

Decision making and brand choice by older consumers

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Abstract Older adults constitute a rapidly growing demographic segment, but stereotypes persist about their consumer behavior. The goal of this review was to develop a more considered understanding of age-associated changes in consumer decision making. Our theoretical model suggests that age-associated changes in cognition, affect, and goals interact to make older consumers' decision-making processes, brand choices, and habits different from those of younger adults. We first review literature on stereotypes about the elderly and then turn to an analysis of age

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differences in the inputs (cognition, affect, and goals) and the outcomes (decisions, brand choices, and habits) of decision processes.

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Older consumers represent an increasingly large and financially powerful part of the population worldwide. We propose that age-associated changes in cognition, affect, and goals intermingle to influence older consumers' decision-making processes, making these processes different from those of younger adults. Thus, the goal of this review was to come to a more considered understanding of age differences in the inputs (cognition, affect, and goals) and the outcomes (decisions, brand choices, and habits) of these processes. For example, the extant literature on consumer decision making focuses largely on the ways in which one input (e.g., memory) affects one outcome (e.g., brand choice). We broaden this literature by highlighting the impact of age-related changes in cognition, affect, and goals on decisions, brand choices, and habits.

1 Stereotypes

Across cultures, people tend to possess stereotypical views of the elderly, with conventional wisdom holding that they are kindly, warm, and friendly, yet at the same time incompetent, ineffective, and helpless (Cuddy et al. 2005). While there is substantial overlap in abilities, preferences, and goals between older and younger consumers, there are also substantial differences. For example, the elderly are consistently more brand-loyal than younger consumers (Lambert-Pandraud et al. 2005). However, rather than view this trend as confirming a general stereotype of a decline in older consumers' ability to process information about new brands, marketers might think more carefully about other underlying reasons for such changes in behavior, such as self-directed changes in motivations (Carstensen et al. 2003). Unfortunately, research tends to show that it is difficult to change these stereotypical views of the elderly (Cuddy et al. 2005). Thus, this article integrates recent literature from both marketing and psychology to understand which age differences in decision making are based in reality—such as increased brand loyalty—and which are the products of often erroneous conventional wisdom about the decreased abilities of older consumers.

2 Inputs: goals, affect, and cognition

2.1 Goals and affect

Important motivational changes occur with aging. Carstensen et al. (2003) have proposed the socio-emotional selectivity theory, which argues that when people perceive remaining time as limited, they prioritize social goals that are emotionally meaningful over those that are more knowledge-related. The theory has also been

applied to explain motivational changes of aging inside and outside of the social realm. Specifically, researchers have found that older consumers are more persuaded by messages that help adults to realize emotionally meaningful goals as opposed to those that serve knowledge-related goals (Fung and Carstensen 2003). They are also more persuaded by messages that are based on emotional appeals than by those based on rational appeals (Williams and Drolet 2005).

Theories about successful aging, including the selective optimization with compensation theory, Heckhausen and Schulz's lifespan theory of control, and Brandstädter and Renner's coping strategies of accommodation and assimilation, make additional predictions about goal change with age due to loss of resources: predicting increased goal selectivity when people move away from developmental goals of growth (e.g., "I want to improve my health") towards goals of maintenance (e.g., "I want to stay healthy") and regulation of loss (e.g., "I do not want my health to deteriorate"; Ebner et al. 2006). Consistent with this, research has found that compared with younger and middle-aged adults, older adults' goals more often reflect loss avoidance and a maintenance orientation (e.g., Heckhausen 1997). These theories and findings suggest a clear but as yet unexplored connection with regulatory focus theory (Avnet and Higgins 2006), a theory that has been well-explored and widely applied in consumer behavior.

According to regulatory focus theory, having a promotion focus involves pursuing gains and ideals, whereas having a prevention focus involves avoiding losses and aiming to fulfill obligations. The dominant focus for individuals can vary, either chronically (people may have a higher promotion or prevention focus in general, or they may be high or low on both promotion and prevention focuses) or situationally (a context can temporarily encourage a particular focus). Researchers have demonstrated a wide range of effects of regulatory focus on product preference and communications (e.g., Avnet and Higgins 2006).

Given changes in goal selectivity with aging, we would expect that older consumers would be more prevention-focused and less promotion-focused compared to younger consumers, especially in domains in which older consumers expect or experience losses, such as some cognitive abilities, health, or fitness.

Furthermore, other variables that change with age may reinforce a relative increase in prevention focus with age. In particular, recent findings suggest that a limited time perspective may increase the relative importance of prevention over promotion goals (Pennington and Roese 2003) and that the cognitive processes associated with a promotion focus versus those associated with a prevention focus are likely to require more cognitive resources. Older consumers tend to have both a more limited time perspective and more limited cognitive resources than younger consumers, potentially reinforcing any tendency they might have to show increased prevention focus relative to younger consumers.

2.2 Cognition: The case of functional learning

Rather than review all existing literature about changes in cognition (see Yoon and Cole 2008), we emphasize several new findings pertaining to age-associated changes in functional learning, that is, learning of continuous functional mappings that relate stimulus and response continua. Through functional learning, an organism acquires a

judgment rule for correctly assigning each stimulus value encountered in a certain domain to one, and only one, response value. For example, “The better the product, the higher its price,” is a functional decision rule. The ability to detect and learn such continuous relations has strong adaptive value throughout a person’s life.

A few studies in aging literature report that when presented with one stimulus value (e.g., quality) and given feedback about the value to be predicted from it (e.g., price), elderly and younger adults are equally able to learn (and apply) the most common functional relations encountered in their daily lives, whether direct, inverse, U-shaped, or inverse U-shaped (Musielak et al. 2006). Without any feedback, older adults use direct relations as the default option. Other functional learning results indicate that when data contain a considerable amount of uncertainty, the elderly are able to learn, interpolate, and extrapolate as well as younger persons (Musielak et al. 2006).

However, when they are presented with more than one stimulus value and given feedback about the value to be predicted (e.g., health status), such that one relation is positive (e.g., dosage) and the other is inverse (e.g., side effects), older adults have difficulty learning the inverse relationship. They can detect which relation is a direct one and apply it, but they encounter difficulties learning how to combine the two stimuli into an overall prediction. Many older adults tend not to use the inverse relation stimulus. Yet when both relations are inverse, some elderly persons appear able to detect and learn the two inverse relationships and combine the stimulus values correctly. Finally, when presented with two direct relationship stimuli embedded within a set of invalid non-diagnostic stimuli, older adults have more trouble than younger adults detecting which stimuli are valid (Chasseigne and Mullet 2007).

Combining two stimuli with opposite meanings also creates a very challenging task for older adults in non-learning situations. For example, when judging the volume of an object from information about its weight and its density, many elderly people cannot use density information inversely. Instead, they judge volume as a direct function of weight and density (Léoni et al. 2002). Nevertheless, in settings in which the inverse information can be reframed easily as direct information, the elderly are able to use the inverse information as well as young adults.

Because a cognitive theory of functional relationships in everyday life is not yet available, it is difficult to know the extent to which differences in functional learning are consequential. If we assume that in everyday life direct relations between events are the rule and inverse or nonlinear relations are the exception, then the concrete consequences of the trouble experienced by older adults when they face combinations of inverse and direct relations should be limited, and even more so if many inverse relations can be reframed as direct relations.

2.3 Corroborating evidence from neuroimaging data

Neuroimaging data reveal that brain activity does not always mirror observed age-associated changes in cognition, affect, and goals (Park and Gutchess 2004). For some tasks, young adults activate regions of the brain more robustly than older adults; for other tasks, older adults recruit regions of the brain that are not engaged by young adults. For example, on some memory tasks, elderly adults increase the activity in prefrontal regions in both hemispheres, but young adults activate only one

hemisphere (as reviewed by Cabeza 2002). On other occasions, older adults fail to activate medial temporal regions to the same extent as the young do (Gutchess et al. 2005). These changing patterns of neural activation with age may serve compensatory functions (e.g., Cabeza 2002); at the very least, the patterns suggest flexibility in the engagement of cognitive and neural resources with age that is not apparent in behavioral data.

Recent behavioral work has begun to identify circumstances in which older adults' cognitive performance reflects preservation and malleability. These findings converge with the neural evidence to suggest that cognitive limitations with age are not absolutes. Both socio-emotional information relevant to one's well-being and meaningful financial information can motivate older adults to deploy cognitive resources flexibly and perform equivalently to younger adults (Castel 2005). This research is important because it suggests that memory and resource limitations with age can be improved depending on the goals and motivations of the individual.

One interesting question regarding older consumers concerns the extent to which brands—and, more generally, classes of objects—represent unique domains. In young adults, objects and persons represent distinct domains, with the medial prefrontal cortex engaged by person information and the left inferior frontal cortex engaged by object information. As far as brands, functional magnetic resonance imaging (fMRI) research on young adults shows that brands and people do not engage the same neural regions and that the activations for brands occur in the same region that has been identified for objects (Yoon et al. 2006). In addition, data show that person judgments evoke a stronger response in reward regions than do brands. These studies suggest that for young adults, people are more motivating than brands in terms of engaging encoding processes successfully and in activating reward regions in the brain. The studies do not address the relative motivational value of brands compared to objects; it may be the case that brands are highly motivating but that this has not been detected thus far due to the emphasis on person judgments. It is uncertain whether these same distinctions will be present to the same extent for older adults. Older adults lose some specificity in the distinction between classes of visual objects with age due to dedifferentiation in ventral visual regions (reviewed by Park and Gutchess 2004), and thus, it is possible that objects and persons, or even objects and brands, would be less distinct for older adults than for younger adults. However, recent fMRI data reveal that some specialized functions of the medial prefrontal cortex, a region of the brain engaged in the processing of social and self-relevant information, are intact with age, with the region similarly engaged by self-relevant information (Gutchess et al. 2007). Furthermore, older adults' ability to recruit frontal regions suggests that additional resources can be harnessed under some circumstances and that motivating conditions may be likely to provoke the engagement of additional frontally mediated mechanisms.

Not only could person, object, and brand domains in the brain be compared across age groups, but the neural regions mediating reward and socio-emotional processes could also be explored. The literature on aging is restricted primarily to study of the amygdala and the processing of faces. Several, but not all, studies note that the response of the amygdala is reduced in older adults. The finding that the number of dopamine receptors decreases with age suggests that activation patterns in dopamine-sensitive regions related to reward, such as the striatum and ventromedial

prefrontal cortex, may change with age, but this has yet to be established. With aging, the extent to which these networks recruit additional regions or are relatively intact, in contrast to those subsuming controlled cognitive processing, is an important area for future research. By studying the benefits and pitfalls of the ways in which an individual's goals, particularly social and emotional ones, impact cognitive aging, we can learn which information-processing mechanisms can be harnessed to frame information in a way that is motivating.

3 Outcomes: decision making, habits, and brand choice

3.1 Decision making

Age differences in cognitive and affective processes as well as changes in goals have important theoretical and practical implications for how decisions are made and how they can be improved. Age-related declines in the efficiency of deliberative processes predict that we will make poorer quality decisions as we age. However, age-related adaptive processes—including motivated selectivity in the use of deliberative capacity, an increased focus on emotional goals, and greater experience—predict better or worse decisions for older adults depending on the situation (Peters et al. 2007b).

To make good decisions, decision makers must have information that is available, accurate, and timely, but they also have to be able to comprehend that information and its meaning. They need to be able to determine meaningful differences between options and weight factors to match their needs and values. Finally, they must be able to make trade-offs and ultimately to choose.

Aging-related changes in the landscape of information processing suggest that older and younger adults may differ, however, in what will help them make better decisions. For example, comprehension of numbers, especially in decisions that are unfamiliar or seldom encountered (possible examples include Medicare Part D and home mortgage rates) tends to decline with age. Research on how to present numeric information to decision makers shows that comprehension and use of numeric information can be increased by reducing cognitive effort, that is, by providing only the most relevant information, highlighting the meaning of only the most relevant information, providing numbers consistent with how people perceive the number line (e.g., so that higher numbers mean better performance), and, in general, doing the math for decision makers rather than requiring them to make inferences (Peters et al. 2007a). Organizing information for older adults benefits memory for and adherence to medication regimes (Park et al. 1994). Older adults seem to spontaneously use memory aids to summarize or check information at the end of an information search, as if to verify forgotten information, whereas younger adults appear to use these same aids in the middle of a search, as if for planning rather than memory purposes.

For three reasons, however, deliberative decline appears to be too simple an explanation for adult age differences in decision making. First, older adults selectively use their deliberative capacity (Hess et al. 2005). Hess and his colleagues believe that with greater relevance and engagement in the task, older adults allocate

more cognitive resources and monitor and control the impact of less relevant information. Younger adults, who have greater resources to begin with, are not as selective in their use of these resources and show fewer effects of irrelevant information on judgments regardless of whether the decision is relevant to their interests. Accordingly, research on how to increase motivation in decisions among older adults holds promise.

Deliberative decline also appears to be too simple an explanation for adult age differences in decision making because accumulated experience compensates for age-related declines. Breast cancer research finds that older women behave more like experts in breast cancer decisions by seeking out less information, making their decisions faster, and arriving at decision outcomes that are equivalent to younger women (Meyer et al. 1995). It is not clear, though, how an intervention could be designed to utilize this notion other than by simply providing greater experience within a domain. Little is known about what mediates the effects of experience on decision making; possible mediators include but are not limited to greater knowledge, greater confidence, and more precise affective reactions to decision options and information.

Finally, research suggests that emotional information may matter more in the decisions of older adults because of the motivation shifts discussed in Section 2.1. Based on research thus far, however, it is not clear whether these shifts are due to a greater influence of emotional information (an emotional bias) or of positive information (a positivity bias) or if they are due to a smaller influence of negative information (a lack of a negativity bias).

The notion that affective information will be weighted more in the decisions of older adults has implications for how information is presented. Peters and colleagues have tested affective markers of information and found that the presence of affective markers has a significant effect on older adults' decisions, particularly for those older adults with slower (rather than faster) processing speed (Peters et al., in review). They did not attempt to test the positivity effect.

To summarize, older adults will process information in ways that are likely to be different from younger adults at the same time as they are faced with more decisions about vital health, financial, and other personal issues. Because research results (and advice) have been based primarily on younger adults, research focusing on older adults could have far-reaching and timely implications given our growing older adult population.

3.2 Aging and habits

Most consumer behaviors are performed on a routine basis, and most routine consumer behaviors are driven by habit. Habits begin as associations in memory. With repetition, associations are formed between behaviors and their periodic occurrences. These associations are automatically translated into corresponding tendencies to repeat these behaviors. The repetition of habit behavior leads to its routinization and automation. This routinization and automation of habit behaviors is associated with certain mental and physiological changes and with the tendency for habit behaviors to become unconscious. Habituation reduces the amount of deliberate thought needed to act and is, in this way, adaptive.

With age, relationships between associations and stimuli and between associations and behaviors are reinforced. For the elderly, then, habits are more likely to be activated and relied on. Accordingly, age can be seen as a proxy for the amount of associate reinforcement. Indeed, research indicates that age is associated with (1) reductions in the individual tendency to generate uncommon free associates and (2) increases in the tendency to repeat a behavior (Drolet et al. 2007).

Aging causes certain cognitive deficits that can be related to the increased development of and reliance on more automatic, habit-driven behavior. Although cognitive and behavioral performances tend to slow with age, field studies show that the real-world performance of elderly adults is usually on par with that of young adults. It appears that the development of habits helps equalize performance. Ironically, then, older may be wiser despite the fact that older adults tend to expend fewer cognitive resources because they can rely on habits.

Age is a variable that captures many socioeconomic (e.g., income and generation) and individual difference (e.g., cognitive ability and emotionality) characteristics. Interestingly, despite an average age difference of nearly 50 years, research shows that elderly and young adults generally agree as to what habits are “good” versus “bad” (Drolet and Suppes 2007). However, there do appear to be differences between age groups in terms of the *kinds* of habit behaviors reported. For example, compared to young adults, the elderly emphasize habits related to interpersonal relationships, such as friend behaviors like giving and helping. This shift in the kind of habits elderly versus young adults report is consistent with the qualitative shift in how older versus younger adults process information and make decisions. Specifically, the elderly tend to focus more on personal experiences and emotion. This qualitative shift appears adaptive for elderly adults (LaBouvie-Vief 1998).

3.3 Brand choice

Although few empirical studies analyze how brand preferences vary with age, several studies show a tendency for older consumers to prefer long-established options (Lambert-Pandraud and Laurent 2007; Lambert-Pandraud et al. 2005). Different complementary mechanisms may lead to such results. The nostalgia mechanism suggests consumers develop preferences during a “critical period,” say between 15 and 30, and keep them for life. An alternative attachment mechanism proposes that consumers can develop, over the years, an attachment to a movie star, a music style, or a brand, even if their first encounter with it occurs at a later age, much beyond the “critical period.” A habit mechanism proposes that because (as noted in Section 3.2) habits become stronger with age, older adults may be more likely to prefer long-established options. Another explanation relies on a possible age-associated absence or decrease in innovativeness accompanied by a possible inverse relationship between age and willingness to explore new options. Additionally, Carstensen’s socio-emotional selectivity theory (discussed in Section 2.1) proposes that older adults put more emphasis on affective factors, which could lead them to prefer long-known options, e.g., to meet with well-known acquaintances rather than to have a potentially interesting new encounter. Cognitive impairments associated with aging, such as reductions in speed of processing or in working memory capacity, provide another family of explanatory variables. For example, impaired

recall ability may mean that older adults have smaller evoked sets and that they have difficulty memorizing and manipulating information, especially new information. This impairment could lead to a simplification of consumer choice processes, to the use of heuristics, and to a tendency to choose long-known options. Finally, biological and physical factors, such as poorer eyesight or hearing ability, more difficulty walking or driving, etc., could lead older consumers to simplify choice processes or to restrict the number of stores they visit.

4 Age, cohort, period

Cohort analysis is a set of statistical techniques that can be used to disentangle age, cohort, and period effects. To conduct such an analysis, one needs comparable repeated cross-sectional data gathered numerous times at regular intervals. Age effects are changes observed in specific groups as they age; period effects (indexed by date of measurement) are changes due to events that influence the behavior of all age groups; cohort effects (indexed by year of birth) refer to the long-term impact of events on people born in different periods and do not change with one's age or stage of life (Glenn 2005).

However, there arises a major statistical problem, as there is a perfect collinearity between the three variables: by definition $\text{age} = \text{period} - \text{cohort}$. In a regression approach, the matrix of explanatory variables does not have full rank, and the ordinary least-squares estimate cannot be computed because the same predicted values (and errors) may be obtained by different combinations of the age, period, and cohort coefficients.

One solution omits one explanatory variable: age, period, or cohort. However, such an omission creates a specification error so that the estimates of the coefficients of the remaining variables are biased and not convergent. Another solution imposes a priori constraints on specific coefficients, e.g., that consumers belonging to two neighboring cohorts have identical coefficients. The problem here is that the estimated results may vary widely depending on which constraints are imposed. A third approach substitutes additional information, but it is often difficult to obtain good a priori information. If, for example, cohort is replaced with a measured variable such as cohort education, it can be unclear whether the right variable for cohort has been substituted. Finally, current research is exploring the possibility of combining a priori information (e.g., information indicating that period effects should be negligible) and a partial least squares (PLS) estimation approach to obtain precise estimates that are not entirely data-driven. An interesting aspect of PLS is the possibility of analyzing at the same time multiple dependent variables, such as repeat purchase and type of brand purchased.

5 Future research and unanswered questions

The literature raises a number of interesting questions and suggests future research directions. We began by asserting that decision making is influenced by consumer cognition, affect, and goals. When older consumers' choices and decision processes

differ from those of younger consumers, it is likely to be because of age-related changes in these fundamental psychological factors. Overall, there is a need for more research about how characteristics of the individual (such as wisdom or experience), the environment (such as laboratory vs. real world), and the task (such as importance) influence the relative impact of cognitive, affective, and goal changes on decision making. Researchers should especially consider whether older adults use the same processes weighted in different ways to make decisions or use totally different processes.

An important methodological issue concerns how respondents are selected for research. Traditionally, the retirement age of 65 has been used as the cutoff for elderly. However, as people work longer and stay healthier longer, this cutoff may change. It is also possible that due to improved medical treatments and differences across countries, there will be an increase in variance of cognitive abilities, goals, and motivations across people of the same age. Future research should include middle-aged respondents in order to better understand aging mechanisms.

Finally, there are a number of unresolved issues in the aging literature that future researchers should address. When are changes linked to aging linear and when are they nonlinear? Do cohort effects interact with age? Certain product or service characteristics may have different meaning, importance, and value to young versus elderly consumers. Accordingly, elderly consumers' choice processes (and changes in these processes) may differ. Stereotypes held by research respondents may affect performance. Laboratory studies are sometimes artificial, so it is important to study older people in real (or realistic) situations in which they can use the expertise they have developed over the years.

References

- Avnet, T., & Tory Higgins, E. (2006). How regulatory fit affects value in consumer choices and opinions. *JMR, Journal of Marketing Research*, 43, 1–10 (February). doi:10.1509/jmkr.43.1.1.
- Cabeza, R. (2002). Hemispheric asymmetry reduction in older adults: The HAROLD model. *Psychology and Aging*, 17, 85–100. doi:10.1037/0882-7974.17.1.85.
- Carstensen, L. L., Fung, H. H., & Charles, S. T. (2003). Socioemotional selectivity and the regulation of emotion in the second half of life. *Motivation and Emotion*, 27(2), 103–123. doi:10.1023/A:1024569803230.
- Castel, A. D. (2005). Memory for grocery prices in younger and older adults: The role of schematic support. *Psychology and Aging*, 20, 718–721. doi:10.1037/0882-7974.20.4.718.
- Chasseigne, G., & Mullet, E. (2007). Learning, inhibition, cognitive aging. Unpublished manuscript.
- Cuddy, A. J. C., Norton, M. I., & Fiske, S. T. (2005). This old stereotype: The stubbornness and pervasiveness of the elderly stereotype. *The Journal of Social Issues*, 61, 267–285. doi:10.1111/j.1540-4560.2005.00405.x.
- Drolet, A., & Suppes, P. (2007). The good and the bad, the true and the false. In M. C. Galavotti, R. Scazzieri, & P. Suppes (Eds.), *Reasoning, rationality, and probability*. Stanford, CA: CSLI Publications.
- Drolet, A., Suppes, P., & Bodapati, A.V.(2007). Habits and free associations: Free your mind and mind your habits. Working paper.
- Ebner, N. C., Freund, A. M., & Baltes, P. B. (2006). Developmental changes in personal goal orientation from young to late adulthood: from striving for gains to maintenance and prevention of losses. *Psychology and Aging*, 21(4), 664–678. doi:10.1037/0882-7974.21.4.664.

- Fung, H. H., & Carstensen, L. L. (2003). Sending memorable messages to the old: Age differences in preferences and memory for advertisements. *Journal of Personality and Social Psychology, 85*(1), 163–178. doi:10.1037/0022-3514.85.1.163.
- Glenn, N. (2005). *Cohort analysis*. Thousand Oaks, CA: Sage.
- Gutchess, A. H., Kensinger, E. A., & Schacter, D. L. (2007). Aging, self-referencing, and medial prefrontal cortex. *Social Neuroscience, 2*, 117–133.
- Gutchess, A. H., et al. (2005). Aging and the neural correlates of successful picture encoding: Frontal activations compensate for decreased medial-temporal activity. *Journal of Cognitive Neuroscience, 17*, 84–96. doi:10.1162/0898929052880048.
- Heckhausen, J. (1997). Developmental regulation across adulthood: Primary and secondary control of age-related changes. *Developmental Psychology, 33*, 176–187. doi:10.1037/0012-1649.33.1.176.
- Hess, T. M., et al. (2005). Aging-related selectivity and susceptibility to irrelevant affective information in the construction of attitudes. *Aging, Neuropsychology, and Cognition, 12*, 149–174. doi:10.1080/13825580590925170.
- Labouvie-Vief, G. (1998). Cognitive-emotional integration in adulthood. *Annual Review of Gerontology & Geriatrics, 17*, 206–237.
- Lambert-Pandraud, R., & Laurent, G. (2007). Tell me which perfume you wear, I'll tell how old you are: Modeling the impact of consumer age on product choice. Working paper, HEC Paris.
- Lambert-Pandraud, R., Laurent, G., & Lapersonne, E. (2005). Repeat purchasing of new automobiles by older consumers: Empirical evidence and interpretations. *Journal of Marketing, 69*, 97–113 (April). doi:10.1509/jmkg.69.2.97.60757.
- Léoni, V., Mullet, E., & Chasseigne, G. (2002). Aging and intuitive physics. *Acta Psychologica, 111*, 29–43. doi:10.1016/S0001-6918(01)00077-4.
- Meyer, B. J. F., Russo, C., & Talbot, A. (1995). Discourse comprehension and problem solving: Decisions about the treatment of breast cancer by women across the life span. *Psychology and Aging, 10*, 84–103. doi:10.1037/0882-7974.10.1.84.
- Musiak, C., Chasseigne, G., & Mullet, E. (2006). The learning of non-linear functions among younger and older adults. *Experimental Aging Research, 32*, 317–340. doi:10.1080/03610730600699126.
- Park, D. C., & Gutchess, A. H. (2004). Long-term memory and aging: a cognitive neuroscience perspective. In R. Cabeza, L. Nyberg, & D.C. Park (Eds.), *Cognitive neuroscience of aging: Linking cognitive and cerebral aging*. New York: Oxford Press.
- Park, D. C., et al. (1994). Cognitive function and medication usage in older adults. *Journal of Applied Gerontology, 13*, 39–57. doi:10.1177/073346489401300104.
- Pennington, G. L., & Roese, N. J. (2003). Regulatory focus and temporal distance. *Journal of Experimental Social Psychology, 39*, 563–576. doi:10.1016/S0022-1031(03)00058-1.
- Peters, E., et al. (2007a). Adult age differences in dual information processes: Implications for the role of affective and deliberative processes in older adults' decision making. *Perspectives on Psychological Science, 2*(1), 1–23.
- Peters, E., et al. (2007b). Numeracy skill and the communication, comprehension, and use of risk and benefit information. *Health Affairs, 26*(3), 741–748. doi:10.1377/hlthaff.26.3.741.
- Williams, P., & Drolet, A. (2005). Age-related differences in responses to emotional advertisements. *The Journal of Consumer Research, 32*, 343–354. doi:10.1086/497545.
- Yoon, C., & Cole, C. A. (2008). Aging and consumer behavior. In Haugtvedt, Kardes, and Herr (Eds.), *The Handbook of Consumer Psychology*. New York: Lawrence Erlbaum Associates, pp 247–272.
- Yoon, C., Gutchess, A., Feinberg, F., & Polk, T. A. (2006). Comparing the structures of brand and human personality: A functional magnetic resonance imaging study. *The Journal of Consumer Research, 33*, 31–40. doi:10.1086/504132.