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The attraction effect in decision making: Superior performance by older adults

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Previous work showed that older adults' choice performance can be wiser than that of younger adults (Tentori, Osherson, Hasher, & May, 2001). We contrasted two possible interpretations: a general expertise/wisdom view that suggests that older adults are generally more skilled at making decisions than younger adults and a domain-specific expertise view that suggests that older adults are more skilled decision makers only in domains in which they have greater knowledge. These hypotheses were contrasted using attraction effect tasks in two different domains: earning extra credit in a course and grocery shopping, domains presumed to be of different levels of knowledge to younger and older adults. Older adults showed consistent choice for both domains; younger adults showed consistent choice only for the extra credit problem. Several explanations of these findings are considered, including Damasio's somatic marker theory and age differences in reliance on heuristic versus analytic styles.

Although older adults often perform more poorly than younger adults on laboratory problem-solving tasks (e.g., Denney, 1982; Giambra & Arenberg, 1980; Rabbitt, 1977), their performance on everyday, practical problem-solving tasks can be as good as that of younger adults (e.g., Denney & Palmer, 1981; Denney & Pearce, 1989; Hartley, 1989; Marsiske & Willis, 1995) and occasionally even better (Cornelius & Caspi, 1987). Decision making can be regarded as a type of problem solving and, in fact, has been argued to be more relevant to everyday problem solving than are many traditional laboratory problem-solving tasks (Hartley, 1989). However, there has not been much age-comparative research on decision making (see Peters, Finucane,

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McGregor, & Slovic, 2000; Sanfey & Hastie, 2000; Yates & Patalano, 1999, for reviews). In this paper, we demonstrate that decision-making performance by older adults can be at least as good as that of younger adults and, in one instance, even better.

In rational choice theories of decision making, the consistency of choice across contexts or variants of a problem is an important construct for maximization of utility (e.g., Tversky & Kahneman, 1986; Tversky, Sattath, & Slovic, 1988). Inconsistency across similar problems can, for example, result in very great costs to a decision maker, as the work of Lichtenstein and Slovic (1971, 1973) has shown with both undergraduate students and adult gamblers. It is widely thought that inconsistencies arise in the absence of well-established or preexisting preferences that then allow people to construct them on each occasion. As a result, minor changes in wording of a problem or in alternatives to select from can lead to differences in preferences and so inconsistencies in choice across variants of the same problem (e.g., Payne, Bettman, & Johnson, 1993; Slovic, 1995). As an example, individuals' preferences are known to vary within the exact same set of options when they make a *choice* (e.g., between Gamble A, 10% chance of earning $ 90, and Gamble B, 90% chance of earning $10), compared to when they make a *judgement* (e.g., how much would you pay for each of these gambles?). People in the choice condition are likely to choose Gamble B whereas people in the judgement condition are likely to value Gamble A more highly (e.g., Lichtenstein & Slovic, 1971; Slovic, 1995). This phenomenon, called preference reversal, is one example of inconsistency in decision making.

Another widely cited example of inconsistency associated with small changes in the decision context is found in the *asymmetric dominance effect*, or more generally, the *attraction effect*. The attraction effect refers to a phenomenon in which adding an irrelevant alternative into an existing choice set increases the proportion of people choosing an alternative from the original set. This phenomenon violates a fundamental assumption of many rational choice models, the *principle of regularity*, by which the probability of choosing one option from an initial choice set cannot be increased by adding a new alternative (e.g., Huber, Payne, & Puto, 1982).

The top portion of Figure 1 presents an example of a decision problem that has the potential to show the attraction effect. Here there are two brands, and each has both a quality and a price associated with it. Brands A and B are competitive to each other because Brand A (termed the competitor) is weaker on the quality dimension and stronger on the price dimension, while the reverse is the case for Brand B (termed the target). In the problem depicted in the bottom part of Figure 1, the identical brands are available, with the same values for quality and for price, but now there is a change in the problem's context because a third brand (termed the decoy) has been added (see Wedell & Pettibone, 1996, for a summary of decoy types).

Across a number of attraction effect tasks, there is widespread evidence of inconsistency shown by young adults ranging in age from the late teens into the thirties (e.g., Ariely & Wallsten, 1995; Dahr & Glazer, 1996; Heath & Chatterjee, 1995; Huber et al., 1982; Huber & Puto, 1983; Mishra, Umesh, & Stem, Jr., 1993; Pan & Lehmann, 1993; Ratneshwar, Shocker, & Stewart, 1987; Sen, 1998; Simonson, 1989; Simonson & Tversky, 1992; Tversky & Simonson, 1993; Wedell, 1991; Wedell & Pettibone, 1996). In addition to being seen across a wide range of participants, inconsistency in choice has also been reported across a wide range of decision contexts including consumer, job, political, and partner choices (Doyle, O'Connor, Reynolds, & Bottomley, 1999; Highhouse, 1996; Pan, O'Curry, & Pitts, 1995; Sedikides, Ariely, & Olsen, 1999).

Two-choice version:

Brand	Quality (out of 100)	Price	Terms
A	50	$30	Competitor
B	70	$40	Target

Three-choice version:

Brand	Quality (out of 100)	Price	Terms
A	50	$30	Competitor
B	70	$40	Target
C	72	$100	Decoy

Figure 1. A sample attraction effect task in the two-choice version (top) and in the three-choice version (bottom).

Against this substantial literature then, recent work suggesting that older adults are less likely than young adults to show the attraction effect is quite surprising (Tentori, Osherson, Hasher, & May, 2001). By the terms widely used in the decision literature, older adults' choice behaviour would then be viewed as more *reliable*[1] than that of younger adults. Although this interpretation might be consistent with findings on everyday problem solving (e.g., Cornelius & Caspi, 1987), when judged against a large literature showing cognitive declines associated with ageing (see, e.g., Craik & Salthouse, 2000), the Tentori et al. finding is particularly surprising.

We note, however, that the problems used by Tentori et al. (2001) were all variants requiring a decision in the context of shopping for groceries. For the sake of generality, participants in that study came from both the US and Italy, with the same findings across a series of experiments. Nonetheless, this particular context, grocery shopping, permits two different explanations for the apparent superiority of older adults: a general expertise/wisdom interpretation and a domain-specific expertise interpretation. Tentori et al. preferred a general expertise interpretation, citing the similarity between their findings and the work of Baltes and his group (e.g., Baltes & Staudinger, 1993, 2000), findings that suggest that age-related increases in wisdom can compensate for other cognitive problems that increase with age.

However, it is also possible that older adults failed to show greater consistency across two- and three-choice variants because of their greater *specific* expertise relative to that of younger adults. After all, it is likely that older adults have had much more experience than younger adults with grocery shopping. This explanation is analogous to the argument made by Denney and her colleagues (Denney & Pearce, 1989; Denney, Pearce, & Palmer, 1982) that if everyday problem-solving performance is determined by experience alone, each age group

[1]Given that invariance or consistency is a basic assumption of rational choice theories (e.g., Tversky & Kahneman, 1986), the term "rational" is also widely used to refer to these decision patterns.

should outperform the other group on the problems with which they are most familiar. In fact, the possibility that greater specific knowledge about grocery shopping reduces susceptibility to the attraction effect is consistent with research in the decision literature (e.g., Coupey, Irwin, & Payne, 1998; Wedell & Boeckenholt, 1990) suggesting that expertise reduces error rates across a number of decision tasks. With respect to the attraction effect, some evidence is consistent with the specific knowledge argument (Sen, 1998), although the data are not entirely straightforward (see, e.g., Mishra et al., 1993; Ratneshwar et al., 1987). Taken together, the Tentori et al. (2001) age superiority effect may be due to the domain-specific expertise that older adults have about grocery shopping relative to that of younger adults, rather than to older adults' general expertise in making decisions in different contexts.

In the present study, we contrasted the specific versus general expertise hypotheses about the source of older adults' previously reported advantage in the attraction effect decision task (Tentori et al., 2001). In doing so, we were also able to address the role of specific expertise in the choice behaviour of younger adults. We did this by using one of the original grocery problems from Tentori et al. along with a new problem in a domain (earning extra credit in a course) about which younger adults could be expected to have more knowledge than older adults. The general expertise view predicts that older adults will show greater consistency than younger adults (or the absence of an attraction effect) in choosing an option across the two- and three-choice versions of both choice problems. The specific expertise view predicts consistency for younger adults in the extra credit problem but not in the grocery problem and, for older adults, in the grocery problem but not in the extra credit problem.

Method

Participants

A total of 689 undergraduate students (age 17 to 27 years) from Duke University, the College of Charleston, Michigan State University, and the University of Toronto and 384 senior citizens (age 60 to 79 years) from the Durham NC, Charleston SC, East Lansing MI, and Toronto ON areas participated in this experiment. Of those, 483 undergraduate students and 220 senior citizens received only one choice problem: either the grocery shopping or the extra credit problem in its two-choice or three-choice version. A subset of 206 undergraduate students and 164 senior citizens did both choice problems[2] and also provided knowledge ratings for each problem. All participants were tested at the times that other work (e.g., Yoon, May, & Hasher, 1999) has shown are generally optimal for each age group: in the morning for older adults and in the afternoon for younger adults. Younger adults received credit for an introductory psychology course in exchange for their participation. Older adults received $10 for their participation.[3] As in many ageing studies, older adults had more education and higher vocabulary score (years of

[2]In this research tradition, it is quite common to give multiple problems to the same participants (e.g., Huber et al., 1982), and we also wished to maximize the number of participants. Analyses comparing the participants who received one vs. two problems altered none of the conclusions based on collapsing these participants.

[3]Studies with college students have used both monetary compensation and course credit (e.g., Sedikides et al., 1999; Sen, 1998); participants showed the attraction effect in both instances. Thus, the fact that the two age groups received different compensation for participation should not be a factor for the attraction effect. We note that most studies in cognitive gerontology done in North America use a similar compensation scheme.

education, $M = 15.92$ years, $SD = 3$; vocabulary score, $M = 32.64$, $SD = 9.14$) than younger adults (years of education, $M = 13.4$ years, $SD = 1.79$; vocabulary score, $M = 21.57$, $SD = 8.18$).

Materials

Using the structure of the original grocery shopping problem from Tentori et al. (2001), a new choice task, earning extra credit in a course, was created in a domain that younger adults would have greater experience with than older adults. In the extra credit problem, each of the options was defined on the following two attributes: the amount of extra credit offered and the minimum amount of time required to finish the extra credit task. The extra credit problem started with the same values as the discount attribute from the grocery shopping problem. Based on pilot work to ensure that Option B was more attractive than C, we doubled the values of the minimum required purchase attribute from the grocery shopping problem before we used them as the values of the minimum required time attribute. Both problems can be seen in Figure 2.

The Grocery Shopping Problem

	Discount offered	Minimum purchase required	I would choose:
Card A	15%	$20	
Card B	25%	$45	
Card C	26%	$100	

The Extra Credit Problem

	Extra credit offered	Minimum amount of time required	I would choose:
Option A	15 points	40 minutes	
Option B	25 points	90 minutes	
Option C	26 points	200 minutes	

Figure 2. The grocery shopping and extra credit problems.

As an approximate index of domain-specific expertise, we assessed knowledge about decision domains for a subset of participants using four questions. These were adopted from Mitchell and Dacin (1996; see also Mishra et al., 1993; Ratneshwar et al., 1987; Sen, 1998). The four questions were as follows:

1. "How familiar are you with grocery shopping (earning extra credit for a course)?" (7-point scale anchored by "not familiar at all" and "very familiar").
2. "I know a lot about grocery shopping (earning extra credit for a course)" (7-point scale anchored by "disagree" and "agree").
3. "How would you rate your knowledge about grocery shopping (earning extra credit for a course) relative to the rest of the population?" (7-point scale anchored by "one of the least knowledgeable people" and "one of the most knowledgeable people").
4. "How interested are you in grocery shopping (earning extra credit for a course)?" (7-point scale anchored by "not interested at all" and "very interested").

The index of knowledge in a domain was the mean score on the four questions.

Design and procedure

A total of 160 participants received only the grocery shopping problem, and 543 participants received only the extra credit problem in either their two-choice or their three-choice versions. A total of 370 participants received both problems; for those participants, both problems were presented in either the two- or the three-choice versions. Each problem was presented on a separate sheet of paper with instructions to consider the information that was presented and to choose whichever option they like. Participants given both problems received the subjective knowledge questionnaire after each of the two problems. Otherwise, the procedure was identical to that used for the other participants. At the end of the experimental session, all participants completed the Extended Range Vocabulary Test (ERVT), Version 3 (Educational Testing Service, 1976).

Results

Choice among options

Following Tentori et al. (2001), we report the proportions of people choosing B and not choosing B in each problem for all participants (see Table 1). As can be seen, younger adults showed the attraction effect in the grocery shopping problem, $\chi^2(1, N = 306) = 23.37$, $p < .01$, with 50% choosing Option B in the two-choice version and 77% choosing it in the three-choice version. By contrast, there was no evidence of a change in the choices made by younger adults across the two versions of the extra credit problem, $\chi^2(1, N = 589) = 0.11$, with 80 and 81% choosing Option B in the two- and three-choice versions, respectively. Older adults did not show the attraction effect for either problem: grocery shopping, $\chi^2(1, N = 224) = 0.28$; extra credit, $\chi^2(1, N = 324) = 1.32$. Moreover, a logistic regression analysis also revealed that the interaction between age group (younger vs. older adults) and choice condition (two- vs. three-choice conditions) on the choice of Option B was statistically significant for the grocery shopping domain, β (regression coefficient) $= -1.04$, $\chi^2(1, N = 530) = 8.14$, $p < .01$, but not for the extra credit domain, $\beta = 0.21$, $\chi^2(1, N = 913) = 0.42$, indicating an age effect for the grocery shopping domain only.

The subset of participants who rated knowledge showed the same choice patterns as the larger group of participants (see Table 2). Again, the younger adults showed the attraction effect only in the grocery shopping problem, $\chi^2(1, N = 206) = 10.46$, $p < .01$, but not in the

TABLE 1
Numbers and proportions of younger and older adults choosing and not choosing B in the grocery shopping and extra credit domains (entire data set)

	Younger adults								*Older adults*							
			Did not choose B								*Did not choose B*					
	Chose B		*Total*		*Chose A*		*Chose C*		*Chose B*		*Total*		*Chose A*		*Chose C*	
Choice condition	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
							Grocery shopping									
2-choice	76	50	76	50					54	49	57	51				
3-choice	118	77	36	23	27	17	9	6	59	52	54	48	42	37	12	11
							Extra credit									
2-choice	235	80	59	20					105	65	56	35				
3-choice	239	81	56	19	31	11	25	8	116	71	47	29	29	18	18	11

TABLE 2
Numbers and proportions of younger and older adults choosing and not choosing B in the grocery shopping and extra credit domains, for participants who received both choice problems and the subjective knowledge questionnaire

	Younger adults								*Older adults*							
			Did not choose B								*Did not choose B*					
	Chose B		*Total*		*Chose A*		*Chose C*		*Chose B*		*Total*		*Chose A*		*Chose C*	
Choice condition	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
							Grocery shopping									
2-choice	49	48	53	52					37	46	44	54				
3-choice	73	70	31	30	25	24	6	6	46	55	37	45	31	38	6	7
							Extra credit									
2-choice	83	81	19	19					55	68	26	32				
3-choice	84	81	20	19	11	10	9	9	55	66	28	34	15	18	13	16

extra credit problem, $\chi^2(1, N = 206) = 0.01$, whereas older adults did not show the attraction effect for either problem: grocery shopping, $\chi^2(1, N = 164) = 1.56$; extra credit, $\chi^2(1, N = 164) = 0.05$. These findings support the general expertise hypothesis for older adults, by which their greater experience with decisions makes them less susceptible to changing their choices when an additional, but not terribly attractive, choice is added to a set of alternatives. By contrast, for younger adults, consistency in decisions appears to be tied to specific knowledge.

Knowledge ratings

The knowledge measure had good reliability; Cronbach's α ranged from .83 to .87 across the four combinations of problems and ages. Confirming our ad hoc assumptions, younger adults were more knowledgeable about extra credit than were older adults, $t(368) = 8.46$, $p < .01$, whereas older adults were more knowledgeable about grocery shopping than were younger adults, $t(368) = 6.52$, $p < .01$ (see Table 3). As well, older adults were more knowledgeable about grocery shopping than about extra credit, $t(326) = 13.44$, $p < .01$, while younger adults reported themselves to be equally knowledgeable about both grocery shopping and extra credit, $t(410) = 0.34$.

Thus, the attraction effect patterns shown by younger and older adults do not follow directly from their knowledge scores: Younger adults showed the attraction effect in the grocery shopping domain, but not in the extra credit domain, although their self-rated knowledge about the two domains did not differ; older adults did not show the attraction effect in either domain, although they reported themselves to be more knowledgeable about grocery shopping than about extra credit. Moreover, a logistic regression analysis also showed that the interaction between domain knowledge and choice condition (two- vs. three-choice conditions) on the choice of Option B was not significant for either younger, β (regression coefficient) $= -0.1$, $\chi^2(1, N = 412) = 0.33$, or for older adults, $\beta = .05$, $\chi^2(1, N = 328) = 0.12$. Thus choice behaviour, at least for these particular problems, could not be predicted on the basis of knowledge ratings.

Discussion

Younger adults showed the attraction effect, or evidence of inconsistent decision-making behaviour, in the grocery shopping problem, as they had previously in the Tentori et al.

TABLE 3
Means and standard deviations of knowledge and interest scores for the grocery shopping and extra credit domains for each age group

		Grocery shopping		*Extra credit*	
Age group		*Knowledge*	*Interest*	*Knowledge*	*Interest*
Younger	Mean	4.94	4.16	4.90	6.02
adults	*SD*	1.14	1.56	1.30	1.33
Older	Mean	5.70	4.70	3.58	4.94
adults	*SD*	1.10	1.86	1.70	2.14

(2001) study. They did not show the effect in the extra credit domain. This pattern of choice is consistent with the idea that it is specific expertise that determines performance in attraction effect tasks. By contrast, older adults appeared to conform to a general expertise view; they failed to show the attraction effect for either the grocery shopping problem or the extra credit problem, thus showing greater consistency in choice than did younger adults.

What accounts for the choice behaviour of these two age groups? Our data suggest that knowledge about a domain is not a particularly helpful construct, at least as it is measured here (and perhaps elsewhere in the decision literature, Ratneshwar et al., 1987). For one thing, younger adults reported themselves to be equally knowledgeable about both grocery shopping and earning extra credit for a course and yet they showed consistent choice on the extra credit problem but not the grocery shopping problem. Hence, with respect to younger adults, our findings add to the pattern of inconsistent findings from previous studies on the effect of knowledge on the attraction effect (Mishra et al., 1993; Ratneshwar et al., 1987; Sen, 1998): Sometimes knowledge matters (Sen, 1998), sometimes it does not (Mishra et al., 1993; Ratneshwar et al., 1987), and the precise determinants of the relation between knowledge and choice are as yet unknown in the attraction effect.

Since Mishra et al. (1993) suggested that interest or motivation also influences the attraction effect, we considered the role that interest might play in the present findings. Our analyses can only be considered suggestive, of course, because there is a one-item scale (Question 4) available to assess interest (see Table 3). Younger adults were more interested in extra credit than in grocery shopping, $t(410) = 13.03$, $p < .01$, and this pattern does coincide with choice behaviour: When interest was higher (extra credit), young adults did not show an attraction effect; when interest was lower (grocery shopping), young adults showed an attraction effect. A logistic regression analysis showed a significant interaction between domain interest and choice condition for younger adults, $\beta = -0.27$, $\chi^2(1, N = 412) = 4.24$, $p < .05$. Our younger adults' data are consistent with Mishra et al.'s suggestion: Interest levels might be a stronger factor than knowledge in reducing the attraction effect.

Older adults were equally interested in both problems, $t(326) = 1.06$, with an interest level that was slightly above indifference on the 7-point scale. Perhaps a moderate level of interest is sufficient to erase the attraction effect for older adults, suggesting that interest also explains their choice behaviour. However, a logistic regression analysis on the level of domain interest and the size of the attraction effect was not significant for older adults, $\beta = -.02$, $\chi^2(1, N = 328) = 0.05$.[4] Of course, these data can only be seen as suggestive, and we note that interest may not succeed in explaining age differences in choice because there are large age differences seen for interest in earning extra credit, with no difference in choice patterns. Nonetheless, within age groups, interest may ultimately prove to play a role in determining the attraction effect. Such a conclusion will require the development of a good measure of interest, along with choice problems that vary greatly on the interest scale for both younger and older adults.[5]

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[4]A logistic regression analysis on the level of domain interest and the size of the attraction effect collapsed across both ages was not significant, $\beta = -.13$, $\chi^2(1, N = 740) = 2.35$, $p = .13$.

[5]When all data are reanalysed using a three-question knowledge scale (averaged over the first three questions, taking out the last question on interest), no conclusions change except that younger adults' knowledge score for grocery shopping is higher than that for extra credit, which does not match their choice patterns anyway.

An additional explanation for age patterns in choice was also considered in part because of the substantial age-related differences in vocabulary scores. Insofar as vocabulary and crystallized intelligence are related (e.g., Horn, 1982; Horn & Hofer, 1992; Schaie, 1994), it is possible that this factor accounts for the superior decision skills of older adults. However, a logistic regression analysis assessing the interaction between vocabulary scores and choice conditions across both age groups was not significant, $\beta = -.005$, $\chi^2(1, N = 1408) = 0.19$.

A final explanation for the better performance shown here by older adults than by younger adults might lie in older adults' increased propensity to rely on heuristic or intuitive information processing coupled with younger adults' greater reliance on analytic, systematic information processing (e.g., Klaczynski & Robinson, 2000; Peters et al., 2000). For example, Johnson (1990) demonstrated that older adults use heuristic-type decision strategies (i.e., so-called noncompensatory decision strategies) to arrive at the same decision as do young adults who used more analytic strategies. As well, there is some evidence that the engagement of analytic processes may actually *impair* performance on attraction-type tasks (e.g., Simonson, 1989; Wedell & Pettibone, 1996) at least to judge by the increase in the size of the attraction effect seen when participants were asked to provide a justification for their decisions. These findings can also be taken as consistent with views (e.g., Chaiken & Trope, 1999; Epstein, 1994; Kahneman, 2003; Stanovich & West, 2000; Wilson & Schooler, 1991) proposing that an effortless processing system can be more effective and adaptive in solving (some) problems than a more effortful, rational system of the sort that young adults may be more inclined to rely on.

Furthermore, Damasio (1994) in his somatic-marker hypothesis argues that feelings or emotions (called somatic markers) become associated with the positive or negative outcomes of responses to situations through a lifetime of experience. During decision making, positive or negative markers activate pleasant or unpleasant feelings to options, and people can use these markers to eliminate options that could potentially lead to negative outcomes. Thus, it is conceivable that this process could actually help older adults perform as well as or better than younger adults in some situations that require solutions that match their feelings or intuitions formulated throughout their life. Neuropsychological evidence consistent with these speculations comes from findings on a gambling task (Bechara, Damasio, Damasio, & Anderson, 1994) thought to use an age-spared, ventromedial prefrontal system (MacPherson, Phillips, & Della Sala, 2002). Older and younger adults did equally well on this task (MacPherson et al., 2002). By contrast, age-related changes in dorsolateral prefrontal areas may reduce the likelihood of using analytic processes requiring executive control.

Overall, older adults appear to be less irregular and more consistent in decision tasks that assess the attraction effect than are younger adults. Younger adults, by contrast, appear to show consistent decisions in a domain of high interest, although not in a domain of indifferent interest. It is unclear whether this pattern is due to interest levels or to perhaps a somatic-markers explanation (Damasio, 1994). Certainly there is evidence from young adults that following one's feelings/instincts can sometimes result in decisions that are more satisfactory to the person than are decisions based on careful analysis of alternatives (Wilson & Schooler, 1991).

With respect to ageing and decision making, the present data are consistent with conclusions of Tentori et al. (2001) and, in particular, with the wisdom perspective in the ageing literature (e.g., Baltes & Staudinger, 1993, 2000); that is, a lifetime of experience may result in skilled decision making across a range of topic domains, independent of interest level.

Whether or not consistency (or superior decision making) is attributable to spared versus impaired neural pathways, or to an age-related increase in reliance on heuristic decision rules, or to the accumulation of somatic markers, or to some combination of these factors remains to be seen. Nonetheless, the present findings show superior decisions being made by older than by younger adults. As a final note, it is possible that one aspect of wisdom—or of increasing experience with decisions—is that heuristic rules (and their neural underpinnings) are good enough for the vast majority of choices that people make in a day.

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