

# A Model of Creative Aging (MOCA): Unlocking the Potential of Constraints for Creativity in Older Adults

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This article is motivated by two apparent paradoxes. The first concerns the relationship between constraints and creativity: despite the pervasive myth of the freedom to create, constraints have been shown to benefit creativity. The second paradox concerns the relationship between creativity and aging: despite a general decline associated with getting older, advanced age offers key advantages for creativity, such as increased knowledge and time availability. We propose that these two paradoxes are related. An analysis of the complex role of constraints in creativity, as the first paradox invites us to develop, provides valuable insights for the second apparent paradox. Our Model of Creative Aging (MOCA) advances the idea that creativity in older age depends on individual and sociocultural attitudes toward creativity and aging, on the framing of constraints as exclusionary (cannot do *x*) or focusing (should do *y*), and on creative expertise. The model's contributions include specific predictions as well as practical implications for promoting focusing constraints for creativity in aging adults.

**Keywords:** creativity, aging, exclusionary and focusing constraints, paradox, creative expertise

The topic of successful aging is increasingly relevant. Older persons are a rapidly growing demographic group. In the United States, the 65-and-older population has increased by over a third during the past decade (United States Census Bureau, 2020a); and projections estimate this segment of the population will almost double in size by the year 2060, when adults aged 65 and over will represent nearly a quarter of the U.S. population (United States Census Bureau, 2020b). Worldwide, a similar growth pattern is expected, with the number of older persons doubling to 1.5 billion in 2050, when one in six people will be aged 65 or older (United Nations, 2019).

Creativity has been shown to benefit successful aging (e.g., Fisher & Specht, 1999), and may act as a protective factor (e.g., Cohen, 2006; Roberts et al., 2015). Still, the relationship between creativity, at both the Big-C and little-c levels, and aging is yet to be fully elucidated. On the one hand, advanced age offers increased knowledge and time availability, which are prized requirements for creative activities. Indeed, anecdotes about highly creative older adults abound (e.g., Gogol, 2018). For example, artists such as Matisse and Grandma Moses have created masterpieces late in their lives. On the other hand, some studies suggest that creativity, as measured by performance on divergent thinking tasks, declines with age, starting around the age of 40 (McCrae et al., 1987), although the magnitude of this change may be small

(Cornelius & Caspi, 1987) and may not map onto real-world creativity such as scientific productivity in academe (e.g., Stroebe, 2010). Much of the existing literature on creativity and aging has correlated this decline with a decrease in some cognitive functions (for an overview, see Harada et al., 2013; Salthouse, 2019), such as cognitive flexibility (Gopnik et al., 2017), fluid cognitive abilities including processing speed (Salthouse, 2012), selective and divided attention (e.g., Carlson et al., 1995; Darowski et al., 2008), and short-term memory (STM; Craik, 1994). However, at the cross-sectional level, these cognitive abilities exhibit minimal if any correlations with creative productivity.

Building on extant research, we propose a model based on the role of constraints in both creativity and aging. We describe creative aging as the successful management and leveraging of constraints, a key component of which is attitudinal and another of which is related to practice. We then connect this idea with research from cognitive, social, and organizational psychology that shows constraints can benefit creativity. The model we advance suggests several testable hypotheses and principles based on individual and sociocultural attitudes toward constraints, creativity, and aging. This descriptive part of the article is complemented by a prescriptive part, in which we propose real-world interventions and applications of our model.

This connection among creativity, constraints, and aging has not been explicitly addressed or formalized. However, the sub-topics of (a) constraints and creativity, and (b) creativity and aging, have received significant empirical attention. Therefore, we begin by reviewing advances in each of these areas. We then integrate the existing findings into a proposed model that we hope will provide both a sound theoretical foundation and useful practical applications.

This article was published Online First January 12, 2023.

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## Creativity and Constraints

Creativity remains a complex area of study. Within it, a growing body of research has explored the intriguing and seemingly counterintuitive possibility that constraints, rather than lack thereof, might facilitate creativity. Evidence from different domains, including creative writing (e.g., Haught, 2015; Haught-Tromp, 2017), business (Medeiros et al., 2014), engineering (e.g., Onarheim, 2012), dance (e.g., Torrents Martín et al., 2015), art (Stokes, 2001, 2008) and design (e.g., Biskjaer & Halskov, 2014; Bonnardel, 2010, 2012) suggests that constraints can indeed have beneficial effects on creative outcomes (see also Haught-Tromp, 2016a, 2016b; Sternberg & Kaufman, 2010). For example, when participants had to generate creative greeting card messages such as *Happy Birthday*, *Thank You*, and *Feel Better*, their messages were more creative when they had to include a given word, such as *carrot* or *vest*, than when they did not have such constraints (Haught-Tromp, 2017). A second finding showed a carry-over effect: mere practice with constraints facilitated creativity in a subsequent writing task, which suggests that experimentation with diverse constraints may benefit creative outcomes.

Although constraints can indeed enhance creativity, findings have not been unequivocal, as a recent review (Acar et al., 2019) and meta-analysis (Damadzic et al., 2022) concluded. While the meta-analysis documented a significant positive relationship between creativity and constraints (Damadzic et al., 2022), the review, more narrowly focused on the management literature, found no such clear overall pattern, and proposed that the relationship between constraints is not linear, but rather inverted U-shaped (Acar et al., 2019). In other words, creativity might thrive best under a moderate level of constraints: not too many nor too few. Another proposal, that captures Damadzic et al.'s (2022) emphasis on the role of moderators, is that the relationship is too complex to be captured by main effects alone, and is better described as an interaction among the constraint(s), the person, the task, and the situation (Tromp & Sternberg, 2022). While some constraints, including extreme ones such as imprisonment, may stifle creativity in some individuals engaged in some tasks, the same constraints may have the opposite effect, enhancing creativity in other individuals, as examples such as prison art suggest. Moreover, although no particular constraint or type of constraint can predict creative outcomes, some taxonomies of constraints that have largely been overlooked can provide more insight into how they are processed and affect creative performance in the context of the proposed interaction.

A critical distinction that bears relevance to the present article and that was proposed as part of the Integrated Constraints in Creativity (IConIC) model (Tromp, 2022a, 2022b) is between the two complementary functions of constraints—exclusionary (avoid *x*) and focusing (use *y*). The exclusionary function is framed by a negation: Do not include *X*. For example, in 2021, New Zealand's tourism agency urged tourists to avoid taking clichéd photographs, such as the “summit spreadeagle” at famous hotspots. This particular exclusionary constraint by itself directs the photographing focus away from something, but not toward anything in particular. As part of the same advertising campaign, tourists were encouraged to explore instead other, less publicized, and more representative national experiences, such as New Zealand's wineries. By contrast with the exclusionary function, this focusing function of constraints is framed by a positive and directive statement: One

should include (photograph) *Y*. As another example, members of the avant-garde European movement *Arte Povera* (“Poor Art”) used everyday materials such as pieces of fabric, paper, and rocks, to create intriguing works of art. Focusing constraints, therefore, point in a particular direction and provide an area of exploration as a starting point and, in the most fortuitous cases, an inspiration trigger (e.g., Finke et al., 1992). At a broad level of analysis, the very fact that creative achievement is often domain-specific (Baer, 1998, 2016) also illustrates the prominent role of constraints: by focusing on a particular domain within which to acquire expertise and make creative contributions, one excludes many others.

The exclusionary and focusing functions of constraints are complementary and often work in pairs (Stokes, 2006): the focusing function eliminates other possible foci, and the exclusionary function must be complemented by a focusing one. However, how a constraint is initially framed can affect its appraisal, processing, and the creativity of the ensuing product. While the exclusionary function is more likely to be viewed as a deterrent and to lower creative motivation, the focusing function is more likely to be perceived as a challenge and to enhance creative motivation (Tromp, 2022a). In terms of processing, exclusionary frames elicit a flexible exploration of alternatives across an unspecified search space, whereas focusing frames elicit a targeted search of a specified area of the search space. For example, Japanese chef and food carving artist Takehiro Kishimoto does not create his art from standard materials, which represents a clear exclusionary constraint. Instead, he uses the focusing constraints of Japanese motifs combined with those of the shape, texture, color, and oxidation rates (which impact available time) of different fruits and vegetables to create veritable design masterpieces (Wong, 2020).

## Creativity and Aging

Originality, as assessed via measures of divergent thinking, has been shown to decline starting around the age of 40 (McCrae et al., 1987). One reason for this decline is that response inhibition, which is required when producing a novel rather than an automatic response, appears to also be negatively affected by aging (Wecker et al., 2000). Another reason may be the nature of the divergent thinking/creative potential tasks that are frequently used to assess creativity, and that aim to isolate one supposed function from the bigger context of human activity. More real-life-based testing might yield different findings. Indeed, content analyses of actual creative products generated over the course of a creator's career reveal a general tendency in the opposite direction, that is, for originality to increase (Simonton, 2015).

In contrast with the evidence of a decline in originality, anecdotes about highly creative older adults abound. For example, artist Matisse created evocative art late in his life, Grandma Moses did not begin painting until she was in her 70s, and scientist John Goodenough coinvented the lithium-ion battery at age 57 and filed a patent application on a new, potentially revolutionary, type of battery at age 92. While studies of large samples of eminent creators in a diversity of domains show that the norm is for “Big C” creative peaks to be reached much earlier, most often before age 50 (e.g., Simonton, 1988, 1997), it is also clear and important to point out that creativity, both of the little-*c* and Big-*C* varieties, is possible in old age. Moreover, as we argue in the article, creativity later in life should be more prevalent than it currently is.

Inquiries into the neural basis of creative ability over the life span reveal that older adults appear to engage in greater functional coupling of the default and executive networks, a characteristic that is positively correlated with creative cognition (Adnan et al., 2019). This default–executive coupling suggests a greater contribution of prior knowledge to creativity in older compared to younger adults (e.g., Meyer & Pollard, 2006). Indeed, in cognitively healthy older adults, retention of information that is successfully learned is preserved (Whiting & Smith, 1997) and vocabulary is either stable or improves over time (Park & Reuter-Lorenz, 2009). Similarly, research on the processes underlying reading suggests older adults rely more on top-down processing, which depends on the activation and use of prior knowledge, compared to a “youthful” style that is more focused on bottom-up processing and learning; a hybrid, “mature” style is characterized by a balance between seeking new information and using existing knowledge (Burke et al., 2000; Sinnott, 1989; Thornton & Light, 2006).

According to the lifestyle-cognition hypothesis, age-related cognitive decline (Marioni et al., 2012) and dementia (e.g., Fratiglioni et al., 2004) may be prevented by an active lifestyle and participation in certain activities. Among such activities are creative pursuits, which may represent a key element for successful cognitive aging, along with building cognitive reserve and engaging in cognitive retraining. A critical aspect of pursuing creativity later in life is tapping into the novelty of old age, which is inherent in all the associated changes. Another critical, often overlooked element of engagement in creative endeavors is that “for both middle-aged and older adults, receiving recognition from others for their creative hobby may provide a greater buffer to depression than do age and self-perceived creativity” (Israel et al., 2020). As such, it is not engagement in creative activity alone that matters, but the fact that this activity has a social element to it and invites the perspective of others (e.g., Dunphy et al., 2019; Keisari et al., 2020). Social recognition contributes in this regard to strengthening one’s creative identity (Glăveanu & Tanggaard, 2014) and the sense of meaning in life (Kaufman, 2018).

### A Model of Creative Aging (MOCA)

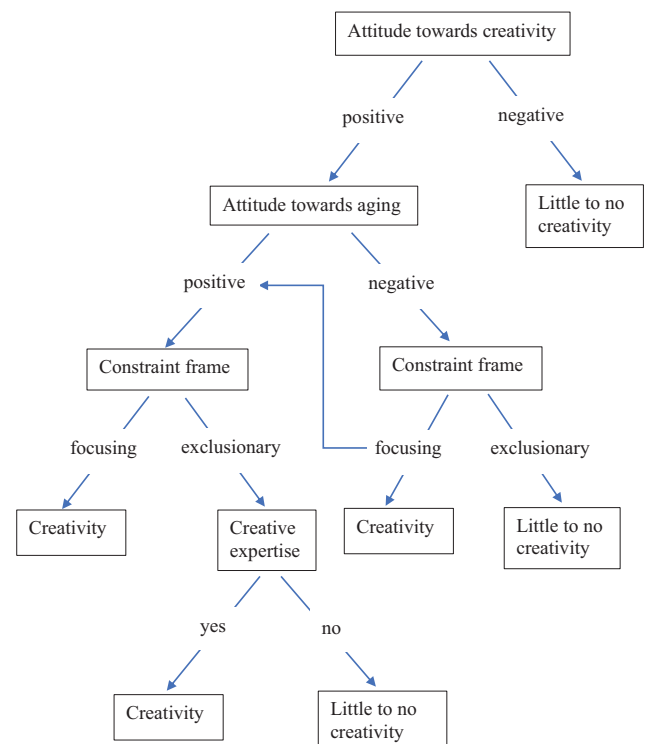
The normal aging process is associated with changes in several areas, including physical (e.g., reduced mobility, health issues), cognitive (e.g., cognitive flexibility, working memory capacity) and social (e.g., social roles, types of social relations). On many of these fronts the changes entail a decline or loss of some sort or another (e.g., reduced mobility, lower processing speed). The traditional image of a general decline associated with aging includes decreases in STM, mental speed, fluid reasoning, and originality (Der et al., 2010; McCrae et al., 1987; Pertzov et al., 2015; Ritchie et al., 2014). Learners become less flexible with age, as evidenced by their tendency to prefer a familiar hypothesis over an unfamiliar one, even though the latter is more consistent with new evidence (Gopnik et al., 2017). Older adults also appear to have decreased mentalizing ability, which is the ability to infer the mental states of others (e.g., Moran et al., 2012); and lower levels of abstraction (Wecker et al., 2005) and mental flexibility (Oosterman et al., 2010).

However, two important points qualify the above-mentioned declines. First, aging is a highly heterogeneous process (Baltes &

Smith, 2003). Second, not all the aging-related changes are negative (e.g., Shilo-Levin et al., 2021). For example, the accumulation of knowledge and life experiences translate in increased vocabulary, social capital, and time available. Many older adults remain or become creative in old age. For example, in the domain of painting, renowned artists have created masterpieces in their late stages of life and while suffering from severe limitations including macular degeneration (Georgia O’Keefe), depression (Salvador Dalí), immobility (Henri Matisse), rheumatoid arthritis (Pierre-Auguste Renoir), and Alzheimer’s dementia (Willem de Kooning; Gogol, 2018). Whether or not such creative accomplishments may be the exception rather than the norm for this age group, an important question is: how are such individuals able to maintain their creativity and perhaps even find new sources of inspiration from their age-related constraints?

The model we advance (see Figure 1) proposes an answer to this question: creativity in older age depends on one’s attitude toward creativity and one’s attitude toward aging as well as one’s creativity experience, which, in turn, affects appraisals of constraints. A positive attitude toward creativity represents a prerequisite for engaging in intentional acts of creativity (given the fact that, sometimes, people can be creative without being aware of it; Kaufman & Glăveanu, 2022) and, ultimately, recognizing one’s own creative outcomes (and, at times, being able to commercialize them, as the story the invention of the Pelton water wheel demonstrates; see Constant, 1978). This kind of positive attitude is associated with increased motivation to engage in creative activities and produce creative outcomes. Attitudes toward aging affect

**Figure 1**  
*Model of Creative Aging (MOCA)*



*Note.* See the online article for the color version of this figure.



creativity via appraisals of the role of constraints. A positive attitude toward aging encompasses a positive view toward constraints and an awareness that the exclusionary function of constraints is complemented by a focusing function. This allows older individuals to find new sources of inspiration from their age-related constraints. A negative attitude toward aging reflects a negative view toward constraints and a lack of awareness that their exclusionary function is complemented by a focusing one. When the focusing function of constraints is explicitly highlighted or following training in the reframing of constraints for creative benefits, older adults with a negative view toward aging are likely to pursue creativity. This, in turn, can shift attitudes toward aging from negative to positive. Additionally, creativity experience can override possible deterring effects of exclusionary frames to allow for the possibility of creativity. The reason for this proposal is that individuals with significant creativity experience are likely to develop a constraint mindset (Tromp, 2022a), and are more likely to leverage the potential of constraints, regardless of how they are framed.

Most of the research on creativity and aging to date has focused on the role of abilities. As many cognitive functions tend to decline somewhat with age, then so too should creativity. While abilities are, without a doubt, important, the documented decline in some cognitive functions does not explain why some individuals display creativity well into old age. While it might be the case that old age creators didn't experience significant cognitive decline, we argue that, for a deeper understanding of the relationship between aging and creativity, attitudinal variables must also be taken into account. We propose that attitudes toward creativity and aging play an important role and may in fact have significant explanatory power for the question of why some older adults pursue creativity and others do not.

Below we expand on each of the steps that form the sequence of our proposed decision tree, and we advance specific hypotheses. We first outline why a positive attitude toward creativity is needed for engagement in creative activities, and what individual and sociocultural factors contribute to this attitude. Next, we consider the role of attitudes toward aging, which are also influenced by individual and sociocultural variables. Then we describe how the framing of constraints, as exclusionary or focusing, affects creativity, and we highlight the critical role of past creativity experience in how individuals respond to exclusionary constraints, which are numerous in advanced age.

## Attitudes Toward Creativity

Attitudes play a key role in whether and the extent to which older adults engage in creative activities. Today, there is a growing literature on the role played by creativity self-beliefs in creative performance (see Karwowski & Kaufman, 2017). The former range from creative mindsets and creative self-efficacy to creative forms of identity. These variables have to do with the concept of creativity individuals hold and the way they apply it to themselves with positive or negative consequences. Attitudes also correspond to this dynamic being largely understood as evaluative positions adopted toward specific people, objects, or events (Friedkin, 2010). While attitudes toward creativity have been relatively less studied, compared to topics such as lay conceptions of creativity or creative self-efficacy, they are a necessary (but not sufficient) condition for engaging in creative practice. This is because, without an appreciation of creative work, there is arguably little

incentive to actually spend considerable time and effort trying to achieve creative goals. At the same time, as briefly mentioned above, it is conceivable that some people lack a clear or necessarily positive attitude toward creativity and yet display creativity, at least in how it is perceived by others (the example of lacking awareness in the CASE model proposed by Kaufman & Glăveanu, 2022); it is harder to imagine, however, the case of having an explicitly negative attitude toward creativity and still performing creatively (unless the attitude refers to the use of the word itself and not the meaning behind it). Therefore, our first prediction is:

*Hypothesis 1: Explicit negative attitudes towards creativity are negatively correlated with actual creativity.*

Another important aspect to consider is that, while attitudes toward creativity are individual-level constructs, they fundamentally depend on sociocultural norms and values (e.g., Ross & Vallée-Tourangeau, 2018). As the planned behavior theory of attitudes notes, understanding whether others would approve or disapprove is an integral part in the relation between attitude and behavior (Armitage & Christian, 2003). More discursive approaches also stress the fact that attitudes are necessarily connected to broader, culturally defined systems of discourse (Potter, 1998) and, in other words, depend on wider frames stemming from one's community and society.

Attitudes toward creativity in particular have a strong cultural basis, because creativity as a process both depends on and contributes to culture (see Glăveanu, 2011, 2020). This makes it an important topic of discussion and debate in most societies, particularly within Western countries in which the figure of the creative individual is popular even if intrinsically ambivalent. On the one hand, creative people in a variety of fields—from art and design to science and discovery—are admired for their capacity and the generally positive impact they have on society as a whole. On the other hand, there is also resistance to novelty and radical innovation that can make creators controversial and not always easy to understand. Positive and negative attitudes toward creativity have their roots in this complex imagery and they, in turn, are likely to shape how much one is tempted to be creative across the life course.

## Attitudes Toward Aging

The proposed model highlights the critical role of attitude toward aging for creativity in older adults. We argue that a negative attitude toward aging can undermine creativity in older age, even when individuals may have a positive attitude toward creativity. Corroborating evidence comes from studies that show older adults who have internalized negative age stereotypes and attitudes tend to display lower performance on both cognitive and physical tasks (Armstrong et al., 2017; Levy, 2009).

Just like attitudes toward creativity, attitudes toward aging are shaped by both individual and sociocultural elements. For example, the concept of self-ageism has recently gained prominence as part an important component of self-related views of aging in later life (Baltes & Smith, 2003; Bergman et al., 2021; Giasson et al., 2017; Kleinspehn-Ammerlahn et al., 2008; Shilo-Levin et al., 2021; Smith & Freund, 2002). At the sociocultural level, although not universal, ageist prescriptive stereotypes abound, mostly stemming from perceived and actual resource

threats, and outlining what older adults should (e.g., move aside, retire) and should not do (e.g., withhold valuable opportunities from younger generations). Even among egalitarians, that is, those who espouse egalitarian beliefs (in the form of decreased prejudice and increased advocacy) for racial minorities and women, more prejudice is documented toward older adults relative to other discriminated groups, as are decisions to allocate fewer resources (Martin & North, 2022). These effects are mediated by beliefs that older adults block access to resources for other underrepresented groups (Martin & North, 2022), in line with so-called succession-based ageism that prescribes retirement and more generally stepping aside in order to render sought-after opportunities available for younger generations (North & Fiske, 2015).

Negative, ageism-related cues from society can be expected to contribute to decreased motivation to engage in creative activities, and make creativity especially challenging in older age. In other words, they provide additional attitudinal hurdles to overcome when individuals pursue creative tasks. For example, targeted ads for older individuals undermine motivation to engage in creative activities and to make significant creative contributions, compared with increased emphasis and reinforcement from society of achievement in young individuals, for example, ubiquitous lists of “30-under-30” and even “Most Influential Teens” (*Time Magazine*).

Not all stereotypes related to aging are negative. On the two critical dimensions of social perceptions of groups, namely competence (e.g., intelligence, skillfulness, independence) and warmth (e.g., kindness, trustworthiness, and friendliness), the older adults are perceived as less competent but warmer than younger adults (Fiske et al., 2002).

There is a strong cultural basis for both positive and negative age-related stereotypes. It is widely assumed that the youth-oriented culture present in many Western countries leads to prejudice and discrimination against the elderly. In contrast, collectivist cultures like those in East and South-East Asia tend to have a more deferential attitude toward older people and place them in positions of power or authority. However, empirical research doesn't always confirm this distinction. Luo et al. (2013), for example, studies the attitudes toward aging and old age in both Chinese and American college students. They found, surprisingly, that Chinese students have more negative attitudes toward older people than their peers from the United States and, across both groups, that female students held more positive than male students. This is explained by the authors based on educational, social, and economic factors, including age segregation and a lack of gerontological-oriented curriculum in China.

Instead of operating with a predetermined assumption about how people behave toward the elderly in different cultural spaces—that, themselves, are much more diverse than the unitary image we attribute them following national or geographical boundaries—we should perhaps focus more on the kinds of capital older individuals have available to them in specific contexts (Bourdieu, 1986). These range from financial to social and symbolic capital and their presence or absence can make a big difference on whether older people are viewed (and view themselves) positively or negatively. The presence of one or more forms of capital increases one's status, including the chance that any creative outcomes get to be recognized in society. Therefore, our second prediction is as follows:

*Hypothesis 2: Explicit negative attitudes towards aging are negatively correlated with actual creativity.*

## The Framing of Constraints

Many of the constraints in the lives of older adults are heavily exclusionary. Such exclusionary frames are less informative and can also be less creatively motivating than focusing frames because they only point away from something, rather than toward something (Tromp, 2022a). In the context of aging, a constraint such as limited mobility has an obvious exclusionary function (things one can no longer do as a result of an impairment). However, the same constraint also has a focusing counterpart (things that one can do within the limits imposed by the impairment). Once this focusing function is identified and leveraged for creative purposes, creative outcomes can emerge.

Consider, for example, a hand tremor, a physical constraint with a clear exclusionary function: It prevents someone from performing some motor tasks with the same level of accuracy. While the constraint excludes some activities, it also has a focusing function, which introduces new creative possibilities. For example, artist Phil Hansen (2013), who developed a hand tremor after years of pointillism, chose to work with this new constraint and “embrace the shake.” As a result of exploring its focusing aspect, he invented new art forms, including fragmented images, inspired by his physical constraint. As another example, photographer Jacqui Kenny identified a focusing function of her debilitating disorder, agoraphobia (a constraint with a clear exclusionary function), and produced creative photographs by “traveling” the world from the confines of her home, using Google's Street View (Den Hoed, 2017).

Negative cues from society make the exclusionary function of constraints more salient, that is, they emphasize things that one can no longer do. For example, whenever commercials target older adults, they tend to highlight a focusing function that directs attention toward leisurely or consumption-related activities rather than challenging, creative ones. Older individuals who have internalized negative age stereotypes and attitudes tend to display lower performance on both cognitive and physical tasks (Armstrong et al., 2017; Levy, 2009). This analysis yields the following predictions:

*Hypothesis 3: Exclusionary constraint frames make creativity less likely than focusing ones.*

*Hypothesis 4: Focusing constraint frames can mediate the effects of negative attitudes towards aging on creativity, thus yielding creativity.*

## The Role of Creative Expertise

We define here creative expertise as the engagement in the production rather than mere consumption of creative outcomes. Consider, for example, the distinction between activities such as (a) reading, visiting museums, attending concerts, and using new technologies, and (b) writing, painting, composing, and generating technological innovations. The former type of activities illustrates a more passive “consumption” of creativity (see, e.g., work on receptive arts engagement, Tymoszuk, Perkins, Fancourt, & Williamon, 2020; Tymoszuk, Perkins, Spiro, et al., 2020), while the latter type

illustrates a more active engagement that results in the “production” of creativity. While the consumption component may include interpreting the creativity of others, which can have itself a creative quality (Glăveanu, 2011), we argue that in order for the connection between constraints and creativity to be fully activated, creative expertise as defined here must also entail engagement in the production of creative outcomes. Such creative experiences can encompass different levels, from the everyday to the Big-C type of creativity (e.g., Lebeda & Csikszentmihalyi, 2017) and different domains.

Many older individuals may be “denied” a more active role in creative production for a variety of reasons. According to the CASE model (Kaufman & Glăveanu, 2022), they could miss the kinds of capital needed to succeed creatively, they might not be aware of the fact that creativity is an option (especially in cultures that foster ageist stereotypes), their expression can be seen as a continuation of the creativity of others or even of their younger selves, without any major additions, and it might also be judged as lacking in exceptionality. The prevalence of one or more of these factors is based on psychological as well as sociocultural variables, with cultures in which creative expression in old age is related to quality of life (Cristini & Cesa-Bianchi, 2019) being better equipped to foster it.

We predict that when the attitude toward aging is positive and the constraint frame is exclusionary, the result can still be creativity for those individuals who have creative expertise. In other words:

*Hypothesis 5:* Creative expertise can serve as a buffer for exclusionary constraints.

The reason for this prediction is that people who have engaged in creative activities typically have an (implicit or explicit) appreciation for the role of constraints, whether they are framed as focusing or exclusionary. Indeed, such individuals are likely to have developed a constraint-leveraging mindset (Tromp, 2022a), that encompasses an awareness and ability to engage with externally imposed constraints and even experiment with self-imposed ones for creative benefits.

Those individuals who have a positive attitude toward creativity but have not pursued it, that is, do not have creative expertise (e.g., because they lacked the time or they were locked into jobs or situations that are boring or where efficiency rather than creativity is reinforced), are likely to only be aware of the exclusionary function of age-related constraints and miss out on the focusing function. Therefore, both a positive attitude toward creativity and presence of accumulated creative expertise are needed for exclusionary constraints to yield creativity.

Individuals who already have a creative mindset and have embraced creativity as a goal before old age may be more immune to ageist stereotypes and prejudice and more likely to continue to pursue creativity despite them. By contrast, individuals who have not embraced creativity as a goal before old age are more likely to be dissuaded from engaging in creative tasks by negative stereotypes related to aging, and therefore may perceive the barrier to entry to be higher.

### Steps Toward Creative Aging: Implications

Interventions that aim to strengthen creative achievements for older adults have been shown to be effective (e.g., Dunphy et al., 2019; Keisari et al., 2020; Strenziok et al., 2014). In this section, we

complement the descriptive aspect of our model, outlined above, with a prescriptive one. We do so by focusing on how each of our four proposed elements, namely, attitudes toward creativity, attitudes toward aging, framing of constraints, and creative expertise, inform targeted interventions. For each analysis, we suggest implications at both the individual and sociocultural levels.

### Cultivating a Positive Attitude Toward Creativity

Although creativity and innovation are prized across domains, attitudes toward them are not universally positive. At the societal level, efficiency or conformity are sometimes more valued than creativity. At the individual level, some people may find creativity more time-consuming or consider that acting creatively involves risks they are not willing to take. Culturally as well, different groups and communities can be “guided” toward expressing their creativity in particular domains and not others. One of the preconditions for creative achievement, in MOCA, entails developing an open, curious, and overall positive attitude toward creativity. While this in and of itself does not guarantee creative success, it remains a key belief-based predictor of creativity (Karwowski & Kaufman, 2017), including for older individuals.

### Developing a Positive Attitude Toward Aging

Just like attitudes toward creativity, attitudes toward aging have both dispositional and situational components. Dual age identity research has shown that perceptions of older generations, such as Baby Boomer, appear to be more positive than perceptions of older age groups, such as older adults, across countries with distinct cultures (Weiss & Zhang, 2020). Therefore, rendering generational rather than age stereotypes more salient may yield more positive attitudes.

Sociocultural studies offer insights into the differences concerning how aging adults are viewed in different cultures, including the age when someone is typically considered “old” (e.g., McConatha et al., 2003). For example, old age elicits more negative associations in Germany than in the United States, but Americans view themselves as “old” at a younger age than Germans (McConatha et al., 2003). There appears to be a universal, cross-cultural trend in perceptions of old age (Löckenhoff et al., 2009), a trend that impacts numerous areas of life for older adults, including their inclination to spend time on creative tasks. This can be due to the fact that being subjected to negative stereotypes and prejudice reduces self-esteem and one’s personal sense of self-efficacy (including creative self-efficacy). On the other hand, positive attitudes toward aging increase self-acceptance in older adults and can act to reduce feeling of doubt, shame, or incompetence. In this regard, the coordination between targeted individual interventions, community-based actions, and nationwide policies aimed at recognizing and encouraging creative achievements in older adults are all paramount.

### Framing Constraints as Focusing

Because constraints have both exclusionary and focusing functions (Tromp, 2022a), awareness of their complementary nature as well as experimentation with diverse constraints can promote the discovery of focusing counterparts for exclusionary constraints, including those stemming from age-related declines. At both the individual and the societal levels, the emphasis should be more on



what older adults can and should do, rather than what they cannot and should not do, especially with respect to active engagement in creative activities.

The appraisal of constraints can be framed as a challenge. For example, how might an aging artist with worsening eyesight and decreased mobility find inspiration from these exclusionary constraints? Acclaimed painter Henri Matisse's innovative technique of "painting with scissors," at the intersection of drawing, sculpture, and conventional painting, emerged as a direct result of his reduced mobility following illness in older age. He unambiguously acknowledged the creative value of such exclusionary constraints: "As I am obliged to remain often in bed because of the state of my health, [...] only what I created after the illness constitutes my real self: free, liberated" (cf. Carelli, 2014, p. 93).

### Gaining Creative Expertise

Last but not least, creative expertise fundamentally shapes creative learning (e.g., Tromp & Baer, 2022). Particularly in the case of older individuals, there are more chances for the person to have accumulated a wealth of life experience, including experiences related to creativity. The question is whether these attempts at creative expression have been valued or devalued by society and whether the person can locate and use past creative experience as a resource. Given that creativity is, beyond its impact on health and well-being, also a key process leading to value creation (Gallistl, 2021), it is to the benefit of everyone—including the elderly—to create opportunities for new creative experiences to emerge and to be integrated into lifelong "projects" to live creatively.

### Future Directions

Other factors remain to be explored. First, to what extent might a decline in creativity be attributed to an adult life consisting of repetitive, unchallenging situations? The decline in creativity may come about because people's underlying capabilities are not being challenged—they're locked into jobs or situations that are boring or where efficiency rather than creativity is reinforced.

Second, the precise relation between age and creativity is likely to depend on the domain. Some creative types—such as lyrical poets and mathematicians—tend to have early peaks and relatively rapid declines, whereas others—among them, historians and philosophers—are prone to later peaks and gradual, even negligible declines (e.g., Simonton, 1991, 1997, 2007). Moreover, while our inquiry has focused on aging from a chronological perspective, future explorations should also address its relationship with career aging and interactions with (a) consistency vs. change in the creative domain pursued in older age, and (b) variety of creative pursuits. For example, an especially fertile area of empirical scrutiny includes analyses of "late-comers" to a field, who possess advanced chronological age, but early career age, often because they have shifted their creative focus to a different domain in later life.

Related to the above, MOCA does not differentiate, in its current form, between different levels of creativity within the mini-c to Big-C range (Kaufman & Beghetto, 2009) and assumes that types of constraints and attitudes toward creativity and aging are important across this continuum. However, we do acknowledge the role of creative expertise, which can include more mundane forms of creative expression but also eminent creative achievements.

Understanding whether the impact of exclusionary constraints is different depending on the four levels specified by Kaufman and Beghetto should be the topic of future theoretical and empirical exploration.

Fourth, sociocultural differences warrant further scrutiny. Recent meta-analyses have revealed the counterintuitive finding that evaluations of older adults tend to be more negative in Eastern, collectivistic cultures than in Western, individualistic ones (North & Fiske, 2015). Recent rises in aging populations were shown to predict these negative attitudes toward elders.

Fifth, the role of technology cannot be dismissed. Nowadays, most creative forms of expression are either dependent on or mediated by the use of technology (Glăveanu et al., 2020). Given that older individuals are not "digital natives" and can have difficulties in either having access to or using specific technologies, this could impact their attitude toward creativity and the chance of accumulating more creative experience.

Sixth, it is possible that a better conceptualization of creativity in older age is as a change rather than a decline in creativity (Abra, 1989). Regularly we compare the creativity of elderly individuals, and that of children as well, with the creative achievements of adults. We need to develop ways of understanding old age creativity in its own right and on its own terms. The MOCA model hopefully makes a step in this direction by not starting from creative skills but focusing on attitudinal factors that make us reflect on how we—including aging adults themselves—consider creativity and the constraints and opportunities associated with growing old.

### Conclusion

Age is the single social category with subgroups to which we may all belong during our life span (North & Fiske, 2015). Older adults have increased knowledge and expertise and more time, on a daily basis, to potentially allocate to creativity. They also have more constraints, some of which are related, directly or indirectly, to aging. Because some kinds of constraints have been shown to facilitate creativity, the paradox of creativity and aging may be explained by the role of constraints.

The Model of Creative Aging (MOCA) we propose serves a descriptive function, by identifying individual attitudinal differences regarding constraints in older adults, and a practical function, by advancing solutions for promoting creativity in aging adults, in line with its documented benefits for overall health and quality of life. Our analysis also suggests implications at both the individual and societal levels. The mere dissemination of the model should help raise awareness of the paired nature of constraints, whose exclusionary function is complemented by a focusing one, and this knowledge alone could prove significant in facilitating engagement in creative tasks. At a broader level, nationwide policies and community-based interventions should be aimed at encouraging and reinforcing the creative achievements of older adults.

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Received April 3, 2022

Revision received June 24, 2022

Accepted October 18, 2022 ■