



Culture, Aging, Self-Continuity, and Life Satisfaction

Li-Jun Ji¹ · Faizan Imtiaz² · Yanjie Su³ · Zhiyong Zhang³ · Alexa C. Bowie¹ · Baorui Chang⁴

Accepted: 3 August 2022 / Published online: 27 September 2022
© The Author(s), under exclusive licence to Springer Nature B.V. 2022

Abstract

The present work examines how culture and age interact to influence self-continuity and life satisfaction. Specifically, we compared Canadian and Chinese young (17–26 years old) and older adults (60–88 years old) in their sense of self-continuity and life satisfaction ($N=424$). Consistent with past research, older adults reported greater self-continuity compared to their young counterparts, while cross-cultural comparisons showed that young Chinese reported greater self-continuity than young Canadians. In terms of life satisfaction, older adults again scored higher than younger adults, while cross-cultural comparisons indicated that, this time, young Canadians reported higher life satisfaction than young Chinese. Although the data were cross-sectional, indirect effects analyses showed that self-continuity mediated the effect of age on life satisfaction in both cultural groups, with the indirect effect stronger among Canadians than among Chinese. These findings highlight the importance of considering culture and age when examining psychological outcomes, and the potential of self-continuity as a mechanism to enhance overall life satisfaction.

Keywords Culture · Aging · Self-Continuity · Life Satisfaction

Most societies in today's world are aging rapidly (Ortman et al., 2014). The process of aging has traditionally been associated with declines in physical mobility, working memory, and cognitive functioning (Salthouse, 2019; Visser et al., 2002). Given these patterns, one may expect that psychological outcomes such as life satisfaction are also sure to decrease with age. However, aging is not a universally negative experience, and there is reason to believe that life satisfaction - along with other psychological outcomes - may increase across

✉ Li-Jun Ji
lijunji@queensu.ca

¹ Department of Psychology, Queen's University, Kingston, ON, Canada

² Department of Psychology, Towson University, Towson, MD, USA

³ School of Psychological and Cognitive Sciences and Beijing Key Laboratory of Behavior and Mental Health, Peking University, Beijing, China

⁴ Department of Psychology, Guangxi Normal University, Guilin, China

the adult lifespan (Baird et al., 2010; Prenda & Lachman, 2001). Further, these experiences may be shaped by the cultural context in which aging occurs. This paper aims to build on the aging literature by examining what contributes towards life satisfaction and well-being in older and younger adults. In particular, we focus on self-continuity and its potential implication on life satisfaction across Canadian and Chinese young and older adults.

1 Self-Continuity

It has been argued that the ability to mentally travel across different time periods is a distinct human characteristic (Suddendorf & Corballis, 2008). A by-product of this ability is self-continuity – the tendency to temporally extend oneself from the present to the past or future (Chandler, 1994). Self-continuity can be constructed in various ways. One approach is through emphasizing stability of the self over time (Chandler et al., 2003) while denying or trivializing changes. Another approach is by developing narratives or stories to account for change or instability while emphasizing connectedness between experiences (Becker et al., 2018; Chandler et al., 2003). People can also derive self-continuity through feelings and thoughts that connect them with their past selves (Sedikides et al., 2015).

In terms of its benefits, research has shown that a strong sense of self-continuity is associated with enhanced resilience and adaptive coping in times of duress. Specifically, Sadeh & Karniol (2012) reported that individuals who had recently lost their jobs but maintained a high sense of self-continuity fared significantly better with the adversity compared to those low in self-continuity. A strong sense of self-continuity has also been linked to decreased delinquency and more ethical behavior. For instance, Van Gelder and colleagues (2013) found that connecting to one's future self through written letters and interactions with an age-progressed digital version of the self led to decreased cheating on a subsequent quiz. In contrast to these benefits, the researchers postulated that a lack of self-continuity may lead to an enhanced desire for immediate gratification, in turn increasing unethical behavior. Indeed, previous research has reported that a lack of connection to one's future self is predictive of unethical business choices that will pay immediate dividends at the expense of potential future harm (e.g., choosing to market a profitable food product that has known health hazards; Hershfield et al., 2012). The researchers also found that low levels of future self-continuity predicted cheating, lying, and making false promises in a negotiation context, as well as the willingness to tolerate unethical negotiation tactics (e.g., bribery; misrepresentation; manipulation through feigned emotions). This literature is in line with previous work showing that self-continuity deficits are associated with a host of psychological issues including depression, suicidal ideology, borderline personality disorder, and schizophrenia (for a review, see Löckenhoff & Rutt 2017).

Self-Continuity and Aging. Research examining age differences in self-continuity is limited. In one of the few studies to pursue this endeavor, Rutt & Löckenhoff (2016) recently investigated temporal self-continuity in 91 participants who ranged in age from 18 to 92. The researchers reported that as individuals got older, they reported greater levels of self-continuity across their past, present, and future selves. Moreover, older individuals endorsed self-continuity to a greater degree compared to younger adults on more distant temporal period (e.g., 10 years from now), as opposed to closer time periods (e.g., 1 month from now).

In a subsequent review of this literature, Löckenhoff & Rutt (2017) examined evidence across explicit and implicit measures of self-continuity, and provided evidence to suggest that older adults may be more connected across distinct temporal periods compared to younger adults. For instance, studies focused on the perception of time have found that the subjective perception of events further from the present were perceived to be shorter than events in closer proximity (Kim & Zauberman, 2009), and this time compression effect appears to strengthen with age (Rutt & Löckenhoff, 2012).

Temporal orientation also shifts with age. Research indicates that older adults tend to focus more on the present compared to the past or future (Imtiaz et al., 2021). A limited sense of time remaining in life as people age may motivate older adults to enhance the present rather than focus on the past or future. Löckenhoff & Rutt (2017) propose that focusing on the present could contribute towards self-continuity by minimizing the subjective divide between the past, present and future.

Another factor that may contribute towards enhanced self-continuity is stability. Löckenhoff & Rutt (2017) noted that trait stability, as well as physical and social environment stability, increased with age. In a study conducted by Lang et al. (2013), when asked to predict future well-being, younger adults reported that their well-being would increase with age, while older adults reported that it would remain stable. Older adults also reported past and future life-satisfaction with greater accuracy, whereas younger adults tended to overestimate the degree of change. This perceived stability among older adults may foster a greater sense of connectedness between the past, present and future, contributing to greater self-continuity. After examining the extant literature on aging and self-continuity, Löckenhoff & Rutt (2017) concluded that self-continuity appears to increase from young to older adults, but more research is required in order to establish more definitive conclusions. Based on the existing literature, we predicted the following:

Hypothesis 1 Previous research has indicated that there may be a positive association between age and self-continuity (Lang et al., 2013; Löckenhoff & Rutt, 2017; Rutt & Löckenhoff, 2016). As such, we predicted that older adults would report stronger self-continuity compared to younger adults.

Self-Continuity and Culture. Culture can be defined as a set of shared values that a group of people adhere to in a given time and place (Schwartz, 2014). These values provide social groups with a framework for interacting with one another, which in turn shapes the social norms and expectations that govern their society (Hofstede, 2001), as well as the predominant thinking styles in the society (Nisbett, 2004; Ji, 2008; Ji et al., 2000; Ji et al., 2001). Research has shown that individuals from distinct cultures (e.g., North America; East-Asia) vary significantly in their worldviews across many important dimensions. For instance, North Americans generally adopt a stronger *independent* self, characterised by a strong desire for autonomy, uniqueness, and personal freedom (Markus & Kitayama, 1991). In contrast, East-Asians espouse a more interdependent self, defined by strong social connectedness and a desire to fit in with their social groups.

North American and East-Asian cultures also vary in *conservatism* (i.e., focus on maintaining the status quo and upholding tradition) versus *intellectual* (i.e., allowing curiosity to guide intellectual endeavours), as well as *affective autonomy* (i.e., pursuing affective experiences that one deems positive and pleasurable; Schwartz 1999). Specifically, East-Asian cul-

tures such as China incline more towards conservatism, with Western cultures such as North America leaning more towards intellectual and affective autonomy. Western cultures such as Canada also value a collective commitment towards ensuring the wellbeing of everyone in society (i.e., *Egalitarianism*), while Eastern cultures like China are more accepting of economic and social disparity across society (i.e., *Hierarchy*). Along the same lines, Eastern cultures are also more likely to expect and adhere to an unequal balance of power within a society (i.e., *Power Distance*; Hofstede, 2001) compared to Western cultures.

Pertinent to the present study, cultural differences have also been examined across variables related to the concept of time. For instance, Hofstede's *Long Term Orientation* measures the degree to which a culture encourages its members to delay personal and collective gratification in favor of future prosperity (Hofstede & Bond, 1988). On this dimension, East-Asian cultures such as China score significantly higher compared to North America. Along similar lines, the GLOBE project's conceptualization of *future orientation* – which emphasizes future planning and delayed gratification (Javidan & House, 2002) – is also higher in East-Asian cultures compared to North America.

These findings are in line with previous research documenting that East Asians, as compared to North Americans, tend to have a broader temporal scope. For instance, when making decisions in a business context (e.g., stock exchange), Canadians and Americans tend to focus on the most immediate (present) information, whereas Chinese consider not only the stock's current condition, but also how it performed in the past (Ji et al., 2008). Interestingly, these patterns were replicated with experienced stock investors, indicating that these proclivities may be inherent to one's culture, and in certain instances more impactful than experience and competence.

Moreover, compared to Canadians, Chinese participants are more likely to consider information from the past (e.g., three years ago) when deliberating over a hypothetical criminal case (Ji et al., 2009). Chinese participants also remember more details about events that occurred in the past, and perceive it as being more connected to the present (Ji et al., 2009). Chinese also value the past more than North Americans (Guo et al., 2012), consistent with the assertion that Chinese culture has historically given precedence to the past – a preference that is manifested through ancestral worship and strong adherence to kinship and family tradition (Kluckhohn & Strodtbeck, 1961).

Along with a strong connection to the past, individuals from East-Asian cultures also appear to be more connected to the downstream consequences of their current behaviors. Across a series of studies examining this issue, Maddux & Yuki (2006) reported that participants from East-Asian backgrounds perceived actions to be significantly more consequential towards the future – a phenomenon that the researchers termed “the ripple effect.” These patterns emerged across a wide range of behaviors, including relatively simple actions (e.g., a shot in a game of billiards), as well as more significant experiences (e.g., a car accident). Regardless of the context, East Asian participants were better able to imagine the long-term impact of the behaviors, and how these actions were inextricably connected to the future.

Finally, recent research has found that, compared to Euro-Canadians, Chinese individuals perceive both the past and the future to be subjectively closer and more relevant to the present (Ji et al., 2019). Moreover, Chinese participants reported greater self-continuity over time compared to Canadians, which may be due to the connection that they have with the past and the future.

It is important to note that nearly all of the aforementioned findings involved research with only young adults as the participants. To our knowledge, research has yet to examine the interaction between culture and aging on self-continuity. To fill this gap in the literature, we compared self-continuity among Canadian and Chinese young and older adults. Based on the findings reviewed above, we predicted the following:

Hypothesis 2 As East-Asian cultures place a greater emphasis on the past and future (Guo et al., 2012; Hofstede & Bond, 1988; Javidan & House, 2002; Ji et al., 2008), and young Chinese participants have reported greater self-continuity compared to their Canadian counterparts (Ji et al., 2019), we predicted that Chinese participants would score significantly higher on self-continuity compared to Canadian participants.

2 Life Satisfaction

Life satisfaction refers to an individual's reflective evaluation of the overall conditions of his or her life (Diener et al., 1985). Research has shown that high levels of life satisfaction are associated with a number of positive development outcomes including student academic success (Antaramian, 2017), workplace performance (Jones, 2006), and optimal mental health (Frisch, 2000). In contrast, low levels of life satisfaction are associated with social, psychological, and behavioral problems (Park, 2004).

Life Satisfaction and Aging. Research examining how life satisfaction varies across the adult lifespan has produced some mixed findings. Blanchflower & Oswald (2008) examined life satisfaction across a diverse range of participants from 72 developed and developing nations and reported that, as individuals aged, life satisfaction followed a U-shaped pattern. Specifically, the researchers reported that life satisfaction decreased from young adulthood to middle age, followed by a steady increase until the mid 70's. Related to the current work, data from the World Happiness Report (Fortin et al., 2015) has shown that this general U-shaped pattern is prevalent across many regions of the world, including North America and East-Asia. A systematic review of the literature by Ulloa and colleagues (2013) also reported that there is support for this U-shaped pattern, and a large-scale meta-analysis across 145 countries confirmed this U-shaped pattern while controlling for education, work, and marital status (Blanchflower, 2021). In this recent work, Blanchflower asserted that this U-shaped happiness-age curve is consistent and robust across the world, having found the effect in 109 developing and 36 advanced countries.

Though these large-scale studies have found strong support for this U-shaped happiness trajectory across the lifespan, whether life satisfaction peaks in young adulthood or later life remains a largely unresolved issue. For instance, Baird and colleagues (2010) assessed life satisfaction across more than 21,000 participants, and reported a positive relationship between aging and life satisfaction, such that life satisfaction increased up until the early 70's. Similarly, Prenda & Lachman (2001) reported that age was positively associated with life satisfaction across a large sample of more than 3,000 participants. However, these findings are not unanimous across the aging literature. For example, Chen (2001) actually reported lower levels of life satisfaction in individuals after the age of 65, suggesting that

even though happiness may increase somewhat after the middle-age low point (Blanchflower, 2021), overall levels remain relatively low compared to young adulthood.

To summarize, though there seems to be consensus in the literature regarding the U-shaped curve that captures the life satisfaction and aging relationship (Blanchflower, 2021; Blanchflower & Oswald, 2008; Fortin et al., 2015; Ulloa et al., 2013), more empirical research is required in order to gain a better understanding of how life satisfaction varies across older and younger adults specifically, and how these differences may be shaped by factors such as culture and self-continuity.

Life Satisfaction and Culture. Research on life satisfaction must be examined uniquely through the lens of varying cultures. In fact, the mixed findings in the life satisfaction and aging literature may be in part due to the fact that this research is often conducted across different cultures.

Previous work has illustrated that individuals from Western cultures report higher levels of psychological well-being compared to individuals from East-Asian cultures (e.g., Diener & Tay 2015). Recent work has further corroborated these findings, showing that young adults from Western, independent cultures (e.g., the United States, Italy) report higher levels of life satisfaction compared to their counterparts from Eastern, more interdependent cultures (e.g., China, Russia; Germani et al., 2021). Interestingly, the researchers also asserted that the aforementioned concept of power distance (i.e., an imbalance of power within a society; Hofstede, 2001) may be related to these findings. Specifically, Germani et al., (2021) postulated that young people in interdependent societies characterized by high power distance may be dissatisfied with the social inequities within their societies, and how this may impact their prospects for future success. Relatedly, findings from a large scale meta-analysis by Steel et al., (2018) reported a positive association between a nation's life satisfaction, individualism, and low power distance. Specifically, countries with a combination of high national individualism and low power distance (e.g., Canada) reported the highest levels of happiness, while nations with a combination of high collectivism and high power distance (e.g., China) reported the lowest levels of life satisfaction. It must be noted that most of this research has been correlational, and the cause-and-effect relationship between power distance and life satisfaction requires further empirical examination. Moreover, it is unclear whether young people in Eastern cultures are forced to live in high power distance contexts due to social and cultural norms, or they are supportive of their cultural heritage and accepting of the power dynamics that accompany it.

Researchers have also asserted that the link between individualistic cultures and enhanced life satisfaction may be due in part to factors such as stress and norms of emotional expression (Tov & Nai, 2018). This may be related to the fact that in Eastern, interdependent cultures, contentment and emotional stability take precedent over happiness and bliss (Tsai et al., 2006). In contrast, Western, independent cultures embolden the maximization of positive emotion, and view it as integral to one's overall quality of life (Sims et al., 2015). Together, these cultural differences shape not only how people pursue and express their emotional states, but also how these experiences influence life satisfaction. For example, research has shown that individualism is positively correlated with the emotional expression norm of happiness (Matsumoto et al., 2008), which may in turn lead to higher rates of reported life satisfaction in Western, independent cultures (Tov & Nai, 2018). On the other hand, emotional suppression has been related to physical and mental health problems, as well as poor

social and psychological adjustment in Eastern, interdependent cultures (Ramzan & Amjad, 2017). These considerations led us to predict the following:

Hypothesis 3 In light of the fact that people from independent (Germani et al., 2021; Steel et al., 2018) and Western (Diener & Tay, 2015) cultures have reported higher rates of life satisfaction compared to their interdependent and Eastern counterparts, we predicted that Canadians would score significantly higher on life satisfaction compared to Chinese.

3 Self-Continuity and Life Satisfaction

The empirical literature on the intersection between self-continuity and life satisfaction is sparse. In one of the rare studies to indirectly examine this issue, Haslam et al. (2008) investigated the impact of social identity continuity on well-being following a significant medical issue. Specifically, the researchers investigated how belonging to certain social identities prior to having a stroke, and re-connecting with those identities following the stroke, influenced one's life satisfaction. Reconnecting with past social identities can be regarded as a proxy for self-continuity, as past research has shown that group memberships are often integral to how one evaluates his or her global sense of self (Tajfel & Turner, 1979; Turner et al., 1994). Results indicated that re-connecting with past social identities following a stroke predicted better coping and enhanced life satisfaction. Further, post-stroke cognitive difficulties that disrupted one's ability to remember and re-connect with the past significantly reduced these positive associations.

Along with the benefits of remaining connected to one's past self, recent research has shown that connecting with one's future self is also associated with enhanced life satisfaction. Specifically, Azizli and colleagues (2015) reported that continuous planning for the future and deliberation of potential future events were both positively correlated with life satisfaction (Azizli et al., 2015). The researchers postulated that planning and deliberation about one's future may produce a heightened sense of control, which has previously been linked with enhanced well-being (Prenda & Lachman, 2001). Interestingly, Prenda and Lachman also found that the benefits of future-oriented planning were most prominent in older adults. This is in line with previous research arguing that self-continuity plays a critical role in sustaining a sense of identity as we age, in turn buffering life satisfaction against the effects of age-related changes (Baltes et al., 2006).

Thus, previous research has provided indirect evidence for a positive link between self-continuity and life satisfaction. The present research will examine this link directly by measuring self-continuity and life satisfaction among young and old adults in Canada and China. In light of the existing literature, we predicted the following:

Hypothesis 4 Self-continuity will be positively associated with life satisfaction, and self-continuity may account for differences in life satisfaction across age and culture groups.

Table 1 Sample demographics

		N	Gender	Age Mean (SD)	Age Range
Canada	Young	108	16 men, 90 women, 2 no report	19.43 (1.43)	18–26
	Old	68	25 men, 40 women, 3 no report	73.32 (6.82)	60–88
China	Young	121	58 men, 63 women	20.12 (1.50)	17–23
	Old	127	85 men, 42 women	70.34 (5.63)	60–85

Table 2 Education and health information about the elderly participants

	Canada	China
Years of Education	11.10 (SD=3.28)	11.52 (SD=3.33)
Physical Health ⁷	3.62 (SD=0.86)	3.59 (SD=0.79)
Satisfaction with one's health ⁸	3.80 (SD=0.89)	3.76 (SD=0.84)
To what extent does your health affect what you want to do ⁹	2.49 (SD=0.90)	2.91 (SD=0.89)
Marital status	63% married, 28% widowed	87% married, 9% widowed

⁷ On the following scale: 1 = much worse; 2 = worse; 3 = average; 4 = better; 5 = much better, compared to peers.

⁸ On a scale from 1 (very dissatisfied) to 5 (very satisfied).

⁹ On the following scale: 1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always.

4 Method

4.1 Participants

For a 2 (culture) × 2 (age) between-participant design, G*power 3.1 (Faul et al., 2009) estimated that at least 404 participants were required to identify a small to medium effect size ($f=0.18$) with power=0.95. We aimed to get at least 100 participants in each cell. Though we recruited them with equal effort, we unfortunately had difficulty getting enough participation from older adults in Canada. This was due to several factors, including (a) more difficulty finding eligible older adults in the location of the study; (b) less interest in participating in the study from Canadian older adults who were recruited; and (c) more incomplete or incorrectly filled out study questionnaires being returned to us from the Canadian older adults. The final sample consisted of Euro-Canadian young adults ($N=108$) and old adults ($N=68$), and Chinese young adults ($N=121$) and old adults ($N=127$). More detail on participant demographics can be found in Tables 1 and 2. Canadian participants were tested in English, while Chinese participants were tested in Mandarin Chinese. Study materials were translated from English to Chinese by two bilingual researchers in order to ensure accuracy and equivalence across cultures.

4.2 Measures and Procedure

The experimental procedure was approved by Queen's University general research ethics board, and informed consent was obtained from all participants prior to data collection. Young adults in both Canada and China signed up for the study voluntarily and came into research laboratories to complete the measures outlined below. The Chinese older participants were recruited among retirees from certain organizations, and they completed the study at their local organizations. Canadian older adults were approached by a member of the research team in local senior clubs and by going door to door in local senior neighborhoods. A brief description of the study was given to prospective participants, and any questions that they had about the research were fielded at this time. If they agreed to participate in the study, participants were given the following measures of self-continuity and life satisfaction, along with measures for an unrelated project on generational differences in consumer behavior (i.e., preferences for varying advertisements across older and younger adults) and organizational behavior (i.e., preferences for different employment opportunities across older and younger adults). Young adults were compensated for their participation with course credits, while older adults were compensated with small gifts that may be used in daily life (e.g., cooking oils; detergents).

IOS Scale. As the first measure of self-continuity, we examined the degree to which one's past and present selves overlapped, and present and future selves overlapped. Participants were presented with a set of 9 diagrams each depicting different degrees of overlap (I = no overlap, 9 = complete overlap) between their past self from a year ago (or future self in a year) and present self (Aron et al., 1992; Ji et al., 2019). The greater the degree of overlap, the greater the self-continuity.

Stability in personality traits. Following Peetz & Wilson (2013) and Ji et al., (2019), we included a second measure of self-continuity with trait adjectives. Participants rated the extent to which each of the 8 personality traits (confident, motivated, empathetic, sociable, incompetent, irresponsible, inconsiderate, and lonely) described their past (a year ago), present, and future (in a year) self, on a scale from 1 (not at all) to 7 (very much). Greater stability (i.e., less change) from the past to the present, or from the present to the future, is an indicator of greater self-continuity. We averaged the absolute change across the 8 personality traits from the past to the present, and from the present to the future, to indicate past-present and present-future change in personality traits, and then subtract these changes from 6 (the maximum change score) so that higher numbers represent greater self-continuity over time.

Satisfaction with Life Scale. The Satisfaction with Life Scale is a 5-item scale used to measure one's present life satisfaction (Diener et al., 1985). Participants were presented with 5 statements related to life satisfaction (e.g., 'The conditions of my life are excellent', 'I am satisfied with my life') and were instructed to rate the degree to which each statement was true about their own life using a 7-point Likert scale (1 = *not at all*, 7 = *very much*). The internal consistency of the scale (α) ranged between 0.74 and 0.84 among the 4 groups of participants in the present study.

Finally, participants reported their gender and age. Older participants also answered questions regarding their education, health, satisfaction with health and how their health interfered with their life (see Table 2 for details).

Table 3 Correlations among age⁷, self-continuity and life satisfaction within each culture

		AGE	Self-continuity (IOS)	Self-continuity (trait)	Life satisfaction
Canada	Age	1			
	Self continuity (IOS)	0.38**	1		
	Self continuity (trait)	0.50**	0.62**	1	
	Life satisfaction	0.16*	0.35**	0.38**	1
China	Age				
	Self continuity (IOS)	0.18**			
	Self continuity (trait)	0.14*	0.29**		
	Life satisfaction	0.51**	0.22**	0.28**	

* $p < .05$; ** $p < .01$

5 Results

Preliminary analyses showed positive correlations among age, self-continuity and life satisfaction, within each culture (see Table 3). Next, we examined self-continuity and life satisfaction across culture and age groups to test Hypotheses 1 to 3. Then we explored whether self-continuity mediated the effect of culture and age on life satisfaction to test Hypothesis 4. Gender did not have any significant main or interaction effect, and thus was excluded from the following analyses.

6 Self-continuity

IOS. A 2 (Culture) x 2 (Age) x 2 (Time: past-present vs. present-future self-continuity; within- subjects factor) mixed ANOVA on self-continuity as measured by IOS revealed a significant age main effect, $F(1, 414) = 39.97, p < .001, \eta_p^2 = 0.09$, such that older participants ($M = 6.75, SE = 0.13$) reported greater self-continuity than younger participants ($M = 5.68, SE = 0.11$), confirming hypothesis 1. There was also a significant interaction effect between age and culture, $F(1, 414) = 7.83, p = .005, \eta_p^2 = 0.02$. Simple effects analyses on the interaction effect showed that Chinese young adults ($M = 5.94, SE = 0.151$) reported higher self-continuity than did Canadian young adults ($M = 5.42, SE = 0.16$), $F(1, 414) = 5.71, p = .017, \eta_p^2 = 0.014$. In contrast, the difference between older Chinese ($M = 6.54, SE = 0.15$) and older Canadians ($M = 6.95, SE = 0.21$) was not significant, $F(1, 414) = 2.67, p = .103$ (see Fig. 1).¹ There was a nonsignificant trend that participants reported higher self-continuity between the present and past ($M = 6.28, SE = 0.09$) than between the present and future ($M = 6.14, SE = 0.10$), $F(1, 414) = 2.99, p = .085$. No other effect approached statistical significance, $ps > 0.230$.

Traits. A 2 (Culture) x 2 (Age) x 2 (Time: past-present vs. present-future self-continuity; within- subjects factor) mixed ANOVA revealed a significant age main effect, $F(1, 404) = 38.67, p < .001, \eta_p^2 = 0.09$, such that older adults reported higher self-continuity than young adults. The Culture x Age interaction effect was significant, $F(1, 404) = 12.60$,

¹The age effect was significant within Canadians ($p < .001$) and Chinese ($p = .005$).

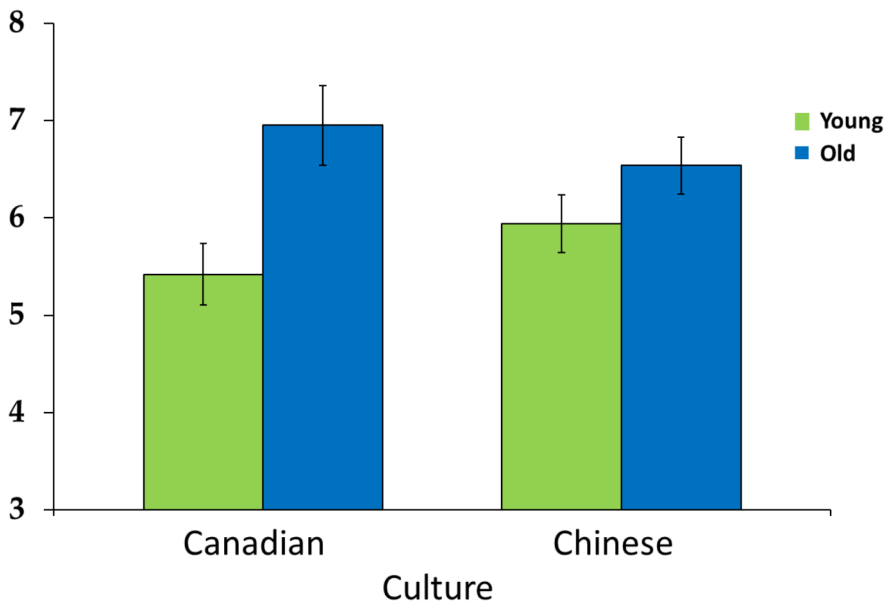


Fig. 1 Differences in Self-Continuity across Culture and Age. Error bars represent 95% confidence interval

$p < .001$, $\eta^2 = 0.03$. Simple effects analyses on the interaction effect showed that Chinese young adults ($M = 5.33$, $SE = 0.05$) reported higher self-continuity than did Canadian young adults ($M = 5.16$, $SE = 0.05$), $F(1, 404) = 5.72$, $p = .017$, $\eta^2 = 0.01$. In contrast, the difference was reversed between older Chinese ($M = 5.47$, $SE = 0.05$) and older Canadians ($M = 5.69$, $SE = 0.07$), $F(1, 404) = 6.91$, $p = .009$ (see Fig. 2)².

In addition, there was a significant Culture \times Time interaction effect³, $F(1, 404) = 4.66$, $p = .032$, $\eta^2 = 0.01$. The interaction between Age and Time was marginally significant, $F(1, 404) = 3.28$, $p = .071$, $\eta^2 = 0.01$. No other effect approached statistical significance, $F_s(1, 404) < 2.29$, $p_s > 0.13$.

Thus, in support of Hypothesis 1, self-continuity was higher among older adults than among younger adults, and this was true among both Canadians and Chinese, replicating and expanding previous findings (Löckenhoff & Rutt, 2017). Consistent with Ji et al., (2019), young Chinese reported higher self-continuity than young Canadians (in support of Hypothesis 2). Such cultural differences, however, disappeared among the older adults.

² The age effect was significant among Canadians ($p < .001$) and Chinese ($p = .030$).

³ Overall, Chinese participants showed greater past ($M = 5.44$, $se = 0.04$) than future self-continuity ($M = 5.36$, $se = 0.04$), $F(1, 404) = 6.84$, $p = .009$, while Canadians showed no difference between past ($M = 5.41$, $se = 0.05$) and future ($M = 5.44$, $se = 0.05$) self-continuity, $F(1, 404) = 0.50$, $p > .25$.

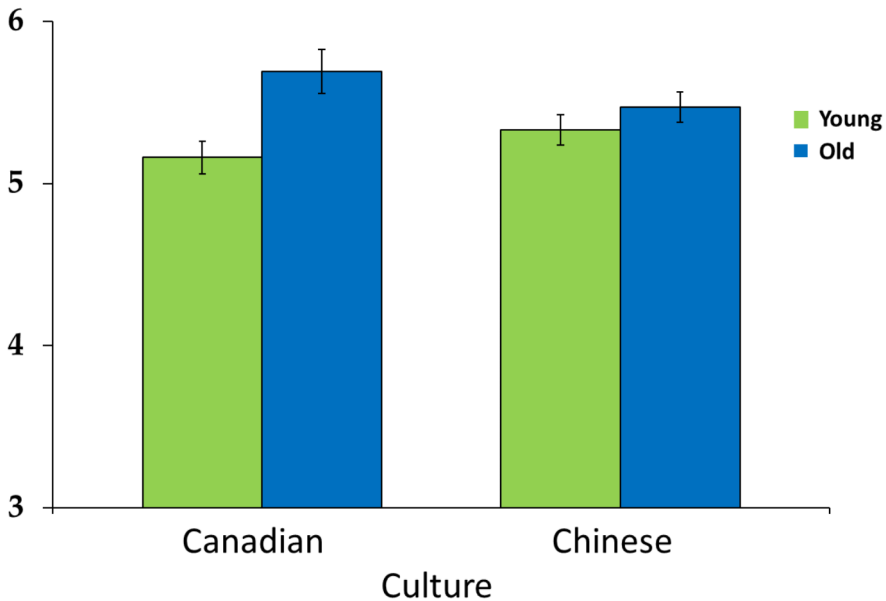


Fig. 2 Trait stability across culture and age

7 Life Satisfaction

A 2 (Culture) x 2 (Age) between-subjects ANOVA was conducted to analyze the effects of culture and age on life satisfaction. There was a significant main effect of age, $F(1, 415)=51.52, p<.001, \eta_p^2 = 0.11$, and Culture, $F(1, 415)=14.84, p<.001, \eta_p^2 = 0.04$. Life satisfaction was greater for older adults ($M=5.11, SD=1.07$) than younger adults ($M=4.30, SD=1.15$)⁴. Life satisfaction was also greater among Canadians ($M=4.89, SD=1.09$) than Chinese ($M=4.52, SD=1.22$). These main effects, however, were qualified by a significant interaction between culture and age, $F(1, 415)=17.46, p<.001, \eta_p^2 = 0.04$. Satisfaction was greater for Canadian young adults ($M=4.77, SD=1.00$) than Chinese young adults ($M=3.90, SD=1.12$), $F(1, 415)=37.16, p<.001, \eta_p^2 = 0.08$, whereas there was no significant difference between Canadian ($M=5.09, SD=1.21$) and Chinese older adults ($M=5.12, SD=0.99$), $F(1, 415)=0.05, p=.828$ (see Fig. 3).

8 Relationship Among Self-Continuity, Life Satisfaction, Culture and Age

As expected, culture and age had significant interaction effects on self-continuity and life satisfaction. Does self-continuity mediate the effect of culture and age on life satisfaction? To test this, we examined whether the pathways from age to life satisfaction were mediated

⁴ The age effect was significant among Chinese ($p<.001$) and Canadians ($p=.054$).

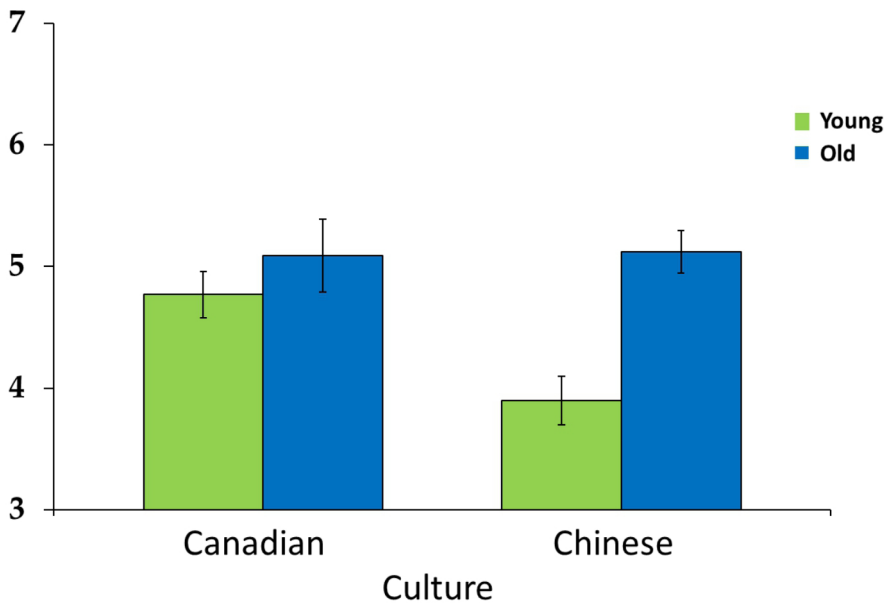


Fig. 3 Life Satisfaction across Culture and Age. Error bars represent 95% confidence interval

by self-continuity⁵ while being moderated by culture. We conducted a conditional process analysis with Hayes' (2018) model 8 from PROCESS⁶ after centering the mediator, using 10,000 bootstrap estimates for the construction of 95% percentile CIs for the conditional indirect effects.

In line with hypothesis 4, self-continuity mediated the relationship between age and life satisfaction for both Canadian and Chinese participants. The indirect effect of age on life satisfaction through self-continuity was significant for both cultural groups, but moderated by culture. The index for the moderated mediation was -0.14 ($SE=0.06$), 95% CI $[-0.26, -0.03]$, indicating a significant moderated mediation effect (see Fig. 4).

To better understand the moderated mediation, Fig. 4a shows the indirect effect within each culture. For Canadians, the age effect on life satisfaction was completely through the indirect path of self-continuity, $b=0.22$ ($SE=0.06$), 95% CI $[0.11, 0.35]$. The alternative model, the age indirect effect on self-continuity through life satisfaction was not significant (as seen in Fig. 4b), $b=0.11$ ($SE=0.07$), 95% CI $[-0.03, 0.24]$. Thus, greater self-continuity among older Canadian participants contributed to their higher life satisfaction, relatively to young Canadians.

The story was slightly different for Chinese participants. The indirect effect of age on life satisfaction through self-continuity (Fig. 4a) was significant, $b=0.09$ ($SE=0.04$), 95% CI $[0.02, 0.17]$, although it explained only a small portion (about 4%) of the total effect.

⁵ We report results based on the IOS measure. Similar patterns of results were obtained when trait stability was used as the mediator.

⁶ We ran Model 59 and found that culture did not moderate the b path (from the mediator to the dependent variable), and thus report the results based on Model 8 for parsimony.

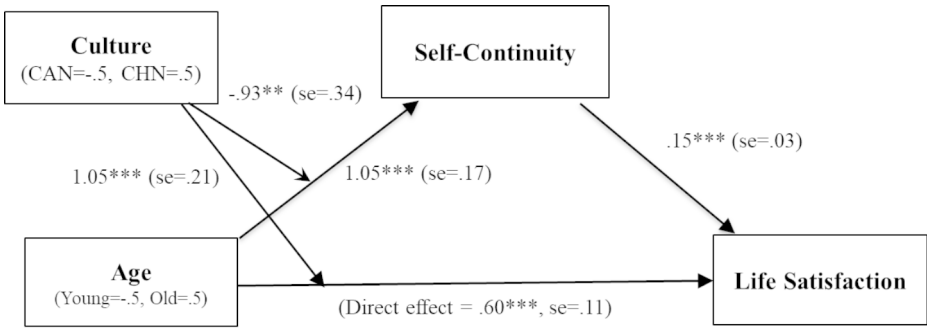


Fig. 4 Moderated Mediation (with unstandardized coefficients). ** $p < .01$. *** $p < .001$

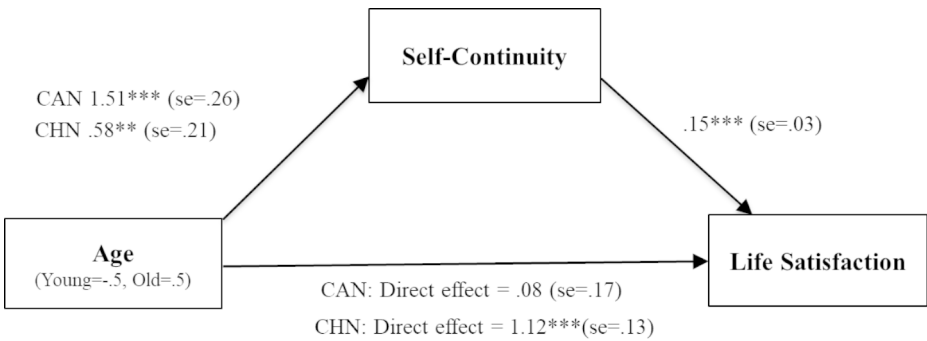


Fig. 4a Unstandardized regression coefficients for the indirect effect of age on life satisfaction through self-continuity among Canadians (CAN) and Chinese (CHN) respectively. *** $p < .001$; ** $p < .01$

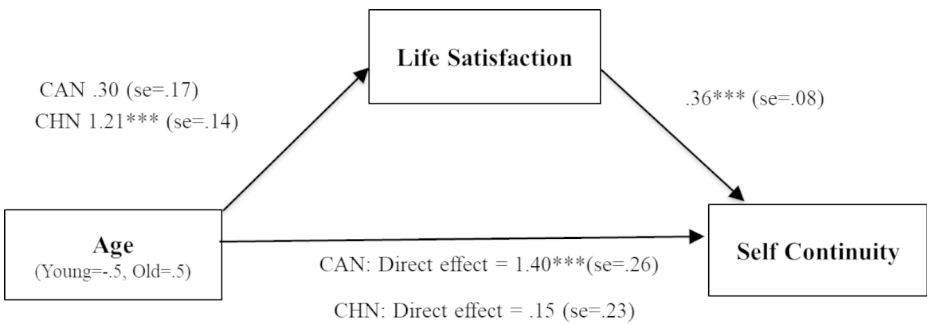


Fig. 4b Unstandardized regression coefficients for the indirect effect of age on self-continuity through life satisfaction among Canadians and Chinese, respectively, based on Model 8 of PROCESS. *** $p < .001$; ** $p < .01$; * $p < .05$

The alternative model (Fig. 4b) – the indirect effect of age on self-continuity through life satisfaction – was significant, $b = 0.43$ ($SE = 0.11$), 95% CI [0.23, 0.65]. Thus, to Chinese, life satisfaction seemed to contribute to self-continuity more than the other way around. Of

course, given the nature of a cross-sectional design in the present study, we are not able to make any causal inference.

9 Discussion

The present research examined the relationship between self-continuity, life satisfaction, age, and culture. Older adults reported significantly higher levels of self-continuity and life satisfaction compared to younger adults. However, the interaction between culture and age uniquely influenced both of these relationships, such that young Chinese scored higher on self-continuity than young Canadians, while young Canadians scored higher on life satisfaction than young Chinese. Moderated mediation analysis further suggested that greater self-continuity accounted for higher levels of life satisfaction in older adults than young adults, and this indirect effect was stronger among Canadians than among Chinese.

10 Connections with Previous Research and Implications

Our finding that older adults scored significantly higher on life satisfaction supports some of the previous literature on happiness and aging (Baird et al., 2010; Prenda & Lachman, 2001). Though this literature has produced some mixed findings in the past, the fact that our results were consistent across both Canadian and Chinese cultures adds some robustness to these findings.

In terms of why older adults may be more satisfied with life compared to younger adults, it has been asserted that a unique motivational shift towards meaning and emotional satisfaction in later life may account for these differences (Carstensen, 2006). Related research has also documented that older adults are significantly more focused on the present compared to the past or the future (Imtiaz et al., 2021). Taken together, this focus on meaning, emotional satisfaction, and the present may lead to older adults prioritizing experiences that will provide fulfilment in the here and now (as opposed to experiences that may pay dividends in the future). Research supporting this notion has found that, as perception of time remaining diminishes, positive affect becomes more strongly related to meaning in life, and this effect is stronger among older individuals than younger ones (Hicks et al., 2012).

On the other side of spectrum, it is important to consider why younger adults may not be as happy as older adults. To this end, past research has documented that young people (aged 18–25) are particularly sensitive to the macro conditions of their societies (Giuliano & Spilimbergo, 2009), and the ongoing challenges created by the 2008 recession will impact the psyche of young people who lived through it for years to come (Bell & Blanchflower, 2011). Indeed, recent research has found that less than one-third of young adults expect their future lives to be better than that of their parents (Sharma, 2017). Further, factors such as climate change, global wars and conflict, record-breaking levels of debt, increased competition due to globalization, and the expected large-scale losses of jobs due to automation have added further angst in the minds of young adults (Berman et al., 1994; Nau et al., 2015; Reyes et al., 2021). Undoubtedly, the short- and long-term negative consequences of the Covid-19 pandemic will only exacerbate these issues (Deckman et al., 2020), although the present study was conducted before the pandemic. Finally, though every generation

experiences its share of stressful events, the rise of social media, which has made repeated exposure to distressing events much more likely than any other time in history, has further intensified these issues (Twenge, 2019). It is important to note that recent events may be construed as more extreme than historical ones, and as such the present findings could be context dependent. Thus, future research should track whether recent historical events have had a disproportional impact on the mindsets of young adults.

Regarding self-continuity, our results replicated the findings of Rutt & Löckenhoff (2016), who reported that self-continuity was positively associated with age. Interestingly, the researchers also asserted that older individuals may be living in an “extended present,” whereby they diminish the perceived differences between their past, present, and future selves. This idea is interesting to consider in light of the literature documenting how seniors are more present-focused and prioritize meaning and emotional satisfaction over long-term development (Carstensen, 2006; Imtiaz et al., 2021). Is self-continuity greater in older adults because of this focus on the here and now, or in spite of it? Future search should aim to tease apart these important questions.

Culture had a unique and important influence on both self-continuity and life satisfaction in the present work. First, the young Chinese participants scored higher than their Canadian counterparts on self-continuity, theoretically replicating previous research showing that East-Asians tend to be more connected to the past (Guo et al., 2012; Ji et al., 2008, 2009), more deliberative of the future (Maddux & Yuki, 2006), and perceive both the past and the future to be subjectively closer to the present compared to North Americans (Ji et al., 2019). These findings are also in line with research showing stronger long-term orientation (Hofstede & Bond, 1988) and future orientation (Javidan & House, 2002) in East-Asian cultures such as China than in Western cultures such as Canada. Finally, the findings from the current work complement recent results indicating that Chinese (Ji et al., 2019) young adults reported greater self-continuity than Euro-Canadian young adults.

In spite of the cultural differences in self-continuity among young adults, an interesting finding from the current work is that these differences did not manifest across older adults. One potential reason for this is that perhaps the high self-continuity scores reported by both Canadian and Chinese older adults represent a ceiling effect, which makes it difficult for any cultural differences to emerge. Another potential explanation is that seniors may become more homogenous over time, essentially canceling out any cultural differences that exist in younger age groups. Research providing some credence for this notion has shown that seniors generally display less conformity to the societal influences around them as they age, and live more authentically and in accordance with their intrinsic values and beliefs (Mumel & Prodnik, 2005; Nielson & Curry, 1997). It will be important for future research to examine the degree to which self-continuity is a product of cultural pressures versus genuine differences across diverse age groups.

Culture and age also impacted life satisfaction, as young Canadians reported being more satisfied with their lives compared to young Chinese. These findings substantiate the existing knowledge base indicating that people from Western, independent cultures tend to score higher on life satisfaction compared to those from Eastern, interdependent cultures (Diener & Tay, 2015; Germani et al., 2021; Steel et al., 2018). However, as with self-continuity, an important question remains regarding the cultural differences in life satisfaction - why did the older adults not replicate the patterns found in the young adult sample? It is possible

that Chinese and Canadian older adults may have achieved high life satisfaction through different routes.

For example, in an Eastern nation like China, respect and adoration from one's family and community may be an important source of happiness for older adults. Indeed, a large scale study of 3,435 people from 26 different countries found that individuals from Eastern cultures (e.g., China, Japan, Malaysia) held significantly more favorable views of aging compared to those from Western cultures (Löckenhoff et al., 2009). Meanwhile, in a Western country like Canada, superior welfare facilities and resources dedicated to the well-being of older adults may produce the same positive outcome in terms of life satisfaction. Indeed, Moor et al. (2013) reported that seniors living in countries that allocated more social support and welfare towards older adults experienced a significant boost in emotional wellbeing. These findings suggest that different roads may lead to the same outcome in terms of senior life satisfaction across cultures. Future work should aim to empirically test this hypothesis.

Interestingly, the moderated mediation analysis revealed that self-continuity mediated the positive association between age and life satisfaction in Canadians, but the alternative model (with life satisfaction mediating the relationship between age and self-continuity) was stronger in the Chinese sample. That self-continuity contributes towards life-satisfaction in older Canadians is not surprising considering that previous research has linked heightened self-continuity to increased resilience after setbacks (Sadeh & Karniol, 2012) and better mental health outcomes (Löckenhoff & Rutt, 2017). The present research adds a generational element to this constellation of work by showing that self-continuity may be one of the reasons why we find higher levels of life satisfaction in older individuals living in the West.

Turning to the Chinese sample, enhanced life satisfaction may be a better predictor of self-continuity, instead of the other way around. In contrast to North American cultures where personal happiness and life satisfaction are viewed as a personal achievement and pursued explicitly (Lu, 2005), Eastern Asian cultures such as China value social harmony and interpersonal connectedness (Markus & Kitayama, 1991). Relating this to the current findings, life satisfaction may be more of a means than an end in Eastern cultures, with self-continuity being a more desired and meaningful outcome. Interestingly, emerging research has outlined a positive association between self-continuity and meaning in life (Van Tilburg et al., 2019). Future work should examine how culture influences this general relationship, and whether it is stronger in Eastern, collectivist societies. Indeed, to build on the findings from the current work, future research should examine how self-continuity relates to not only life satisfaction, but also other indices of well-being such as meaning in life and resilience. This is especially important considering the unique moderating role that culture played on the relationship between self-continuity and life satisfaction in the present research.

11 Limitations and Future Directions

The present research examined self-continuity, life satisfaction, and culture across older and younger adults. In order to build on these findings, future work should examine these variables across the full adult lifespan. Data from children, as well as middle-aged adults,

would add clarity to how life satisfaction, self-continuity, and culture interact to produce unique motives and outcomes across the entire human lifespan. Similarly, research would benefit from examining these questions not only across distinct age groups, but also within them. For example, recent work has outlined how seniors are distinct from other age groups in terms of their preferences and motives (Imtiaz & Ji, 2021), and previous research has shown significant differences across the young-old (69–69 years old), the old-old (70–79 years old), and the oldest-old (80+ years old) in terms of their desires, cognitive abilities, and health (Garfein & Herzog, 1995). This is important to consider as life-satisfaction will undoubtedly be impacted by these factors. Indeed, research has documented that much of the decline in life satisfaction that occurs in seniors occurs after the age of 70 (Baird et al., 2010), and can be attributed directly to the end of life process. Moreover, Gerstorff et al., (2008) reported that the sharp decline that is common near the end of life appears to be precipitated by significant health problems and the subsequent expectation of one's death. Along the same lines, emerging research is showcasing how the ethnic and cultural diversity that is inherent in today's youth will reshape the very fabric of our future society (Frey, 2018). Together, these findings highlight the importance of examining the variables in question in the present work not only across age groups, but within them as well.

Along with age diversity, it will be important for future research to expand the present findings through cultural diversity. This will help test the generalizability of the current findings across varying independent and interdependent cultures. That is, do all independent cultures produce young adults who are higher in life satisfaction compared to their counterparts in interdependent cultures? Likewise, do young adults across varying interdependent cultures universally report greater levels of self-continuity than young adults from independent cultures, or are these findings unique to Chinese and Canadian cultures? Though past work has shown that many variables do indeed generalize across independent and interdependent cultures (e.g., power distance; conservatism/autonomy; future orientation; hierarchy/egalitarianism), a large scale meta-analysis by North & Fiske (2015) including data from 21,093 participants and 23 different countries also reported that countries from both independent and interdependent cultures displayed unique attitudes towards aging and their seniors. Specifically, the researchers found some Eastern cultures who venerated their seniors to a high degree, but did not treat them particularly well. Meanwhile, some Western cultures did not show as much outward respect towards seniors, but behaved benevolently towards older adults nonetheless. Thus, the researchers argued that a more individualized approach to understanding aging and culture is required in order to test the generalizability of the cross-cultural findings.

The present research is based on a cross-sectional study. The correlational nature in the study design limits us from making any causal inferences about the relationship between self-continuity and life satisfaction. Future research may incorporate experimental and longitudinal designs to better understand how these different variables influence each other.

12 Conclusion

In conclusion, self-continuity and life satisfaction differ across people from varying cultural backgrounds and different age groups. Across a sample of Canadian and Chinese participants, older adults scored higher on life satisfaction compared to younger adults, and this

effect was mediated by self-continuity and moderated by culture. These findings highlight the importance of considering age and culture when examining psychological outcomes, and the potential of self-continuity to be used as a way to enhance overall life satisfaction.

Funding This research was supported by Social Science and Humanities Research Council of Canada (SSHRC) research grants (435-2012-1279 and 435-2018-0061) to Ji.

Data Availability <https://doi.org/10.5683/SP2/RZDGI>, Scholars Portal Dataverse.

Code Availability (software application or custom code): NA.

Conflicts of Interest/Competing Interests The authors declare that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethics Approval has been obtained from Queen's University, Canada.

Consent to Participate has been obtained from all participants.

Consent for Publication has been obtained from all coauthors.

References

- Antaramian, S. (2017). The importance of very high life satisfaction for students' academic success. *Cogent Education*, 2017(4), 1307622. <https://doi.org/10.1080/2331186X.2017.1307622>
- Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of other in the self scale and the structure of interpersonal closeness. *Journal of personality and social psychology*, 63(4), 596. <https://doi.org/10.1037/0022-3514.63.4.596>
- Azizli, N., Atkinson, B. E., Baughman, H. M., & Giammarco, E. A. (2015). Relationships between general self-efficacy, planning for the future, and life satisfaction. *Personality and Individual Differences*, 82, 58–60. <https://doi.org/10.1016/j.paid.2015.03.006>
- Baird, B. M., Lucas, R. E., & Donnellan, M. B. (2010). Life satisfaction across the lifespan: Findings from two nationally representative panel studies. *Social Indicators Research*, 99(2), 183–203. <https://doi.org/10.1007/s11205-010-9584-9>
- Baltes, P. B., Reuter-Lorenz, P. A., & Rösler, F. (Eds.). (2006). *Lifespan development and the brain: The perspective of biocultural co-constructivism*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511499722>
- Becker, M., Vignoles, V. L., Owe, E., Easterbrook, M. J., Brown, R., Smith, P. B., & Lay, S. (2018). Being oneself through time: Bases of self-continuity across 55 cultures. *Self and Identity*, 17(3), 276–293. <https://doi.org/10.1080/15298868.2017.1330222>
- Bell, D. N., & Blanchflower, D. G. (2011). Young people and the Great Recession. *Oxford Review of Economic Policy*, 27(2), 241–267. <https://doi.org/10.1093/oxrep/gr011>
- Berman, E., Bound, J., & Griliches, Z. (1994). Changes in the demand for skilled labor within US manufacturing: evidence from the annual survey of manufactures. *The Quarterly Journal of Economics*, 109(2), 367–397. <https://doi.org/10.2307/2118467>
- Blanchflower, D. G. (2021). Is happiness U-shaped everywhere? Age and subjective well-being in 145 countries. *Journal of Population Economics*, 34(2), 575–624. <https://doi.org/10.1007/s00148-020-00797-z>
- Blanchflower, D. G., & Oswald, A. (2008). Is well-being U-shaped over the life cycle? *Social Science and Medicine*, 66, 1733–1749. <https://doi.org/10.1016/j.socscimed.2008.01.030>
- Carstensen, L. L. (2006). The influence of a sense of time on human development. *Science*, 312(5782), 1913–1915. <https://doi.org/10.1126/science.1127488>
- Chandler, M. J. (1994). Self-continuity in suicidal and nonsuicidal adolescents. *New Directions in Child Development*, 64, 55–70. <https://doi.org/10.1002/cd.23219946406>
- Chandler, M. J., Lalonde, C. E., Sokol, B. W., & Hallett, D. (2003). Personal persistence, identity development, and suicide: A study of Native and non-Native North American adolescents. *Monographs of the Society for Research in Child Development*, 68(2), i–130. <https://doi.org/10.1111/1540-5834.00246>

- Chen, C. (2001). Aging and life satisfaction. *Social Indicators Research*, *54*, 57–79. <https://doi.org/10.1023/A:1007260728792>
- Deckman, M., McDonald, J., Rouse, S., & Kromer, M. (2020). Gen Z, Gender, and COVID-19. *Politics & Gender*, *16*(4), 1019–1027. <https://doi.org/10.1017/S1743923X20000434>
- Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of personality assessment*, *49*(1), 71–75. https://doi.org/10.1207/s15327752jpa4901_13
- Diener, E., & Tay, L. (2015). Subjective well-being and human welfare around the world as reflected in the Gallup World Poll. *International Journal of Psychology*, *50*, 135–149. <https://doi.org/10.1002/ijop.12136>
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*, 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>
- Fortin, N., Helliwell, J. F., & Wang, S. (2015). How does subjective well-being vary around the world by gender and age?. In J. Helliwell, R. Layard, & J. Sachs (Eds.), *World happiness report* (pp. 42–75). Earth Institute, Columbia University
- Frey, W. H. (2018). *Diversity explosion: How new racial demographics are remaking America*. Brookings Institution Press
- Frisch, M. B. (2000). Improving mental and physical health care through quality of life therapy and assessment. In E. Diener, & D. R. Rahtz (Eds.), *Advances in quality of life theory and research* (pp. 207–241). Dordrecht, the Netherlands: Kluwer. https://doi.org/10.1007/978-94-011-4291-5_10
- Garfein, A. J., & Herzog, A. R. (1995). Robust aging among the young-old, old-old, and oldest-old. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *50*(2), S77–S87. <https://doi.org/10.1093/geronb/50B.2.S77>
- Germani, A., Delvecchio, E., Li, J. B., Lis, A., Nartova-Bochaver, S. K., Vazsonyi, A. T., & Mazzeschi, C. (2021). The link between individualism–collectivism and life satisfaction among emerging adults from four countries. *Applied Psychology: Health and Well-Being*, *13*(2), 437–453. <https://doi.org/10.1111/aphw.12259>
- Gerstorff, D., Ram, N., Estabrook, R., Schupp, J., Wagner, G. G., & Lindenberger, U. (2008). Life satisfaction shows terminal decline in old age: Longitudinal evidence from the German socio-economic panel study (SOEP). *Developmental Psychology*, *44*, 1148–1159. <https://doi.org/10.1037/0012-1649.44.4.1148>
- Giuliano, P., & Spilimbergo, A. (2009). *Growing up in a Recession: Beliefs and the Macroeconomy* (No. w15321). National Bureau of Economic Research
- Guo, T., Ji, L. J., Spina, R., & Zhang, Z. (2012). Culture, temporal focus, and values of the past and the future. *Personality and Social Psychology Bulletin*, *38*(8), 1030–1040. <https://doi.org/10.1177/0146167212443895>
- Haslam, C., Holme, A., Haslam, S. A., Iyer, A., Jetten, J., & Williams, W. H. (2008). Maintaining group memberships: Social identity continuity predicts well-being after stroke. *Neuropsychological Rehabilitation*, *18*(5–6), 671–691. <https://doi.org/10.1080/09602010701643449>
- Hayes, A. F. (2018). *Introduction to mediation, moderation and conditional process analysis: A regression-based approach*. New York: The Guilford Press
- Hershfield, H. E., Cohen, T. R., & Thompson, L. (2012). Short horizons and tempting situations: Lack of continuity to our future selves leads to unethical decision making and behavior. *Organizational Behavior and Human Decision Processes*, *117*(2), 298–310. <https://doi.org/10.1016/j.obhdp.2011.11.002>
- Hicks, J. A., Trent, J., Davis, W. E., & King, L. A. (2012). Positive affect, meaning in life, and future time perspective: An application of socioemotional selectivity theory. *Psychology and Aging*, *27*(1), 181–189. <https://doi.org/10.1037/a0023965>
- Hofstede, G., & [1980] (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations*. Sage
- Hofstede, G., & Bond, M. H. (1988). The Confucian connection: From cultural roots to economic growth. *Organizational Dynamics*, *16*(4), 4–21. [https://doi.org/10.1016/0090-2616\(88\)90009-5](https://doi.org/10.1016/0090-2616(88)90009-5)
- Imtiaz, F., & Ji, L. J. (2021). “Then and now”: Examining the impact of temporal focus on persuasive messages across seniors and young adults. *Experimental Aging Research*, *47*(1), 1–22. <https://doi.org/10.1080/0361073X.2020.1839309>
- Imtiaz, F., Ji, L. J., & Vaughan-Johnston, T. I. (2021). Exploring preferences for present- and future-focused job opportunities across seniors and young Adults. *Current Psychology*, 1–6. <https://doi.org/10.1007/s12144-021-01365-8>
- Javidan, M., & House, R. J. (2002). Leadership and culture around the world: Findings from GLOBE: An introduction to the special issue. *Journal of World Business*, *37*(1), 1–2. [https://doi.org/10.1016/S1090-9516\(01\)00068-2](https://doi.org/10.1016/S1090-9516(01)00068-2)
- Ji, L. J. (2008). The Leopard Cannot Change His Spots, or Can He? Culture and the Development of Lay Theories of Change. *Personality & Social Psychology Bulletin*, *34*(5), 613–622. <https://doi.org/10.1177/0146167207313935>

- Ji, L. J., Guo, T., Zhang, Z., & Messervey, D. (2009). Looking into the past: cultural differences in perception and representation of past information. *Journal of personality and social psychology*, 96(4), 761–769. <https://doi.org/10.1037/a0014498>
- Ji, L. J., Hong, E., Guo, T., Zhang, Z., Su, Y., & Li, Y. (2019). Culture, psychological proximity to the past and future, and self-continuity. *European Journal of Social Psychology*, 49 (4), 735–747. <https://doi.org/10.1002/ejsp.2544>
- Ji, L. J., Nisbett, R. E., & Su, Y. (2001). Culture, Change, and Prediction. *Psychological Science*, 12(6), 450–456. <https://doi.org/10.1111/1467-9280.00384>
- Ji, L. J., Peng, K., & Nisbett, R. E. (2000). Culture, Control, and Perception of Relationships in the Environment. *Journal of Personality and Social Psychology*, 78(5), 943–955. <https://doi.org/10.1037/0022-3514.78.5.943>
- Ji, L. J., Zhang, Z., & Guo, T. (2008). To buy or to sell: Cultural differences in stock market decisions based on price trends. *Journal of Behavioral Decision Making*, 21(4), 399–413. <https://doi.org/10.1002/bdm.595>
- Jones, M. D. (2006). Which is a better predictor of job performance: Job satisfaction or life satisfaction. *Journal of Behavioral and Applied Management*, 8, 20–42. <https://doi.org/10.21818/001c.16696>
- Kim, B. K., & Zauberman, G. (2009). Perception of anticipatory time in temporal discounting. *Journal of Neuroscience Psychology and Economics*, 2, 91–101. <https://doi.org/10.1037/a0017686>
- Kluckhohn, F. R., & Strodtbeck, F. L. (1961). *Variations in value orientations*. Peterson
- Lang, F. R., Weiss, D., Gerstorf, D., & Wagner, G. G. (2013). Forecasting life satisfaction across adulthood: Benefits of seeing a dark future? *Psychology and Aging*, 28(1), 249–261. <https://doi.org/10.1037/a0030797>
- Löckenhoff, C. E., De Fruyt, F., Terracciano, A., McCrae, R. R., De Bolle, M., Costa, P. T., & Yik, M. (2009). Perceptions of aging across 26 cultures and their culture-level associates. *Psychology and Aging*, 24(4), 941–954. <https://doi.org/10.1037/a0016901>
- Löckenhoff, C. E., & Rutt, J. L. (2017). Age differences in self-continuity: Converging evidence and directions for future research. *The Gerontologist*, 57(3), 396–408. <https://doi.org/10.1093/geront/gnx010>
- Lu, L. (2005). In pursuit of happiness: The cultural psychological study of SWB. *Chinese Journal of Psychology*, 47, 99–112. <https://doi.org/10.6129/CJP.2005.4702.0>
- Maddux, W. W., & Yuki, M. (2006). The “ripple effect”: Cultural differences in perceptions of the consequences of events. *Personality and Social Psychology Bulletin*, 32(5), 669–683. <https://doi.org/10.1177/0146167205283840>
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological review*, 98(2), 224–253. <https://doi.org/10.1037/0033-295X.98.2.224>
- Matsumoto, D., Yoo, S. H., & Fontaine, J. (2008). Mapping expressive differences around the world: The relationship between emotional display rules and individualism versus collectivism. *Journal of Cross-Cultural Psychology*, 39(1), 55–74. <https://doi.org/10.1177/0022022107311854>
- Moor, N., de Graaf, P. M., & Komter, A. (2013). Family, welfare state generosity and the vulnerability of older adults: A cross-national study. *Journal of Aging Studies*, 27(4), 347–357. <https://doi.org/10.1016/j.jaging.2013.07.002>
- Mumel, D., & Prodnik, J. (2005). Grey consumers are all the same, they even dress the same—myth or reality? *Journal of Fashion Marketing and Management: An International Journal*, 9(4), 434–449. <https://doi.org/10.1108/13612020510620803>
- Nau, M., Dwyer, R. E., & Hodson, R. (2015). Can't afford a baby? Debt and young Americans. *Research in Social Stratification and Mobility*, 42, 114–122. <https://doi.org/10.1016/j.rssm.2015.05.003>
- Nielson, J., & Curry, K. (1997). Creative strategies for connecting with mature individuals. *Journal of Consumer Marketing*, 14(4), 310–322. <https://doi.org/10.1108/07363769710188563>
- Nisbett, R. E. (2004). *The Geography of Thought: How Asians and Westerners Think Differently... and Why*. New York: Free Press
- North, M. S., & Fiske, S. T. (2015). Modern attitudes toward older adults in the aging world: A cross-cultural meta-analysis. *Psychological Bulletin*, 141(5), 993–1021. <https://doi.org/10.1037/a0039469>
- Ortman, J. M., Velkoff, V. A., & Hogan, H. (2014). *An aging nation: the older population in the United States* (pp. 25–1140). Washington, DC: United States Census Bureau, Economics and Statistics Administration, US Department of Commerce
- Park, N. (2004). The role of subjective well-being in positive youth development. *The Annals of the American Academy of Political and Social Science*, 591(1), 25–39. <https://doi.org/10.1177/0002716203260078>
- Petz, J., & Wilson, A. E. (2013). The post-birthday world: Consequences of temporal landmarks for temporal self appraisal and motivation. *Journal of Personality and Social Psychology*, 104, 249–266. <https://doi.org/10.1037/a0030477>
- Prenda, K. M., & Lachman, M. E. (2001). Planning for the future: a life management strategy for increasing control and life satisfaction in adulthood. *Psychology and Aging*, 16(2), 206–216. <https://doi.org/10.1037/0882-7974.16.2.206>

- Ramzan, N., & Amjad, N. (2017). Cross cultural variation in emotion regulation: A systematic review. *Annals of King Edward Medical University*, 23(1), 77–90. <https://doi.org/10.21649/akemu.v23i1.1512>
- Reyes, M. E. S., Carmen, B. P. B., Luminarias, M. E. P., Mangulabnan, S. A. N. B., & Ogunbode, C. A. (2021). An investigation into the relationship between climate change anxiety and mental health among Gen Z Filipinos. *Current Psychology*, 1–9. <https://doi.org/10.1007/s12144-021-02099-3>
- Rutt, J. L., & Löckenhoff, C. E. (2012). Time keeps on slipping? Age differences in the subjective compression of future time. Paper presented at the Annual Meeting of the Society for Personality and Social Psychology, New Orleans, LA
- Rutt, J. L., & Löckenhoff, C. E. (2016). From past to future: Temporal self-continuity across the life span. *Psychology and Aging*, 31(6), 631–639. <https://doi.org/10.1037/pag0000090>
- Sadeh, N., & Karniol, R. (2012). The sense of self-continuity as a resource in adaptive coping with job loss. *Journal of Vocational Behavior*, 80(1), 93–99. <https://doi.org/10.1016/j.jvb.2011.04.009>
- Salthouse, T. A. (2019). Trajectories of normal cognitive aging. *Psychology and Aging*, 34(1), 17–24. <https://doi.org/10.1037/pag0000288>
- Schwartz, S. H. (1999). A theory of cultural values and some implications for work. *Applied psychology*, 48(1), 23–47. <https://doi.org/10.1111/j.1464-0597.1999.tb00047.x>
- Schwartz, S. (2014). Rethinking the concept and measurement of societal culture in light of empirical findings. *Journal of Cross-Cultural Psychology*, 45(1), 5–13. <https://doi.org/10.1177/0022022113490830>
- Sedikides, C., Wildschut, T., Routledge, C., & Arndt, J. (2015). Nostalgia counteracts self-discontinuity and restores self-continuity. *European Journal of Social Psychology*, 45(1), 52–61. <https://doi.org/10.1002/ejsp.2073>
- Sharma, R. (2017). 2017 Global Youth Wellbeing Index. Retrieved from <http://www.youthindex.org/full-report>
- Sims, T., Tsai, J. L., Jiang, D., Wang, Y., Fung, H. H., & Zhang, X. (2015). Wanting to maximize the positive and minimize the negative: Implications for mixed affective experience in American and Chinese contexts. *Journal of Personality and Social Psychology*, 109, 292–315. <https://doi.org/10.1037/a0039276>
- Steel, P., Taras, V., Uggerslev, K., & Bosco, F. (2018). The happy culture: A theoretical, meta-analytic, and empirical review of the relationship between culture and wealth and subjective well-being. *Personality and Social Psychology Review*, 22(2), 128–169. <https://doi.org/10.1177/1088868317721372>
- Suddendorf, T., & Corballis, M. C. (2008). New evidence for animal foresight? *Animal Behaviour*, 75(5), e1–e3. <https://doi.org/10.1016/j.anbehav.2008.01.006>
- Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin, & S. Worchel (Eds.), *The social psychology of intergroup relations* (48 vol., p. 33). Monterey, CA: Brooks/Cole
- Tov, W., & Nai, Z. L. S. (2018). Cultural differences in subjective wellbeing: How and why. In J. E. Maddux (Ed.), *Frontiers of social psychology. Subjective well-being and life satisfaction* (pp. 50–73). Routledge/Taylor & Francis Group
- Tsai, J. L., Knutson, B., & Fung, H. H. (2006). Cultural variation in affect valuation. *Journal of Personality and Social Psychology*, 90(2), 288–307. <https://doi.org/10.1037/0022-3514.90.2.288>
- Turner, J. C., Oakes, P. J., Haslam, S. A., & McGarty, C. A. (1994). Self and collective: Cognition and social context. *Personality and Social Psychology Bulletin*, 20, 454–463. <https://doi.org/10.1177/0146167294205002>
- Twenge, J. M. (2019). The sad state of happiness in the United States and the role of digital media. In *The World Happiness Report* (Chap. 5). Retrieved from: <http://worldhappiness.report/ed/2019/the-sad-state-of-happiness-in-the-united-states-and-the-role-of-digital-media/>
- Ulloa, B. F. L., Moller, V., & Sousa-Poza, A. (2013). How does subjective well-being evolve with age? A literature review. *Journal of Population Ageing*, 6, 227–246. <https://doi.org/10.1007/s12062-013-9085-0>
- Van Gelder, J. L., Hershfield, H. E., & Nordgren, L. F. (2013). Vividness of the future self predicts delinquency. *Psychological science*, 24(6), 974–980. <https://doi.org/10.1177/0956797612465197>
- Van Tilburg, W. A., Sedikides, C., Wildschut, T., & Vingerhoets, A. J. (2019). How nostalgia infuses life with meaning: From social connectedness to self-continuity. *European Journal of Social Psychology*, 49(3), 521–532. <https://doi.org/10.1002/ejsp.2519>
- Visser, M., Pluijm, S. M., Stel, V. S., Bosscher, R. J., & Deeg, D. J. (2002). Physical activity as a determinant of change in mobility performance: the Longitudinal Aging Study Amsterdam. *Journal of the American Geriatrics Society*, 50(11), 1774–1781. <https://doi.org/10.1046/j.1532-5415.2002.50504.x>

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.