as socioeconomic status (SES) and education are also important factors in decision making. A compensatory strategy has been found to be more common among adults with lower SES and those with less education (Yoon et al., 2009). Non-compensatory strategies consistent with satisficing have been found to be associated with higher education and those in better health (Queen et al., 2012).

The Current Study

The current study used existing data to examine decision making processes in adults. Previous research shows that cognitive abilities, such as reaction time and executive functioning, are important for predicting decision-making strategies and outcomes (Engle, 2018, Patrick et al., 2013). Research has also shown that affective components matter in decision-making processes (Carstensen et al., 1999); however, this area of research less well established. The aim of the current study is to add to our understanding of cognitive and affective components and their roles in decision-making strategies and outcomes.

Hypothesis One: Executive function and reaction time will account for a significant amount of variance in decision quality.

Hypothesis Two: Affective components will account for a significant amount of variance in decision-making strategies and outcomes.

Research Question One: Does affect or cognition best account for differences in strategy and quality of decision?

Method

Participants

Data for this study came from the larger ABCD study (Patrick & Gentzler); this health coaching study involved a pre-screen and four in-person data collection sessions. Decision-making data for the current study were gathered during the second and third in-person sessions and prescreen data were used for providing information on an affective component. The pre-screen involved more than 1500 adults, although only 96 were invited to complete the in-person portion. Of those 96 adults, only a subset ($n = 60$) completed the decision tasks; 56 adults ages 18 through 72 had completed data and were included in final analyses (75 percent female). A

power analysis, implemented in G Power (Faul, Erdfelder, Buchner, & Lang, 2009) suggested that $N = 53$ would provide sufficient power ($\lambda = .80$) to detect a large to medium-sized effect ($f^2 = .25$) with three to four predictors in a multiple regression.

Materials

Information Matrices. An 8 x 7 matrix (Patrick et al., 2013) was used to display the alternatives (i.e., different car types or houses) and features of those alternatives (e.g., safety ratings). Matrices were based on actual products available in the environment, similar to the information found in Consumer Reports. This added to the ecological validity of the task, enabling participants to use their existing expertise. The features for cars included price, style, appearance, safety, reliability, fuel, equipment, and performance. The housing features include rent, size, locale, medical services, non-medical services, social, safety, and rules/options. Participants viewed matrices on the computer and were able to view one cell of information at a time, in any order. Participants were not allowed to write down any information, but could look back through information as many times as they wished before making a decision. Time spent on the task was recorded in milliseconds.

Vignettes. Participants were asked to make a purchase decision for themselves and for hypothetical individuals described in a vignette. Participants engaged in two initial practice scenarios where they chose a candy bar and a suit for themselves. This helped to acquaint them with the program used for the study. After the two practice scenarios, the participants received the vignettes for either the car or home decisions domains, depending on the week. At week 1 participants were asked to make decisions about purchasing a car, and at week 2 they made decisions about purchasing a home. The vignettes and their matching matrices were always counterbalanced across participants within domain. The vignettes describe the individuals'

lifestyle and financial situation, thus some the needs of these individuals were implied, while others were clearly stated. Participants viewed two vignettes for purchasing a car and two for selecting a home. Participants also engaged in a self-condition where they chose a car or home for themselves before selecting one for others in each decision domain. Thus, participants made three decisions in each domain during the study.

The two vignettes for cars focused on a hypothetical single individual and a couple. The single individual, Chris, was a college student that had commuting needs to and from school and work. The couple, Larry and Sue, were professionals that regularly entertained clients. The two vignettes for homes focused on two hypothetical older women. One of the older women, Anna, was an older adult in poor health who wished to have more community engagement. Betty was the second older adult in the home vignette. She was healthy, wished for more engagement with peers, and had a good income (Patrick et al., 2013).

Total time on task for cars ($M = 147.31$, $SD = 65.19$) and homes ($M = 182.47$, $SD = 87.51$), and total number of pieces of information used for cars ($M = 20.45$, $SD = 11.41$) and homes ($M = 23.26$, $SD = 14.23$) were assessed using the vignettes and matrices. Information on overall alternative-based and feature-based strategies were assessed. Alternative-based and feature-based strategies were assessed for each decision that was made by counting the number of times the row (alternatives) or column (features) was opened consecutively by a participant. An overall domain-specific score was computed for each participant by averaging their ratio of repetition for choices A and B in each of the two domains. A high ratio of repetition for alternatives was indicative of a compensatory search, whereas a high ratio of repetition for features indicated a non-compensatory search. Strategy could not be assessed for the practice

conditions because the matrices were not large enough to calculate a ratio of repetition for participants.

Quality of Decisions. The quality of decisions was assessed for both car and home decision domains. Each domain was broken down into whether or not participants made at least one good decision when completing the matrices. In scenario A for the car decision, 21.90 percent made a good decision, while in scenario B, 40.60 percent made a good decision. Combining across scenarios for the car decision revealed that 50 percent of individuals made at least one good decision.

Scenario A for the housing domain showed that only seven percent of individuals made a good decision, and in scenario B, 55.60 percent of individuals made a good decision. Combining across scenarios in the housing domain, 62.20 percent of participants made at least one good decision.

Affective Measures

At the pre-screen, individuals were asked a series of questions, including those about a place to live and automobile purchases. Participants indicated how important the decision to purchase a car or house was (1 = not very important; 5 = very important). Participants were also asked about how emotionally meaningful the decision is to buy a car or house (1 = not very meaningful; 5 = Very meaningful). Participants indicated how intellectually difficult it is to make a decision about purchasing a home or car (1 = not very intellectually difficult; 5 = very intellectually difficult). Finally, participants were asked how recently they had purchased a car ($M = 3.41$, $SD = 1.39$) or home ($M = 3.35$, $SD = 1.32$) for themselves (1 = “never,” 2 = “within the past year,” 3 = “1 to 2 years ago,” 4 = “2 to 5 years ago,” 5 = “more than 5 years ago”).

Affective Scales. For each domain, the ratings for meaningfulness and importance were combined to form a single scale. Affective scales for Cars had a mean of 6.36 ($SD = 2.22$, $\alpha = .76$). For Homes, the affective scale had a mean of 9.62 ($SD = .8$, $\alpha = .63$). Thus, indicating decent internal reliability for scales containing only two items. Meaningfulness and importance were chosen for the affective component because these factors relate to Carstensen and colleagues' (1999) Socioemotional Selectivity Theory which highlights differences in maximizing social and emotional gains and minimizing these losses. For example, older individuals will spend more time with individuals with whom they have more meaningful relationships and whom they find more important to them because of the limited time perspective.

Cognitive Measures

Digit- Substitution. The digit-symbol substitution task is a measure of executive function and was administered electronically. For this test the participant used a list of nine digit-symbol pairs to list the corresponding symbol next to a list of digits in an allotted time-span. The average response rate for each participant was calculated in milliseconds ($M = 1862.36$, $SD = 340.87$) and participants repeated this task until they reached 100 percent accuracy. Participants were given a trial period with feedback to start, and then progressed to the experimental condition where no feedback was given (Mueller & Piper, 2014).

Four Choice Reaction Time Test. This is a test of reaction time where an individual had to detect a stimulus in one of four quadrants on a computer screen. The participant had to press a button to indicate where the stimuli is both quickly and accurately, thus measuring reaction time in milliseconds ($M = 688.89$, $SD = 295.66$) among participants (Mueller & Piper, 2014).

Procedure

Participants completed informed written consent before beginning participation in the study. Participants then took some prescreen measures for this study, such as global cognition and personality measures. Participants were then invited to complete the in-person portion of this study that included the cognitive measures, digit-symbol substitution, a measure of executive function, and a four-choice reaction time test. Participants also made importance ratings on features of cars and houses prior to beginning the study.

The cognitive processing measures and affective measures were obtained at Baseline (Week 0), the automobile decisions were made at Week 1, and Housing decisions were made at Week 2. Before completing the decision matrices, participants completed a guided practice decision using a 2 by 3 matrix for candy bars and a 4 by 4 matrix for a suit of clothing for a female lawyer. This was followed by the first 8 by 7 domain matrix (automobile, housing) for which a person chose an alternative for themselves. Each participant then made a decision about a purchase for two other individuals following the choice made for themselves. Vignettes were provided in order to aid the participant in making a selection for the other individuals. The vignettes and matrices are presented in Appendix A. In each vignette, the hypothetical needs and resources for each fictional person/couple were addressed. Vignettes were written so that participants all had the objective to meet the hypothetical characters' needs (Patrick et al., 2013).

Results

Two affective scales, one for houses and one for cars, were created using the emotional meaningfulness and importance items for each respective domain. These scales were used in subsequent analyses (see materials for scale reliability). Decision quality was also assessed for

each domain. Individuals were classified as a good decision-maker in each domain if they made at least one of the “good decisions” (expert determined) out of the two possible decisions.

Bivariate correlations were examined (Table 3) between the decision quality variables, the digit-symbol substitution task, the affective scales, and the alternative and feature-based strategies for each decision domain. Both Pearson’s r and Spearman’s ρ (rho) correlation coefficients were calculated for variables in order to appropriately assess the ordinal nature of some of the scales. Car decision quality was not significantly associated with any of the other variables. House quality was only significantly negatively associated with the car affective scale ($\rho = -.43, p < .01$). The affective scale for housing decisions was significantly negatively associated with using an alternative based search strategy ($\rho = -.30, p < .05$). Additionally, the use of an alternative-based strategy in the car domain was positively related to the use of an alternative-based strategy in the housing domain ($r = .45, p < .05$). Similarly, the use of a feature-based strategy in the car domain was significantly related to the use of a feature-based strategy in the housing domain ($r = .45, p < .05$). Correlation analyses also revealed that the average number of pieces of information used and the average total time it took participants to make a decision were not related to strategy or decision quality.

Correlations were also used to determine if the recency of making a decision about purchasing a car or home was related to decision strategy or quality. The recency of purchasing a car was not related to either strategy (feature versus alternative) or the quality of the decision. Similarly, the recency of purchasing a home was not related to either strategy or decision quality on the decision matrix.

Correlations including demographic information and other study variables revealed that age was associated with the digit-symbol task ($r = .58, p < .05$). Age was also associated with

the other cognitive variable, the four-choice reaction time test ($r = .57, p < .05$). The two cognitive variables were moderately correlated ($r = .59, p < .05$); however, due to the lower number of individuals that participated in the four-choice reaction time test, the cognitive variable included in subsequent regression analyses was the digit-symbol task. Additional correlations were examined between all variables measured (see Table 3).

Cars

Two logistic regressions, one for each decision domain, were conducted in order to best analyze the data collected and address the proposed hypotheses because of the dichotomous dependent variable. A logistic regression was conducted predicting car decision quality (see figure 1) using digit-symbol time, the affective scale for cars, and an alternative search strategy. With all three predictors entered, the equation was not significant, $\chi^2(df = 3) = 3.69, p = .30$. The pseudo R^2 measures were low for this analysis, Cox & Snell = .12, Nagelkerke = .16. For the car buying decision, 66.70 percent of individuals were classified correctly, with 75 percent classified as making a good decision. Examination of the coefficients did not reveal any predictors as increasing the odds for correct classification.

A mediation analysis was conducted to examine direct and indirect effects of affect on car decision quality with an alternative-based strategy as a mediator. Neither the direct nor indirect pathways were significant for this model. The model was also examined using a feature-based strategy as the mediator, and again, neither the direct nor indirect effects were significant.

Homes

A logistic regression was conducted predicting home decision quality (see figure 2) using the digit symbol time, alternative search strategy, and the affective scale for the housing domain. With all three predictors entered in the same step, the equation was not significant, $\chi^2(df = 3) =$

3.06, $p = .38$. The pseudo R^2 measures were also low, Cox & Snell = .07 and Nagelkerke = .10. Seventy percent of individuals were correctly classified as making a good decision, with 92.3 percent of the individuals making a good decision correctly classified. Although the model failed to reach significance and the beta weight for an alternative-based strategy was not significant ($B = .85$, Wald = .21), examination of the Odds Ratio showed that adults who relied an alternative-based strategy were more than twice as likely ($OR = 2.34$) to be classified as making a good decision in choosing a home in the vignettes. Additionally, those who scored higher on the affective scale (importance and meaningfulness of domain specific decisions) were 2.16 times more likely to be classified as making a good decision ($B = .77$, Wald = 1.91).

The relations between affect, decision strategy and decision quality for the housing domain was also assessed using a mediation model (see figure 3) with affect predicting decision quality through an alternative-based strategy. While the model as a whole did not produce any direct or indirect effects, there was a significant effect for affect predicting the use of an alternative-based strategy ($b = -.11$, $p = .04$). When the feature-based strategy was entered into the same model (affect predicting decision quality), the path from affect to decision strategy was also significant ($b = .09$, $p = .03$).

Discussion

The main purpose of this study was to examine the decision-making process in a wide age range of adults. While research shows that both cognitive abilities (Engle, 2018; Patrick et al., 2013) and affective factors (Carstensen et al., 1999; Isen & Means, 1983; von Helversen & Mata, 2012) are important for decision-making processes, the research on affective factors was less well established and mainly focuses solely on valence (i.e., positive emotions versus negative emotions in decision-making). Hypothesis 1 stated that a cognitive measure of

executive function (digit-symbol substitution test) would account for a significant amount of variance in decision quality. This hypothesis was tested for both the car and home domains through the use of logistic regression because of the dichotomous outcome variable, decision quality. The cognitive variables in the logistic regression equations for each domain were not significant predictors that increased classification for whether or not individuals made a good quality decision, thus, hypothesis one was not supported. The findings from this study are contradictory to the literature that has found cognitive processes to be an important factor related to complex tasks (Engle, 2018).

Hypothesis 2 stated that affective components would account for a significant amount of variance in decision-making strategies. This hypothesis was also tested using the logistic regression equation. The affective scale was not a predictor that increased the odds for correct classification in the car or home domains; however, the odds ratio in the logistic regression specific to the home domain showed that individuals who relied more heavily on an alternative-based strategy were more than twice as likely to make a good decision. Additionally, in the mediation model the indirect pathway from affect (the predictor) to alternative-based strategy (the mediator) was significant. This suggests that while hypothesis two was not supported, it does demonstrate that affect is related to an alternative-based decision-making strategy. The findings in this study are consistent with the research by von Helversen and Mata (2012) which also found that affect (positive) was predictive of search strategy, but measures of fluid cognitive abilities were not predictive of search strategy.

The research question that this study attempted to answer was, does affect or cognition best account for differences in strategy and quality of decision? Based on the logistic regressions for the home domain, as well as the mediation models, affect, but not cognition best accounts for

differences in strategy and quality of decision. Again, this is consistent with some findings in the literature (von Helversen & Mata, 2012); however, there is also literature that suggests each variable would be important.

Given that there is some conflicting evidence regarding the importance of affect and cognitive abilities in decision-making strategies and outcomes, future studies might attempt to use a different measure of cognitive abilities to capture executive function. Future studies should also analyze the vincentized ratio of repetition for both the feature and alternative strategies. This would allow for researchers to examine changes in search strategy throughout the decision tasks.

This study was limited in that it was a small sample of adults from one geographic area, meaning that these results may not generalize to the population at large. Additionally, there was not both car and home domain information for every single participant (more data on housing domain), so that may have influenced the results. Because of the small sample size, the mediation analyses that were conducted were also low-powered. To stabilize the beta weights, 5,000 bootstrapped samples were used.

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Table 1

Means and Standard Deviations for Scales, Cars, and Homes

Variable	N	M	SD	Minimum	Maximum
Age	56	41.86	15.66	18.00	72.00
Quality Car	56	.41	.71	0.00	2.00
Affect Car	53	6.36	2.22	2.00	10.00
Features Car	32	.60	.21	.14	.95
Alternate Car	32	.31	.18	.07	.77
Total Time Car	32	147.31	65.19	62.05	335.18
Pieces Info Car	32	20.45	11.41	6.00	66.50
Quality House	56	.63	.68	0.00	2.00
Affect House	53	9.62	.88	5.00	10.00
Features House	45	.54	.17	.07	.87
Alternate House	45	.39	.21	.04	1.00
Total Time House	45	182.47	87.51	48.67	510.59
Pieces Info House	45	23.26	14.23	4.50	89.00
Four Choice	47	688.89	295.66	360.48	1396.89
Letter Digit	50	1862.36	340.87	1179.43	2890.33
Pieces info A Car	31	20.10	13.71	0.00	76.00
Repeats A Car	31	.18	.18	0.00	.64
Time A Car	32	142.75	81.73	2.25	366.35
Alternative A Car	30	.31	.19	0.00	.78
Feature A Car	30	.63	.21	.15	1.00
Pieces info B Car	32	20.53	10.65	4.00	57.00
Repeats B Car	32	.19	.16	0.00	.57
Time B Car	32	151.87	63.93	42.74	304.01
Alternative B Car	32	.31	.21	0.00	.79
Feature B Car	32	.57	.25	0.00	.89
Pieces info A House	43	24.44	19.47	2.00	117.00
Repeats A House	42	.24	.18	0.00	.60
Time A House	43	117.88	93.06	37.19	439.84
Alternative A House	43	.38	.26	0.00	1.00
Feature A House	43	.56	.23	0.00	.90
Pieces info B House	45	22.27	13.38	4.00	61.00
Repeats B House	43	.74	3.79	0.00	25.00
Time B House	45	187.14	109.40	34.82	652.07
Alternative B House	45	.39	.24	0.00	1.00
Feature B House	45	.52	.23	0.00	1.00

Note. Total time was measured in milliseconds.

Table 2

Means and Standard Deviations of Affective Variables

Variable	N	M	SD	Minimum	Maximum
Importance House	53	4.89	.32	4.00	5.00
Meaningfulness House	53	4.74	.65	1.00	5.00
Difficulty House	51	3.59	1.31	1.00	5.00
Recency House	51	3.41	1.39	1.00	5.00
Importance Car	53	3.43	1.17	1.00	5.00
Meaningfulness Car	53	2.92	1.30	1.00	5.00
Difficulty Car	51	3.16	1.22	1.00	5.00
Recency Car	51	3.35	1.32	1.00	5.00

Table 3
Pearson Correlations – Part 1

	#			#			Choice	#		Choice	#
	Choice	Pieces	Time	Choice	Pieces	Time	House	Pieces	Time	House	Pieces
	Car A	Car A	Car A	Car B	Car B	Car B	A	A	A	B	B
Choice Car A	1	0.116	-0.021	0.190	0.255	0.037	0.083	-0.246	-0.368	0.236	0.085
# Pieces Car A	-	1	.742**	-0.043	.769**	.593**	0.135	.486*	0.220	.619**	0.386
Time Car A	-	-	1	-0.097	.376*	.596**	.468*	0.172	.449*	.440*	0.309
Choice Car B	-	-	-	1	-0.036	0.094	0.183	-0.324	-0.169	-0.189	-0.067
# Pieces Car B	-	-	-	-	1	.738**	0.101	.520**	0.202	.671**	0.367
Time Car B	-	-	-	-	-	1	0.398	0.324	.474*	.553**	.477*
Choice House A	-	-	-	-	-	-	1	-0.296	-0.186	.337*	-0.029
# Pieces House A	-	-	-	-	-	-	-	1	.644**	.360*	.526**
Time House A	-	-	-	-	-	-	-	-	1	0.249	.435**
Choice House B	-	-	-	-	-	-	-	-	-	1	.393**
# Pieces House B	-	-	-	-	-	-	-	-	-	-	1
Time House B	-	-	-	-	-	-	-	-	-	-	-
Four Choice	-	-	-	-	-	-	-	-	-	-	-
Letter Digit	-	-	-	-	-	-	-	-	-	-	-
Live Importance	-	-	-	-	-	-	-	-	-	-	-
Live Meaningful	-	-	-	-	-	-	-	-	-	-	-
Live Difficulty	-	-	-	-	-	-	-	-	-	-	-
Live Recency	-	-	-	-	-	-	-	-	-	-	-
Car Importance	-	-	-	-	-	-	-	-	-	-	-
Car Meaningful	-	-	-	-	-	-	-	-	-	-	-
Car Difficulty	-	-	-	-	-	-	-	-	-	-	-
Car Recency	-	-	-	-	-	-	-	-	-	-	-
Age	-	-	-	-	-	-	-	-	-	-	-
Sex	-	-	-	-	-	-	-	-	-	-	-
Alternatives Car	-	-	-	-	-	-	-	-	-	-	-
Alternatives House	-	-	-	-	-	-	-	-	-	-	-
Features Car	-	-	-	-	-	-	-	-	-	-	-
Features House	-	-	-	-	-	-	-	-	-	-	-
Affect scale car	-	-	-	-	-	-	-	-	-	-	-
Affect scale house	-	-	-	-	-	-	-	-	-	-	-
Car Decision	-	-	-	-	-	-	-	-	-	-	-
House Decision	-	-	-	-	-	-	-	-	-	-	-

* *significant at $p < .05$*

** *significant at $p < .01$*

Table 4
Pearson Correlations – Part 2

	Time House B	Four Choice	Letter Digit	Live Import- ance	Live Meani- ngful	Live Diffic- ulty	Live Recen- cy	Car Import- ance	Car Meani- ngful	Car Diffic- ulty	Car Recen- cy
Choice Car A	-0.087	-0.210	-0.155	-0.233	0.010	-0.201	-0.153	-0.061	0.223	-0.035	-0.150
# Pieces Car A	0.155	-0.135	-0.298	-0.127	-0.280	-0.044	-0.294	-.383*	-0.182	-0.053	-0.198
Time Car A	.595**	0.236	0.017	-0.033	-0.119	-0.028	-0.039	-0.301	-0.163	0.107	-0.142
Choice Car B	0.080	0.077	0.107	-0.130	0.098	0.006	0.231	0.008	-0.070	-0.141	-0.130
# Pieces Car B	0.099	-0.287	-.390*	-0.035	-0.088	0.153	-0.200	-0.158	0.056	0.040	-0.195
Time Car B	.604**	0.126	-0.129	-0.007	0.007	0.063	0.105	-0.076	0.009	0.301	-0.158
Choice House A	0.128	0.145	0.141	0.165	0.199	-0.204	0.239	-0.006	-0.079	0.025	-0.006
# Pieces House A	0.090	-0.257	-.359*	-0.204	-0.290	0.108	-0.280	0.016	-0.018	0.163	-.380*
Time House A	.514**	0.138	-0.003	-0.202	-0.252	0.060	0.132	0.055	0.100	0.134	-0.110
Choice House B	0.250	-0.078	-0.235	0.116	0.248	-0.015	0.018	0.035	0.052	0.122	-0.077
# Pieces House B	.609**	-0.215	-0.206	-0.016	-0.226	-0.068	0.011	-0.018	0.073	0.191	-.443**
Time House B	1	0.172	0.196	-0.062	-0.020	0.051	.309*	0.020	0.084	0.286	-0.159
Four Choice	-	1	.591**	-0.077	0.084	-0.138	.413**	0.095	0.084	-0.114	0.284
Letter Digit	-	-	1	-0.132	0.060	-0.045	0.283	0.103	.288*	-0.043	0.231
Live Importance	-	-	-	1	.589**	.305*	0.021	0.237	0.025	0.047	.284*
Live Meaningful	-	-	-	-	1	0.257	0.146	.329*	0.180	0.103	.475**
Live Difficulty	-	-	-	-	-	1	-0.081	.278*	0.123	.390**	0.235
Live Recency	-	-	-	-	-	-	1	.296*	0.259	0.103	0.093
Car Importance	-	-	-	-	-	-	-	1	.618**	.589**	0.020
Car Meaningful	-	-	-	-	-	-	-	-	1	.475**	0.024
Car Difficulty	-	-	-	-	-	-	-	-	-	1	-0.010
Car Recency	-	-	-	-	-	-	-	-	-	-	1
Age	-	-	-	-	-	-	-	-	-	-	-
Sex	-	-	-	-	-	-	-	-	-	-	-
Alternatives Car	-	-	-	-	-	-	-	-	-	-	-
Alternatives House	-	-	-	-	-	-	-	-	-	-	-
Features Car	-	-	-	-	-	-	-	-	-	-	-
Features House	-	-	-	-	-	-	-	-	-	-	-
Affect scale car	-	-	-	-	-	-	-	-	-	-	-
Affect scale house	-	-	-	-	-	-	-	-	-	-	-
Car Decision	-	-	-	-	-	-	-	-	-	-	-
House Decision	-	-	-	-	-	-	-	-	-	-	-

* *significant at $p < .05$*

** *significant at $p < .01$*

Table 5
Pearson Correlations – Part 3

	Age	Sex	Altern -atives Car	Altern -atives House	Featur -es Car	Featur -es House	Affect scale car	Affect scale house	Car Qualit- y	House Qualit- y
Choice Car A	-0.149	0.074	0.254	0.264	-.350*	-0.053	0.083	-0.060	-0.128	0.140
# Pieces Car A	-0.243	0.023	0.018	.413*	-0.009	-0.199	-0.320	-0.253	0.027	-0.214
Time Car A	0.009	-0.102	-0.030	0.102	0.004	0.053	-0.261	-0.102	0.062	-0.144
Choice Car B	-0.015	0.037	0.223	0.123	-0.281	0.124	-0.033	0.038	.477**	0.119
# Pieces Car B	-0.298	0.253	0.152	.451*	-0.067	-0.245	-0.062	-0.078	-0.009	-0.017
Time Car B	-0.106	0.110	-0.040	0.148	0.070	-0.011	-0.039	0.004	0.254	0.006
Choice House A	0.195	0.091	0.120	0.014	-0.148	0.023	-0.049	0.210	.457*	-0.036
# Pieces House A	-0.281	-0.131	-0.217	0.108	0.232	-0.152	-0.003	-0.288	0.061	-0.074
Time House A	0.082	0.005	-0.172	-0.149	0.154	-0.033	0.089	-0.263	0.313	-0.024
Choice House B	-0.027	-0.103	-0.152	0.019	0.189	0.078	0.049	0.220	0.087	-0.119
# Pieces House B	-0.069	0.003	-0.003	0.078	-0.016	-0.074	0.033	-0.156	.442*	-0.192
Time House B	0.138	-0.122	-0.049	-0.093	-0.031	0.023	0.061	-0.044	.424*	-0.011
Four Choice	.568**	-0.114	0.208	-0.175	-0.173	0.025	0.099	0.037	0.101	-0.118
Letter Digit	.577**	-0.059	0.220	0.037	-0.256	-0.143	0.223	0.000	-0.280	-0.104
Live Importance	-0.045	0.079	-0.139	-.391**	0.247	.397**	0.140	.800**	-0.107	0.021
Live Meaningful	0.089	-0.218	0.110	-0.182	-0.066	0.206	.278*	.956**	-0.244	0.260
Live Difficulty	-0.083	0.026	-0.037	0.042	0.079	0.037	0.219	.302*	-0.304	0.096
Live Recency	.608**	-0.024	-0.021	-0.083	0.153	0.054	.308*	0.116	0.319	-0.295
Car Importance	0.038	-0.114	-0.344	-0.101	0.294	-0.070	.888**	.330*	-0.118	-.317*
Car Meaningful	.271*	0.035	-0.055	0.174	-0.023	-0.205	.910**	0.143	-0.334	-.432**
Car Difficulty	-0.148	-0.225	-.594**	0.140	.454*	-0.109	.589**	0.094	-0.166	-0.067
Car Recency	.323*	-0.266	0.074	-0.144	-0.090	0.023	0.025	.456**	-0.341	0.267
Age	1	-0.098	0.324	-0.014	-0.177	0.005	0.179	0.050	0.022	-.324*
Sex	-	1	-0.058	-0.105	0.119	0.100	-0.039	-0.133	0.144	-0.183
Alternatives Car	-	-	1	.446*	-.884**	-0.297	-0.228	0.044	0.022	0.010
Alternatives House	-	-	-	1	-.539**	-.817**	0.049	-.314*	-0.234	0.038
Features Car	-	-	-	-	1	.453*	0.158	0.021	-0.077	-0.085
Features House	-	-	-	-	-	1	-0.158	.333*	0.242	-0.035
Affect scale car	-	-	-	-	-	-	1	0.257	-0.247	-.424**
Affect scale house	-	-	-	-	-	-	-	1	-0.220	0.181
Car Decision	-	-	-	-	-	-	-	-	1	0.027
House Decision	-	-	-	-	-	-	-	-	-	1

* *significant at $p < .05$*

** *significant at $p < .01$*

Table 6
Spearman's Rho Correlations – Part 1

	#			#			#		#		#
	Choice	Pieces	Time	Choice	Pieces	Time	Choice	Pieces	Time	Choice	
	Car A	Car A	Car A	Car B	Car B	Car B	House	House	House	House	
	Car A	Car A	Car A	Car B	Car B	Car B	A	A	A	B	
Choice Car A	1	0.112	-0.001	0.161	0.267	0.075	-0.098	-0.258	-0.366	0.118	0.058
# Pieces Car A	-	1	.744**	-0.070	.604**	.581**	0.194	.489*	.538**	.582**	.697**
Time Car A	-	-	1	-0.155	0.264	.518**	.542**	0.190	.483*	0.396	.488*
Choice Car B	-	-	-	1	-0.025	-0.055	0.181	-0.365	-0.318	-0.222	-0.134
# Pieces Car B	-	-	-	-	1	.781**	0.126	.498*	0.394	.674**	.572**
Time Car B	-	-	-	-	-	1	.405*	0.369	.544**	.616**	.702**
Choice House A	-	-	-	-	-	-	1	-0.208	-0.117	0.292	0.028
# Pieces House A	-	-	-	-	-	-	-	1	.618**	.302*	.427**
Time House A	-	-	-	-	-	-	-	-	1	0.224	.416**
Choice House B	-	-	-	-	-	-	-	-	-	1	.413**
# Pieces House B	-	-	-	-	-	-	-	-	-	-	1
Time House B	-	-	-	-	-	-	-	-	-	-	-
Four Choice	-	-	-	-	-	-	-	-	-	-	-
Letter Digit	-	-	-	-	-	-	-	-	-	-	-
Live Importance	-	-	-	-	-	-	-	-	-	-	-
Live Meaningful	-	-	-	-	-	-	-	-	-	-	-
Live Difficulty	-	-	-	-	-	-	-	-	-	-	-
Live Recency	-	-	-	-	-	-	-	-	-	-	-
Car Importance	-	-	-	-	-	-	-	-	-	-	-
Car Meaningful	-	-	-	-	-	-	-	-	-	-	-
Car Difficulty	-	-	-	-	-	-	-	-	-	-	-
Car Recency	-	-	-	-	-	-	-	-	-	-	-
Age	-	-	-	-	-	-	-	-	-	-	-
Sex	-	-	-	-	-	-	-	-	-	-	-
Alternatives Car	-	-	-	-	-	-	-	-	-	-	-
Alternatives House	-	-	-	-	-	-	-	-	-	-	-
Features Car	-	-	-	-	-	-	-	-	-	-	-
Features House	-	-	-	-	-	-	-	-	-	-	-
Affect scale car	-	-	-	-	-	-	-	-	-	-	-
Affect scale house	-	-	-	-	-	-	-	-	-	-	-
Car Decision	-	-	-	-	-	-	-	-	-	-	-
House Decision	-	-	-	-	-	-	-	-	-	-	-

* *significant at $p < .05$*

** *significant at $p < .01$*

Table 7
Spearman's Rho Correlations – Part 2

	Time House B	Four Choice	Letter Digit	Live Import -ance	Live Meani -ngful	Live Diffic- ulty	Live Recen- cy	Car Import -ance	Car Meani -ngful	Car Diffic- ulty	Car Recen- cy
Choice Car A	0.132	-0.173	-0.095	-0.240	0.049	-0.118	-0.133	-0.007	0.227	0.054	-0.156
# Pieces Car A	.516**	-0.086	-0.235	-0.153	-0.294	-0.152	-0.282	-.498**	-0.266	-0.085	-0.286
Time Car A	.558**	0.220	0.044	-0.070	-0.101	-0.137	-0.018	-0.326	-0.126	-0.008	-0.250
Choice Car B	0.015	0.118	0.009	-0.137	-0.031	0.017	0.250	0.004	-0.102	-0.193	-0.180
# Pieces Car B	.408*	-0.274	-0.347	-0.052	0.060	0.170	-0.151	-0.140	0.061	0.089	-0.220
Time Car B	.690**	0.101	-0.127	-0.023	0.061	-0.010	0.078	-0.060	0.088	0.307	-0.235
Choice House A	0.075	0.158	0.160	0.207	0.228	-0.193	0.252	0.049	-0.103	0.036	-0.015
# Pieces House A	0.124	-0.290	-.409**	0.073	-0.194	0.118	-0.263	-0.175	-0.202	-0.008	-0.240
Time House A	.483**	0.180	0.032	-0.085	-0.252	0.032	0.122	-0.022	0.114	0.011	-0.087
Choice House B	0.282	-0.020	-0.101	0.123	0.173	-0.041	0.078	0.152	0.135	0.176	-0.112
# Pieces House B	.697**	-0.199	-0.207	0.079	-0.144	0.018	-0.004	-0.021	0.078	0.194	-.471**
Time House B	1	0.196	0.093	-0.178	-0.100	-0.056	.317*	-0.046	0.147	0.139	-0.235
Four Choice	-	1	.707**	-0.048	0.042	-0.108	.460**	0.214	0.173	-0.057	.308*
Letter Digit	-	-	1	-0.046	-0.051	0.006	.309*	0.138	.362*	0.007	.295*
Live Importance	-	-	-	1	.567**	.291*	0.024	0.248	0.018	0.073	0.268
Live Meaningful	-	-	-	-	1	.329*	0.103	0.264	0.081	0.071	.491**
Live Difficulty	-	-	-	-	-	1	-0.026	.280*	0.160	.448**	0.159
Live Recency	-	-	-	-	-	-	1	.290*	0.252	0.098	0.037
Car Importance	-	-	-	-	-	-	-	1	.602**	.556**	0.015
Car Meaningful	-	-	-	-	-	-	-	-	1	.449**	0.007
Car Difficulty	-	-	-	-	-	-	-	-	-	1	-0.011
Car Recency	-	-	-	-	-	-	-	-	-	-	1
Age	-	-	-	-	-	-	-	-	-	-	-
Sex	-	-	-	-	-	-	-	-	-	-	-
Alternatives Car	-	-	-	-	-	-	-	-	-	-	-
Alternatives House	-	-	-	-	-	-	-	-	-	-	-
Features Car	-	-	-	-	-	-	-	-	-	-	-
Features House	-	-	-	-	-	-	-	-	-	-	-
Affect scale car	-	-	-	-	-	-	-	-	-	-	-
Affect scale house	-	-	-	-	-	-	-	-	-	-	-
Car Decision	-	-	-	-	-	-	-	-	-	-	-
House Decision	-	-	-	-	-	-	-	-	-	-	-

* *significant at $p < .05$*

** *significant at $p < .01$*

Table 8
Spearman's Rho Correlations – Part 3

	Age	Sex	Altern -atives Car	Altern -atives House	Featur -es Car	Featur -es House	Affect scale car	Affect scale house	Car Qualit- y	House Qualit- y
Choice Car A	-0.174	0.028	0.212	0.192	-0.278	-0.008	0.107	0.014	-0.213	0.086
# Pieces Car A	-0.102	0.103	0.091	0.343	-0.091	-0.189	-.449*	-0.280	0.155	-0.077
Time Car A	0.129	-0.039	0.035	0.115	-0.014	0.094	-0.268	-0.092	0.129	-0.167
Choice Car B	-0.085	0.088	.366*	0.105	-.375*	0.149	-0.074	-0.054	.472**	0.122
# Pieces Car B	-0.242	.356*	0.164	0.325	-0.167	-0.156	-0.067	0.059	0.088	0.101
Time Car B	-0.076	0.133	-0.070	0.143	0.023	-0.016	-0.008	0.059	0.257	-0.024
Choice House A	0.133	0.109	0.116	0.014	-0.116	0.047	-0.038	0.214	.473*	-0.016
# Pieces House A	-0.221	-0.129	-0.227	-0.007	0.201	0.058	-0.221	-0.104	0.090	0.130
Time House A	0.162	0.069	-0.186	-0.141	0.132	0.011	0.062	-0.189	0.277	-0.024
Choice House B	0.079	-0.081	-0.212	0.066	0.208	0.058	0.149	0.161	0.109	-0.259
# Pieces House B	-0.113	0.094	-0.041	0.111	-0.023	0.043	0.015	-0.073	.418*	-0.180
Time House B	0.220	-0.081	0.071	0.015	-0.105	0.024	0.051	-0.134	.511**	-0.060
Four Choice	.611**	-0.205	0.189	-0.154	-0.158	0.046	0.199	0.021	0.004	-0.140
Letter Digit	.560**	-0.068	0.200	0.019	-0.275	-0.132	.288*	-0.062	-0.324	-0.166
Live Importance	-0.057	0.079	-0.122	-0.263	0.157	.319*	0.144	.735**	-0.107	0.021
Live Meaningful	-0.049	-0.129	0.050	-0.226	-0.027	0.240	0.185	.951**	-0.235	0.260
Live Difficulty	-0.093	0.051	-0.086	0.031	0.057	0.057	0.241	.330*	-0.311	0.112
Live Recency	.571**	-0.006	0.052	-0.093	0.099	0.081	.287*	0.053	0.325	-0.299
Car Importance	0.007	-0.060	-.386*	-0.165	0.336	-0.017	.867**	.285*	-0.122	-.324*
Car Meaningful	.274*	0.043	-0.059	0.195	-0.011	-0.216	.915**	0.068	-0.318	-.447**
Car Difficulty	-0.124	-0.222	-.619**	0.132	.490**	-0.094	.549**	0.043	-0.184	-0.053
Car Recency	.305*	-0.251	0.023	-0.202	-0.052	0.045	0.031	.458**	-0.334	0.273
Age	1	-0.115	0.263	-0.008	-0.110	0.047	0.156	-0.062	0.017	-.357*
Sex	-	1	-0.098	-0.043	0.070	0.090	0.009	-0.077	0.144	-0.183
Alternatives Car	-	-	1	.501*	-.900**	-0.250	-0.283	0.023	0.112	-0.036
Alternatives House	-	-	-	1	-.598**	-.767**	0.030	-.304*	-0.167	-0.012
Features Car	-	-	-	-	1	.427*	0.212	0.003	-0.122	-0.083
Features House	-	-	-	-	-	1	-0.151	.326*	0.256	-0.016
Affect scale car	-	-	-	-	-	-	1	0.188	-0.240	-.430**
Affect scale house	-	-	-	-	-	-	-	1	-0.225	0.203
Car Decision	-	-	-	-	-	-	-	-	1	0.027
House Decision	-	-	-	-	-	-	-	-	-	1

* *significant at $p < .05$*

** *significant at $p < .01$*

Figure 1. *Figure 2.* *Figure 3.*

Appendix A

SELF								
	Rent	Size	Locale	Medical Services	Non-Medical Services	Social	Safety	Rules/Options
1.	\$2,775; utilities; No Medicaid or Medicare	Average; 1 bedroom; 1 bath; 550 sqft.	Good; Near large metropolitan area	Limited; Registered nurse during day; Personal Care Assistants 24-hr.	Excellent; laundry, heavy housework; 1 full & 2 light meals	Excellent; All seniors; On-site exercise room; daily programs	Excellent; Reception desk & alarm at entry; each unit has private system	Visitors can stay over; middle sized cat/dog with deposit
2.	\$930; utilities; No Medicaid or Medicare	Small; 1 bedroom, 1 bath; 448 sqft.	Excellent; Near large city; close to shopping and recreation	Limited; 24-hr. emergency call system; weekly visit by RN	Very good; laundry facilities, full dinner, 2 light meals	Very good; All seniors; daily classes & programs	Very good; security entrance; each unit has double locks	No pets; daily visitors, cannot stay over
3.	\$600; No utilities; No Medicaid or Medicare	Large; 2 bedrooms; 1 and one-half bath; 1220 sqft.	Average; Near downtown area; near business district, hospitals	Poor; No services offered	Good; Indoor pool; exercise & recreation rooms; coin laundry	Poor; No planned activities; mix of age groups & nationalities	Average; Private, external key – lock entry to units	No pets; visitors can stay over
4.	\$4,152; utilities; Medicare & Medicaid accepted	Small; 1 bedroom; 1 bath; 300 sqft.	Excellent; near large metro area; landscaped ground	Excellent; complete, 24 – hr. physician & RN's; acute care	Excellent; 3 full meals; housekeeping, laundry, personal care	Very good; All seniors; activities director; daily programs	Good; electronic key entry to building	No pets; daily visitors; cannot stay
5.	\$2,000; utilities; Medicare & Medicaid accepted	Average; 4 bedroom; 2 baths; 950 sqft.	Good; suburban, residential area; near shopping	Good; Daily visiting nurse; trained house - supervisor	Very good; 3 full meals; laundry, housekeeping	Good; all seniors; daily activities & weekly trips	Good; key pad entry; security station	Pets with deposit; visitors cannot stay
6.	\$1,200; utilities; Medicare & Medicaid accepted	Small; 1 bedroom; 1 bath; 300 sqft.	Average; near urban area	Good; complete, 24 – hr. physician; acute care	Good; 3 full meals; housekeeping, laundry, personal care	Good; All seniors; daily programs, crafts	Average; receptionist at building entry	1 pet under 10 lbs. with deposit; visitors can stay
7.	\$1,295; utilities; No Medicaid or Medicare	Large; 2 bedrooms; 2 baths; 2200 sqft.	Excellent; near suburban shopping; landscaped grounds	Poor; emergency call	Average; coin laundry; light breakfast	Average; Age-mixed residents; indoor pool	Very good; electronic entry to building and units	Pets under 50 lbs. with deposit; visitors anytime
8.	\$400; utilities; No Medicaid or Medicare	Average; 1 bedroom; 1 bath; 550 sqft.	Good; suburban area; on bus line to shopping	Poor; no services offered	Poor; no laundry or recreation areas	Limited; age – mixed residents	Average; private entry, standard locks	Pets allowed; no deposit required; visitors cannot stay

Anna is a 65-year-old widow who currently lives alone in her third floor apartment in the city. Her 40-year-old daughter visits her twice daily to cook and clean for Anna since her physical health is so poor. Due to diabetes, she is unable to walk and her vision is poor. Anna lives on less than \$600 a month from Social Security and her husband's pension. Her only visitors are her daughter and son-in-law, even though Anna had once been quite active in community groups. She complains she misses being with others and that she doesn't want to continue to burden her daughter. Anna is thinking about moving to a new home.

	Rent	Size	Locale	Medical Services	Non-Medical Services	Social	Safety	Rules/Options
1.	\$1,505 per month; utilities; No Medicaid or Medicare	Average; 2 bedrooms; 1 bath; 950 sqft.	Good; Near large city	Good; Full – time RN & personal care assistants	Excellent; housekeeping services; 2 meals; pharmacy	Excellent; All seniors; exercise room; daily activities	Excellent; Reception desk & alarm; private alarms	Pets with deposit; visitors cannot stay
2.	\$300 per month; No utilities paid; Medicaid & Medicare	Average; 1 bedroom; 1 bath; 900 sqft.	Poor; Downtown area; close to business district & night clubs	Good; trained supervisor; 24 hr. emergency call	Average; party room; billiards; laundry	No planned activities; adults only, many with disabilities	Average; Reception desk at entry; individual key – lock entry	No pets; visitors anytime
3.	\$1,100 per month; utilities; Medicare & Medicaid accepted	Small; 1 bedroom; 1 bath; 300 sqft.	Average; secluded grounds; 40 miles from nearest city	Excellent; 24 – hr. physician & nurses; acute care facilities	Excellent; 3 meals; housekeeping & personal care	Very good; Frail seniors; Full – time therapist; daily programs	Good; electronic entry to building; low security for individual units	No pets; visiting hours
4.	\$975 per month; utilities; No Medicaid or Medicare	Large; 1 bedroom, 1 bath; 808 sqft.	Excellent; Near large suburban area; close to shopping; bus line	Limited; 24 – hr. emergency call system; weekly health screenings	Very good; in-house coin laundry; three light meals	Very good; All seniors; daily classes & programs; weekly trips	Very good; electronic – key entrance; each unit has double locks	Pets under 10 lbs. with deposit, visitors can stay
5.	\$800 per month; some utilities; No Medicare or Medicaid	Average; 2 bedrooms; 1 bath; 950 sqft.	Good; suburban – metro area; near shopping & recreation	Good; weekly health screens; 24 hr. emergency call	Very good; 2 light meals daily; laundry & housekeeping	Good; all seniors; daily activities & weekly trips	Average; electronic entry to building and units	2 pets with deposit, pet walking area; visiting hours
6.	\$895 per month; utilities; No Medicaid or Medicare	Large; 2 bedrooms; 1 bath; 1200 sqft.	Excellent; near suburban shopping, recreation, & cultural events	Poor; no extra services	Average; coin laundry	Average; age – mixed residents; party room, exercise room; tennis courts	Good; standard external key entry to building and units	Pet under 50 lbs. with deposit, visitors can stay over
7.	\$500 per month; No utilities; No Medicaid or Medicare	Average; 1 bedroom; 1 bath; 550 sqft.	Poor; urban, business area; on bus line to shopping	Poor; no services offered	Poor; no laundry or recreation areas offered	Limited; age – mixed residents	Average; private entry with standard locks	Small pets with deposit; visitors daily
8.	\$1,800 per month; utilities; Medicare & Medicaid	Small; 1 bedroom; 1 bath; 280 sqft.	Average; near urban area	Good; complete; on – call physician & 24 – hr. RNs	Good; 3 full meals; housekeeping, laundry, personal care	Good; all seniors; daily programs, crafts	Average; receptionist at building; low security for individual units	Small pets with deposit; visiting hours

Betty is a 70 year old widow whose six children live out of state. She lives in the suburb of a large city where she has lived for the past 52 years. She has a good income from her husband's pension, Social Security, and her investments. She has a few close friends nearby and is well acquainted with the neighbors. She enjoys the many young families who live near her, but she wants to interact more with people her own age. Her health is very good, with only minor arthritis. In fact, she still drives her own car and does most of her own housework, although the heavy housework is becoming too much for her alone. Betty's children would like her to think about moving to a new home.								
	Rent	Size	Locale	Medical Services	Non – Medical Services	Social	Safety	Rules/Options
1.	\$1,875 per month; utilities; No Medicaid or Medicare	Small; 1 bedroom; 1 bath; 335 sqft.	Good; Near large metro area	Limited; RN during day; 24 – hr. personal care assistants	Excellent; laundry, heavy housework; 1 full & 2 light meals	Excellent; All seniors; exercise room; daily programs	Excellent; Reception desk & alarm at entry; private systems for units	No pets; visiting hours
2.	\$800 per month, utilities; Medicare & Medicaid accepted	Large; 6 bedroom; 2 baths; 1500 sqft.	Good; residential area; near shopping & recreation	Good; visiting nurse; 24 hr. emergency call; live – in assistant	Very good; 3 full meals; laundry & housekeeping	Good; all seniors, many with disabilities; daily & weekly meetings	Good; electronic entry to building and units	No pets; visitors cannot stay
3.	\$1,030 per month; utilities included; No Medicaid or Medicare	Average; 2 bedrooms, 1 bath; 900 sqft.	Excellent; near large metro area; close to shopping and recreation	Limited; 24 – hr. emergency call system, weekly visit by RN	Very good; in – house laundry facilities, 1 full and 2 light meals	Very good; All seniors; daily classes & programs; weekly trips	Very good; security entrance; each unit has double locks	Pets with a deposit; visitors can stay overnight
4.	\$4,152 per month; utilities; Medicare & Medicaid accepted	Small; 1 bedroom; 1 bath; 300 sqft.	Excellent; near large metro area; landscaped grounds	Excellent; complete, 24 – hr. physician & RNs; acute care facilities	Excellent; all meals; complete housekeeping, laundry, personal care	Very good; all seniors; full – time activities director; daily programs	Good; electronic key entry to building; low security for units	Pets under 10 lbs. with deposit; visitors can stay
5.	\$1,200 per month; utilities; Medicare & Medicaid accepted	Small; 1 bedroom; 1 bath; 300 sqft.	Average; near urban area	Good; 24 – hr. physician & RNs; acute care facilities	Good; all meals; housekeeping; laundry, personal care	Good; all seniors; part – time activities director; daily programs	Average; receptionist at building entry; low security for units	Mid – sized pet, no deposit required; visiting hours
6.	\$795 per month; utilities included; No Medicaid or Medicare	Large; 1 bedroom; 1 bath; 1200 sqft.	Excellent; near suburban shopping & recreation area; garden	Poor; 24 – hr. emergency call	Average; coin laundry; light breakfast	Average; age – mixed residents; indoor pool; party room, exercise room	Very good; electronic key entry to building & units	50 lb. pet with deposit; daily visitors allowed
7.	\$600 per month; no utilities; No Medicaid or Medicare	Large; 2 bedrooms; 1 and one – half bath; 1220 sqft.	Average; near downtown area; close to business district, hospitals	No additional services offered	Good; indoor pool; exercise & recreation rooms; coin laundry	Poor; no planned activities; mix of age groups and nationalities	Average; private key – lock entry to units	Small pet with deposit; visitors allowed
8.	\$340 per month; no utilities; No Medicaid or Medicare	Average; 1 bedroom; 1 bath; 550 sqft.	Good; suburban, residential area; on bus line to shopping	Poor; no services offered	Poor; no laundry or recreation areas offered	Limited; age – mixed residents	Average; private entry with dead – bolt locks	1 pet under 10 lbs.; visitors can stay overnight

Appendix B

We make many decisions every day. Below are several areas of decisions you may or may not have had to make.

1. For each of the following, please indicate how IMPORTANT you think each choice is, how EMOTIONALLY MEANINGFUL, INTELLECTUALLY DIFFICULT you think each choice is, and how RECENTLY you made each choice::

	IMPORTANT	MEANINGFUL	DIFFICULT	RECENCY
a place to live	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
a school to attend	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
a car to buy	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
a health insurance plan	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
what to eat for lunch	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
a dating partner	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
whether to exercise	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
which computer to buy	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
which cancer treatment to use	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>