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Ethics-Relevant Values in Adulthood: Longitudinal Findings from the Life and Time Study

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Supplemental materials including all version-controlled syntax and output for all analyses are available at <https://osf.io/ms7aq/>. Summary documents are also available. The authors wish to acknowledge the considerable assistance of Seraphine Shen-Miller, in helping to create the Mature Values Index, and for empirical work that helped form the basis for the materialism measure. Thanks also to Allison Tackman and Judith Kenner for their work on the Life and Time Study. Data collection benefited from prior support from the National Science Foundation. Work on the manuscript benefited from support from the Sir John Templeton Foundation. This work benefited from access to the University of Oregon's high-performance computer, Talapas.

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Abstract

Objective: This study investigates a set of variables related to the relative valuing of narrow self-interest versus the concerns of a larger community. These values likely capture stable dispositions. Additionally, because ethics-relevant values are associated with ongoing cultural and moral socialization, they may develop over time as in May's theory of "mature" values.

Method: We administered eight value-priority scales (Mature Values, Unmitigated Self-Interest, Materialism, Financial Aspirations, and Horizontal and Vertical Individualism and Collectivism) to a national community sample ($N = 864$, 66% female, 71% White, mean age 36) on four occasions approximately one year apart (Time 4 $N = 570$). We examined mean-level change as cross-sectional age differences and longitudinal change, and rank-order stability. Correlations with Big Five/Big Six personality traits are reported. **Results:** As people grew older they increased in Mature Values and Horizontal and Vertical Collectivism, and decreased in Unmitigated Self-Interest, Materialism, and Vertical Individualism. Rank-order stability of the values was nearly as high as personality traits over three years. Stability increased with age for some scales. **Discussion:** The stability of values scores suggests that they capture dispositional aspects, but age differences and longitudinal trends are also consistent with the hypothesis of socialization toward more inclusive value priorities.

Keywords: personal values, longitudinal value change, value stability, human values, life span development

Ethics-Relevant Values in Adulthood:

Longitudinal Findings from the Life and Time Study

Current personality inventories typically focus on patterns of behavior, excluding content about values. But values – guiding principles in people’s lives that apply across contexts – are arguably also important aspects of personality, equally relevant to understanding an individual. For example, scores on one of the two major dimensions of the commonly used Schwartz Values Survey (Schwartz, 1992) contrasts the degree to which people value achievement and power versus universalism and benevolence. While most people likely value both, many decisions, from small choices about daily activities to large ones about career and lifestyle, will demand putting one value ahead of another. A businessperson who wants to succeed by maximizing profit but who also wants to be respected for integrity and social conscience will have to frequently choose which to prioritize; the relative strength of competing value priorities may determine what habits are formed and long-term outcomes accrued. Values also help define the culture of groups, organizations, and societies by influencing who is judged to be a desirable member (Triandis & Gelfand, 1998).

Some of the inter-individual variance in value priorities reflects personal preferences for which there may not be strong normative expectations. But ethics are an important domain of values, where widely-shared cultural norms do play a role. Schwartz and Bardi (2001), for example, found that values of benevolence and universalism, the most morally-relevant of the 10 Schwartz value types, were the most highly endorsed across diverse societies. The current study focuses specifically on value priorities related to the relative valuing of narrow self-interest over the concerns of a larger community. This contrast of self-focused versus inclusive values is particularly associated with cultural and moral socialization, which likely continues through

adulthood. In family life, in religious and spiritual traditions, and in many work and community contexts, ongoing social influence will generally encourage concern for others and discourage narrow self-interest. A large majority of ethnically diverse American (Arnett, 2003) and Israeli (Mayseless & Scharf, 2003) young adults report believing that becoming an emotionally mature adult means becoming less self-oriented and developing greater consideration for others. This is therefore a sector of the values domain in which “maturation” seems especially likely to occur. In this manuscript we present results from the Life and Time study, designed to explore potential sources of personality trait change in adulthood, and which included values variables of this type because preliminary work (e.g. Saucier, 2013, Table 6) in other data suggested they might be promising for predicting personality change (see Thalmayer, Saucier, Flournoy, & Srivastava, under review, for tests of hypotheses related to values as predictors of personality change).

The values of interest here include an index based on the values development proposal of Rollo May (described below) and on related value concepts, including materialism, self-interest, collectivism and individualism. This set of self-focused versus inclusive value priorities is tested in several ways to explore a central question: to what extent do these values change or remain stable during early and middle adulthood? First, mean-level age differences are considered: Do younger people have more self-focused value profiles? Second, change in the values is tested longitudinally during adulthood: Do adults increase in inclusive values over a three-year span? Third, the cumulative continuity hypothesis (Roberts & Caspi, 2003) is tested: Does more change in values occur earlier rather than later in adulthood? Associations among the values constructs, Big Five/Big Six personality traits, and gender are also explored.

The Development of “Mature” Values

The rudiments of a values-development theory of personality change were laid out by Rollo May (1967). According to May, in the trajectory of healthy human development there is a subtle but potentially profound shift in the nature of our values. “Mature values” should serve to diminish or prevent neurotic anxiety. Such values include aspects of self-transcendence, going beyond physical gratification and survival, an exploitative attitude toward nature and other people and the immediate situation and in-group, and instead involve empathy, generosity, and ethics. Additionally, mature values include aspects of self-actualization or self-determination, going beyond the desire for approval or to be like others, instead involving creativity and freedom. Such values are chosen independently and remain in transformation, not hardening into dogma. They have a more symbolic character and abstract conception of the good than immature values, which means that it matters less whether “values are literally satisfied or not,” because “satisfaction and security lie in the holding of the values” (p. 82). This development may involve not only values and goals but also worldview beliefs, descriptive schemas about what the world is like. Maturation should mean moving from a short-sighted, small-minded worldview, in which the self is seen as the only reality, personal pleasure as the highest attainable good, and one’s in-group as superior, which justifies an unmitigated pursuit of self-interest. Note that May did not consider this shift in values to be an inevitable aspect of “intrinsic maturation,” however, but instead something that could occur in optimal self-development, akin to Maslow’s (1968) concept of self-actualization or Jung’s (1971) concept of individuation.

By May’s standards, materialistic values, prioritizing external objects and attributes, are immature: Materialistic values emphasize gratification, exploitation, and social approval, and do not transcend the self or in-group. Satisfaction and security are sought at a literal rather than symbolic level and an instrumental rather than communal approach to the environment and

society reduces social relations to economic ones. Research on materialistic values confirms the maladaptive associations of immature values. A meta-analysis of 151 studies, including 753 effect sizes from 259 samples representing every populated continent, determined that materialism was consistently associated with lower scores across many measures of well-being including life satisfaction, affect, self-appraisals, mental health symptoms, physical health and risky behavior (Dittmar, Bond, Hurst & Kasser, 2014). In an 18-month longitudinal study in China, materialism was seen to decrease well-being and increase depression. In three longitudinal studies ranging from 6 months to 12 years in duration, Kasser and colleagues (2014) demonstrated that well-being improved as importance placed on materialistic goals and values decreased. The authors also demonstrated an increase in self-esteem over several months, relative to a control group, for highly materialistic US adolescents who participated in an intervention to decrease materialism (Kasser et al., 2014).

Materialistic values are an aspect of a broader dimension of belief-system components labeled Unmitigated Self-Interest (Saucier, 2000, 2013). Unmitigated Self-Interest is the valuing of personal interest as the primary source of goodness in life. In addition to materialism, Unmitigated Self-Interest encompasses hedonism, egoism, and solipsism; it is also related to amorality and Machiavellianism. In the Eugene-Springfield Community Sample, Saucier (2013, Table 6) found that higher Unmitigated Self-Interest scores were associated with decreases in self-reported Big Five Emotional Stability, Intellect, Conscientiousness, and especially Agreeableness, over 10 years (Unmitigated Self-Interest was measured in year 3 of the 10-year span), with a maximum magnitude of $r = .20$.

The items used to measure Collectivism and Individualism (Triandis & Gelfand, 1998) indicate that these constructs also concern value priorities. Individualists give priority to

independence, personal freedom, uniqueness (Oyserman, Coon, & Kemmelmeier, 2002), and self-determination (Le & Levenson, 2005); collectivists give priority to duty, obligation, social harmony (Oyserman et al., 2002), and self-transcendence (Le & Levenson, 2005). The relation of these value orientations to adaptive personality development is unresolved. Individualism may be disadvantageous psychosocially, increasing isolation and alienation and making maintenance of intimate, lasting relationships more difficult (Bellah, Madsen, Sullivan, Swidler, & Tipton, 1985; Dion & Dion, 2002; Scott, Ciarrochi, & Deane, 2004). On the other hand, it has been theoretically linked to high attainment of autonomy (Oishi, 2000), and fulfilling a basic need for autonomy is presumably healthy (e.g., Ryan & Deci, 2000). Because Collectivism involves self-regulation in service of social obligations and group goals, it should be linked to traits related to social self-regulation, including Agreeableness, Conscientiousness, and Honesty/Propriety.

Stability and change of values constructs generally

Research on values typically assumes them to be stable characteristics (Bardi, Lee, Hofmann-Towfigh, & Soutar, 2009) and recent longitudinal studies have demonstrated substantial mean-level and rank-order stability. Milfont, Milojev, and Sibley (2016) reported little average change over three administrations of a measure of Schwartz values one year apart for a sample of adults in New Zealand. Vecchione and colleagues (2016) reported only a small average increase in conformity values, otherwise finding substantial stability, in a sample of Italian young adults administered a measure of Schwartz values three times over a span of eight years.

On the other hand, mean-level age differences in cross-sectional studies are consistently observed. Milfont and colleagues (2016) in the New Zealand study mentioned above, reported greater endorsement of Conservation and Self-Transcendence and less endorsement of Openness

and Self-Enhancement values for older participants. Robinson (2013) reported higher valuing of tradition and conservation and lower valuing of stimulation and change in older participants in a large pan-European sample. Gouveia, Vione, Milfont, and Fischer (2015) reported higher interpersonal and normative scores and lower excitement and self-promotion scores for older participants on the Basic Values Survey (BVS) of six values, organized into a two-dimensional framework of surviving and thriving, and personal, central, and social goals, in a large cross-sectional Brazilian sample. Such studies, of course, cannot distinguish developmental change (i.e., maturation) from cohort effects.

Personality traits have also been shown to have high, though not perfect, rank order stability, with some predictable mean-level changes with age (Roberts & DelVecchio, 2000; Roberts, Walton, & Viechtbauer, 2006). Furthermore, traits have been seen to become more stable over time – older people are less likely to change than younger ones (Roberts & DelVecchio, 2000; but see Costello, Srivastava, & Saucier, 2017). This hypothesis of cumulative continuity has only been tested for values among participants in their early 20s using the Schwartz basic values (Vecchione et al., 2016), though it seems equally relevant to older individuals' values – for one thing the imprint of cultural socialization likely increases with age.

Relation of value priorities to personality traits and gender

While value priorities might best be thought of as stable dispositions, their content does not appear to be included in popular inventories of personality traits. In a meta-analysis of 60 studies using the Five-Factor Model (FFM) of personality traits and the Schwartz values, Parks-Leduc, Feldman and Bardi (2015) report consistent and theoretically meaningful relationships but with small to medium effect sizes. Overall more cognitively based traits, especially Openness to Experience, were more strongly related to values than more emotionally based traits like

Emotional Stability. High scores on FFM Openness were associated with higher scores on Self-Direction and Stimulation values, particularly those related to novel ideas, and on the broadmindedness component of Universalism. Lower scores were associated with higher valuing of tradition, conformity, and security. Agreeableness was the trait the next most strongly associated with values. High scores were associated especially with Benevolence (prosocial care for those in a close network) but also Universalism (care for wider society), Conformity, and Tradition values. Low scorers on Agreeableness scored higher on Power values. Higher Extraversion was associated with higher scores on Stimulation, Power, Achievement, and Hedonism values. Higher Conscientiousness was associated with higher valuing of Security, Order, adherence to rules, and the avoidance of risks, and to a lesser extent, Conformity and Achievement.

Another meta-analysis of correlations between Big Five traits and Schwartz's values from 14 countries reported that relations between traits and values varied across cultural contexts (Fischer & Boer, 2015). Big Five Openness was again seen to associate with lower Conservation, and higher Agreeableness with higher Self-Transcendence. Interestingly, trait-value associations were stronger in countries with more democratic institutions and permissive social contexts, and weaker in those with greater financial, ecological, and social threats (Fisher & Boer, 2015).

Studies that report gender differences typically report findings that suggest more self-focused values in men and more inclusive values in women. On the Schwartz Values scales, women have been seen to endorse more Conservation-, and men more Openness-, related values (Robinson, 2013; Schwartz & Rubel-Lifschitz, 2009). Robinson (2013) reported higher Self-Transcendence-related scores for women and higher Self-Enhancement-related values for men.

Goals for the current study

Previous literature has suggested relatively consistent age differences, and some gender differences, in the relative valuing of Schwartz Values constructs, such that younger and male adults are more likely to endorse values related to openness and older and female adults more likely to endorse values related to tradition and conservation. More recent longitudinal work, however, indicates the stability of values-scores over time. If, when, and for whom value priorities shift to become less self-focused over time remains unclear.

The current study focuses on a set of value priorities – materialism, financial aspirations, immature values, unmitigated self-interest, and individualism – which involve a more self-focused attitude and lack of moral engagement with a broader community. In terms of the Schwartz values types, they represent prioritization of hedonism and power over benevolence and universalism, or more broadly of self-enhancement over self-transcendence. Such values may be best conceived as aspects of people’s personalities, capturing relatively stable dispositions. At the same time, they may also capture aspects of development that change over time.

To test these questions, this set of self-focused versus broader scope values are tested in terms of mean-level differences across age, longitudinal change over three years, and the cumulative continuity hypothesis – whether more change occurs earlier rather than later in adulthood. Based on previous empirical results for other value measures and on the assumption of growth in this direction with adulthood, it is hypothesized that values will be largely stable, but that age correlations and longitudinal trends will indicate, on average, a dynamic of maturing toward less self-focused value priorities. The measures are also explored in terms of their psychometric properties, intercorrelations, and relation to gender and to Big Five/Six personality traits.

Methods

Participants

A total of 879 participants joined the Life and Time Study national sample at Time 1, however, ten were later observed to have entered impossibly large age discrepancies in over the subsequent years, indicating insincere participation, and five did not provide their age. Thus, analyses were conducted with 864 total participants. Of these, 622 provided data at Time 2, 590 at Time 3, and 574 at Time 4. This sample (66% female) is comprised of participants from the four major geographical regions in the United States: at Time 1 17% resided in the Northeast, 20% in the Midwest, 35% in the South, and 28% in the West. The age of participants at Time 1 (in 2010) ranged from 18 to 63 ($M = 36$, $SD = 10.5$). The ethnic composition of the national sample was similar to that of the general United States population: 71% non-Hispanic White, Caucasian, or European-American; 12% Black or African-American; 8% Hispanic, Latino, or Spanish; 5% Asian or Asian-American; 2% American Indian or Alaska Native; 1% Native Hawaiian or other Pacific Islander. The education level of the sample was somewhat higher than national averages: at Time 1 5% reported having a doctoral degree, 16% a masters degree, 35% a 4-year college degree, 19% a 2-year associates degree or a post-secondary certification, 24% a high school education or GED, and 1% only some high school. Seventy-one percent reported an individual annual income below \$50,000 a year. A student sample was also collected, and participants in both the national and student samples were asked to nominate informants, in data not reported here.

Procedure

Participants were recruited in 2010 through four methods: an eligibility screening questionnaire on Mechanical Turk, invitations coordinated by an e-mail marketing firm, Google

Adwords, and Craigslist ads in communities around the United States whose demographic profile was favorable to enhancing minority representation. Participants completed surveys up to four times, each wave separated by approximately one year. At each wave, participants were emailed a link to a website to complete a battery of self-report questionnaires, including two personality scales, described below, and values, aspirations, worldviews, goals, life events, and relationship, work, and life satisfaction items. Participants were compensated with a gift card for \$20-40 (increasing across waves) to an internet retailer after completing surveys. Participants could opt to receive a check in the mail instead. Analyses of Big Five and Big Six rank-order stability, mean-level change, and measurement invariance in the Life and Time national sample are not reported here but are reported in Costello et al. (2017)

Materials

The Life and Time study focused on personality change during adulthood. Values-scales related to May's concept of Mature Values were included as hypothetical predictors of personality change. We report on the full set of values variables included in the study.

Psychometric properties of the scales are reported in Table 1. Correlations of all values scales with each other and with personality scales are reported in Table 2. Supplemental materials including a list of all variables administered to the samples and all version-controlled syntax and output for analyses are available at <https://osf.io/ms7aq/>.

Mature Values Index. This preliminary index was developed by the second author and a graduate assistant, both of whom scrutinized May's (1967) writings on mature values, and rated the relative suitability of items from the Schwartz (1992) or Rokeach (1973) values surveys. The consensus selection included 10 forward-keyed (freedom, choosing own goals, meaning in life, creativity, a world of beauty, wisdom, being honest, being helpful, mature love,

and unity with nature) and seven reverse-keyed items (pleasure, a comfortable life, wealth, social power, social recognition, preserving my public image, and being obedient). These items were chosen to operationalize both the self-transcendence and self-actualization/self-determination aspects of the theory. The response scale was as in Schwartz (1992) – a 9-point (-1 to +7) response scale from “opposed to my values” to “of supreme importance”.¹ The forward-keyed and reverse-keyed items were averaged and transformed into percent of maximum possible (POMP) scores as two subscales, which were then averaged for the final scale used in analyses. Note that the Mature Values Index is a composite scale, meaning that it is a group of concepts chosen because they are all theoretically associated with the construct, not based on any assumptions about their interrelations, and is therefore not designed to achieve unidimensionality.

Unmitigated Self-Interest. In the Eugene-Springfield Community Sample, this 8-item scale (Saucier, 2008) measuring a dimension derived from isms terms from an English-language dictionary (Saucier, 2000, 2013), had a 4-year retest stability of .65 and coefficient Alpha of .70. Half the items were reverse-keyed, all were answered on a 5-point Likert-scale from strongly disagree to strongly agree. Based on evidence in the community sample that the two items related to ethnocentrism have divergent correlates from the other items, we relied on the remaining six items, the content of which includes aspects of hedonism, materialism, egoism, and solipsism.

¹ The scale was initially tested in the Eugene-Springfield Community Sample (N = 601). Items were mean centered for each participant by subtracting their average response to the 66 total Schwartz and Rokeach items from their response for each of the 17 scale items. Internal consistency (coefficient Alpha) was .59 for this heterogeneous but theoretically meaningful composite scale. As an indicator of divergent validity, in this sample the scale correlated only moderately with scores on collectivist and individualist values ($r = .05 - .25$; Triandis et al., 1998).

Materialism. A scale of six-items derived from the materialistic-values aspect of Richins and Dawson's (1992) inventory was chosen as those most core to values from a group of 14 items administered to the sample. The 14 items were those with the best psychometric qualities in a pool of items tapping materialistic values and compulsive buying tendencies (from Richins & Dawson, 1992), and possession-guarding tendencies (from Belk, 1984), used by Shen-Miller (2009; also Shen-Miller, Saucier & Pan, 2015); only the materialistic values variable was considered relevant and examined here. Half the items were reverse-keyed; all were answered on the same 5-point Likert-scale as the BFAS items, from extremely inaccurate to extremely accurate.

Financial Aspirations. Aspirations for Financial Success (Kasser & Ryan, 1993) is one of 5 scales on a 23-item inventory of aspirations. The scale includes 5 items worded in the second person (e.g. "You will buy things just because you want them") rated on a 5-point likert-scale from "not at all important" to "very important". A raw score version was used here. Results with a version mean-centered across items from this and three other aspiration scales are included in supplemental materials; no results with this version varied interpretatively from those reported here.

Individualism and Collectivism. Triandis and Gelfand's (1998) scales are split into two components. Vertical Individualism has a focus on autonomy in an unequal world in which individuals compete for status, whereas Horizontal Individualism focuses on autonomy in an implicitly equal world of unique and independent individuals. Vertical Collectivism has a focus on duties to family and in-groups where some have more authority, whereas Horizontal Collectivism focuses on enjoyment of relationships with relatively equal peers (Triandis &

Gelfand, 1998). Each of the four subscales was measured with four items keyed in the same direction, answered on a 5-point Likert-scale ranging from strongly disagree to strongly agree.

BFI-Six. Personality traits were measured with the 44-item Big Five Inventory (John, Naumann, & Soto, 2008) plus a 16-item addendum to create a six-factor version (as in Thalmayer, Saucier, & Eigenhuis, 2011). This includes an Honesty/Propriety scale drawn largely from the QB6 (Saucier, 2009; Thalmayer et al., 2011), similar to the Honesty/Humility factor in the HEXACO (Ashton & Lee, 2007). Items on this scale include: “is not good at deceiving other people”, “sticks to the rules”, “uses others for my own ends”, “takes risks that could cause trouble for me”, “misrepresents the facts”, “has bad manners”, “uses flattery to get ahead,” and “would never take things that aren't mine.” The BFI-Six also includes an alternative Agreeableness scale (as in Thalmayer et al., 2011), with more content related to lack of short-temperedness and irritability than typical Big Five Agreeableness. Scale statistics are reported in Table 1. Two additional items were administered as potential H/P items but were omitted from scoring because they referred to physical risk-taking and not to either honesty or propriety (cf. Thalmayer & Saucier, 2014, for a corresponding pruning of an H/P item-pool based on cross-national measurement-invariance analyses.)

BFAS. The Big Five Aspect Scales (BFAS; DeYoung, Quilty, & Peterson, 2007) include two scales of 10-items each for each of the Big Five dimensions (see Table 1).

Analyses

To aid interpretation across scales, all dependent measures were rescaled with a linear transformation, $[\text{observed score} - \text{minimum possible}] / [\text{maximum possible} - \text{minimum possible}] \times 100$, to percent of maximum possible (POMP) scores to give them a range from 0 to 100 (Cohen, Cohen, Aiken, & West, 1999). Psychometric properties were assessed in terms of

Cronbach's alpha and the mean and variance of inter-item correlations. Ideally, correlations between items measuring a single construct should range from .15 to .50 (Clark & Watson, 1995); a large range in correlations within a scale will indicate multidimensionality. If the variance of inter-item correlations is zero, a factor analysis will only find one non-singlet factor. For descriptive purposes, correlations with gender and personality scales and among the values scales are reported. For all analyses, significance was interpreted at $p < .01$ to reduce family-wise error rates due the number of analyses.

The cross-sectional effect of age was tested using Pearson correlation between value scales and age. Mean-level change was tested using latent curve models with structured residuals (LCM-SR; Curran, Howard, Bainter, Lane, & McGinley, 2014) in Mplus 7 (Muthén & Muthén, 2012), with robust maximum likelihood estimation. LCM-SR expands on traditional latent curve models by regressing the residual variance at time t on the residual at time $t-1$. However, the mean structure of the latent curve model does not change with the inclusion of structured residuals (Curran et al., 2014) -- the intercept and slope values are the same as if run in a traditional LCM. The inclusion of structured residuals analysis additionally allows estimation of the magnitude of wave-to-wave patterns of within-person stability and change above and beyond what is expected from the individual growth trajectories described by latent curve factors. This auto-regressive component is the rank order stability of variance in scores that is not explained by the LCM. Where this auto-regressive component is large, one can conclude that there may be room for future work to explore what helps explain this covariance.

The measurement invariance of the values scales across four age groups corresponding to decades, participants in their 20s ($N = 304$), 30s ($N = 227$), 40s ($N = 199$), and 50s ($N = 132$), was assessed using the R (version 3.4.4; R Core Team, 2018) package lavaan (Rosseel, 2012).

Because χ^2 is very sensitive to sample size, we followed the recommendation of Kang, McNeish, and Hancock (2016) to rely primarily on change in the McDonald's non-centrality fit index (MFI; McDonald, 1989), which they show to be less sensitive to model complexity, sample size, and magnitude of factor loadings. Our measurement model structure, with four age groups, each with four measurements, was somewhat different than that used by Kang and colleagues (2016), so we sought to confirm their findings that under the null hypothesis of invariance, only 1% of model comparisons would exceed a fit reduction in $MFI < -.01$. Our simulations resulted in a very similar threshold for fit decrement in MFI of $-.0124$ (Flournoy, 2018).

We estimated rank-order stability and tested for cumulative continuity of the values dimensions across the four waves of the study and four decade-based age groups using a multi-group path analytic approach using the R package MplusAutomation (Hallquist & Wiley, 2018) and Mplus 7 (Muthén & Muthén, 2012). In these analyses, we modeled the stability of each value scale separately by modeling the variance-covariance structure of the corresponding (observed) scale score across the four waves of the study. We focused on two models: a less constrained model and a more constrained model. The less constrained model imposed equality constraints within each age group on correlations between the same scale scores at with the same lag-size (e.g., the correlation for a given scale score between waves 1 and 2 is the same as the correlation for the same score between waves 2 and 3, etc.), but allowed these correlation to be different across each age-decade group. The constrained model additionally constrained each of them to be the same across all four age groups. The four-wave design provides three estimates of stability across one-year lags (Waves 1 to 2, 2 to 3, and 3 to 4; henceforth lag-1), two estimates of stability across two-year lags (Waves 1 to 3 and 2 to 4; henceforth lag-2), and a single estimate of stability across a three-year lag (Waves 1 to 4; henceforth lag-3). The less

constrained model, that with longitudinal invariance, assumes that stability across equally-sized lags should be equal across time (at least across three years)², but that they can differ across age groups. The more constrained model, that with age-group invariance, further assumes that stability is the same across age groups. We compared the relative fit of these models using χ^2 , AIC, and MFI. The cumulative continuity hypothesis holds that stability increases with age (Roberts & Caspi, 2003), so it would predict that the unconstrained model would fit the data better than the constrained model. It would further predict that stability estimates increase moving across each decade (e.g., 20's to 30's, etc.), which we examine descriptively.

Results

Psychometric properties of the scales and correlations with gender are reported in Table 1. All scales had mean inter item correlations within the accepted range for unidimensional scales, and variance of inter-item correlations within a similar range to personality scales, with the anticipated exception of the Mature Values Index. Women scored higher than men on the Mature Values Index ($r = .19$) and Horizontal Collectivism ($r = .10$), and lower on Unmitigated Self-Interest ($r = -.08$) and Vertical Individualism ($r = -.17$). Correlations among the values scales and of the values with personality traits are reported in Table 2. Among values scales, as expected, Unmitigated Self-Interest, Materialism, the Mature Values Index, Financial Aspirations, and Vertical Individualism overlap moderately with each other, with correlations from .33 to .49 in magnitude. Horizontal Collectivism, to a lesser extent, belongs to the broader-focused pole of this group ($r = .01$ -.31 in magnitude). Horizontal Individualism and Vertical Collectivism are more distinct, except for a .44 correlations between the collectivism subscales.

² It also assumes that variances are equal across time; this is primarily done to put the standardized covariances (i.e., correlations) on the same scale.

The largest-magnitude correlations between personality trait and values scales involve Honesty/Propriety and Agreeableness (including both versions of the BFI scale and both BFAS components), indicating their involvement in measuring moral character. These correlations were largest in magnitude for Horizontal Collectivism (.35-.56), Vertical Collectivism (.23 -.37), Vertical Individualism (.31-.45), Materialism (.19-.35) and Mature Value Index (.27-.46). The Mature Values Index was also notably correlated with BFI and BFAS Openness (.37 and .48).

The Stability of Values Scores over time

The average retest correlations between the three one-year lags and between the longest, three-year lag, are reported in Table 1 for all scales. Retest stability of values scales over one-year ranged from .69 for Horizontal Collectivism to .82 for Materialism. Over three years this ranged from .54 for Horizontal Individualism to .75 for Materialism. These can be compared to slightly higher stabilities for the BFI-six, ranging from .76 (one year) and .68 (three years) for Honesty/Propriety to .88 (one year) and .84 (three years) for Extraversion.

Mean-Level Change in Values: Cross-Sectional Analyses

The Pearson correlations between age and values scales at Time 1 are reported in Table 1. For six of eight scales, correlations were statistically significant ($p < .01$). Consistent with the developmental/socialization hypothesis and results of previous studies using Schwartz values scales, older participants scored higher on Horizontal Collectivism ($r = .19$) and the Mature Values Index ($r = .11$). They scored lower on Unmitigated Self-Interest ($r = -.18$), Materialism ($r = -.17$), and Vertical Individualism ($r = -.15$).

Mean Level and Individual Differences in Change in Values: Longitudinal Analyses

Estimates of the measurement invariance of the values scales across the four age decades are reported in Table 3. We took a two-step approach to evaluating measurement invariance.

First we inspected whether changes in McDonald's non-centrality fit index (MFI) were below the threshold for assuming perfect measurement invariance. If a scale was above the threshold, we next evaluated the practical impact by dropping items that violated invariance and seeing if the reduced scales gave different substantive results in the LCM-SR models. One scale, Horizontal Individualism, had a relatively small decrement in MFI. For the other scales, modification indices were used to assess which items were the most problematic. For four scales, Unmitigated Self-Interest, Vertical Individualism, Materialism, and Financial Aspirations, a reduced version with one or two fewer items achieved acceptable measurement invariance across age decades. The specific items dropped to achieve invariance across age decades, presumably those that are interpreted the most differently by people of different ages, appear in Table 3. In all four cases, the univariate LCM-SR using modified scales resulted in very similar estimates and identical interpretations as those reported below for the original scales. We therefore judged results for those scales to be robust to these measurement issues, and we report results for the full scales to maintain continuity with prior literature using these scales. For two scales, Horizontal and Vertical Collectivism, reduced versions continued to show violations of invariance according to the MFI criterion, and the short length of the scales prevented us from dropping additional items. The LCM-SR models using the reduced scales also show the same pattern of results as the *a priori* scales, but results with these scales must be considered in light of possibly measurement instability. Finally, we did not evaluate the Mature Values composite for measurement invariance because it is a formative, rather than reflective, instrument, as discussed above.

Parameter estimates from LCM-SR models for values scales are reported in Table 4. Longitudinal mean-level change is displayed graphically in Figure 1 with the addition of means and 95% confidence intervals for age groups in 5-year bands (20-24, ..., 50-54) using wave 1

measurements. Average latent slope was significantly different from zero ($p < .01$) for six of the eight scales, in all cases in expected directions. Scores on Unmitigated Self-Interest (mean slope in POMP units per year = $-.26$), Vertical Individualism ($-.31$), and Materialism ($-.24$) on average decreased over the life span, and scores on the Mature Values Index ($.07$) and Vertical ($.17$) and Horizontal Collectivism ($.28$) on average increased. Note that these are small changes. For example, Unmitigated Self-Interest decreases on average by $-.26$ POMP units a year, with an estimated standard deviation of the intercept of 13.4 POMP units. Over a typical decade, the expected decrease in Unmitigated Self-Interest would thus be -0.19 standard deviations ($10 \times -0.26 / 13.4$). On average it would take about 52 years for an individual's Unmitigated Self-Interest score to decrease by one standard deviation (see Table 4 for similarly standardized effect sizes). For three of the scales, residuals showed significant lag-1 autocorrelation, indicating that a person's deviation from her growth curve at one wave is related to the deviation at the next. Age was used as the time metric in order to focus on mean trajectories across the lifespan. To test for the possibility that non-significant variance was an artefact of this method, follow-up analyses used wave instead of age as the time metric. The variance in slopes was non-significant for all scales in both models, as well as the LCM-SR models.

Stability of Values over Time: The Cumulative Continuity Hypothesis

We estimated the lag-1, lag-2, and lag-3 rank-order stability of values in two models (separately for each value). The first model imposed longitudinal invariance (i.e., the three lag-1 correlations were constrained to be equal, and two lag-2 correlations were constrained to be equal), and the second additionally imposed age-group invariance (e.g., lag-1 correlations were constrained to be equal for participants in their 20s, 30s, 40s, and 50s). We tested for cumulative continuity by comparing the relative fit of these models, which would predict that the first model

(i.e., the one in which age groups can have different stability estimates) would fit the data better, and further predict higher correlations between waves for each successive age group (e.g., higher for participants in their 30s than 20s). Fit indices for the models are provided in Table 5. Both models fit the data adequately in terms of absolute fit, as demonstrated by RMSEAs near the close-fitting benchmark of .05 (point estimates from <.01 to .08, with 90% CIs ranging from <.01 to .10).

Table 5 also contains the fit indices we used to compare models and examine the cumulative continuity of values. Chi-Square difference tests suggest that a model imposing age-group invariance fits the data significantly worse for five of the values scales: Vertical Individualism, Financial Aspirations, Mature Values, Vertical Collectivism, and Horizontal Collectivism. However, small improvements in fit could lead to significant Chi-Square difference tests in large samples like ours, so we used two more conservative measures: AIC, a parsimony adjusted fit measure, and MFI (using the cutoff of .01 that we used for measurement invariance tests). AIC was lower (better) and MFI was at least .01 higher (better) for the age-variant models for the same five values, further suggesting age differences in the stability of these values. Taken together, the evidence is suggestive of small age-related differences in stability for the majority of the values scales³, but there is little to no evidence of age differences in slopes for the remaining three (Unmitigated Self-Interest, Materialism, and Horizontal Individualism). In addition to predicting that the age-group invariant model would fit the data worse, the cumulative continuity hypothesis would predict that lag-1, lag-2, and lag-3

³ Unambiguously interpreting age-group comparisons of correlations requires strict (age-group) measurement invariance, which was only achieved for Horizontal Collectivism. We conducted analyses with reduced (invariant) scales, which led to the same conclusion with two exceptions. Financial Aspirations did not show age differences in stability when using a reduced (invariant) scale (see Supplement). Vertical Individualism was more equivocal when using a reduced (invariant) scale. This suggests that age differences in the stability of the former (and to a lesser extent, the latter) values may be due to age differences in measurement quality rather than the true (latent) stability of the value.

correlations should be greater for each successive age group. These correlations (with 95% CIs around them) are displayed graphically in Figure 2, where small age-related differences in stability are visible, perhaps most clearly for lag-3. However, with only a few exceptions (e.g. Mature Values Index), stability estimates do not appear to be higher for each successive age group as predicted by the cumulative continuity hypothesis.

Discussion

The current study explored stability and change of a set of value priorities concerned with the relative valuing of self-interest versus the concerns of the broader community in a large national sample tested on four occasions. These values relevant to ethical behavior are associated with cultural and moral socialization that continues into adulthood, and thus belong to a domain of values and personality in which a process of development seems especially likely to occur. Among the scales tested, the Unmitigated Self-Interest, Materialism, Mature Values, Financial Aspirations, and Vertical Individualism scales associated moderately with each other. Horizontal Collectivism, to a lesser extent, belongs to the inclusive pole of this group. Horizontal and Vertical Collectivism, Vertical Individualism, Materialism and the Mature Value Index also correlated moderately with Agreeableness and Honesty/Propriety scales, and the Mature Values Index correlated moderately with Openness. The moderate size of these correlations indicates that such values content is mostly distinct from current personality models, especially the Big Five.

An overarching question was the extent to which these values are stable dispositions versus the extent to which they are dynamic, changing indicators of personal development. Results provide evidence for both stability and change. Overall, the values constructs were seen to be almost as stable as Big Five and Big Six personality traits tested in the same sample in

terms of retest stability over one-, two-, and three-year lags. The stability of the values scale scores by age range, as shown in Figure 2, also compares well to estimates of the stability of personality attributes drawn from a meta-analysis of 152 longitudinal studies with an average span of 7 years (Roberts & DelVecchio, 2000), which reported average stability of personality trait scores of .54 during college-age, .64 for people in their 30s, and .74 for people aged 50-70.

In addition to dispositional stability, scores on values scales were seen to change with age in ways that reflect continued growth of mature values through middle adulthood. Older participants scored higher on Horizontal Collectivism and the Mature Values Index and lower on Unmitigated Self-Interest, Materialism, and Vertical Individualism. Scores on the Mature Values Index and Vertical and Horizontal Collectivism were seen to increase on average for participants over time, and scores on Unmitigated Self-Interest, Materialism, and Vertical and Horizontal Individualism were seen to decrease. All age correlations and linear trends were consistent with the hypothesis that self-focus decreases and inclusive values increase with age. These findings are consistent with previous cross-sectional (Bardi et al., 2009; Gouveia et al., 2015; Robinson, 2013) and longitudinal (Gouveia et al., 2015; Milfont et al., 2016; Robinson, 2013) findings using the Schwartz values scales. Although Rollo May (1967) focused on optimal development which could occur in the context of personal growth, rather than on typical development, these findings can also be seen as consistent with his theory of mature values.

The general trend in these results is from a more isolated competitiveness to a more cohesive, cooperative emphasis in one's value priorities. To use terms from Erikson (1959), the values shift includes a theme of moving from isolation toward intimacy and generativity. An alternative interpretation is that the change reflects a life-shift from youthful separation from the family of origin toward adult creation of a family of one's own. These results are also in line

with studies of emerging adulthood that indicate an expectation for development in this direction during adulthood (Arnett, 2003; Mayseless & Scharf, 2003). More self-focus and some deviance from cultural ethical norms is tolerated to a degree in adolescents. Adults, on the other hand, are expected to be guardians of the culture and to care for others.

We compared the stability of values over one-, two-, and three-year lags for four age groups (participants in their 20s, 30s, 40s, and 50s) in order to test the cumulative continuity hypothesis. This addressed the question of whether more rank-order change occurs earlier rather than later in adulthood. The evidence is mixed. χ^2 tests, AIC, and MFI were consistent with age differences in rank-order stability for Vertical Individualism, Materialism, Mature Values, Vertical Collectivism and Horizontal Collectivism. However, within these five values, only two (Mature Values and Vertical Collectivism) showed consistently increasing stability across age decades, with the other three showing no clear pattern (see Figure 2). Taken together, there is some evidence of small age differences in rank-order stability in values, but less consistent evidence that stability increases with age as the cumulative continuity hypothesis would suggest. These findings are somewhat at odds with findings for Big Five personality traits, where stability has been shown to increase from early to late adulthood (Roberts & DelVecchio, 2000; but see Costello et al., 2017).

The extent to which these constructs are about as stable as personality traits, but largely absent from current personality trait models, suggests questions to address in future studies. For example, do values have as much impact on our lives as personality traits? Vocational interests, also stable dispositions excluded from personality models, were recently shown to predict important life outcomes above and beyond, and in some cases better than, Big Five traits (Stoll et al., 2016). And do values influence the behaviorally-focused traits measured by personality, or

are they more influenced by personality? Such questions could address the extent to which values should be considered core aspects of personality organization, and if so which are the best candidates. For example, in this study, individualism was the least stable construct over time, in contrast to related scales for collectivism.

A limitation of the current study was the short time frame; although the study covered the full range of adulthood, each subject was only followed for three years. A longer period would be ideal to capture the small but potentially steady and meaningful change and development that occurs in both value priorities and personality attributes over the life course. A longer study period would also better allow for the disentangling of cohort from age effects. Future studies will ideally find ways to track these variables over more years of individual's lives.

Another possible limitation was that over 30% of the sample was lost due to attrition by the fourth wave. We tested missingness by predicting continued participation through all four waves with logistic regressions from Time 1 personality, values, and demographic variables. The only statistically significant predictor ($p = .02$) of continued participation (versus attrition) is Openness, which has a tiny effect -- the odds ratio is 1.01, so a person with a score of 100 POMP units on Openness would only be approximately 2.7 times more likely to complete the study than a person with a score of 0 POMP units. It is also worth noting that we use all available observations and fit the models using maximum-likelihood which provides unbiased estimates as long as the data are missing completely at random, as well as in the case that the missing data patterns are dependent on the values of the variables we have observed and that are included in the model (missing at random; Matta, Flournoy, & Byrne, 2017). It is also possible that the data are missing not at random, meaning that the missing data pattern is dependent on the values of the relevant outcome variables (i.e., values scales) we did not observe. For example, if people

that show a sudden and non-linear (based on their previous scores) spike in Unmitigated Self Interest tend to not respond during the wave they experience this spike, this will result in data that is missing not at random, and we may, for example, underestimate the amount of residual variance or the population mean intercept. Finally, although it may seem counterintuitive, covariates that are related to the missing data pattern but not the outcome itself are not relevant to the analysis of the outcome.

Conclusion

The current study explored stability and change of a set of value priorities relevant to ethical behavior. Values theories have assumed stability over time (Rokeach, 1973; Schwartz, 1992), but this assumption has not been widely tested in longitudinal samples. To what extent do these values capture stable dispositions, and to what extent are they indicators of personal development? Substantial stability was observed, nearly as much as for personality attributes, suggesting that such values capture stable individual differences. This stability in two cases increased a small amount with age. On the other hand, longitudinal age trends indicated that participants develop less self-focused, more inclusive values with age. Consistent with a hypothesis of ongoing socialization toward broader-scope values, and with Rollo May's theory, there appears to be small but predictable patterns of change in values with age. In their ability to define individual's priorities and character development, these constructs are arguably an important complement to Big Five and Big Six personality attributes. Future studies could compare the predictive ability of values versus personality traits on life outcomes and their influence on each other.

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Table 1

Descriptive Statistics, retest correlations, and correlations with age and gender for Time 1 Values and Personality Scales

	Items	Min	Max	Mean	SD	α	mir	vir	r_{retest}	$r_{t1,t4}$	r_{age}	r_{female}
<i>Values Scales</i>												
Unmitigated Self-Interest	6	0	87.5	28.9	16.2	.67	.26	.010	.78	.73	-.19	-.07
Vertical Individualism	4	0	100	47.2	19.3	.65	.32	.005	.71	.64	-.15	-.16
Materialism	6	0	100	39.8	2.1	.80	.40	.006	.78	.70	-.16	-.03
Financial Aspirations	5	0	100	48.5	22.2	.80	.45	.018	.79	.73	-.06	-.05
Mature Values ¹	17	3.45	91.9	61.7	8.4	.60	.09	.060	.81	.75	.10	.17
Vertical Collectivism	4	6.25	100	71.5	18.1	.67	.34	.013	.72	.70	.12	.03
Horizontal Collectivism	4	6.25	100	72.2	17.1	.71	.40	.010	.73	.68	.20	.09
Horizontal Individualism	4	18.75	100	74.5	15.8	.56	.25	.011	.59	.54	-.06	.01
<i>BFI-Six Scales</i>												
Conscientiousness	9	12.5	100	68.5	17.3	.82	.36	.006	.81	.75	.12	.11
Honesty/Propriety	8	25	100	71.2	15.7	.68	.21	.008	.76	.69	.18	.23
Agreeableness-Six	8	0	100	59.8	18.7	.79	.32	.013	.81	.73	.14	.01

Neuroticism	8	0	100	49.6	21.4	.86	.44	.008	.83	.78	-.09	.18
Extraversion	8	0	100	54.9	22.2	.88	.47	.013	.88	.84	.12	.05
Openness	10	27.5	100	74.4	14.9	.78	.29	.013	.83	.78	-.02	-.04
<i>BFAS Scales</i>												
Industriousness	10	7.5	100	63.2	18.5	.86	.37	.007	.80	.73	.11	.05
Orderliness	10	10	100	61.8	16.5	.78	.26	.013	.82	.77	.07	.11
Compassion	10	7.5	100	77.6	16.2	.89	.45	.008	.81	.76	.11	.23
Politeness	10	5	100	69.8	16.3	.78	.27	.008	.80	.76	.18	.22
Volatility	10	0	100	43.8	22.1	.91	.51	.006	.83	.74	-.11	.10
Withdrawal	10	0	100	46	2.8	.88	.42	.006	.84	.79	-.15	.11
Assertiveness	10	0	100	61.5	19.6	.89	.45	.008	.86	.80	.08	-.06
Enthusiasm	10	0	100	62.1	18.8	.86	.37	.011	.85	.81	.08	.10
Intellect	10	15	100	75.4	16	.83	.34	.010	.82	.78	-.02	-.10
Openness	10	20	100	73.2	15.8	.79	.28	.014	.82	.79	-.19	-.07

Note. N=862-864. All scales were rescaled to percent of maximum possible (POMP), giving scores a possible range of 0 to 100

(Cohen, Cohen, Aiken, & West, 1999). Minimum, maximum, mean, standard deviation, and age and gender correlations are at Time

1. mir = mean inter-item correlation, vir = variance of inter-item correlations, both are measures of unidimensionality (Clark &

Watson, 1995). r_{retest} is an average of retest correlations between years 1 and 2, 2 and 3, and 3 and 4. $r_{t1,t4}$ is the Time 1 to Time 4 retest correlation. For correlations with age and gender, bolding indicates $p < .01$.

¹ This scale was scored by averaging the 10 forward-keyed and the 7 reverse-keyed items separately, then transforming each into percent of maximum possible (POMP) scores. These two subscales were then averaged for the final scale. The alpha and mean and variance of inter item correlation values, however, were calculated on the full set of items entered as a single group. Note also that alpha is not a valid measure of reliability if the scale is not unidimensional.

Table 2

Correlations Between Personality and Values Scales (Time 1)

	USI	VI	Mat	FA	MV	VC	HC	HI
<i>Values Scales</i>								
Vertical Individualism (VI)	38							
Materialism (Mat)	45	41						
Financial Aspirations (FA)	41	49	50					
Mature Values (MV)	-50	-52	-59	-55				
Vertical Collectivism (VC)	-07	03	02	14	00			
Horizontal Collectivism (HC)	-27	-25	-20	-01	23	44		
Horizontal Individualism (HI)	11	24	03	22	-02	-08	-10	
<i>BFI-Six Scales</i>								
Conscientiousness	02	02	-09	11	-02	24	26	06
Honesty/Propriety	-26	-33	-27	-15	26	27	35	-12
Agreeableness-6	-18	-33	-28	-17	24	23	49	-16
Neuroticism	-01	09	17	-03	-02	-10	-22	-02
Extraversion	06	04	00	19	-07	10	29	02
Openness	-20	-05	-18	00	31	00	15	19
<i>BFAS Scales</i>								
Industriousness	07	04	-09	12	-04	23	25	09
Orderliness	10	10	14	20	-20	22	12	04
Compassion	-39	-34	-26	-17	41	31	55	-09
Politeness	-30	-45	-28	-21	32	33	47	-17

Volatility	07	17	24	06	-13	-15	-30	00
Withdrawal	04	10	24	01	-08	-09	-26	-02
Assertiveness	07	16	-06	21	-03	06	14	15
Enthusiasm	-02	-12	-05	06	05	21	46	-14
Intellect	-19	-03	-24	-09	23	02	11	19
Openness	-23	-14	-16	-07	41	07	22	14

Note. $N = 861-863$. Decimal points removed. Bolding indicates $p < .01$. USI = Unmitigated Self-Interest.

Table 3

Measurement Invariance of Values Scales Across Four Age-Band Decades

	Δ MFI	Items removed to achieve Invariance	Δ MFI ^M
Unmitigated Self-Interest	-.038	“The pleasures of the senses are the highest good.” “People ought to be motivated by something beyond their own self-interest.” “Worldly possessions are the greatest good and the highest value in life.”	-.010
Vertical Individualism	-.032	“When another person does better than I do, I get tense and aroused.”	-.009
Materialism ¹	-	“I would be happier if I could afford to buy more things.” “I believe that one of the most important achievements in life involves acquiring material possessions.”	-.008
Financial Aspirations	-.023	“You will be your own boss.” “You will have a job that pays well.”	-.005
Vertical Collectivism ²	-.043	“It is my duty to take care of my family, even when I have to sacrifice what I want.”	-.017
Horizontal Collectivism ²	-.055	“If a coworker got a prize, I would feel proud.”	-.032
Horizontal Individualism	-.012	-	-

Note. Participants in 20s, $N = 304$; in 30s, $N = 233$; in 40s, $N = 199$; in 50s, $N = 132$. MFI = McDonald’s non-centrality fit index.

MFI^M = MFI for modified versions, dropping the items identified. Per Kang, McNeish, and Hancock (2016) and simulations incorporating our data-structure, the cut off for invariance across groups was defined as change $< -.0124$ between group-unconstrained and group-strict models at $p < .01$. Growth trajectory analyses were conducted in both full and modified scales, both of which showed the same pattern of slope estimates, indicating that any deficits in invariance did not impact substantive conclusions.

¹ The model assuming strict longitudinal invariance did not converge and so was not comparable to the strict group invariance model.

However, dropping items allowed converge for both models.

² These scales were improved but did not meet criteria for invariance after modifications.

Table 4

Parameter Estimates (with Standard Errors) from Latent Curve Models with Structured Residuals (LCM-SR) for Values Scales

	Intercept mean	Intercept variance	Slope mean	Slope variance	Auto regressive component	Decade change, Std.
Unmitigated Self-Interest	28.93 (.51)	180.32 (12.81)	-.26 (.05)	.07 (.09)	.18 (.05)	-.19
Vertical Individualism	47.20 (.59)	222.50 (18.05)	-.31 (.05)	.13 (.12)	.11 (.05)	-.21
Materialism	40.03 (.63)	277.19 (21.17)	-.25 (.06)	.07 (.13)	.17 (.06)	-.15
Financial Aspirations	48.56 (.73)	371.58 (24.08)	-.07 (.06)	.11 (.17)	.14 (.06)	-.04
Mature Values Index	64.27 (.26)	44.65 (3.56)	.08 (.02)	.02 (.03)	.15 (.05)	.12
Vertical Collectivism	70.05 (.58)	220.55 (20.39)	.17 (.05)	.09 (.14)	.15 (.05)	.11
Horizontal Collectivism	71.70 (.53)	184.81 (15.58)	.28 (.05)	.08 (.11)	.12 (.05)	.21
Horizontal Individualism	74.38 (.46)	132.89 (11.61)	-.09 (.04)	.03 (.09)	.05 (.05)	-.08

Note. Maximum *N* for each wave: Time 1 = 863, Time 2 = 622, Time 3 = 590, Time 4 = 570; exact *N* for each is reported in .out files in supplementary information. Standard errors for each estimate are in parentheses. Bolding indicates $p < .01$. Decade change, Std. (standardized) is

calculated using the following formula: $10 \times \text{slope mean} / \sqrt{\text{intercept variance}}$. It is roughly comparable to Cohen's d for expected change over a decade.

Table 5

Fit for Longitudinal and Group Invariance Models to Test Cumulative Continuity

	Model	χ^2	AIC	MFI	RMSEA [90% CI]
Unmitigated Self-Interest	Longitudinal	33.04	20425.67	.995	.04 [.00, .07]
	Group	43.86	20412.49	.995	.03 [.00, .06]
Vertical Individualism	Longitudinal	4.95	21652.78	.990	.06 [.02, .09]
	Group	86.52*	21674.35	.971	.08 [.06, .10]
Materialism	Longitudinal	32.13	21645.88	.995	.04 [.00, .07]
	Group	5.10	21639.85	.992	.04 [.00, .07]
Financial Aspirations	Longitudinal	21.11	22166.01	1.002	.00 [.00, .05]
	Group	49.97*	2217.87	.992	.04 [.00, .07]
Mature Values Index	Longitudinal	36.43	16623.59	.993	.05 [.00, .08]
	Group	71.22*	16634.37	.980	.07 [.04, .09]
Vertical Collectivism	Longitudinal	39.69	21442.04	.991	.06 [.02, .09]
	Group	84.93*	21463.28	.972	.08 [.06, .10]
Horizontal Collectivism	Longitudinal	15.19	20902.12	1.005	.00 [.00, .02]
	Group	77.51*	2094.43	.976	.07 [.05, .10]
Horizontal Individualism	Longitudinal	25.40	21148.45	.999	.02 [.00, .06]
	Group	44.98	21144.04	.995	.03 [.00, .06]

Note. Maximum N for each wave: Time 1 = 863, Time 2 = 622, Time 3 = 590, Time 4 = 570;

exact N for each is reported in .out files in supplementary information. MFI = McDonald's non-centrality fit index; Longitudinal = model with longitudinal invariance; Group = model with age group invariance. For all analyses, 32 parameters were estimated for longitudinal and 20 for group models. Degrees of freedom for longitudinal models were 24, for group 36, and for

difference, 12. Bolded χ^2 values are statistically significant from a fully saturated model at $p < .01$.

* Indicates statistically significant difference between longitudinal and group models at $p < .01$, meaning the latter fits the data significantly worse than the former.

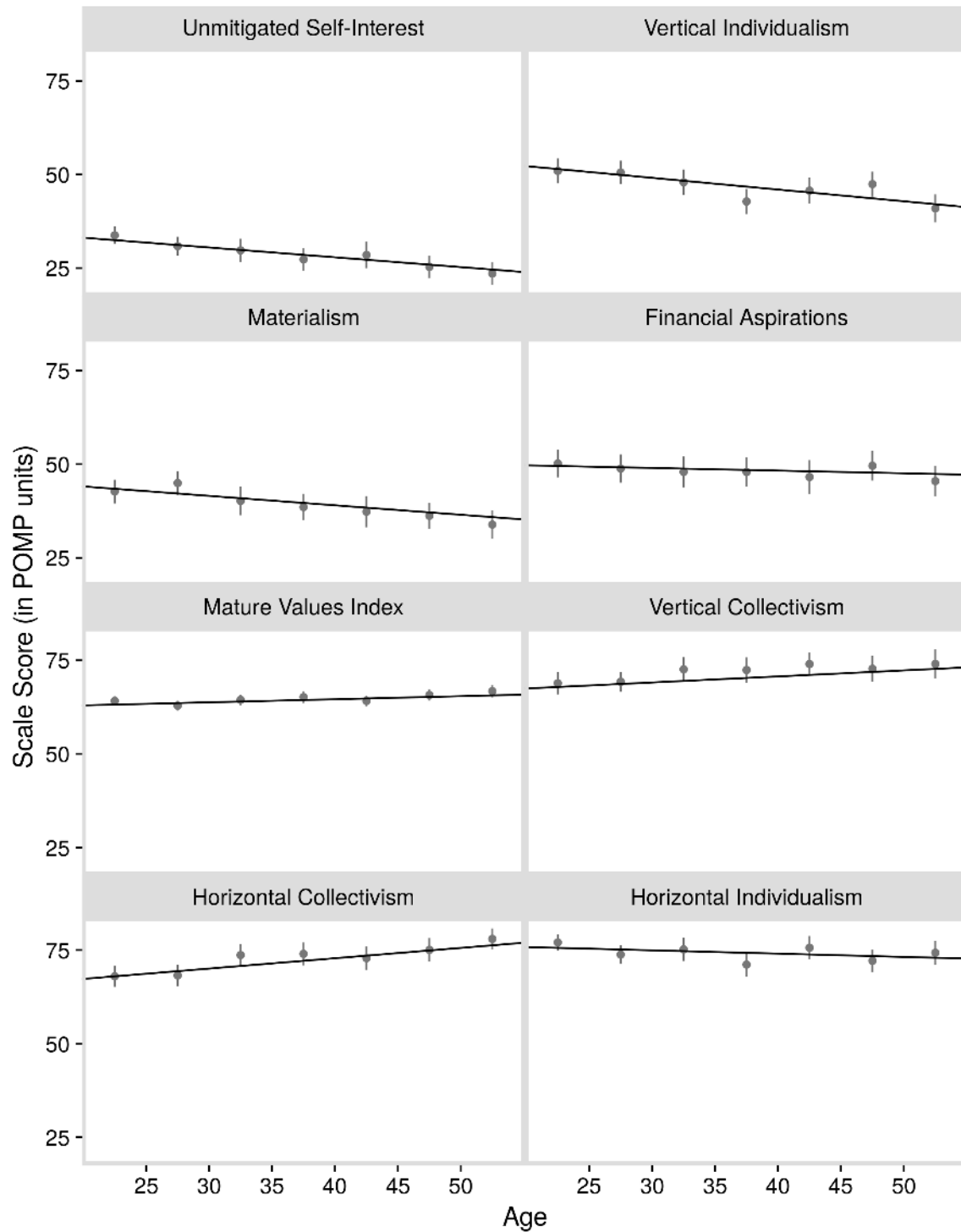


Figure 1. Model-predicted longitudinal growth trajectories for values with Time 1 means and 95% confidence intervals for age groups in 5-year bands (20-24, 25-29, . . . 50-55). Maximum *N*s for participants in 20s, *N* = 304; in 30s, *N* = 233; in 40s, *N* = 199; in 50s, *N* = 132. Exact *N* for each analysis is reported in .out files in supplementary information.

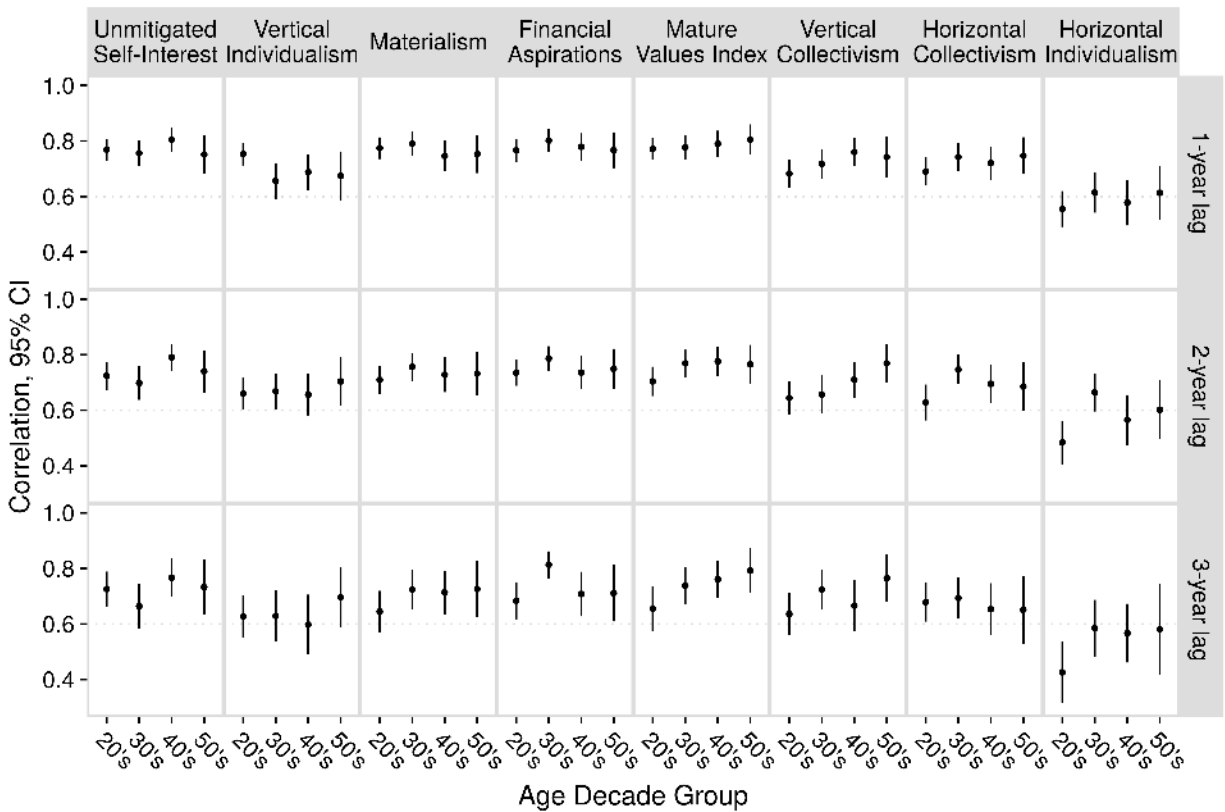


Figure 2. Stability of values scores by age group. Maximum Ns for participants in 20s, $N = 304$; in 30s, $N = 233$; in 40s, $N = 199$; in 50s, $N = 132$. Exact N for each analysis is reported in .out files in supplementary information.