INTRODUCTION

The problems and challenges of aging have long been an important societal concern. Accompanying the physical changes of aging are psychological changes that have critical implications for the quality of life that people experience. Equally critical may be the fact that, as people age, their opportunities to recover or compensate for poor-quality judgments and decisions diminish. For example, poor financial decisions early in life may be remedied by learning from mistakes and making better decisions in the future. Less than careful health care choices in one’s earlier years may be compensated for by resilience to disease or injury. However, as one ages, diminished physical capacity and less time can translate into reduced opportunities to recover from the “normal” ups and downs of everyday decision outcomes. As a result, understanding the psychological processes that underlie the judgments and decisions of older adults can help us to identify areas in which they may be most vulnerable and therefore can guide efforts to help them face the challenges of aging.

Importance of Judgment and Decision Making for Older Adults

The impact of age-related changes is magnified further by recent social trends that create a need for maintaining strong decision-making capabilities for a greater number of years. To begin with, advances in modern medicine allow people to live longer than ever before and enjoy more years beyond retirement. In addition, our society places a strong value on independence
and self-determinacy; this is often interpreted as living with less reliance on
the help and resources of others. The trend toward geographically dispersed
families means that older individuals may have limited access to knowledge-
able and supportive family members. As a result of these trends, responsibil-
ity for sound judgment and good decision making rests more on the indi-
vidual than it has in the past.

The quality of judgment and decision making is of great import in the
lives of older adults, as can be readily seen in three contexts central to the lives
of most people: (1) motor vehicle operation, (2) health care, and (3) financial
management.

Although many of us take it for granted, driving is a complex judgment
and decision-making task that requires people to be perceptive and vigilant.
Safe operation of a motor vehicle includes the ability not only to perform in a
real-time environment, but also to assess and judge correctly the situations
(e.g., traffic speeds and densities) and environmental conditions (e.g., weather,
darkness) in which they are capable of driving. Older individuals, in particu-
lar, need to assess the point when they should discontinue driving altogether.
The trend in society toward independent living and the importance of auto-
mobiles as the main source of personal mobility, however, makes decisions
and trade-offs concerning driving difficult.

Judgments of personal health status (e.g., “Am I ill?” “Should I go to the
doctor?”) are particularly important for individuals living alone or with lim-
ited access to a social support network. Once one enters the health care
system, decisions there are often quite complex due to the vast array of health
care options provided in the marketplace and the volume of information
available for consumers to consider. In addition, the historically paternalistic
approach to medical treatment has shifted toward a more patient-directed
one (Zwahr, 1999). Having to choose among many and complex treatment
or health insurance options carries not only consequences for the quality of
health care that an individual receives, but also strong financial implications.

Effective financial management draws heavily on one’s judgment and
decision-making abilities. More and more people are relying heavily on
individual, self-directed financial plans in order to maintain their standard of
living after retirement. Although some individuals call on professionals to
develop a formal financial plan, even formal plans require investors to make
critical decisions about when to withdraw or reallocate money in an environ-
ment of changing market conditions and tax laws. As individuals live longer,
their financial assets must go farther, and high-quality financial decision
making must be maintained. In an information-rich and risky environment,
this task can be difficult even for those who are knowledgeable and capable.
For those with decrements in information-processing capabilities, exercising
good judgment and making wise financial decisions may be beyond their
capacities.
Research on Judgment and Decision Making

The psychological study of decision making, which we present here in a necessarily abbreviated form, examines the mechanisms that underlie people’s choices, preferences, and judgments and attempts to discover how to improve decision-making processes.1 Two relevant overviews of research on decision making and aging are Yates and Patalano (1999) and Sanfey and Hastie (in press).

Decision research developed out of economic theory and, as a result of this rationalistic origin, has concentrated mostly on reason-based explanations for how people make decisions and form judgments. The implicit assumption that good decision making is a conscious, deliberative process has been one of the field’s most enduring themes. Recent research, however, has begun to examine the role of emotion, affect, and intuition in decisions.

In this paper we cover research and theories that address some of the issues that older adults face in making everyday judgments and decisions. A decision, of course, is a choice between two or more options or alternatives (e.g., choosing a car). One of those options could be the status quo (e.g., doing nothing or making no change). A judgment, in contrast, is the psychological appraisal of information. It is an understanding of a situation or an individual (e.g., “I’m having some stomach distress. How likely is it to be due to my new medication?”).

Some general themes have emerged during the past 40 years of research on judgment and decision making. The first major theme we consider is that people (both older and younger adults) have limited resources to deal with complex decisions and the great quantity of information with which they are faced. As a result, they rely on mental shortcuts, called heuristics, to deal with such complexity. The use of mental shortcuts is frequently adaptive (because they are efficient and the resulting judgments or decisions are generally good enough), but it can also be maladaptive (resulting in poorer decisions). We

1Space does not allow us to pursue all of the important topics in decision-making research that could be examined in older adults. Judgments and decisions are influenced by many factors. Social and political attitudes, or worldviews, for example, have been shown to influence risk perceptions (Peters and Slovic, 1996). Cultural backgrounds may influence the propensity to take risks as well as risk attitudes and decision-making strategies (Weber and Hsee, in press). Other important work has been done using younger adults as subjects on the use of narratives and other display formats in communicating information (e.g., Sanfey and Hastie, 1998; Satterfield et al., in press), on the impact of reasons on choice (e.g., Shafir et al., 1993), and on the status quo effect (Thaler, 1980). Errors of omission versus commission have been examined (e.g., Ritov and Baron, 1990) as have protected values (e.g., Baron and Spranca, 1997). Disproportionate sensitivity to loss (i.e., loss aversion) has been studied extensively, particularly within the context of prospect theory (Kahneman and Tversky, 1979). A small number of studies have examined individual differences in decision making (e.g., Lopes, 1987; Peters and Slovic, in press), a topic that may have even greater relevance among older adults.
describe below the traditional heuristics and biases approach in research on
decision making as well as the more recent study of affective
processes and decisions. We use research and theory derived from the aging
and social psychological literatures to speculate that aging will increase reli-
ance on heuristics and affect in judgment and decision making.

A second major theme emerging from research is that people frequently
do not know their own “true” values for an object or situation (e.g., the
importance of the quality of a health plan versus the importance of its cost).
Instead they construct values and preferences “on the spot” when asked to
form a particular judgment or to make a specific decision (Slovic, 1995:365):

Preferences appear to be remarkably labile, sensitive to the way a choice
problem is described or “framed” and to the mode of response used to
express the preference. These failures of invariance have contributed to a
new conception of judgment and choice in which beliefs and preferences
are often constructed—not merely revealed—in the elicitation process.

With human judgment being a constructive process, individual prefer-
ences can be unstable across different contexts, and situational influences
can carry great impact. The extent of this lability, particularly if greater in
older adults, has implications for their decision-making competence. We
explore the notion of decision-making competence among older adults from
a decision theoretic perspective, including suggestions for how to assess such
competence.

Despite the importance of good judgment and decision making and a
wealth of knowledge about these processes, current understanding of judg-
ment and decision making in older adults is poor. Researchers, for the most
part, have neglected to recognize the importance of sound judgment and
decision processes in later life and have tended to use only younger adults in
their studies. One result, however, is that there is a wealth of theories and
methodologies that can now be applied to the study of decision-making pro-
cesses and decision-making competence among older adults. This paper high-
lights what we see to be the most fruitful initial approaches to the study of age
and decision making. We examine three main questions: (1) Does heuristic
processing increase with age? (2) Does the salience of affective processes in
decision making increase among older adults? and (3) Are older adults influ-
enced by the contextual frame of the decision situation in ways that affect
their decision competence?

AGE AND HEURISTIC PROCESSING

Aging may be marked by the increased salience of associative and auto-
matic processes such as heuristics (Mutter and Pliske, 1994; Yates and
Patalano, 1999). Although life-span theories (e.g., Fredrickson and
Carstensen, 1990; Labouvie-Vief, 1999) do not make predictions about the salience of automatic, associative, and intuitive processes versus controlled and analytical processes in older (compared with younger) adults, aging research nonetheless supports this distinction. For example, Jennings and Jacoby (1993) demonstrated that older adults performed less well than their younger counterparts on tasks that required conscious control of memory, but they performed equally well on tasks that relied on automatic memory processes (i.e., familiarity). Although younger adults appear more likely than older adults to interpret a story analytically, older adults appear likely to focus less on the story’s details and more on the gist of the story and its underlying significance (Adams et al., 1997). Older adults also have shown similar or better abilities to represent, update, and recall more global and holistic levels of understanding (e.g., Radvansky, 1999). Finally, prior research has demonstrated that aging is associated with increased dependence on schematic knowledge (e.g., Hess, 1990).

Age-Related Increases in Heuristic Processing

Heuristics and biases (the systematic and nonnormative deviations that can result from heuristic processing) are studied in research on judgment and decision making because they can reveal the psychological processes that underlie how people judge and decide. In addition, however, the use of heuristics and their resulting biases have many practical implications. For example, using the availability heuristic, an older person might estimate the number and frequency of his or her symptoms for a doctor “by the ease with which instances or occurrences can be brought to mind” (Tversky and Kahneman, 1974:1127). The resulting estimate will be more or less accurate depending on the actual symptoms, the individual’s capacity to remember, and the vividness and emotional character of the situations in which the symptoms were both experienced and reported.

Traditionally, heuristics have been considered serious sources of error due to their overuse or inappropriate application (Kahneman and Tversky, 1973). From Epstein’s (1994) dual process theory, however, we see a different view of the adaptive nature and organization of heuristics. Heuristic processing is central to the experiential system’s natural mode of operation as

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2As suggested by one reviewer, although age-related decrements in controlled processing may be greater than the corresponding decrements in automatic (i.e., heuristic) processing, it does not necessarily follow that older adults will use heuristics more often (relative to young adults). However, consistent with our hypothesis, Johnson (1990) demonstrated that older adults used decision strategies associated with heuristic processing (i.e., noncompensatory strategies) more often than younger adults.
an intuitive, rapid, automatic, crudely differentiated system. The experiential mode of processing represents events in the form of concrete, context-specific, and holistic images. Importantly, Epstein characterizes these ways of processing information as highly adaptive under normal circumstances, when rapid assessment and immediate action are often necessary. He also suggests that the various heuristics identified in research on judgment and decision making (e.g., availability, representativeness), traditionally thought to be unrelated to one another and caused by a limited capacity for information processing, might instead be the product of the organized experiential system. If true, then conditions that facilitate or constrain the use of one heuristic should tend to simultaneously influence the use of other heuristics. The process of aging may be one of the conditions that increases the use of heuristics.

Research Directions in Heuristic Processing

We focus here on two heuristics—the representativeness heuristic and the availability heuristic—in order to examine the implications that an increased reliance on heuristic processing might have on the aging individual.

The Representativeness Heuristic

To begin with, the representativeness heuristic is said to be invoked when a probability or frequency is estimated by thinking about similarity with a stereotype, schema, or other preexisting knowledge structure. The estimate is based on "the degree of correspondence between a sample and a population, an instance and a category, an act and an actor, or, more generally, between an outcome and a model" (Tversky and Kahneman, 1983:295).

Older adults, themselves more reliant on schematic knowledge (Hess, 1990), may be particularly likely to use this heuristic. Although this approach to processing is both fast and efficient and allows older adults to take advantage of the vast store of knowledge they have accumulated, it also leaves them susceptible to a number of biases. For example, highly detailed descriptions of an individual or an event may influence the judgments of older adults more. An older adult may judge the side effects from a particular medical operation as less likely to occur than side effects from that same operation described as leaving the older adult dependent on family and friends for mo-

3Epstein (1994) posits that two information-processing systems exist—the experiential system and the rational system. Whereas the experiential system processes information quickly and automatically and is driven primarily by affect, the rational system processes information more slowly, deliberatively, and logically. See Hammond’s (1998) Cognitive Continuum Theory for a related distinction between intuitive and analytic thinking.
bility. The latter account may appear more plausible due to its greater detail and, as a result, the older adult may refuse treatment. However, that account is statistically less probable due to this same detail.

An increased use of the representativeness heuristic could have other effects as well. It could lead older adults to a greater neglect of base rates. With base rate neglect, older adults may be more likely to base their judgments of the best hospital on the quality of the food in the cafeteria, the number of magazines in the waiting room, and the friendliness of the nursing staff (all of which may be stereotypical indicators of a “good” hospital), rather than on the hospital’s proportion of successful outcomes in cases similar to theirs. In another context, older adults observing a run of extremely good returns in the stock market might conclude that the fluctuation is representative of the future market and may make risky investments that then decline rapidly if the market “regresses toward the mean,” as it often does.

The Availability Heuristic

With another well-known heuristic—the availability heuristic—frequencies and probabilities are judged by thinking of examples. The easier it is to retrieve examples, the higher the estimated likelihood of occurrence. On one hand, older adults may be slower and have more difficulty than younger adults at retrieving examples due to age-related deficits in memory and speed of processing (e.g., Salthouse, 1996) so that they may judge the likelihood of being in a car accident as lower because they cannot retrieve as many instances of car crashes. On the other hand, older adults have a much broader network of memories from which to draw, so that they may have many more car crash memories to retrieve. In addition, availability also appears to be influenced by emotionally compelling and vivid information at the time of the occurrence as well as at the time of memory retrieval. Results of studies with younger adults show that a handful of vivid testimonials, for example, can outweigh comprehensive statistical summaries (Borgida and Nisbett, 1977). As we observe in the next section, older adults may be particularly susceptible to (and helped by) emotional influences on judgments and decisions. The implications for older adults who must use statistical information about health care options and financial plans to make good decisions are important. It may be that marketers and con artists can take greater advantage of older than younger adults through the use of vivid stories and vignettes about their products.

We have been struck by the lack of research examining age-related differences in heuristic processing. The only research of which we are aware are the studies by Mutter and Pliske (1994) on illusory correlation, often explained with reference to the availability heuristic. In traditional studies of illusory correlation (e.g., Chapman and Chapman, 1967), researchers have found that
people often perceive associations between two variables that are consistent with their intuitive associations and expectations, but are not actually present in the data they are observing. Mutter and Pliske showed age-related increases in illusory correlations as would be expected if older adults relied more than younger adults on heuristic processing. In their studies, older and younger subjects judged whether and to what extent two variables (a patient’s response to a Rorschach Ink Blot and a patient’s behavior) were related to one another. As pointed out by Yates and Patalano (1999), judgments of relatedness are fundamental to good decision making. For instance, suppose an older individual incorrectly infers the effectiveness of some ineffective home remedies. Mutter and Pliske found that older subjects were even more inclined than younger subjects to exhibit such illusory correlations. They offer as an explanation that older adults may rely to a greater extent than younger adults on heuristics to simplify the selection, encoding, and retrieval of evidence for co-occurrence judgments.

AFFECT AND DECISION MAKING AMONG OLDER ADULTS

The importance of affect and emotion is increasingly being acknowledged by decision researchers. A strong early proponent of the importance of affect in decision making was Zajonc (1980), who argued that affective reactions to stimuli are often the very first reactions, occurring automatically and subsequently guiding information processing and judgment. If Zajonc is correct, then affective reactions may serve as orienting mechanisms, helping people navigate quickly and efficiently through a complex, uncertain, and sometimes dangerous world (e.g., Finucane et al., 2000). Important work on affect and decision making also has been done by Isen (1993), Johnson and Tversky (1983), Janis and Mann (1977), Kahneman and Snell (1990), Mellers et al. (1997), Loewenstein (1996), Rozin et al. (1993), Wilson et al. (1993), and others.

Theorists such as Mowrer (1960a, b) and Epstein (1994) give affect a direct role in motivating behavior, asserting or implying that people integrate positive and negative feelings according to some sort of automatic, rapid “affective algebra,” whose operations and rules remain to be discovered. Epstein’s (1994:716) view on this is concise:

The experiential system is assumed to be intimately associated with the experience of affect, . . . which refer[s] to subtle feelings of which people are often unaware. When a person responds to an emotionally significant

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4Affect may be viewed as a feeling state that people experience, such as happiness or sadness. It may also be viewed as a quality (e.g., goodness or badness) assigned to a stimulus. These two conceptions tend to be related.
event... the experiential system automatically searches its memory banks for related events, including their emotional accompaniments. . . . If the activated feelings are pleasant, they motivate actions and thoughts anticipated to reproduce the feelings. If the feelings are unpleasant, they motivate actions and thoughts anticipated to avoid the feelings.

Damasio’s Somatic Marker Hypothesis

One of the most comprehensive and dramatic theoretical accounts of the role of affect and emotion in decision making is presented by the neurologist, Antonio Damasio (1994). In seeking to determine “what in the brain allows humans to behave rationally,” Damasio argues that thought is made largely from images, broadly construed to include perceptual and symbolic representations. A lifetime of learning leads these images to become “marked” by positive and negative feelings linked directly or indirectly to somatic or bodily states. When a negative somatic marker is linked to an image of a future outcome, it sounds an alarm. When a positive marker is associated with the outcome image, it becomes a beacon of incentive. Damasio hypothesized that somatic markers increase the accuracy and efficiency of the decision process, and their absence, observed in people with certain types of brain damage, degrades decision performance.

There are numerous reasons to expect that the relative importance and salience of affect may increase with age. First, older adults might strategically change preferred decision modes (from more deliberative to more affective) in order to compensate for cognitive declines in everyday functioning. Second, such changes may be an indicator of ego development and emotional maturity (Labouvie-Vief et al., 1989a, 1989b). Third, such shifts may result from changing motivations (Carstensen et al., 1999; Fredrickson and Carstensen, 1990). Fourth, with the greater experience that comes with age, older adults, like other experts, may tend to approach tasks using more automatic processing (e.g., Myles-Worsley et al., 1988). Finally, an increased reliance on affect may be a relative change due to a decline in analytical processing. Although the evidence is somewhat mixed, in this section we examine whether affective processes may exert a greater influence on everyday choices in older adults.

Research Directions in Affect

At this point, little empirical support exists to demonstrate that affective processes carry greater weight in the decisions and behaviors of older adults. A wide range of tasks, however, has already been used successfully with younger adults and could be applied to older adults to examine age-induced changes in the relation between affect and behavior and in conflicts between emotional and analytical thinking.
Wisdom and Choice

A card-selection task was designed by Damasio and his colleagues (Bechara et al., 1994) to mimic the uncertainties of gains and losses in a real-world environment in order to test the idea that affective processing was related to good decision performance. The task may provide a unique method for testing changes in affective and analytical information-processing abilities through the life span. In it, subjects selected cards one at a time from four decks placed face-down in front of them. Each time they turned over a card (for 100 total cards), they were told how much play money they won or lost with that card. They were told to select from any deck as often or as seldom as they wished and in any order that they liked. They were given the goal to earn as much play money as possible. The decks were arranged so that two of the decks had low gains and low losses and, overall, would win money; the other two decks had high gains and high losses and, overall, would lose money. Damasio equated good judgment with more selections from the winning decks.

In her dissertation, Peters (1998) used a methodology identical to the above study from Damasio’s group. However, participants in Peters’s study chose about 10 fewer cards from the “good” decks relative to the nonclinical participants in the experiment reported by Bechara et al. (1994). Peters’s participants were all college students; those in Bechara et al.’s study were older (age range = 20-79 years compared with 17-25 years in Peters’ Experiment 1). It is possible that the older participants had more experience with card playing and that this factor improved their performance. However, the cards used in both of these studies were not ordinary cards, nor was the task an ordinary card game. It seems unlikely that experience playing poker or gin rummy would help individuals to learn in this unfamiliar task.

The most interesting possibility is that affect becomes more salient and/or that the ability to integrate affective and analytical information processing improves with age (e.g., Blanchard-Fields et al., 1987; Labouvie-Vief et al., 1989a, 1989b). No direct evidence has been found, however, to support the notion that individuals become more sensitive to gains and/or to losses as they age or that older adults are better able to integrate the meaning of rewarding and punishing feedback when making subsequent responses to the same stimulus.

Affective reactions may play a bigger role in the construction of older (versus younger) adults’ choices. It has been demonstrated that older adults generate fewer potential solutions to a given problem (McCrae et al., 1987). In general, this difference has been characterized as yet another inevitable decline. However, if affect is more salient to older adults, it may be that they simply are better at rejecting not-so-good options prior to consideration (Damasio, 1994:174):
[Affect] does not deliberate for us. [It] assists the deliberation by highlighting some options (either dangerous or favorable), and eliminating them rapidly from subsequent consideration. You may think of it as a system for automated qualification of predictions, which acts, whether you want it or not, to evaluate the extremely diverse scenarios of the anticipated future before you. Think of it as a biasing device.

As pointed out by Yates and Patalano (1999), real-world decision makers, such as firefighters, do not “wade through large numbers of alternatives. Instead, they want to zero in immediately on the best option, or at least one that is ‘good enough’” (p. 41). The experience that comes with age may allow people to do just that. Indeed, at least one study has indicated that younger adults may tend to waste their energy generating excessive numbers of options that do not ultimately yield better decisions (Streufert et al., 1990).

Affect and Behavior

Affect has been shown to guide and orient choices and intended behaviors in college student as well as nationally representative samples (e.g., Frijda et al., 1989). No studies could be found, however, that examined whether age might induce a stronger correlation between affect and behavior. In a reanalysis of our own data (Peters and Slovic, 1996, N = 1,512), we found that the correlations between people’s affect and their intended support or opposition toward nuclear power appeared to increase from young to middle ages and then decreased in older populations (r = .49, .55, and .42 for groups ages 18-39, 40-59, and 60+ with corresponding sample sizes N = 725, 485, and 246). Although we expected the correlations to be highest in the older group, it may be that the particular affective technique used (which involved the production of images prior to the affective evaluation) imposed a cognitive burden that led to a reduction in the number and quality of images in the older respondents. Other affective techniques that do not impose as great a cognitive load may show the hypothesized age-related increases throughout the life span.

Affect and Time

It is also important to examine how increases in affect and experience relate to time phenomena, such as impulsive consumption, in different age

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5In addition, the same pattern of correlations held in a second unpublished study in which subjects free-associated to the concept of eating beef. The subsequent affective ratings were correlated with perceived risks to the American public of eating red meat (r = .24, .48, and .14 for groups ages 18-39, 40-59, and 60+, respectively, with corresponding sample sizes N = 110, 68, and 37).
groups. We might expect that older adults would be less likely to delay positive outcomes and would have a preference for immediate consumption of goods if affective influences carried greater weight. In decision theoretic terms, older subjects might show high discount rates, so that they would prefer a much smaller amount of money (or other positive event) now rather than a larger amount of money at some specified time in the future. Although immediate consumption may be wise for an around-the-world cruise while the older adult is still in good health, impulsive consumption could be quite detrimental with respect to financial planning.

In fact, older subjects have been shown to have greater emotional control (Lawton et al., 1992) so that impulsive consumption should be less likely in an older age group. In addition, Loewenstein (1992; Loewenstein and Prelec, 1992) reports that for goods for which consumption is fleeting and easily imaginable, individuals prefer to delay the consumption of goods (and speed up the consumption of bads). He attributes this behavior to the existence of “anticipatory” affect—the savoring or dread that occurs while anticipating an event, separate from any affect experienced during actual consumption. On the basis of this analysis, older adults might be expected to delay their consumption of goods (and speed up their consumption of bads) more than younger adults, since this time preference should maximize the overall hedonic value of the affect anticipated and experienced.

Conflicts Between Emotional and Analytical Modes of Thought

It is also possible to explicitly assess reliance on affective reactions versus analytical considerations. Denes-Raj and Epstein (1994) did this by giving college-aged subjects an opportunity to win $1 by drawing a red jelly bean from a bowl. They found that many subjects chose to draw from a bowl containing 5 red beans out of 100 beans (5 percent chance of winning; see Figure C-1), even though they knew analytically that the winning odds were better in the smaller bowl that contained 1 red bean out of 10 (10 percent chance of winning). Apparently the greater number of winning beans was more appealing to some subjects than the proportion of winning beans. This result was interpreted as indicating that intuitive, affective processes dominated their rational processing systems. A number of subjects indicated, for example, that the larger bowl “looked more inviting.” If older adults rely more on affective processing, they would be expected to draw from the nonoptimal larger bowl more often.

A less frivolous example of how the balance between affective and analytic processing can be assessed arises from the different responses people

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6The beans were spread in a single layer in the bottom of the bowl.
make to likelihood assessments portrayed as percentages or probabilities (e.g., “persons like Joe are assessed as having a 10 percent chance of committing a violent act during the next 6 months”) and assessments portrayed as relative frequencies (e.g. “of 100 persons like Joe, 10 would be expected to commit a violent act during the next 6 months”). Slovic et al. (in press) found that the frequentistic portrayal evoked more violent imagery and negative affect, leading many people to judge the risk of releasing Joe from a psychiatric hospital as higher compared with the perceived risk evoked by the percentage probability frame. If affect is more salient to older adults, we might expect that the stronger reaction to relative frequency frames (compared with probability frames) would be more evident in older than in younger adults. If so, implications for risk communication would be evident (e.g., rare but important dangers might be better appreciated by older people when described in frequentistic terms).

**AGING, DECISION-MAKING COMPETENCE, AND PREFERENCE CONSISTENCY**

As people get older, their competence at everyday decision making seems to be questioned more often. While formal assessments of mental compe-
tence are sometimes required in general medical or legal settings (e.g., when patients’ abilities to consent to or refuse treatment are suspect), implicit judgments by families or clinicians are more common. In either respect, judging someone to be incompetent can have a dramatic effect on his or her life.

Competence Criteria

For the purpose of defining and measuring competence, five commonly cited criteria from research on adolescents and young adults include the ability to (1) structure a decision, (2) understand and remember relevant information, (3) appreciate the personal significance of the information, (4) temper impulsivity, and (5) rationally integrate the information and reason about it7 (Appelbaum and Grisso, 1988; Parker and Fischhoff, 1999; Rosenfeld and Turkheimer, 1995; see also Sanfey and Hastie, in press, and Yates and Patalano, 1999, for alternative classifications).

Research Directions in Decision-Making Competence

Despite its importance, research on how to measure decision-making competence in the elderly is virtually nonexistent. However, the knowledge gathered by researchers in recent decades can be used to develop a behaviorally based measure of older adults’ decision-making competence. In this section we focus on information integration and reasoning, with particular emphasis on consistency and the impact of preference reversals on decision-making competence. Information integration is the skill that has been most thoroughly examined by judgment and decision researchers to date, and is therefore an excellent starting point for the development of a decision-making competence scale.

Many professionals (physicians, lawyers, economists, psychologists) have much to say about how information should be integrated, because proper integration is a hallmark of rationality, from which good decisions are most likely to result. However, with the exception of a few studies (e.g., Malloy et al., 1992; Rosenfeld and Turkheimer, 1995), no studies of aging have focused on one of the aspects of information integration most relevant to competency in decision making—the ability to weigh attributes in a consistent manner.

Consistency is important because it both generates and reflects reliable preferences. For instance, an individual who weighs information in a way that results in a good decision will benefit from repeating that decision. If an individual integrates the same information in different ways, he or she may

7The ability to express a choice is also a common definition of decision competence, but is mainly of interest in severely impaired individuals.
end up with different decision outcomes, being unable to reap the same benefits more than once, or at least predictably. Moreover, some unscrupulous individuals may take advantage of others by maximizing conditions under which inconsistencies may arise. In studies with younger adults, Lichtenstein and Slovic (1971) demonstrated that inconsistencies in preferences could lead undergraduate subjects to becoming “money pumps,” constantly giving more money to the experimenter as the experimenter manipulated the situation. Lichtenstein and Slovic (1973) replicated their findings using real money and real gamblers in a Las Vegas casino.

Earlier, we highlighted the constructive nature of judgment and decision processes as one of the main themes emerging from research on judgment and decision making. Preference construction often leads to inconsistency. Several decades of research have conclusively demonstrated that characteristics of the task (e.g., the way the stimulus information or question is framed, the number of options and attributes given) strongly influence people’s preferences, in some cases resulting in complete reversals of preference.

Preference reversals due to framing effects have important implications for many life decisions, such as choosing which health care option to pursue. For instance, the impact of dying seems to be greater when it is framed as a mortality rate of 10 percent, than when it is framed as a survival rate of 90 percent. In terms of decision behavior, such as choosing between alternative treatments for lung cancer, McNeil et al. (1982) showed that surgery was relatively less attractive than radiation therapy when risk information was presented in terms of mortality rather than survival, despite surgery having better long-term prospects. The effect was demonstrated for naive subjects (patients) as well as experts (physicians). Of course, for a 95-year-old, long-term survival prospects may not be important, but an otherwise healthy 65-year-old may not wish to be led astray by the framing effect and reduce his or her life span unintentionally.

Malloy et al. (1992) examined the influence of treatment descriptions on medical decisions by older adults. They presented 201 individuals (ages 65 to 94) with descriptions of three life-sustaining interventions. The interventions were described in three ways: positively (e.g., “device to help you breathe”), negatively (e.g., “machine that controls your breathing”), and exactly as they are worded in a widely used advance directive (e.g., “breathing by machine”). Results showed that for the three interventions presented in the three wordings, individuals were less likely to opt for an intervention when it was worded negatively than when it was framed positively or phrased as the directive already in use (12, 30, and 19 percent opted for the intervention with negative, positive, and current wordings, respectively). Moreover, most subjects appeared inconsistent from one moment to the next: 77 percent changed their minds at least once when given the same scenario but a different description of the intervention.
Malloy et al. (1992) concluded that their results highlight the need for older adults to get more decision-making help from their doctors. However, their study does not permit any conclusion to be made about whether elderly individuals are any worse at decision making than others, or whether they would in fact benefit from decision aiding by a doctor. In short, we do not know whether Malloy et al.’s elderly sample was any more inconsistent than young adults (or physicians for that matter) faced with the same decision tasks. Weber et al. (1995), however, do provide evidence that short-term memory limitations can lead to some preference reversals as the result of simplification in the encoding of presented information. Given the strong evidence of age-related declines in working memory found in the aging literature and the role of memory in the use of such judgmental heuristics as the availability heuristic, older adults may be more easily influenced by the decision context.

Age-related differences in decision consistency have been examined by Chasseigne et al. (1997) in a multiple-cue probability learning (MCPL) task. Learning probabilistic judgments is especially critical in the later stages of life, because major changes (such as retirement, loss of partner, and relocation) occur and individuals need to learn to cope with a new set of probabilistic relations in a new environment. For instance, coping with many illnesses simultaneously requires learning complex relations between the number of pills taken for each of several conditions and pain status.

In Chasseigne et al.’s study three groups of subjects (ages 20-30, 65-75, and 76-90) were asked to learn the relationships between three knobs on a boiler (the cues) and the boiler’s water temperature (the criterion). The study tested and confirmed the hypothesis that due to their reduced working memory, older subjects have more difficulty remembering and processing the necessary information, resulting in more trial-to-trial variability or error variance (i.e., lower consistency). Providing task information that explicitly described the relation between each cue and the criterion improved the consistency of the two youngest groups, but not the 76-90-year-old group. Like other cognitive abilities, MCPL depends on information-processing speed and working-memory capacity, but reducing the working-memory load by simplifying the task did not help the very elderly. Chasseigne et al. suggest that the very elderly may have lost their flexibility of functioning, making them unable to modify their responses despite the external information. Assessing age-related differences in various MCPL tasks, as well as the extent to which the differences can or cannot be influenced by judgment aids, is an important direction for future research in order to accurately identify and augment the decision competence of elderly individuals.

Despite the above focus on internal consistency, equal attention should be paid to the other important aspects of competent decision making: the abilities to structure a decision, understand and remember information, ap-
preciate the information’s personal significance and temper impulsivity. Each of these skills taps functionally different areas, and choosing one over another to represent an individual’s decision-making competence may result in discrepant conclusions. Individuals may perform adequately on a measure of information integration, for example, but display impaired performance on recall. Basing judgments of competence on one or several different abilities affects the identity and proportion of patients classified as incompetent (Fitten et al., 1990; Grisso and Appelbaum, 1995).

Developing a reliable and valid measure of decision-making competence is important because it is potentially very harmful to an individual’s well-being if those who need decision assistance are not identified, and those who do not need assistance are denied their right to choose for themselves. In addition, a good measure of decision competence is important for identifying a baseline against which to compare special subgroups (e.g., persons with different diseases, medications, living arrangements). As such, future research should address how decision-making competence in older adults may improve, as well as how it might decline, so that decision situations can be improved for older adults, and individuals who require professional help can be identified (Birren and Schroots, 1996).

CONCLUSION

The quality of the judgments and decisions made by older persons will determine, to a large extent, the quality of their lives. In this brief review, we have attempted to sketch ways in which existing theories and methods may illuminate age-related changes in judgment and decision making. Although our initial thoughts on decision making among older adults centered on the inevitable declines of aging, further consideration suggests that improvements associated with experiential thinking may create a decision-making process that is much more bearable to older adults. By bearable, we mean that, despite age declines in cognitive functioning, older adults may adapt quite well to the judgments and decisions required of them in later years. The study of decision making in older adults will undoubtedly provide great practical benefits by pointing the way toward aiding and improving decisions as well as identifying those older adults who might need the most help. In addition to these practical benefits, coordinating decision-making research with studies of age-related changes in memory, attention, affect, and other psychological processes may produce important scientific insights into the mechanisms that underlie the judgments and decisions of older and younger adults.
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