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MOTIVATED COGNITION AND CURIOSITY IN THE AGING CONSUMER¹

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Across the lifespan, our goals often include learning new things, building relationships with loved ones, and being healthy and active. Older age is often associated with changes in what motivates us, but younger and older adults often have many goals in common. People of all ages set goals, and assessing what factors influence goal pursuit (as well as how those factors may change with age) can lead to interesting insights about how individuals across the lifespan interact with products, learn new things, and make important decisions.

Some theories of motivation in older age focus largely on the shift from knowledge acquisition goals in younger adulthood to emotion regulation goals in older adulthood. While the empirical evidence to support this shift is strong, it is also worth examining the situations in which older adults do continue to seek knowledge. Many older consumers are retired but being in this phase of life does not necessarily mean that they stop pursuing goals that promote the acquisition of new information in their daily lives. For example, many older people have hobbies such as birdwatching, in which an expert may acquire knowledge about migration patterns, habitats, and food sources. Many are curious about how memory changes with age, and how they can do their best to stay cognitively healthy. In this chapter, we will discuss what motivates younger and older people to learn new skills and new information through the lens of several theories of cognitive aging. After discussing knowledge, emotion, and control as motivating factors, we will examine the roles of curiosity and interest in motivated cognition—including a suggestion that curiosity may not always benefit older consumers. We will then turn to older adults' perceptions of risk, gains, and losses, and how those perceptions may affect consumer behavior. Throughout this chapter, we will also consider older adults' use of and perceptions about so-called “brain training” techniques, examine how age-related changes may affect variety-seeking, and discuss

how situations that induce stereotype threat and anxiety may also motivate the cognition of older adults differently from younger adults.

Knowledge, Emotion, and Control as Motivating Factors

Several theories of healthy cognitive aging focus on changes in people's goals. These theories propose differences in the way older adults attend to, remember, and make decisions about the world around them.

Socioemotional Selectivity Theory

Socioemotional selectivity theory holds that aging is associated with a positivity effect in memory, such that older adults remember positive over negative information, and also that there is a general shift in goal pursuit across the adult lifespan. Younger adults focus on acquiring knowledge, often to succeed in school and at work, while older adulthood is associated with a lower priority assigned to pursuing knowledge-based goals and a higher priority assigned to pursuing goals that regulate emotions and build social relationships (Carstensen, Isaacowitz, and Charles, 1999; Carstensen, Fung, and Charles, 2003).

Motivation is intricately tied to memory, especially in aging; if more of older adults' goals are related to emotion, their memory for emotional items may be preserved, in contrast to other declines in memory. Prior work suggests that older adults remember products' slogans more accurately if those slogans had an emotional component (Fung and Carstensen, 2003). For example, "Capture those special moments," as compared to "Capture the unexplored world," was more preferred and better remembered by older adults when used in an advertisement for a camera. However, when older participants were asked to imagine that a medication existed that would extend their life by 20 years, their preferences and memory were more similar to that of younger adults' (Fung and Carstensen, 2003; cf. Uttl and Graf, 2006).

Lifespan Theory of Control

The lifespan theory of control holds that humans have a basic desire to control their environment, and because losing this control causes discomfort in the individual, loss of control is avoided if at all possible (Heckhausen and Schulz, 1995). Primary control is the attempt to change the external world so that it fits with the individual's goals, while secondary control is the attempt to modify internal processes so that one can mesh with the environment, and is identified as being a largely internal cognitive process, as opposed to the external primary control. According to Heckhausen and Schulz (1995), primary control has greater adaptive value than secondary control, and the latter mostly exists to support the former. Which type of control is utilized more strongly is dependent upon both

biological and societal factors, as biological changes and shifts in normative social constraints across the lifespan promote the use of secondary control over primary control.

Older adults do, however, report decreased ability to exert primary control over their environment (Heckhausen and Schulz, 1995). When older adults face events in their lives in which they have very limited opportunities to exert primary control—for example, when facing serious health problems—coping strategies are “likely to be focused on regulating emotion” rather than pursuing goals in the external environment (Heckhausen and Schulz, 1995; p. 296). Preserved emotion regulation is a key component of socioemotional selectivity theory, as discussed above.

Curiosity and Interest as Motivating Factors

Consumers across the lifespan are more likely to pursue information in which they are interested, and this tendency can have implications for which products they seek to learn more about and, perhaps, purchase. Curiosity, or the seeking out of some new information, has been studied extensively in young children (Engel, 2011; Smock and Holt, 1962), but it remains a motivating factor into older adulthood. In fact, Sakaki, Yagi, and Murayama (2018) argue that curiosity in older age supports physical, mental, and cognitive health. However, some measurements of curiosity and related factors (e.g., openness to experience; Kashdan et al., 2004, 2009) do show a general decline with age (Kashdan et al., 2004, 2009).

Socioemotional selectivity theory, as discussed above, suggests that our goals change as we age from primarily knowledge-based pursuits in younger adulthood to primarily socioemotional relationship building in older adulthood. This general pattern can help explain why curiosity may decline with age (Sakaki et al., 2018): While learning new things and encountering novel environments is a common goal among younger adults, it becomes less important as we age, when we prefer to spend time with those we already know well.

While some measures of curiosity may decline across the lifespan (see Robinson et al., 2017), maintaining curiosity is associated with positive outcomes in memory and well-being (Sakaki et al., 2018). Successful aging, Sakaki and colleagues (2018) argue, can benefit from a person’s interest in learning new information. Further evidence supports this notion of curiosity as a protective factor: In a large-scale study of older adults, those who were more curious were more likely to survive over a five-year period than those who were not (Swan and Carmelli, 1996). It is interesting to consider the benefits of curiosity from a consumer psychology perspective: If older consumers are less curious than their younger counterparts in some domains but not in others, perhaps further examination of domains of preserved curiosity can uncover novel and innovative ways to market products. For example, work examining purchasing decisions suggests that aging is negatively related to gathering information about alternatives and

AU: References 'Robinson et al., 2017; McDaniel, Waddill, Finstad, and Bourg, 1990; Anguera et al., 2013; Baltes, Sowarka, and Kliegl, 1989; Brehmer, Westerberg, and Backman, 2012; Cowan, Fitzpatrick, Roberts, and While, 2004' are cited in the text but not provided in the reference list. Please check and provide the details for these citations to add in the reference list or delete the citations from text.

positively related to brand loyalty (e.g., when purchasing a car, Evanschitzky and Woisetschläger, 2008), and lack of social influence from others may contribute to this conservative behavior (East, Uncles, and Lomax, 2014). The growing body of literature suggests that incorporating older adults' curiosity as a relevant factor in models of preferences with aging may help explain brand loyalty.

Age-related memory differences can be overcome—or at least reduced—when older adult participants are interested in the information (see Zacks and Hasher, 2006), possibly related to the reduced load on attentional resources that is needed to study interesting material (McDaniel, Waddill, Finstad, and Bourg, 1990). Additionally, when specific information is of interest to the participant, their memory performance is not just enhanced for that information; information presented in the same context also gets remembered with higher accuracy (for example, Gruber et al., 2014). In the context of marketing, future research may investigate whether curiosity or interest drives younger and older adults' memory for information peripheral to the product being advertised. For example, if marketing a new medication that is meant to provide some interesting and novel therapeutic benefit (e.g., scoring well on exams might be of interest to undergraduate students, and extending the lifespan might be interesting to older adults), a memory test for the product's name and purpose can be accompanied by items assessing peripheral information such as dosage instructions, side effects, and even the name of the hypothetical prescribing physician. Memory accuracy and preference judgments can be compared between products that younger and older individuals find interesting and those that they do not.

McGillivray and colleagues (2015) investigated the role of interest in memory for trivia questions, e.g., “What was the first country to allow women the right to vote?” (Answer: New Zealand.) Participants rated how interesting they found the answer once it was presented, as well as how likely they felt it would be for them to remember the information at a later time. Interestingly, older adults' recall accuracy after a one-week delay was strongly predicted by the ratings they gave after learning the answers to the trivia questions, while younger adults' recall was less strongly predicted by this factor. These findings may be driven by attention, as attention is shifted away from uninteresting items and toward more interesting items (Castel, 2008), which has notable implications for learning in other domains (e.g., see Hargis, Siegel, & Castel, 2019). Many older adults seek out activities in which they will learn new information: For example, many older adults who attend formal lifelong learning classes (Kim and Merriam, 2004) and those who participate in massive open online learning courses (“MOOCs”; Xiong and Zuo, 2019) report that they engage in such programs to learn new things.

Variety-Seeking

Curiosity and interest could also be related to how much people choose to try different options or stick to the usual choice. When making decisions about

which car to purchase or which dessert to order at a restaurant, we are often faced with various options. Will we order our favorite dish again or choose something that will be different from our usual choice, but might be less satisfying? Variety-seeking refers to the tendency to vary choices such as where to eat, what to buy, or what to do with spare time, even if it means choosing the less enjoyable option (Ratner, Kahn, and Kahneman, 1999). While there are individual differences in variety-seeking behavior, people generally prefer to vary their choices. This is perhaps due, at least in part, to memory: People tend to remember an experience overall more favorably if it includes variety than if it does not (Ratner, Kahn, and Kahneman, 1999).

Early investigation into how variety-seeking behaviors change in older age suggested that certain forms of variety-seeking may decrease with age. For example, a desire to travel and seek new experiences tends to decline with age, but there are no age differences in preferences for variety in everyday activities, and older and younger adults both report a tendency to become bored when things are unchanging (Zuckerman and Neeb, 1980). This suggests that there is a shift in the amount of variety people prefer as they get older, but older adults do not necessarily stop engaging in varied behaviors. There is also evidence that even though variety-seeking behavior declines with age, this decrease is not reflective of an overall decline in engagement, especially in activities that are meaningful or social in nature. For example, older adults spend more time volunteering than younger or middle-aged adults, despite being involved in fewer volunteer organizations and activities than either age group (Hendricks and Cutler, 2004).

Particularly relevant to consumer psychology, some research has examined variety-seeking behaviors in relation to how people make decisions about what product to purchase, what music to listen to, or what food to consume. Research on how these decisions change with age suggests that there are no age differences in how many options people choose for immediate consumption, but older adults choose fewer options for future consumption than younger adults do (Novak and Mather, 2007). These age-related differences are not due to memory declines or age differences in preference for the options themselves. Novak and Mather (2007) suggest that older adults may be willing to try more options while their mood is positive. However, they only selected their favorite options for future consumption to avoid choices that might lead to negative or uncertain future experiences. Other work further supports the role of emotion regulation in variety-seeking behaviors in older adults. For example, when given the opportunity to experience events in any order, older adults are more likely than younger adults to save the best (i.e., rated most positive) for last and to separate the negative and positive events with a neutral event to create a more positive experience overall (Drolet, Lau-Gesk, and Scott, 2011). These findings are in line with predictions from socioemotional selectivity theory (discussed previously in this chapter), which suggests a greater focus on emotion regulation in older age.

Other motivational factors can also influence the extent to which older adults choose to use their limited cognitive resources, and this can influence variety-seeking behavior. For example, older adults prefer to have fewer available options when making decisions (Reed, Mikels, and Lockenhoff, 2013) and place lower value on having ample choice options than young adults (Mikels, Reed, and Simon, 2009). Further, when given many options from which to choose, older adults engage in less information search than younger adults do (Mata and Nunes, 2010). These findings may reflect a preference for reducing the need to engage cognitive resources, as effortful cognitive processing is required for weighing the relative pros and cons of every option (see Shah and Oppenheimer, 2008). This explanation is in line with some theories of cognitive aging that suggest that older adults, aware of their limited resources, choose to selectively allocate attention and cognitive resources accordingly to optimize outcomes (Baltes and Baltes, 1990; Hess, 2014) and avoid losses (Heckhausen and Schulz, 1995). Despite a decline in information search and preference for fewer options, older adults tend to make fairly high-quality decisions (Mata and Nunes, 2010), indicating that older adults are able to use their limited resources to successfully achieve their goals.

This reduction in information search and preference for fewer options may also manifest in brand loyalty behaviors. While older adults tend to show greater brand loyalty for some types of purchases more than others (i.e., greater loyalty for cars than toiletries; Schewe, 1984; Lambert-Pandraud and Laurent, 2010), research has shown that older adults consider fewer brands than younger adults (Lambert-Pandraud, Laurent, and Lapersonne, 2005). Brand loyalty may be related to memory for truth and meaningfulness in older age. For example, Rahhal, May, and Hasher (2002) found that while older adults struggled compared to younger adults to remember perceptual source information, they did remember whether a person was truthful (see also Cassidy, Hedden, Yoon, and Gutches, 2014; Mitchell and Hill, 2019), suggesting that meaning can be extracted without memory for specific details. Others have established that the meaningfulness of a message can particularly affect older adults' memory performance (Skinner and Price, 2019). Perhaps older adults' preserved ability to remember character-related information is linked with their brand loyalty, such that remembering that a brand has treated them fairly in the past (i.e., that it is trustworthy) leads to increased likelihood to continue purchasing products produced by that brand (see Yoon et al., 2005; Yoon, Cole, and Lee, 2009).

Brain-Training Games

The power of curiosity (and, perhaps, motivational changes in variety-seeking) could help explain the increasing popularity of so-called "brain-training games." Brain-training is predicted to be a six billion dollar industry in 2020 (SharpBrains, 2015). Older adults may be particularly interested in ways to keep their minds "healthy," and brain-training games are compellingly advertised as a solution, or at

least a supplement, for cognitive health. Types of “brain games” subject to previous empirical investigation include *NeuroRacer*, a 3-D video game that measures perceptual discrimination ability in a visuomotor tracking task (Anguera et al., 2013); a mix of cognitive tasks including reasoning and speed of processing (Ball et al., 2002); fluid intelligence (Baltes, Sowarka, and Kliegl, 1989); and programs such as *Cogmed*, which adaptively trains working memory (Brehmer, Westerberg, and Backman, 2012). A recent meta-analysis (Melby-Lervag and Hulme, 2013) on games such as those mentioned above suggests that the evidence is mixed at best for the effectiveness of these programs; there is little to no long-term retention of gains or transfer of them into related domains. It is important to note, however, that these games are not at all likely to be harmful to the player (unless they take time away from another thing the person could be doing to stay in good cognitive shape, such as taking a walk with a friend). In fact, many people enjoy the feeling of solving complex problems on a computer or tablet, which should be encouraged for many who would not otherwise be using their skills in this way.

Though the scientific evidence for the effectiveness of brain-training programs on broader cognitive functioning is certainly not settled (see Simons et al., 2016 for a discussion), many consumers seem to trust the notion that brain training actually works. In fact, Rabipour and colleagues (2015, 2018) have found that people generally believe brain-training programs to be effective, which Rabipour, Andringa, Boot, and Davidson (2018) suggest may be related to extensive advertising campaigns meant to illustrate the potential of brain training to maintain or enhance positive functioning (Farah, 2015). Older adults in particular seem to be optimistic about brain training (Rabipour and Davidson, 2015), and it may be that curiosity is part of what drives this interest in and optimism about brain training. Perhaps some older adults are more susceptible to the messaging in these advertisements in the real world due to their interest in cognitive health (though reminding older people of their declining abilities could induce stereotype threat, as discussed below). A younger person’s curiosity might not be especially piqued when an advertisement asserts that a given product can help users remember where they put their glasses, but older adults may find this interesting, may direct more attentional resources toward that information, and may therefore be more optimistic about and perhaps more likely to remember that information. Future research can examine whether curiosity about how the brain works is piqued in such advertisements as those touting the “science of neuroplasticity,” and whether curiosity (about how memory works, for example) is a driving factor in purchasing a subscription.

While evidence supporting far transfer and long-term benefits from brain training is not very convincing, there is some evidence to suggest that engaging in the learning of challenging skills might be an effective way to stay sharp in older age. For example, Park and colleagues (2014) designed an intervention to improve cognitive functioning in older adults in which participants either received intensive training in a new domain (photography, quilting, or both) or were in a control

group where activities included things like watching documentaries, playing word games, and participating in social activities. Learning a new skill (e.g., photography) was considered cognitively demanding, because it required learning not only new physical and motor skills like operating a camera or working a sewing machine, but also learning the software required for photo editing or understanding how to weave together complex patterns for quilt making.

Park and colleagues found that those in the training conditions showed greater improvement on cognitive assessments compared to controls, particularly in speed of processing and episodic memory. Other work has found similar improvements in older adults who learn a new language (Schroeder and Marian, 2012) or learn to use new technology, such as an Apple iPad (Chan, Haber, Drew, and Park, 2016), suggesting that engaging in mentally challenging activities in older age may be an effective way to improve memory. Like brain training, the extent of the effects from this type of skill learning is still unknown, such as how long the benefits last or whether improvements apply to everyday situations like remembering where one left their keys. In addition, engaging in these activities did not produce widespread improvements in all cognitive abilities, and complex skill learning may not in itself be more effective than computerized brain-training games. However, pursuing new hobbies such as photography and quilting might be more likely to be continued long-term and on a regular basis if participants are actually interested in them, thus potentially fostering greater long-term benefits. Participating in hobbies and other skill learning could also encourage older adults to engage in other behaviors that are known to improve memory and cognitive functioning, such as exercising or social activities. For example, an interest in photography might encourage more nature walks to take pictures or one might want to find others who are also interested in photography. In this way, more realistic behavior-based methods to improve cognitive functioning might be a more viable way to stay sharp than brain-training games that encourage people to spend more time on their computers or phones.

A Potential Pitfall of Curiosity and Interest

While curiosity may be a protective factor in cognitive aging (Sakaki et al., 2018), it could also shed light on a common problem among older adults. With aging comes an increased risk of financial exploitation (James, Boyle, and Bennett, 2014): Previous work has found that of older adults surveyed, 4.5 percent reported being defrauded in the past five years (Lichtenberg, Stickney, and Paulson, 2013). Those who are psychologically vulnerable—for example, those with diagnoses of depression or mild cognitive impairment—may be at even higher risk of financial victimization (Han, Boyle, James, Yu, and Bennett, 2015; Lichtenberg et al., 2013). Established frameworks include older adults' cognitive functioning as an important facet of susceptibility to exploitation (e.g., Pinsker, McFarland, and Pachana, 2010; see Shao, Zhang, Ren, Li, and Lin, 2019, for a review), such that difficulties in

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cognitive functioning are associated with greater likelihood of victimization (James et al., 2014). While greater curiosity is certainly not considered a negative aspect of aging, perhaps for an older adult who is a target in a scam, being curious or interested in learning more about the “opportunity” could actually lead to adverse effects (see also Yoon et al., 2009). For example, bogus claims about anti-aging supplements that purportedly prevent or cure various ills may pique the interest of older adults who are concerned about the negative aspects of aging (perhaps particularly if they subscribe to some negative stereotypes regarding aging discussed below).

Scams in the medical domain may be particularly harmful to older adults' physical and financial health. Many older adults take more than five medications or supplements regularly (Qato et al., 2008). Common supplements such as ginseng or Gingko bilboa, which may be considered beneficial for those who are getting older, could lead to adverse reactions when taken with other medications (Marinac, Buchinger, Godfrey, Wooten, Sun, and Willsie, 2007). As many older adults who consume such supplements reported interest in the “general health purposes” of the supplements (Marinac et al., 2007; p. 18), there are perhaps pitfalls to interest in taking steps to “ward off” specific illnesses or the aging process more generally. While the overall direction of curiosity research in cognitive aging seems to suggest that it is a beneficial and protective factor, it is also important to assess whether those who are more interested in anti-aging medicine may be more susceptible to products marketed as anti-aging but that do not actually help, and could in fact be harmful to patients, such as the victims of a fake Botox scam who lost millions of dollars (*Arizona Daily Sun*, 2005).

Risk, Gains, and Losses as Motivating Factors

When we select and pursue goals, we must make a series of decisions, some of which carry more risk than others (e.g., “should I take notes on the information my physician is giving me, or should I simply expect that I will remember the information that is important?”). The underlying processes of decision-making, particularly in light of risk, may change across the lifespan. Risk can be a powerful motivating factor: For example, the risk of losing resources, the risk of forgetting important information, and the risk of offending a social partner can all influence behavior. Some research suggests that certain types of decisions are made fairly similarly by younger and older adults (e.g., those that involve strategic thinking to understand how others make decisions; Kovalchik, Camerer, Grether, Plott, and Allman, 2005), but the introduction of risk can cause younger and older adults to behave differently.

Selective Optimization with Compensation Model

As we age, evidence suggests that we shift away from accumulating resources, and toward conserving resources and avoiding losses (Fruend, 2008). That is, instead

of pursuing goals that would allow one to gain resources, older adults pursue goals that would allow them to avoid losing resources. At its core, the selective optimization with compensation (SOC) model involves the prioritization of goals by their relevance (selection) in order to increase gains (optimization) and avoid losses (compensation; Baltes and Baltes, 1990; Freund, 2008).

Baltes' (1997) example of an individual engaging in SOC-based strategies is outlined as follows: A famous pianist, in response to a question about how he managed to maintain a high level of performance in his craft, suggested that he played fewer pieces (selection), practiced those few pieces more often (optimization), and managed the music such that the sections that needed to be played quickly seemed quicker than he was able to produce them (compensation).

To expand, selection—the first component of the theory—is based on the fact that when faced with a large number of potential actions and a limited capacity for engaging in them, individuals across the lifespan engage in a selective amount. This can be shaped by culture, such as infants who are born with the ability to recognize different sounds produced by all languages, but are shaped by exposure to focus on a certain subset necessary for communicating in whatever language(s) they learn.

Optimization, or the shift toward doing things more effectively, is also thought to be relevant across the lifespan; for example, practicing to learn a particular set of items, and engaging effortfully in learning or acquiring skills. When we choose to optimize is based largely on our goals, as we use our limited resources to pursue them. Compensation occurs when the individual is unable to pursue a given set of avenues, but uses other strategies to maintain success in a given domain (e.g., using external aids such as lists to remember activities that need to be done). This compensation can be engaged in response to a lack of available resources, a change in context, or a readjustment of one's goals. The process of selecting, optimizing, and compensating is thought to lead to the maximization of gains and the minimization of losses (gains and losses are dependent upon the developmental and environmental state of the individual), the attainment of goals, and/or the maintenance of functioning of the organism (Baltes, Staundinger, and Lindenberger, 1999).

Much of the empirical support for SOC comes from self-report studies (Freund, 2008). A set of behaviors identified as “SOC strategies” tend to decline in frequency of use across the lifespan, but using these strategies into old age is related to positive outcomes (Freund, 2008). SOC-related behaviors have been found to correlate with a number of indicators of successful aging, including satisfaction with age, lack of agitation, absence of loneliness, and positive emotions (Freund and Baltes, 1998). Perhaps the adaptive shifts that occur with age are at least partly a result of an increasing awareness of and ability to effectively deal with physical and cognitive decline associated with normal (non-pathological) aging.

The SOC model has been used to explain findings from memory studies, in which older adults show lower performance overall but relatively accurate

memory for information that is important, valuable, or meaningful. For example, when asked to remember words paired with varying point values, older adults remember fewer words than younger adults, but often remember the highest value words in order to optimize their score (Castel, 2008; Castel, McGillivray, and Friedman, 2012). This reflects an SOC-based strategy in which to compensate for declines in capacity, older adults select the most important or valuable information to remember in order to optimize the outcome (i.e., point score).

Risk-Aversion in Older Adulthood?

Laboratory-based tasks that measure participants' decision-making and willingness to risk money suggest that, as we age, we act in ways that reduce risk (Deakin, Aitken, Robbins, and Sahakian, 2004; cf. Dror, Katona, and Mungur, 1998; but see Kovalchik, Camerer, Grether, Plott, and Allman, 2005; MacPherson, Phillips, and Della Sala, 2002). As discussed in this chapter, there is also a common stereotype that older adults are cautious (Okun, 1976). However, the evidence supporting the notion that older adults are risk-avoidant is mixed (see Mather, 2006). Real-world financial decisions often have potential for gains and losses, such as deciding whether to pursue an investment strategy that is risky versus one that is more conservative. Some studies indicate that risk-seeking behavior with one's own investments increases into older age but starts to decrease after approximately 65 years of age (Knoll, 2010; Schooley and Worden, 1999), while in another study, the older employees of financial organizations made riskier decisions than the younger employees (Brouthers, Brouthers, and Werner, 2000).

Castel and colleagues (2016) examined how important financial information—in this case, being owed or owing others varying amounts of money—may affect learning. They found that the more money an individual owed the participant, the more likely that both younger and older participants would remember how much that individual owed. The risk of losing resources that would be associated with forgetting who owes one a fairly large sum of money can be a strong motivating factor for younger and older people, and cognitive resources seem to be allocated accordingly to avoid this risk. Older adults seem to be especially focused on remembering who owes them money (gains), but less likely to remember people to whom they owe money (losses), suggesting a difference in approach to remembering gains and losses relative to younger adults (see also Freund, 2008). These age-related differences can have implications regarding how older adults remember information related to financial decisions and investments (Benartzi and Castel, 2016).

In addition, the risk of forgetting (in some sense, *losing*) important information may lead us to depend on external sources (such as a calendar, a to-do list, or smartphone application) to do the remembering for us. What we offload onto such external sources is influenced by our awareness of how our own cognitive system works (Risko and Gilbert, 2016). Saving some information to a digital

device, for example, could give people the opportunity to reallocate cognitive resources toward other information; when participants are told to forget an initial list of items, their memory is enhanced for a second list of items (Bjork and Woodward, 1973). Indeed, more recent work has shown that saving information to a computer enhances memory for information presented later (Storm and Stone, 2015). In fact, Hamilton and Benjamin (2019) suggest that a learner's off-loading mechanism could be considered as an "extended organism" (p. 40). Using computers to save information can allow people to direct elsewhere the cognitive resources that would have been spent remembering. However, this kind of cognitive offloading may be associated with a cost: For example, saving valuable information to an untrustworthy source could lead to detrimental outcomes if that information is lost.

Using a digital device to offload is an interesting area of study among aging consumers, as there is thought to be a "digital divide" (p. 253) between younger and older adults (Charness and Boot, 2009). Stereotypes of older adults as incapable of using current-day technology are common (Broady, Chan, and Caputi, 2010), and older adults have been found to be less confident in their computer-related knowledge than younger adults are (Marquie, Jourdan-Boddaert, and Huet, 2002). While some older adults report experiencing negative outcomes associated with technology use, such as inconveniences and security issues, many older adults report more positive than negative outcomes (Mitzer et al., 2010). Perhaps decisions about how to use a digital device as a supplement to human memory is affected by both the characteristics of the participants (e.g., age, interest and confidence in using technology) as well as characteristics of the offloading device (e.g., the trustworthiness of the source, and whether it is designed in a way that is accessible to those with changes in visual or auditory acuity).

Stereotype Threat and Anxiety as Motivating Factors

As discussed above, the aging process is not all downhill—but it is often perceived to be (Levy, 2009). Stereotypes of older adults are often negative; for example, that they are unhappy, cognitively impaired, risk-avoidant, incompetent, and poor drivers (Chasteen, 2000; Coudin and Alexopolous, 2010; Cuddy, Norton, and Fiske, 2005; Lambert, Watson, Stefanucci, Ward, Bakdash, and Strayer, 2016; Okun, 1976). Younger individuals often hold these views about aging, but, importantly, stereotypes about aging can also be internalized and endorsed by older adults themselves (Kruse and Schmitt, 2006; Levy, 2009) and the people who care for them (e.g., Bleijenbergh, 2012; Cowan, Fitzpatrick, Roberts, and While, 2004; Topaz and Doron, 2013).

Stereotype threat can occur when an individual is placed in an environment that may activate their negative stereotypes about the group to which they belong (e.g., an older adult's stereotypes about older adults), and this threat can impair performance on a number of tasks (e.g., driving, Lambert et al., 2016; see Barber,

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2017 for a review). Of particular interest is how stereotype threat may impact older adults' memory performance, as forgetfulness is a pervasive age-related stereotype held by many, including older adults (Lineweaver and Hertzog, 1998; see also Beaudoin and Desrichard, 2011; Diehl and Wahl, 2009). Several studies indicate that conditions of stereotype threat lead to older adults' decreased cognitive performance on cognitive tasks, as compared to those who were not put under conditions of stereotype threat (Chasteen, Bhattacharayya, Horhota, Tam, and Hasher, 2005; Lemaire, Brun, and Régner, 2018; Nicolas, Lemaire, and Régner, 2019; see also Wong and Gallo, 2018).

Stereotype threat and anxiety about age-related deficits can detrimentally affect older adults' performance on cognitive tasks. However, such factors can also be considered as motivating cognition, similar to but different from factors such as socioemotional relevance and curiosity explored above. While relationship building and curiosity may drive older adults to pursue particular cognitive goals such as learning new information, stereotype threat and anxiety may influence goal pursuit in a negative way, such that certain activities are avoided or goals are modified to avoid reflecting age-related stereotypes. These factors influence younger and older adults differently, and these differences can have an impact on decision-making across the lifespan.

Some products use advertising to capitalize on the stereotype of older adults as forgetful. Advertisements for products that claim to treat memory loss, for example, may feature older people speaking about their use of this product and how it improved their forgetfulness. If an older adult who is susceptible to stereotype threat views advertisements like this, their discomfort about being perceived as incompetent and forgetful may influence them to purchase said item.

Some work suggests that the framing of a task can influence the effect of stereotype threat. Specifically, older adults tend to perform more accurately under conditions of stereotype threat when they are oriented to focus on preventing losses, as opposed to when they are oriented to maximize gains (Barber and Mather, 2013b; Barber, Mather, and Gatz, 2015). Older adults operating under stereotype threat may adopt a loss prevention strategy, which may actually improve motivation and performance on a task. Thus, if older adults do feel concern about their cognitive abilities, perhaps framing messaging to older consumers around loss prevention may decrease the impact of cognitive deficits associated with memory or decision-making.

Conclusion

Motivation, memory, and decision-making change across the lifespan. Many of these changes can be explained by peoples' priorities shifting from knowledge gathering in younger adulthood to relationship building in older adulthood (e.g., Carstensen et al., 1999); perhaps this explanation is compatible with a shift from primary to secondary control (e.g., Heckhausen and Schulz, 1995), or with a focus

on avoiding losses (e.g., Freund, 2008). While overall curiosity may decrease with older age, it is still a powerful motivator of older adults' behavior and may even be a protective factor in old age (Sakaki et al., 2018). Brain training, for example, is a specific (and popular) way in which curiosity about how the brain works can be piqued, though being highly motivated to pursue information about anti-aging supplements may put older adults at risk for health issues or fraud. Variety-seeking behaviors tend to decrease as people get older, but older adults may focus their time, efforts, and cognitive abilities on behaviors that satisfy social and emotional goals rather than including variety for the sake of it. Age also affects perception of gains and losses. People across the lifespan may save important information to a computer or a smartphone application, but how and why we use such external offloading technologies may be affected by cognitive aging, memory abilities, and our perceptions about our own learning and about digital technology. Finally, emotional factors such as anxiety and stereotype threat can influence older adults' behavior, including their memory for information and their perceptions about products. Due to a focus on positive information, older adults may also be targets for financial fraud and scams, and future research and interventions are needed to address this growing concern.

In this chapter, we sought to investigate circumstances under which younger and older adults' behavior may differ with respect to motivated cognition. Future work may examine how different theories of motivation in cognitive aging may explain different facets of consumer behavior. In addition to socioemotional selectivity theory, lifespan theory of control, and selective optimization with compensation theory, we can also assess how value-directed remembering and selectivity affect motivation to learn and make decisions across the adult lifespan. While many older adults experience memory decline and possible onset of dementia, healthy older adults can use motivated cognition and continued curiosity to enhance cognitive function and maintain independence in older age.

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