

For the Benefit of Others: Generativity and Meaning in Life in the Elderly in Four Cultures

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Generativity has been argued to be an important indicator of successful aging. Indeed, generative concern has been found to be associated with meaning in life. In the present study, this relationship is argued to be partly explained through generative goals. Moreover, the path between generative goals and meaning in life is hypothesized to be conditional on belief in the species (assessed through Machiavellianism as a proxy variable). This moderated mediation model is tested with data from 4 cultural samples: 856 Cameroonian, Czech, German, and Hong Kong Chinese participants aged at least 60 years provided information on their generative concern, generative goals, meaning in life, and Machiavellianism. Controlling for effects of relationship, level of education, everyday competence, and cognitive functioning on meaning in life, analyses confirmed the moderated mediation model in all cultural samples. That is, generative concern is partly associated with meaning in life because it leads to generative goals. In turn, these provide individuals with meaning in life. This association, however, depends on belief in the species in that meaning in life does not increase when Machiavellian attitudes compete with generative goals.

Keywords: generativity, belief in the species, goals, well-being, Machiavellianism

Rowe and Kahn (1998) proposed a definition of successful aging that emphasizes three components: minimizing the risk of disease and disability, maintaining physical and mental function,

and continuing engagement with (social) life. In our study, we focus on the last-mentioned facet which Rowe and Kahn argue consists of cultivation of social relationships as well as productivity. We do so by stressing the significance of generative strivings for well-being in old age as generativity offers the opportunity to be productive (e.g., by offering advice) in a social context (i.e., support for the recipient of one's generative endeavors). Up to now, few studies have examined the impact of generativity on human development in late adulthood. Thus, Kruse and Wahl (2009) identify generativity as a developmental issue that has yet to be fully acknowledged for its contributions to successful aging. Given that most findings on determinants and consequences of generativity stem from Western samples (Arnett, 2008), the generalizability of what is known about generativity is problematic. Thus, the present study examines the relationship between generativity and well-being among elderly people in highly diverse cultural contexts: Cameroon, the Czech Republic, Germany, and Hong Kong.

In Erikson's life span theory, generativity is the central developmental issue of middle adulthood. Erikson defines generativity as "the concern in establishing and guiding the next generation" (Erikson, 1963, p. 276). That is, generative individuals intend to pass on knowledge and experiences to their junior ones to help them develop and thrive. Generativity can be expressed in a variety of social roles (MacDermid, Franz, & De Reus, 1998) and has been found to affect, for example, parenting behavior (e.g., Peterson,

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2006) and political activities (e.g., Peterson, Smirles, & Wentworth, 1997).

The fact that the developmental crisis of generativity is postulated to be set during middle adulthood does not mean, however, that generativity is restricted to this life stage (see e.g., Busch & Hofer, 2011, for generative concern in adolescents). Indeed, Kotre (1996) argued that various behavioral expressions of generativity might peak at different points in the life cycle. Specifically, cultural generativity, defined as the passing on and keeping of culturally relevant symbol systems (i.e., ideas, values) is postulated to peak later in life. Similarly, it has been argued that establishing the next generation and guiding the next generation might best be conceptualized as distinct life stages, with generativity as the establishment of younger generations preceding generativity as the guidance of younger generations (e.g., Vaillant & Milofsky, 1980). In fact, in his later theorizing, Erikson himself acknowledged that generativity is of great importance in the process of aging (Erikson, Erikson, & Kivnick, 1986): Generative demands may change with old age, but they do not disappear, and generativity is a vital element of the elderly's life review.

In line with this argument, generativity can be regarded as "evidence of a successful aging process" (Schoklitsch & Baumann, 2011, p. 32). For example, generative people are likely to come to a positive balance in a life-review, that is, achieve ego-integrity (James & Zarrett, 2005). Also, asked about their definitions of successful aging, older people phrase a large share of their responses in terms of generativity (Fisher, 1995). Generally, aging is associated with a motivational shift away from goals and projects that will bring about some personal benefits in the future. Rather, older people focus on immediate emotional benefits (Carstensen, Isaacowitz, & Charles, 1999) and on ego-transcending goals (Brandtstädter, Rothermund, Kranz, & Kühn, 2010; Tornstam, 1997). In line with this reasoning, generativity has been found to be a goal that is highly esteemed by people who perceive their future time as limited (as tends to be the case with older individuals; Lang & Carstensen, 2002). Moreover, several studies report that generative goals become more important with age (e.g., McAdams, de St. Aubin, & Logan, 1993; Sheldon & Kasser, 2001). Hence, generativity is an important developmental task in the aging process.

In an effort to systematize research on generativity, McAdams and de St. Aubin (1992) have introduced their generativity model. It consists of seven interrelated aspects: an (a) inner desire and (b) cultural demands are sources of (c) generative concern, that is, a positive attitude toward generativity. Generative concern in turn is a source of (d) generative goals, provided a (e) belief in the species is present. Generative goals, in turn, are put into practice in (f) generative action which then is integrated into a person's (g) life story in a meaningful way (see McAdams, Hart, & Maruna, 1998, for more details).

Although the model has been successful in initiating research on generativity and a variety of predictions have been confirmed empirically (e.g., Hofer, Busch, Chasiotis, Kärtner, & Campos, 2008; see McAdams et al., 1998), the role of belief in the species has yet to be examined in detail. Erikson (1963) argues that people may show behaviors that have a generative appearance but still fail to be truly generative. For example, parenthood may be seen as a prototypically generative behavior (cf. Kotre's, 1996, concepts of biological and parental generativity). Still, Erikson (1963) says, to

be a truly generative parent you need the conviction that your generative effort is worthwhile. That is, you have to be convinced that humankind develops in a positive way and that those intended to receive your generative efforts will appreciate this contribution (e.g., McAdams, 2000; McAdams & de St. Aubin, 1992). Otherwise, one would be forced to question the worth of one's generative behavior: To use Erikson's example, why have children if humankind turns the world into a worse place to live in every day? Why teach my children about what I have learnt in life if he or she will dismiss what I am saying anyway?

In their generativity model, McAdams and de St. Aubin (1992) take up Erikson's idea of belief in the species by proposing that without this belief people find it hard to commit to generative goals. More specifically, they postulate that generative goals are stimulated by generative concern. Generative concern is the first conscious representation of generativity in the individual: People care for how the following generations fare. That is, generative concern denotes a general willingness to help younger generations thrive. This general willingness to become generative is then translated into more specific generative goals (for empirical confirmations of this relation see Hofer et al., 2008; McAdams et al., 1993). According to the generativity model, however, this relationship is qualified by belief in the species: When belief in the species is present, generative concern is easily translated into generative goals; its absence, on the other hand, reduces the extent to which generative concern results in generative goals.

Again, it is unfortunate that belief in the species has hardly received any attention in research on generativity. Thus, the exact role of belief in the species has not yet been examined. A major reason for this lack of research is that no instrument has been established that specifically assesses belief in the species yet. Instead, researchers have tried to approach the belief in the species concept by proxy variables. For example, Van De Water and McAdams (1989) employed scales such as, for example, faith in people and basic trust to tap belief in the species. This attempt, however, has not yet received any replication.

More recently, Machiavellianism has been argued to be a proxy for belief in the species (Busch & Hofer, 2012). Machiavellianism is a personality trait that combines a cold and manipulative view on others and a cynical moral stance so that behavior is selected which allows a maximal satisfaction of the Machiavellian's intentions (for an overview, see Jones & Paulhus, 2009). Consequently, Machiavellians have frequently been found to lie or cheat (Jones & Paulhus, 2009). That is, they readily manipulate others to achieve their goals and disprize other people's concerns because they see others as means rather than ends (Christie & Geis, 1970). McHoskey (1999) demonstrated that people high in Machiavellianism have little interest in contributing to society. Moreover, if they do show prosocial behavior, Bereczkei, Birkas, and Kerekes (2010) argue, it needs to be public so they gain prestige and recognition. Thus, ultimately, even seemingly prosocial behavior serves a selfish agenda. In sum, the cynical and self-centered Machiavellian perspective seems hardly compatible with the "hope in the advancement and betterment of human life in succeeding generations" characteristic of belief in the species (McAdams & de St. Aubin, 1992, p. 1006). Thus, Machiavellianism is well suited to capture the low end of belief in the species.

Although McAdams and de St. Aubin's (1992) model of generativity assumes that belief in the species affects generative goal

commitment, this effect has not yet been subject to empirical examination. In fact, the first study on belief in the species found the proxy variables representing belief in the species to be associated with self-reported generative behavior arguing that belief in the species is “a key prerequisite for generative action” (Van De Water & McAdams, 1989, p. 437). This suggests that it might not only be the setting of generative goals which is affected by belief in the species but the actualization of generative goals as well: Generative goals may be set in spite of low belief in the species, but under such circumstances generative goals fail to be actualized in corresponding behavior. Thus, a lack of belief in the species might affect consequences of generative goal setting as much as generative goal setting per se. We propose that people lacking belief in the species would not derive any meaning from their generative goals.

Generally, goals provide individuals' lives with meaning and a sense of purpose (e.g., Bühler & Massarik, 1968; Frazier, Newman, & Jaccard, 2007). Indeed, Ryff (1989) proposes that having goals is an aspect of positive functioning in its own right. As Emmons (2003, p. 107) puts it, “goals are essential components of a person's experience of his or her life as meaningful and contribute to the process by which people construe their lives as meaningful and worthwhile” (note that the latter thought is reflected in the fact that generative individuals tend to emphasize prosocial goal pursuit in their life stories; McAdams, Diamond, de St. Aubin, & Mansfield, 1997). Goal pursuit is thus reliably found to contribute to well-being (e.g., Diener, 1984; Emmons, 1986). However, the full potential of goal pursuit to foster well-being can be amplified by internal factors as for example in the case of goals that are intrinsic rather than extrinsic (see Deci & Ryan, 2000, for an overview) or congruent with one's implicit motive system (e.g., Hofer, Busch, Bond, Li, & Law, 2010). We assume that in the context of generativity, belief in the species is such a factor. Thus, the concurrence of generative goals and strong belief in the species ought to be more beneficial for well-being than generative goals that are pursued despite a low belief in the species.

Previous research, however, has focused on the relation of generative concern rather than generative goals with well-being. Generative concern has consistently been found to promote life satisfaction (e.g., Ackerman, Zuroff, & Moskowitz, 2000; Hofer et al., 2008) and purpose in life (e.g., Busch & Hofer, 2012; Grossbaum & Bates, 2002). That is, generative concern has already been demonstrated to be associated with meaning in life. To the best of our knowledge, however, no study has considered the relation of generative concern and generative goals with meaning in life simultaneously.

The Present Research

To sum up, for reasons given above it is hypothesized that the relationship between generative concern and meaning in life is—at least—partly mediated by generative goals. Hence, we assume that generative concern as a positive attitude toward generativity motivates people to set corresponding goals which then provide them with a sense of meaning in life. Yet, the mediation effect is hypothesized to be moderated by belief in the species. Only high levels of belief in the species will allow elderly people to perceive enhanced levels of meaning in life by pursuing generative goals. Due to the lack of a direct measure of belief in the species,

Machiavellianism will be used as an indicator of a lack of belief in the species (see Busch & Hofer, 2012). In Figure 1, the hypothesized relationships among psychological constructs are presented. Additionally, measurements of physical and cognitive competence were included to control for effects on elderly people's well-being (Waddell & Jacobs-Lawson, 2010).

A second focus derives from the cross-cultural design. The present study assumes that the psychological mechanisms delineated above can be generalized to a variety of cultural contexts. It is argued that culture-bound patterns of socialization affect individuals' cognitive, emotional, and motivational processes (Keller, 2007; Markus & Kitayama, 1991). Thus, the cultural context shapes developmental processes and affects an individual's behavior and strivings by representing a major source of (behavioral) determinants that have their locus outside the individual (Pepitone, 1976). Yet, there is latitude for variation in individuals' basic components of personality (e.g., motives, traits) among members of a given cultural group arising from biological and educational variations. Additionally, recent research has shown that despite a surface diversity in cultural norms and values, there are certain invariant aspects of basic human psychological processes (e.g., Hofer et al., 2010; for aging-related findings see Fung, Carstensen, & Lutz, 1999). Thus, we challenge the idea that culture per se results in variability in basic psychological mechanisms or processes and hypothesize that the proposed relationship between psychological constructs is found across diverse cultural contexts.

To make such a cross-cultural generalization as broad as possible, it is indispensable to assess data from cultural samples representing a wide range of cultural marker variables (van de Vijver & Leung, 1997). The selection of cultures in the present study was based on value orientations (Schwartz, 1992), which show considerable overlap with other cultural markers such as individualism/collectivism (e.g., Triandis, 1996). Thus, participants were recruited in Cameroon, China (Hong Kong), the Czech Republic, and Germany because recent research has provided evidence that Cameroonian, Chinese, Czech, and German participants significantly differ from each other in their value orientations (e.g., Hofer et al., 2010; Jowell & the Central Coordinating Team, 2007). Still, this assumption guiding the selection of cultures for the present study was tested by including a measure of value orientations.

Method

Sample

To assure cultural homogeneity within the four samples, only native participants were recruited. With respect to the multiethnic

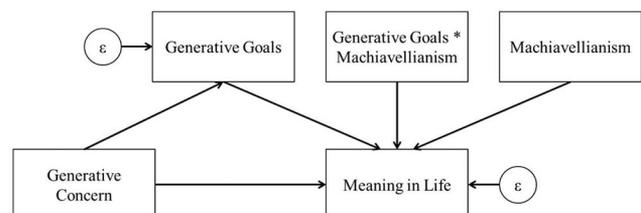


Figure 1. Model on mediational effect of generative goals on the relationship between generative concern and meaning in life moderated by Machiavellianism.

population in Cameroon, sampling was restricted to ethnic Grassfield Bantus (Nso) from the Anglophone northwest province in Cameroon (Mbaku, 2005). Chinese participants were recruited in Hong Kong and recruitment of Czech participants was done in Prague and Olomouc. Finally, German participants were recruited in Osnabrück.

In total, data for present analyses were collected from 856 noninstitutionalized participants (for sociodemographic information see Table 1). Of these, 225 were from Cameroon, 243 from China, 163 from the Czech Republic, and 224 from Germany. With exception of the Chinese sample, cultural samples were reasonably balanced concerning gender. Participants ranged in age from 60 to 90 years. Women and men did not differ in mean age. Yet, cultural samples differed in mean age ($F_{(3, 852)} = 78.14; p < .001; \eta^2 = .22$): Chinese and Czech participants were significantly older than Cameroonian and German participants who in turn also differed significantly from each other in age. Eta-squared (η^2) is reported as index of the strength of association; η^2 s of .01, .06, and .14 can be interpreted as small, medium, and large effect size, respectively.

Participants' level of education was categorized into three categories, that is, low (primary school education or less), medium (junior secondary school or ordinary level education), and high education (secondary school or university education). Analyses revealed differences between cultural samples in the distribution of educational levels ($\chi^2_{(6)} = 296.49; p < .001$): Low levels of education were more often assigned to Cameroonian and Chinese participants. Additionally, a medium level of education could not be assigned to Czech participants due to types of degrees in the educational system.

In total, 560 participants were in a current relationship (married: $n = 540$) and 296 participants (widowed: $n = 192$) reported to live without a steady partner. Although the percentage of participants

having a steady relationship did not greatly differ between samples from China, the Czech Republic, and Germany, it was highest among Cameroonian participants ($\chi^2_{(3)} = 22.46; p < .001$).

Only 61 of the study participants were childless, and 795 had at least one child (range: 1 to 18; $M = 3.23; SD = 2.45$). Analyses showed ($F_{(3, 852)} = 220.91; p < .001; \eta^2 = .44$) that the highest number of children born was reported by Cameroonian participants, followed by Chinese participants, and, finally, by Czech and German participants. The latter two did not differ from each other in number of children.

Procedure

Recruitment in Germany was done via local newspapers. In the Czech Republic and China, elderly people were contacted via flyers and notes in local senior centers. Typically, elderly people in Cameroon return to their home village after retirement. Thus, local research assistants visited villages near major cities in the north province of Cameroon to recruit elderly people for the present study.

All participants were volunteers and were guaranteed that any information given would be treated confidentially. Cameroonian and German participants were given monetary compensation proportional to average differences in GDP per capita. Chinese and Czech study subjects received coupons to buy goods at will in local supermarkets. Data collection was done on university premises in Germany and in local senior centers in Hong Kong; in the other regions, it was mostly conducted at the participants' homes. At all research sites, local research assistants familiar with all instruments applied were present while participants worked through questionnaires to help clarify any questions that arose.

Instruments were administered in either Chinese (China), Czech (the Czech Republic), or German (Germany). In Cameroon Eng-

Table 1
Descriptive Statistics of Sociodemographic Information, Value Orientations, Meaning in Life, Generative Concern, Generative Goals, Machiavellianism, Instrumental Activities of Daily Living, and Cognitive Competence in the Four Cultural Samples

Measurement	Cameroon <i>M (SD)</i>	China <i>M (SD)</i>	Czech Rep. <i>M (SD)</i>	Germany <i>M (SD)</i>
Sociodemographic information				
1. Age	64.60 (5.62)	72.63 (7.41)	71.45 (5.55)	67.49 (5.78)
2. Gender (% females)	48.7	72.8	56.4	54.9
3. Education (% low/medium/high)	63.3/16.8/19.9	52.7/25.9/21.4	9.8/0/90.2	21.0/30.4/48.7
4. Relationship status (% without partner)	22.6	39.1	43.6	35.3
5. Number of children born	5.88 (2.79)	2.78 (1.61)	1.96 (.93)	1.98 (1.30)
Value orientations (selection of cultural groups)				
6. Openness to change	3.06 _c (1.34)	3.51 _b (1.21)	2.99 _c (.99)	4.20 _a (1.06)
7. Conservation	5.21 _a (.59)	5.28 _a (.91)	4.52 _b (.89)	3.98 _c (1.02)
Psychological variables for structure-oriented analyses				
8. Meaning in life	4.38 (.76)	4.10 (1.13)	4.36 (1.00)	4.25 (1.03)
9. Generative concern	2.06 (.44)	1.11 (.61)	1.52 (.49)	1.46 (.52)
10. Generative goals	3.35 (.50)	3.12 (.73)	3.32 (.59)	3.03 (.64)
11. Machiavellianism	1.30 (.49)	1.37 (.61)	1.70 (.64)	1.29 (.62)
Everyday and cognitive competence (control variables in structure-oriented analyses)				
12. Everyday competence	2.57 (.65)	3.11 (.55)	3.06 (.47)	3.34 (.38)
13. Cognitive competence ¹	.54 (1.31)	.27 (.83)	-.47 (.66)	-.50 (.48)

Note. a, b, c = Different subscripts for value orientations indicate statistically significant differences between cultural samples. See text for details. ¹ = Descriptives for the subtests of the NAI within the four cultural samples: ZVT-G (CAM: $M = 58.05; SD = 37.19$; CH: $M = 40.07; SD = 21.35$; CZ: $M = 29.54; SD = 10.85$; GER: $M = 25.14; SD = 8.68$); LT-G (CAM: $M = 59.30; SD = 38.73$; CH: $M = 49.88; SD = 24.45$; CZ: $M = 36.94; SD = 25.69$; GER: $M = 35.06; SD = 16.78$); BT (CAM: $M = 5.15; SD = 1.01$; CH: $M = 4.18; SD = 1.22$; CZ: $M = 5.72; SD = 1.06$; GER: $M = 5.33; SD = 1.02$).

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lish versions of instruments were administered. Although English is not the native language among the Nso in the northwest province of Cameroon, it represents the official language and is exclusively used in educational institutions and predominantly so in everyday life. Moreover, only very few people are able to read or write in the colloquial languages in Cameroon. However, local assistants who were all ethnic Nso were trained to give (standardized) illustrations of test items in Lamnso (native language of the Nso) or Pidgin-English when necessary.

Measurements

Measurements applied for the present study were part of a cross-cultural project on successful aging in different cultural contexts. Instruments were administered to participants individually. First, the questionnaires on meaning in life, life goals, value orientations, generative concern, Machiavellianism, and activities of daily living (ADLs) were given. Next, participants provided information on their sociodemographic characteristics and took a brief test on their cognitive performance.

Although some instruments were available in all language versions needed (e.g., the Schwartz Value Survey, SVS; Schwartz, 1992), others had to be translated into Chinese and/or Czech. The lacking Chinese instruments were translated from their original English versions by bilingual research assistants in Hong Kong. The lacking Czech instruments were translated from their English or German version by a professional translator into Czech. The quality of all translated material was ensured by a back-translation by bilingual psychologists.

Meaning in life. Perceived meaning in life was assessed with the subscale presence of meaning (MLQ-P; e.g., “My life has a clear sense of purpose”) of the meaning in life questionnaire (Steger, Frazier, Oishi, & Kaler, 2006). Participants are asked to rate each of the five items on a 7-point Likert scale ranging from 0 (*strongly disagree*) to 6 (*strongly agree*). Cronbach’s Alpha for the total sample was .79 (ranging from .72 among Cameroonian to .83 among Chinese participants).

Generative goals. The questionnaire GOALS (Pöhlmann & Brunstein, 1997) measures the importance participants assign to goals from various life domains. Participants are asked to rate goals on a 5-point Likert scale from 0 (*not at all important*) to 4 (*very important*). In the present study, four items measuring the importance of altruistic goals (i.e., support other people in their efforts; act selflessly; do good; help other people who are in need) were used to assess generative strivings of elderly people. Cronbach’s Alpha was .77 for the total sample (ranging from .71 in the Cameroonian to .79 in the Chinese sample).

Value orientations. As a cultural marker for differences between samples, the Schwartz Value Survey (Schwartz, 1992) was administered to assess the importance that individuals ascribe to certain value orientations as guiding principles for their lives. In the present study, only 22 items were used that have universally been shown to have the same meaning with respect to the higher order value types *conservation* (14 items; subsumes the value types of conformity, security, and tradition; e.g., honoring parents and elders; family security; humble) and *openness to change* (eight items; subsumes the value types of self-direction and stimulation; e.g., choosing own goals; varied life). These two value dimensions were selected as openness to change with its emphasis on auton-

omy and self-direction relates to individualism, and conservation with its emphasis on self-restriction and protection of stability to collectivism (Triandis, 1996). Items are rated on a Likert scale from -1 (*opposed to my values*) to 7 (*of supreme importance*). In total, datasets of 834 (openness to change) and 821 (conservation) participants, respectively, could be used for analyses. Cronbach’s Alpha was .86 for conservation (ranging from .75 in the Cameroonian to .85 in the German sample) and .79 for openness to change (ranging from .74 in the Czech to .81 in the German and Cameroonian samples).

Generative concern. The Loyola Generativity Scale (LGS; McAdams & de St. Aubin, 1992) was administered to assess generative concern. The LGS includes 20 items (e.g., “I try to pass along the knowledge I have gained through my experience”) designed to measure a general disposition for generativity. Participants are asked to evaluate items on a 4-point Likert scale from 0 (*never*) to 3 (*very often*). Cronbach’s Alpha was .86 (ranging from .75 in the Cameroonian to .84 in the Czech sample).

Machiavellianism. The tendency to view people as objects to be manipulated and exploited with emotional detachment and cool calculation was measured by administering the Mach IV (Christie & Geis, 1970). In the present study only the 10 positively phrased statements reflecting Machiavellian views of human nature (e.g., “Anyone who completely trusts anyone else is asking for trouble”) were used. The items are evaluated on a 5-point Likert scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*). Cronbach’s Alpha was .66 (ranging from .60 among Cameroonian to .75 among German participants).

Everyday competence. Effective coping with daily demands was assessed by reports on difficulties in instrumental activities of daily living (IADL; Lawton & Brody, 1969). Originally, 16 items covering various domains of activities (e.g., food preparation and shopping; handling of finances and medication; housekeeping; modes of transport) were used. However, initial analyses showed that two items (e.g., daily routines in meals) did not add to the reliability of the construct in the Czech and German samples. Thus, the final IADL-scale included 14 items. Participants rated each item (e.g., “In case I have to take some medicine, I always know exactly when and at which dosage to take it”) on a 5-point Likert scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*). Cronbach’s Alpha was .85 (ranging from .73 in the German to .84 in the Cameroonian and Chinese samples).

Cognitive performance. In contrast to self-reported difficulties in IADLs, three subtests of the Nürnberger Altersinventar (NAI; Oswald & Fleischmann, 1997) were administered to assess participants’ cognitive speed and memory performance. Cognitive functioning has been described as an indicator of successful aging (e.g., Rowe & Kahn, 1998) and relates to measurements of subjective well-being among elderly people (e.g., Staudinger & Fleeson, 1996). In the present study, two subtests for speed of information processing were administered, that is, the “number-connection test” (ZVT-G; two exercise and two test sheets) and the “labyrinth test” (LT-G; one exercise and one test sheet): (a) On each test sheet of the ZVT-G, the numbers 1 to 30 are printed in a scrambled order and have to be connected with a pen as fast as possible. Mean time in seconds for the two test trials indicates cognitive speed; (b) The LT-G measures efficiency of visuomotor coordination: By using a pen, participants are asked to find the way out of a labyrinth as fast as possible. The time of the test trial is the

indicator of cognitive functioning. Finally, memory performance was assessed by a third subtest, the “picture-test” (BT). Participants are shown seven picture cards (each for approximately 3 s; e.g., screwdriver, button). Immediately after the presentation, participants are asked to recall the pictures. The number of correct pictures represents the index for memory performance.

The three criteria for cognitive speed and memory functioning are combined to form one single indicator of cognitive performance. Intercorrelations among the measures were sufficiently high with $r = .72$ between the two speed tests ($p < .001$) and $r = -.25$ (LT-G) and $-.23$ (ZVT-G; $p < .01$), respectively, between the memory performance and speed tests. To produce a single measure of cognitive performance the three test scores were combined based on the regression factor scores for the first component derived from principal components analysis that accounted for 62% of the variance within the total sample. Factor loadings of the emerged one-factor solution were .90 (LT-G), .89 (ZVT-G), and $-.50$ (BT). Thus, low scores indicate good cognitive performance.

Equivalence of measurements across cultural groups. With the exception of differences in value orientations (cultural marker), the present study has a structure-oriented rather than a level-oriented focus. That is, the emphasis is on the relationship among psychological constructs across cultural groups rather than differences in mean levels of test scores between cultural samples. However, data on psychological constructs included in the hypothesized model (generative concern, generative goals, meaning in life, Machiavellianism) were examined for measurement invariance across cultural samples to guarantee that (latent) variables in the hypothesized models are psychometrically sound.¹

Internal consistencies indicate that sets of items can be treated as measuring single latent variables across cultural samples under investigation. Additionally, none of the scales showed an internal consistency that falls below an acceptable α of .6 (Nunnally, 1978). To further scrutinize cross-cultural applicability of data, exploratory factor analyses (EFA; principle component analysis) were conducted separately for each of the four scales within each cultural sample. With respect to measurements of generative goals, meaning in life, and Machiavellianism, findings indicate that all items show significant factor loadings on a single factor within each cultural sample. Ranges of factor loadings across the four samples are .60 to .87 for generative goals, .47 to .86 for meaning in life, and .27 to .71 for Machiavellianism. Results of the EFA for generative concern were less straightforward. Analyses indicated that all six reverse coded items of the LGS should be excluded from further analyses because of nonsignificant factor loadings in at least one cultural group. Additionally, the item referring to adopting children was excluded as it did not show a significant factor loading in the Cameroonian and Czech data.

Next, measurement equivalence of generative goals, meaning in life, Machiavellianism, and the reduced scale for generative concern (13 items) across the cultural subsamples was examined in more detail by use of multigroup confirmatory factor analysis. It was tested whether the measurement model upholds by specifying two models, one including the data on meaning in life and Machiavellianism, and the other the data on generative goals and generative concern.

According to Kline (1998), the ratio of cases/observations to number of free parameters ought to be in the range of 10 or even

20. Thus, to reduce the number of free parameters to be estimated in the measurement models, item parcels were built for the measurements of Machiavellianism and generative concern. Although item parceling is controversially discussed in literature (e.g., Little, Cunningham, Shahar, & Widaman, 2002), it is an appropriate means in SEM procedures if unidimensionality of constructs under investigation is given (e.g., Bandalos, 2002). EFAs approved unidimensionality of measurements. For building parcels, we used random assignment resulting in homogenous samples that were similar in variance. With respect to Machiavellianism, three parcels were built that included three or four items. Similarly, the three parcels built for the remaining item set of the LGS contained four or five items.

The first measurement model (Model A) included the two latent variables meaning in life and Machiavellianism which were measured by five items and three parcels, respectively. The second measurement model to be tested (Model B) included the latent variables generative goals (four items) and generative concern (three parcels). In the specified models latent factors were allowed to be correlated. Two increasingly restrictive measurement models were defined: first, the unconstrained model with no equality constraints across cultural groups; second, the measurement weights model where the measurement weights were constrained to be equal across all groups and the variances and covariance of the two latent scores were estimated separately for each group.

Referring to Model A (meaning in life and Machiavellianism), the unconstrained model (144 data points, 68 unknown parameters) adequately fit our data ($\chi^2/\text{degrees of freedom}$: 1.77; CFI: .97; RMSEA: .030). Within each of the cultural samples, all items/parcels significantly loaded on the specified factor with critical ratios (CR) ≥ 3.03 ($p < .01$). Also, the measurement weights model with factor loadings constrained to be equal across cultural samples showed a good data fit ($\chi^2/\text{degrees of freedom}$: 1.91; CFI: .96; RMSEA: .033).

With respect to Model B (generative goals and concern), both, the unconstrained model (112 data points; 60 unknown parameters; $\chi^2/\text{degrees of freedom}$: 1.81; CFI: .98; RMSEA: .031; CRs ≥ 5.10 ; $p < .001$) and the measurement weights model ($\chi^2/\text{degrees of freedom}$: 1.93; CFI: .97; RMSEA: .034) adequately fit the data.

Using chi-square difference tests, nested model comparisons indicated an impairment of fit when constraining factor loadings (Model A: $\chi^2(18) = 45.08$; Model B: $\chi^2(15) = 35.44$). However, the chi-square statistic is dependent on sample size and small differences become easily significant if sample size is large. Thus, evaluating the fit of two nested models ought to be done from the perspective of multiple fit indices (Cheung & Rensvold, 2002). According to recommendations set forth by Chen (2007) and Cheung and Rensvold (2002), the hypotheses of measurement invariance should not be rejected when change in fit indices from

¹ As the SVS has already been widely and successfully used in more than 80 cultural contexts around the globe (e.g., Schwartz, 1992) and data on value orientations are only used as cultural markers we could refrain from testing measurement invariance. Likewise, data on IADLs which served to control for everyday competence in individuals' meaning in life were excluded from detailed analyses on measurement invariance. Yet, internal consistencies of value dimensions and everyday competence, respectively, point to applicability of measurements in the cultural samples at hand.

the unconstrained to the more constrained model is low (e.g., $\Delta\text{CFI} \leq -.01$; $\Delta\text{RMSEA} \leq .015$). Following these guidelines, constraining factor loadings across cultural samples did not result in an impairment of fit (Model A: $\Delta\text{CFI} = -.01$; $\Delta\text{RMSEA} \leq .003$; Model B: $\Delta\text{CFI} = -.01$; $\Delta\text{RMSEA} \leq .003$).

To conclude, analyses on measurement equivalence indicate configural and metric invariance allowing us to meaningfully examine structural relationships among psychological constructs across cultural groups. In subsequent analyses, the reduced generative concern scale (13 items) will be used. Cronbach's Alpha was .86 (ranging from .81 in the Cameroonian to .86 in the Chinese sample).

Results

Results will be presented according to the following schema: First, to scrutinize whether cultural samples were appropriately selected, assumptions on cultural orientations in the present samples will be tested by examining mean differences in value orientations. Next, correlations among psychological measurements in the total sample as well as correlations between psychological measurements and individuals' sociodemographic characteristics and their everyday competence and cognitive functioning will be given. The latter set of correlations is conducted to identify effects of sociodemographic characteristics as well as everyday competence and cognitive functioning on the dependent variable, that is, meaning in life. Variables impacting meaning in life will be controlled for in subsequent analyses. Finally, analyses on the fit of the mediation model (generative concern, generative goals, and meaning in life) and the moderated mediation model (moderating effect of Machiavellianism) for the total sample but also across cultural groups will be presented. Descriptive data on measures are presented in Table 1.

Differences in Value Orientations Between Cultural Samples

A multivariate analysis of variance (MANOVA) with higher-order value types as dependent variables and culture as factor was conducted to test for differences in higher order value types between cultural samples. Multivariate statistics indicated variability across cultural groups ($F_{(6, 1610)} = 99.37/\text{Wilks's criterion}$; $p < .001$; $\eta^2 = .97$). Culture showed a significant effect on openness to change ($F_{(3, 806)} = 42.72$; $p < .001$; $\eta^2 = .14$) and conservation ($F_{(3, 806)} = 105.98$; $p < .001$; $\eta^2 = .28$). Post hoc tests (Bonferroni) showed that German participants scored significantly higher for openness to change than Czech, Chinese, and Cameroonian participants ($ps < .001$). Additionally, Chinese participants reported higher levels of openness to change than Cameroonian and Czech participants ($ps < .001$). With respect to conservation, German participants scored lowest ($ps < .001$). Finally, Czech participants showed lower levels of conservation than Cameroonian and Chinese participants ($ps < .001$). To conclude, findings indicate significant variation across important dimensions of value orientation that are typically used as cultural markers, and substantiate the assumptions guiding the selection of cultural groups for the present study.

Correlations Among Psychological Measurements as Well as Between Psychological Measurements and Sociodemographic Variables, Everyday Competence, and Cognitive Functioning

In the upper part of Table 2, correlations among psychological measurements are given. As shown, meaning in life was significantly positively associated with generative concern and goals, and negatively related to Machiavellianism. Furthermore, generative concern showed a significant positive association with generative goals. Level of Machiavellianism was unrelated to measurements of generative concerns and goals.²

In the lower part of Table 2, correlations between psychological measurements and participants' age, gender, level of education, relationship status, number of children, everyday competence, and cognitive functioning are presented. With respect to meaning in life, that is, the dependent variable in subsequent analyses, higher levels of meaning in life were significantly associated with both a higher degree of school education and having a steady relationship. Although no significant effects could be found for participants' age, gender, and number of children, everyday and cognitive competence were significantly related to meaning in life: The better participants' everyday and cognitive competence, the higher were the reported levels of meaning in life. Thus, participants' level of education and relationship status as well as their everyday and cognitive competence were controlled for in subsequent analyses on meaning in life.

Significant associations were also identified for generative concern: Age and number of children were significantly positively related to generative concern. Furthermore, higher reports of generative concern were significantly related to a higher level of education, to having a steady partner, and to being male, but not to measures of everyday and cognitive competence. Only a higher number of children born was significantly associated with generative goals. Finally, higher levels of Machiavellianism were significantly associated with a higher age and with being male.

Testing the Mediation and Moderated Mediation Model

In the final part of the result section, analyses on the proposed models of mediation and moderated mediation will be presented. First, findings derived from the total sample will be given. Next, the fit of the hypothesized models across cultural groups will be examined.

Testing the mediation effect of generative goals. We hypothesized that commitment to generative goals mediates the link between generative concern and meaning in life. The simple mediation, which can be considered to represent an average model, was tested by applying Preacher and Hayes' (2004) model for estimating the size and significance of the indirect effect in simple mediation. In analyses, the dependent variable, that is, meaning in life, was controlled for effects of relationship status, level of education, and everyday and cognitive competence. Criteria for

² As examining the fit of the mediation and moderated mediation models across cultural samples involves a testing of differences in strength of paths between constructs, we could refrain from testing differences in strength of correlational patterns between cultural samples.

Table 2
Correlations Among Meaning in Life, Generative Concern and Goals, and Machiavellianism and Between Psychological Measurements and Sociodemographic Variables, Everyday Competence, and Cognitive Functioning

Measurement	1 Meaning in life	2 Generative concern	3 Generative goals	4 Machiavellianism
1	—			
2	.31***	—		
3	.17***	.30***	—	
4	-.13***	-.03	-.05	—
Age	-.03	.27***	-.01	.11**
Gender ¹	.05	.14***	-.03	.11**
Level of Education	.12**	.08*	-.02	.03
Relationship status ¹	.09*	.10**	.01	-.03
Number of children born	.06	.33***	.12**	-.04
Everyday competence	.09*	-.05	-.06	.05
Cognitive competence	-.14***	.03	-.01	.02

Note. ¹ = Gender and relationship status were coded 0 (female; no partner) and 1 (male; with partner).
* $p < .05$. ** $p < .01$. *** $p < .001$.

mediation were met (see Figure 2): Generative concern significantly related to meaning in life and generative goals. Additionally, significant indirect effects of commitment to generative goals could be verified in analyses on meaning in life (indirect effect = .04; $SE = .02$; $z = 2.54$; $p < .05$; 95% confidence interval for generative goals based on 1,000 bootstrap resamples: [.01, .08]).

Testing the moderated mediation hypothesis. To examine whether, and if so, how the effect of the mediator on the dependent variable varies across levels of the moderator, the integrative approach suggested by Preacher, Rucker, and Hayes (2007) was applied. This approach allows combining mediation and moderation into one general analytical framework (see also Edwards & Lambert, 2007). Thus, in the hypothesized model generative goals mediate the effect of generative concern on meaning in life. However, Machiavellianism is assumed to moderate the path from generative goals to meaning in life. As the distribution of product terms is usually skewed, conditional indirect effects will be examined in detail by employing a bootstrap approach.

Coefficient estimates in Figure 3 show again that there was a significant direct effect of generative concern on meaning in life and generative goals which in turn were significantly related to meaning in life. Most important for our hypothesis, findings indicated that the indirect effect of generative concern on meaning in life via generative goals was moderated by Machiavellianism. Conditional indirect effects showed that there were significant

indirect effects of generative concern on meaning in life only for low levels of Machiavellianism, that is, one standard deviation below the mean (indirect effect = .07, $SE = .02$, $z = 3.07$, $p < .01$; 95% confidence interval for the indirect effect one SD below the mean based on 1,000 bootstrap resamples: [.03, .12]) and medium levels of Machiavellianism, that is, at the mean (indirect effect = .04, $SE = .02$, $z = 2.25$, $p < .05$; 95% confidence interval for the indirect effect at the mean: [.01, .07]). For high levels of Machiavellianism (one standard deviation above the mean) the indirect effects did not reach significance ($p = .80$).

In Figure 4, the moderating effect of Machiavellianism on the relationship between generative goals and meaning in life is graphed. As shown, the relationship between generative goals and meaning in life was steeper for respondents who reported low and medium rather than high levels of Machiavellianism. Among participants characterized by high levels of Machiavellianism generative goals were not associated with meaning in life.³

Testing the fit of the hypothesized models across cultural groups. Finally, the equivalence of the proposed mediation and moderation effects across cultural groups was examined by applying multigroup, structural equation modeling (SEM) that has become a preferred method in multivariate analysis in social and behavioral sciences when, for example, the strength of relationships among measurements is tested for equivalence in various (cultural) groups.

Multigroup path analyses with manifest variables were conducted to test equality of regression coefficients across cultural groups by applying SEM with maximum likelihood estimation (AMOS). The moderated mediation model depicted in Figure 1 was tested. Generative concern, generative goals, Machiavellianism, and the interaction term of generative goals with Machiavellianism were treated as exogenous variables, whereas meaning in life was treated as an endogenous variable with effects of level of education, relationship status, everyday competence, and cognitive

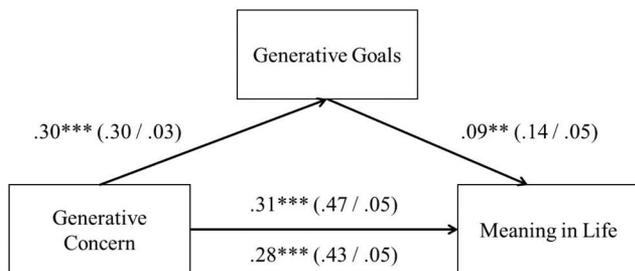


Figure 2. Generative goals mediate between generative concern and meaning in life. Note: Coefficients are given as follows: β (b/SE).

³ Support for our hypothesized model stems from additional analyses showing that Machiavellianism did not moderate the path from generative concern to generative goals.

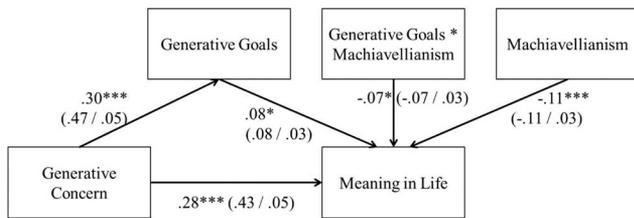


Figure 3. The mediation of generative goals between generative concern and meaning in life is moderated by Machiavellianism. Note: Coefficients are given as follows: β (b/SE).

functioning being partialled out. Two models were defined: first, the unconstrained model in which no equality constraints were imposed on the data across cultural groups and exogenous variables were allowed to correlate with each other, and second, the structural weights model in which paths were set to be equal in all four cultural groups. A good fit of this second model would indicate that the effect of the predictors on the outcome variable, that is, meaning in life, did not differ between cultural samples. The two defined models were tested against each other through nested model comparisons.

After equality constraints on regression coefficients were placed across groups (intercepts were left free to vary), the constrained models gained 15 degrees of freedom (60 data points minus 45 parameters to be estimated). Fit indices indicated that the specified structural weights model (all paths set as equal across cultural groups) fit the data sufficiently well. The ratio of the chi-square value degrees of freedom was 1.62. The Adjusted Goodness of Fit Index (AGFI = .96) exceeded its critical value (.90); the Root Mean Square Error of Approximation (RMSEA = .027) fell below its critical value (.06) and the Akaike's Information Criterion (AIC = 114.31) was lower than the critical value (120.00), as determined by a saturated model. Most importantly, nested model comparisons showed that the structural weights models did not fit worse than the unconstrained models, $\Delta\chi^2(15) = 24.31, p > .05$. Referring to the structural weights model, all structural parameter estimates were statistically important. In detail, there was a significant relationship between generative concern and generative goals (CR = 7.36; $p < .001$; β s ranging from .24 to .25). Furthermore, meaning in life was significantly linked to generative concern (CR = 7.64; $p < .001$; β s ranging from .24 to .28), to generative goals (CR = 2.05; $p < .05$; β s = .07), to Machiavellianism (CR = -3.92; $p < .001$; β s ranging from -.14 to -.12), and, most importantly, to the interaction term (CR = -2.23; $p < .05$; β s ranging from -.09 to -.07). Based on these results as well as the good fit indices of the models, we can conclude that the findings on predictors of meaning in life in the total sample hold true regardless of participants' cultural background.

Discussion

The present study shows that the beneficial effect of generative concern on meaning in life was partly mediated by generative goals. Moreover, the effect of generative goals on meaning in life was moderated by Machiavellianism. That is, for individuals with low or medium Machiavellianism generative goals were more strongly associated with meaning in life than for individuals with

high Machiavellianism. This pattern was found to be equivalent in elderly participants from four cultures: Cameroon, China, the Czech Republic, and Germany. These cultures were shown to differ in value orientations: As expected, German participants scored lowest for conservation, Cameroonian and Chinese participants scored highest, and Czech participants ranged in-between. For openness to change values, German participants scored highest followed by Chinese participants who, in turn, scored higher than Cameroonian and Czech participants. This relatively low openness to change value orientation in the Czech sample was unexpected. In sum, however, value orientations show that the cultural groups selected represent a variety of psychologically defined cultural orientations.

Generative Goals as Mediator Between Generative Concern and Meaning in Life

The mediation assumption which predicted that the relationship between generative concern and meaning in life is partly mediated by generative goals was confirmed in all cultural samples. That is, a positive attitude toward generativity contributes to meaning in life by spawning generative goals. Goals are effective in providing individuals with direction in life (e.g., Frazier et al., 2007) and, particularly for the elderly, are seen by some authors to be an integral part of well-being (Ryff, 1989).

This result also renders additional support to an essential prediction of McAdams and de St. Aubin's (1992) generativity model in that it cross-culturally confirms the link between generative concern and generative goals (Hofer et al., 2008; McAdams et al., 1993). However, the mediation model as delineated above was qualified by Machiavellianism which was used as a proxy variable for belief in the species: The cynical, selfish, and manipulative view on others that characterizes Machiavellianism opposes the fundamentally positive view of mankind as evolving to the better (see Busch & Hofer, 2012). As hypothesized, belief in the species was found to moderate the association between generative goals and meaning in life. That is, individuals low in belief in the species do not benefit from generative goal pursuit in terms of meaning in

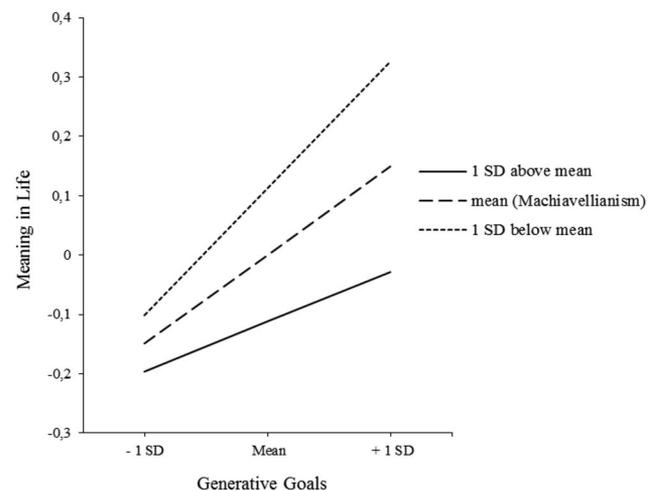


Figure 4. Effects of generative goals on meaning in life moderated by level of Machiavellianism.

life. Presumably, those high in Machiavellianism expect others not to appreciate but to take advantage of their generative efforts and hence find only little meaning in pursuing generative goals. This interpretation is in line with Erikson's (1963) argument that true generativity with all its beneficial effects can only be achieved when belief in the species is given. In line with this argument, then, the decisive effect of belief in the species might not be that it decreases generative goal setting but that it reduces the beneficial effects that generative goal pursuit usually entails. Thus, the present findings ought to draw attention to the neglected construct of belief in the species and its position and function in the generativity model which has proved so helpful in systemizing research on this central developmental task in adulthood.

Limitations and Outlook

In sum, analyses strongly confirmed our main hypotheses by showing that, independent of culture, generative goals mediate the relationship between concern for generativity and meaning in life but only if the tendency to view people as objects to be manipulated and exploited is low. Thus, although the study sheds light on the relationship between facets of generativity and well-being in old age, some limitations of the study have to be acknowledged.

In our study, altruistic goals were applied as a measurement for generative strivings. Even if a considerable overlap between altruistic and generative goals can easily be assumed, a more direct measure of generative goals might be used in future studies. For example, an idiographic technique such as the personal striving approach (Emmons & McAdams, 1991) may lead to a more detailed assessment of generative goals (e.g., Hofer et al., 2008).

Again from a methodological point of view, a specific assessment instrument for belief in the species has not yet been developed. Thus, our operationalization of belief in the species with Machiavellianism as its proxy, that is, lack of the conviction that generativity is worthwhile, might not have covered all facets of belief in the species: For example, Cheng (2009) asked his participants about the respect they perceive younger people to have for their generative efforts. However, we are confident that high Machiavellian attitudes and low belief in the species share some common ground (Busch & Hofer, 2012). Nevertheless, future research might try to develop a specific instrument for belief in the species or identify other proxy variables such as social dominance orientation, that is, individual differences in how much intergroup inequality is favored (e.g., Sidanius & Pratto, 2001).

Even if analyses indicated that participants' cognitive performance was associated with meaning in life across cultures, a note has to be made on the meaningfulness of the test scores of the NAI. The mean time of test trials in both speed tests (ZVT-G and LT-G) was considerably higher among Cameroonian and Chinese than for Czech and German participants. Probably, familiarity with test material and procedures has affected test scores. We assume that Cameroonian and Chinese participants have been less familiar with speed tests and therefore scored lower in cognitive functioning. Thus, test scores are not suitable for cross-cultural mean comparisons but can be used to examine relationships among measurements (van de Vijver & Leung, 1997).

Some interesting findings concerning generativity and sociodemographic features occurred: First, age was positively correlated with both generative concern and Machiavellianism. That is, among the elderly the willingness to contribute to the development

of their junior ones seems to increase which underscores the importance of generativity in old age. However, at the same time attitudes which counteract this willingness seem to increase as well. Whether this is due to a perceived decrease in abilities to act generatively or to an increase in sobering experiences of unappreciative reactions to generative efforts is a question that future research might address.

Second, number of children was positively related to generative concern and generative goals. Having children might thus be a perpetual instigation for generative concern and generative goals across the life span.

Next, future cross-cultural studies on generativity ought to integrate measurements on generative behavior to close the gap between generative goals and perceived well-being. Above all, goals that are successfully realized in behavioral generative strategies are supposed to contribute to well-being. As cultural contexts may differ from each other in given opportunities and constraints to act generatively, an examination of cultural equivalence of behavior seems to be indispensable. Preferably, future research on generativity in various cultures will employ a longitudinal design examining the dynamic nature of various facets of generativity and successful aging.

To conclude, the study presents evidence for a significant relationship between generativity and well-being in old age across highly diverse cultural groups. It was shown that the effect of generative concern on meaning in life was partly mediated by generative goals. Furthermore, the role of belief in the species, a topic that has rarely been studied in the past, was examined: Generative goals contributed to meaning in life only when not opposed by low belief in the species, suggesting that lower levels of belief in the species might prevent people from reaping the beneficial effects of generative goal pursuit. In general, the study exemplifies the benefits of a multicultural approach, permitting meaningful insights about culture-specific developmental processes but also about the extent to which developmental processes can be generalized across cultures.

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