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Prosociality Across Adulthood: A Developmental and Motivational Perspective

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Why do people contribute to the well-being of others? What promotes or hinders their contribution? Framed by expectancy-value theory and the motivational theory of life span development, we use data from the Midlife in the United States National longitudinal study (MIDUS I, II, and III) to examine how individuals' perceived contributions to the well-being of others develop across adulthood, in the related but distinct forms of overall prosociality (more other-focused) and generativity (more self-focused). Our findings show that prosociality and generativity display similar, yet distinct trajectories, peaking in midlife a decade apart from each other, when expectancy and value for prosocial behavior are highest. Moreover, expectancy as reflected in perceived control and control strivings, and value as indicated by agreeableness, predict individuals' prosociality and generativity. Trajectories of prosocial contributions further differ according to individual differences in perceived control, control striving, education, income, and number of children, whereas trajectories of generativity only differ across levels of perceived control and income. By applying motivational and life span developmental perspectives, our study offers insight into how prosociality and generativity develop throughout adulthood.

Keywords: adulthood, development, generativity, motivation, prosociality

Prosociality is a cornerstone of a healthy society (Padilla-Walker & Carlo, 2014), one which middle-aged adults with their relatively well-developed skills and resources may be particularly well-situated to support (e.g., Heckhausen, 2001; Schroeder & Graziano, 2015). But how does prosociality develop across adulthood, and what promotes or hinders this development? To help answer this, we integrate motivational and developmental theory to frame an examination of how prosociality, and its specific form of generativity, develop across adulthood, and vary across differences in individuals' expectancy (indicated by *perceived control and control strivings*), and value (indicated by *agreeableness*).

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Prosociality and Generativity

Prosociality broadly encompasses individuals' actions for the benefit of others (Penner, Dovidio, Piliavin, & Schroeder, 2005). This includes behaviors such as sharing, helping, and contributing to others and society. The related, but distinct, construct of generativity reflects an individual's efforts toward providing help, support, and guidance to others, but focusing on one's legacy (Erikson, 1950; Gruenewald, Liao, & Seeman, 2012; McAdams & de St. Aubin, 1992; McAdams, de St. Aubin & Logan, 1993; Pratt & Lawford, 2014). Generativity is a core developmental goal in midadulthood (Erikson, 1950), which develops and remains relevant throughout adulthood (e.g., McAdams, 2001; Pratt & Lawford, 2014). Although prosociality and generativity share an emphasis on helping others, generativity is a distinct construct driven by the underlying desire to contribute to the community and future generations through one's own legacy (Pratt & Lawford, 2014), and thus evincing a greater self-focus. We purposefully examine domain-general prosociality and generativity in the current study, but for simplicity, we primarily use the broader term of prosociality, except for when findings or theory are specific to generativity.

Theoretical Framework

Scholars have noted the challenge of examining the myriad dynamic and multilevel processes that frame prosociality across the life span (Eisenberg, Spinrad, & Knafo-Noam, 2015; Penner et al., 2005). This body of work reflects the need to further unpack the motivational mechanisms (Eisenberg, VanSchyndel, & Spinrad, 2016) that shape the development of prosociality (Eisenberg et al., 2015) across adulthood. We contribute to this endeavor by

applying expectancy-value theory (Atkinson, 1957; Beckmann & Heckhausen, 2018; Eccles & Wigfield, 2002; Wigfield et al., 2015) and the motivational theory of life span development (Heckhausen, Wrosch, & Schulz, 2010, 2019) to an examination of prosociality across adulthood.

A robust and consistent empirical and theoretical literature using the expectancy-value theory asserts that underlying beliefs about how well one will do on the activity (*expectancies*) and how much one values the outcomes stemming from engagement with this activity (*values*) directs goal choice and persistence (Atkinson, 1957; Beckmann & Heckhausen, 2018; Eccles & Wigfield, 2002; Wigfield et al., 2015). Considerable insight into why an individual *values* prosociality coalesces around prosociality being driven by altruistic and egoistic motives (for review see Eisenberg et al., 2016). Yet, less is known about individuals' *expectancy* that their prosocial actions will lead to desired outcomes. We contribute to this literature with an expectancy-value theory guided selection of predictors of prosociality in the current study.

The motivational theory of life span development (Heckhausen et al., 2010, 2019) offers additional insight into goal choice and pursuit across the life course. This theory posits that individuals' expectancy that they can attain a goal acts in concert with the value they place on the goal to inform the adaptiveness of their sustained commitment to or disengagement from the goal. Development reflects and directs an individual's opportunities and constraints, pursuits, and attainments across major life domains (e.g., work, family, health), and major changes in the life course, including multiple transitions extending across adulthood (e.g., establishing a career, building a family, retirement). This theoretical framework guides our examination of the development of prosociality across adulthood as it relates to one's prosocial-related expectancy and value.

Prosocial Expectancy and Value

Based on expectancy-value theory (for review see Beckmann & Heckhausen, 2018), expectations that one's prosocial motivations can be effectively translated into desired outcomes should enhance prosociality. Indeed, prior research points to the belief that one can help others as a core component of prosociality (Caprara, Alessandri, & Eisenberg, 2012; Habashi, Graziano, & Hoover, 2016; Penner, 2002; Penner et al., 2005). According to our theoretical framework (motivational theory of life span development: Heckhausen et al., 2010, 2019), individuals are fundamentally motivated to maximize their ability to control their own development. This motivation is realized through control strivings, which increase the likelihood that individuals will attain a goal. Goals are most often selected if one perceives having control over attaining the goal (perceived control), and individuals adaptively match their level of engagement (control strivings) to their perceived control over goal attainment (for review see Heckhausen et al., 2010). Accordingly, we include perceived control and control strivings as indicators of *expectancy* in our study.

Concern for others enhances prosociality by increasing the value one places on prosocial actions. Indeed, prosociality is increased by simply imagining or remembering helping someone in need (Gaesser & Schacter, 2014). Other research points to empathy and agreeableness as central dispositions linked to prosociality (Caprara et al., 2012; Habashi et al., 2016; Penner, 2002; Penner et al., 2005). Further research has found that agreeableness is unique in being a significant predictor of both costless (e.g., posthumous organ donation) and costly (e.g., charity donation, volunteerism) forms of prosociality (Ferguson, Zhao, O'Carroll, & Smillie, 2019). Agreeableness signals an increased concern for others and greater value placed on other's welfare, and accordingly is the central *value* predictor used in the current study. Figure 1 depicts our general expectancy-value model.

Developmental Trajectory of Prosociality and Generativity Across Adulthood

Prior research regarding prosociality suggests that older adults are more likely to exhibit prosocial behavior compared with younger adults (e.g., Beadle, Sheehan, Dahlben, & Gutchess, 2015; Sze, Gyurak, Goodkind, & Levenson, 2012; Van Lange, De Bruin, Otten, & Joireman, 1997). Yet other research suggests that underlying individual-level differences inform these behaviors (Kanacri et al., 2014), and the age–prosociality relationship differs depending on how prosociality is primed (Gaesser, Dodds, & Schacter, 2017) or examined (Okun & Schultz, 2003). We return to our theoretical framework for clarity regarding the developmental trajectory of prosociality and generativity across adulthood.

The motivational theory of life span development (Heckhausen et al., 2010, 2019) suggests that one's control capacity peaks in midlife. Thus, midlife may represent a peak time in the life span for one's expectancy that their prosociality can be effectively realized (Heckhausen, 2001). Likewise, midlife reflects the peak for some value components related to prosociality. Specifically, agreeableness increases through mid- to late-adulthood (Roberts & Mroczek, 2008) and rank-order stability of agreeableness peaks in midadulthood (Specht, Egloff, & Schmukle, 2011). Midadulthood is also the time in the life span when individuals are most likely to support both their children and their own parents (Fingerman et al., 2011; Grundy & Henretta, 2006). The increased caregiving role-exposure in combination with high and stable agreeableness may make individuals more aware of other's needs, which combines with peak levels of control capacity to make people more likely to feel like they can help others in need.

Research and theory on generativity also suggests a midlife peak. Generativity was originally conceived by Erikson (1950) as

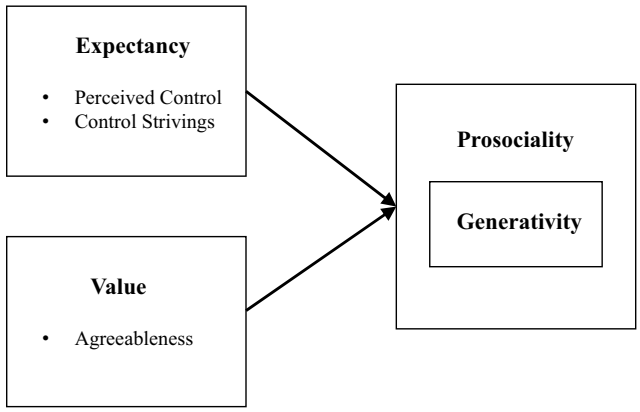

Figure 1. General expectancy-value model predicting prosociality and generativity.

a process unique to midlife, and prior research on the development of generativity across adulthood suggests a rise in generativity through young adulthood, a peak in midlife, and a decline in later life (Einolf, 2014; Keyes & Ryff, 1998; McAdams et al., 1993). Based on these prior findings and extant theory, we expect a midlife peak for prosociality and generativity, yet the exact age of the peak is uncertain.

The Present Study

The extant developmental and motivational research and theory discussed above frames our examination of prosociality across adulthood. We examine both general prosociality, and it's more specific and self-focused form of generativity. Using this framework, we propose that prosociality and generativity will peak in midlife (Hypothesis 1), and that one's *expectancy* (as indicated by perceived control and control striving), and *value* (as indicated by agreeableness) will predict higher and sustained levels of both prosociality and generativity across adulthood (Hypothesis 2).

We include four demographic covariates in our models: household income, education, number of children, and gender. Household income and education reflect socioeconomic status (SES), which has broad implications for one's control across adulthood (e.g., Corak, 2013; Heckhausen & Buchmann, 2019; Heckhausen & Shane, 2015; Marmot, 2006; Schoon & Lyons-Amos, 2017). Prior research has linked SES and prosocial behavior (e.g., Benenson, Pascoe, & Radmore, 2007; Callan, Kim, Gheorghiu, & Matthews, 2017; Guinote, Cotzia, Sandhu, & Siwa, 2015; Korndörfer, Egloff, & Schmukle, 2015; Nettle, Colléony, & Cockerill, 2011; Piff, Kraus, Côté, Cheng, & Keltner, 2010). Although the valence of this linkage is unclear, these prior studies converge on SES being an important predictor of prosociality. Nurturing or caregiving tendencies may also affect prosociality (for reviews see Brown & Brown, 2015; Preston, 2013). Given this, we expect prosociality to positively relate to the number of children one has. Prior research suggests that women report higher levels of agreeableness (e.g., Kajonius & Johnson, 2018; Schmitt, Realo, Voracek, & Allik, 2008), and benevolence values (Schwartz & Rubel, 2005). Moreover, results from the American Time Use Survey have consistently found that women are more likely to be in a caregiving role for both household and nonhousehold members, and engage in volunteering activities (Bureau of Labor Statistics, 2003–2018). Accordingly, we include gender as an additional covariate in our analyses.

Method

Participants and Procedure

Data from the Midlife in the United States National Study of Health and Well-Being (MIDUS), a U.S. nationally selected study of individuals across adulthood, were used. Initial data collection began in 1995 (MIDUS 1: n = 7,108), and participants were reassessed approximately every 9 years thereafter (2004, MIDUS 2: n = 4,963; 2013, MIDUS 3: n = 3,294). Further information on the MIDUS study can be found elsewhere (Ryff et al., 2017), and the data are publicly available through the Inter-University Consortium for Political and Social Research (ICPSR). Observations were retained in the analyzed sample if individuals had complete data on the covariates and outcome variables at any observation point. This allowed participants to contribute 1 (n = 2412), 2 (n = 1702), or 3 (n = 2062) observations to the analyses, resulting in an analyzed sample of 6,176 participants, 12,002 observations. Attrition analyses indicated that compared with individuals in the analyzed sample with fewer than three waves of data (n = 4114), individuals in the analyzed sample with three waves of data (n = 2062) were younger, more likely White, and reported higher levels of education, income, perceived control, agreeableness, generativity and prosociality. Demographics and summary statistics for the original and analyzed sample are presented in Table 1.

Measures

Prosociality. Prosociality was measured with the item: "how would you rate your contribution to the welfare and well-being of other people these days? Take into account all that you do, in terms

Table 1
Demographics and Summary Statistics From the Original MIDUS Sample and the Analyzed Sample

	Original MIDUS sample		Analyzed sample	
Variable	Wave 1	Wave 1	Wave 2	Wave 3
Observations	6110–7106	5903	3684	2415
Age at assessment wave	46.38 (13.00) [20, 75]	46.68 (12.90) [20, 75]	55.77 (12.24) [30, 84]	63.83 (10.96) [39, 92]
% Female	51.70%	52.04%	54.59%	54.00%
% Non-White	10.28%	9.32%	6.51%	5.92%
Number of children	2.30 (1.56) [0, 5]	2.31 (1.55) [0, 5]	2.40 (1.47) [0, 5]	2.36 (1.44) [0, 5]
Education level	6.77 (2.49) [1, 12]	6.89 (2.48) [1, 12]	7.31 (2.53) [1, 12]	7.64 (2.47) [1, 12]
Household income	$71,701 (61282) [0, 300000]	$72,013 (61307) [0, 300000]	$72,033 (60202) [0, 300000]	$87,757 (72866) [0, 300000]
Perceived control	5.50 (1.03) [1, 7]	5.52 (1.01) [1, 7]	5.54 (1.00) [1.08, 7]	5.47 (1.01) [1, 7]
Control striving	3.24 (.54) [1, 4]	3.24 (.54) [1, 4]	3.20 (.55) [1.2, 4]	3.18 (.54) [1.4, 4]
Agreeableness	3.49 (.49) [1, 4]	3.49 (.49) [1, 4]	3.44 (.50) [1, 4]	3.43 (.50) [1.6, 4]
Prosociality	6.63 (2.21) [0, 10]	6.63 (2.20) [0, 10]	6.51 (2.17) [0, 10]	6.48 (2.20) [0, 10]
Generativity	2.83 (.63) [1, 4]	2.83 (.63) [1, 4]	2.83 (.64) [1, 4]	2.81 (.65) [1, 4]

Note. M (SD) [Minimum, Maximum]. Highest coded value for number of children is 5 = *5 or more children*. Highest coded value for income is $300,000. Education level 1 = *no school/some grade* school, 2 = *eight grade/junior high school*, 3 = *some high school*, 4 = *GED*, 5 = *graduated from high school*, 6 = *1 to 2 years of college, no degree yet*; 7 = *3 or more years of college, no degree yet*; 8 = *graduated from a 2-year college or vocational school, or associates degree*, 9 = *Bachelor's degree,* 10 = *some graduate school*, 11 = *master's degree*, 12 = *doctoral degree*.

of time, money, or concern, on your job, and for your family, friends, and the community." Participants responded to the item using an 11-point scale, ranging from *the worst possible contribution to the welfare and well-being of other people* (0) to *the best possible contribution to the welfare and well-being of other people* (10).

Generativity. Generativity was included in the present study as a distinct and more self-focused form of prosociality motivated by an individual's desire to leave a legacy. Participants' perceived generativity was measured with a modified 6-item version of the Loyola Generativity Scale (McAdams & de St. Aubin, 1992). This scale includes items related to both past and current generative desires and behaviors (e.g., "You have had a good influence on the lives of many people"; "You have skills to pass along"). Participants indicated how much each item reflected them using a 4-point scale, ranging from *a lot* (1) to *not at all* (4). Responses were mean-summed (αs = .84–.85), and reversed so that higher scores indicated greater generativity.

Perceived control. Perceived control was measured using the 12-item sense of control scale (Lachman & Weaver, 1998). The scale consists of four items reflecting mastery (e.g., "I can do just about anything I really set my mind to.") and eight items reflecting constraints (e.g., "There is little I can do to change the important things in my life."). Participants responded to each item using a 7-point scale, ranging from *strongly agree* (1) to *strongly disagree* (7). The overall perceived control measure was calculated by reverse scoring the mastery items and mean-summing them with the constraint items so that higher values indicated greater perceived control (αs = .85–.87).

Control striving. Control striving was measured using the primary control subscale of the primary and secondary control scale (Wrosch, Heckhausen, & Lachman, 2000). The scale consists of five items (e.g., "When faced with a bad situation, I do what I can do to change it for the better"), which participants responded to using a 4-point scale, ranging from *a lot* (1) to *not at all* (4). Responses were reverse scored and mean-summed so that higher values indicated greater control striving (αs = .76–.79).

Agreeableness. Agreeableness was measured using a modified version of the Big-5 inventory (Rossi, 2001). Participants indicated how much five self-descriptive adjectives (helpful, warm, caring, softhearted, sympathetic) described them on a 4-point scale from *a lot* (1) to *not at all* (4). Responses were reverse coded and mean-summed with higher scores representing higher agreeableness (αs = .78–.81).

Demographic covariates. Participants' income, education, gender, and number of children were included as additional covariates. Annual household income was coded into 7 categories ranging from 1 = *$0 to $10,000* to 7 = *Greater than $175,000*. Highest level of education was coded with values ranging from 1 = *No school/some grade school* to 12 = *Doctoral Degree*. Gender was coded 0 = *male* and 1 = *female*. Number of children was coded using five values ranging from *no children* (0) to *five or more children* (5).

Analyses

Multilevel model growth curve analyses were performed in Stata (Rabe-Hesketh & Skrondal, 2012). Data were structured with longitudinal survey responses (Level 1) nested within participants (Level 2). Only observed data were used, with three observations being the most contributed by any single participant. Continuous predictor variables and covariates were grand-mean centered, age was centered at 53, and study wave was centered at 0 to reflect the initial assessment. All models included a random intercept and random slope (change across assessment wave), and allowed the random intercept and random slope to covary. All models used robust standard errors.

Model building began with prosociality and generativity examined with study wave and age, and the interaction between wave and age, as predictors (Model 1). This provided estimates of how prosociality and generativity changed over time (across each 9-year assessment wave), varied across ages (between 24 and 92), and whether the change over time differed across ages. The composite equation for Model 1 is below wherein y_{ij} is the predicted value of the dependent variable for participant i at time j. The fixed effects portion of the model includes γ_{00} as the sample intercept at time (wave) 0, $\gamma_{10}(T_{ij})$ as the change across assessment wave for participant i at time j, $\gamma_{01}B_2x_{2ij}$ as the effect of a one unit change in age on the intercept of the outcome variable for participant i at time j, and $\gamma_{11}B_px_{pij}{}^*T_{ij}$ as the effect of a one unit change in age on the change in the outcome variable across assessment wave for participant i at time j. The random effects portion of the model includes ζ_{0i} as participant deviation from the sample intercept, $\zeta_{1i}(T_{ij})$ as participant deviation from the sample change across assessment wave, and e_{ij} as participant deviation at each time point from their mean across all time points. [Model 1: $y_{ij} = \gamma_{00} + \gamma_{10}(T_{ij}) + \gamma_{01}B_2x_{2ij} + \gamma_{11}B_2x_{2i}{}^*T_{ij} + \zeta_{0i} + \zeta_{1i}(T_{ij}) + e_{ij}$].

Model 2 added perceived control, control strivings, agreeableness, education, income, and number of children as time-varying predictors, and gender as a time-invariant predictor. Model coefficients representing the relationship between the time-varying covariates and prosociality and generativity are the combination of between-person (Level 2) and within-person (Level 1) effects. This produced the following composite equation for Model 2, that added $\gamma_{01}B_3x_{3ij} + \ldots + \gamma_{01}B_px_{pij}$ as the effect of a one unit change in the covariate on the outcome variable for participant i at time j. [Model 2: $y_{ij} = \gamma_{00} + \gamma_{10}(T_{ij}) + \gamma_{01}B_2x_{2ij} + \gamma_{11}B_2x_{2i}{}^*T_{ij} + \gamma_{01}B_3x_{3ij} + \ldots + \gamma_{01}B_px_{pij} + \zeta_{0i} + \zeta_{1i}(T_{ij}) + e_{ij}$].

In the final model (Model 3), the predictors were interacted with age and wave to examine whether the trajectories of prosociality and generativity across adulthood differed across levels of the predictors. This produced the following composite equation with $\gamma_{11}B_3x_{3i}{}^*T_{ij} + \ldots + \gamma_{11}B_px_{pij}{}^*T_{ij}$ representing the two-way interaction between assessment wave and the predictors, $\gamma_{01}B_2x_{2i}{}^*\gamma_{01}B_3x_{3ij} \ldots \gamma_{01}B_2x_{2i}{}^*\gamma_{01}B_px_{pij}$ representing the two-way interaction between age and the predictors, and $\gamma_{11}B_2x_{2i}{}^*\gamma_{01}B_3x_{3ij} \ldots \gamma_{11}B_2x_{2i}{}^*\gamma_{01}B_px_{pij}$ added as the three-way interaction between wave, age, and the predictors. [Model 3: $y_{ij} = \gamma_{00} + \gamma_{10}(T_{ij}) + \gamma_{01}B_2x_{2ij} + \gamma_{11}B_2x_{2i}{}^*T_{ij} + \gamma_{01}B_3x_{3ij} + \ldots + \gamma_{01}B_px_{pij} + \gamma_{11}B_3x_{3i}{}^*T_{ij} + \ldots + \gamma_{11}B_px_{pij}{}^*T_{ij} + \gamma_{01}B_2x_{2i}{}^*\gamma_{01}B_3x_{3ij} \ldots \gamma_{01}B_2x_{2i}{}^*\gamma_{01}B_px_{pij} + \gamma_{11}B_2x_{2i}{}^*B_3x_{3i}{}^*T_{ij} + \ldots + \gamma_{11}B_2x_{2i}{}^*B_px_{pij}{}^*T_{ij} + \zeta_{oi} + \zeta_{1i}(T_{ij}) + e_{ij}$].

Model-predicted values of prosociality and generativity across adulthood for low, average, and high values of the predictors were obtained from Model 3. Predicted values were generated for each age in the observed Wave 1 range (24–75 years of age), with subsequent 9-year values for Wave 2 (33–83 years of age) and Wave 3 (42–92 years of age). These values were then plotted

across age, with quadratic trajectory lines for low, average, and high values of the predictors added to the figures (Figures 2 and 3, panels A–G).

Results

Pairwise correlations for study variables at each assessment wave are presented in Table 2. Notably, our general prosociality measure and our more specific generativity measure are significantly positively correlated at each assessment wave ($ps < .001$) but the size of the correlation is moderate ($rs = .44–.47$). This affirms that our measures of prosociality and generativity are related, yet distinct constructs. Perceived control and control strivings were also significantly positively correlated at each assessment wave (rs .42–.44, $ps < .001$) showing their interrelation, but at a moderate level that justifies the inclusion of both measures in the analyses.

General Trajectories of Prosociality and Generativity Across Adulthood

Prosociality. Results from the multilevel model growth curve analyses predicting prosociality and generativity are presented in Tables 3 and 4, respectively. Prosociality differed significantly across assessment wave for participants of different ages ($B = -.009$ (.002); 95% CI [−.013, −.005], $p < .001$; Model 1, Table 3). Simple slopes with region of significance analyses were then conducted for each age in the sample (24–92) to examine the developmental trajectory of prosociality across adulthood. Region of significance analyses identify the values of the moderator at which point the relationship between the predictor and the outcome become significant (Preacher, Curran, & Bauer, 2006). Supporting Hypothesis 1, the results indicated an inverted u-shaped trajectory that peaked in midadulthood. Specifically, prosociality increased across assessment wave for individuals less than 36 years of age ($ps < .05$), was stable for individuals between 36 and 52 years of age ($ps > .05$), and decreased for participants older than 52 years of age ($ps < .05$). The inflection point where the change in prosociality across assessment wave went from positive to negative, an indication of when prosociality peaked, was between ages 45 and 46.

Generativity. Generativity also differed significantly across assessment waves for participants of different ages ($B = -.003$ (.000); 95% CI [−.004, −.002], $p < .001$; Model 1, Table 4). Supporting Hypothesis 1, simple slopes with region of significance analyses indicated an inverted u-shaped trajectory that peaked in midadulthood, but with a slightly later inflection point than prosociality. Specifically, the change in generativity across assessment wave was positive for individuals less than 51 years of age ($ps < .05$), nonsignificant for individuals between 52 and 61 years of age ($ps > .05$), and negative for individuals greater than 62 years of age ($ps < .05$). The inflection point where the change in generativity across assessment wave went from positive to negative, an indication of when generativity peaked, was between ages 56 and 57.

Predictors of Prosociality and Generativity

Prosociality. Results of the multilevel model growth curve analyses predicting prosociality are presented in Table 3. The results collectively support Hypothesis 2, in that higher levels of prosociality were predicted by perceived control ($B = .203$ (.024); 95% CI [.156, .251], $p < .001$, $\beta = .094$), primary control striving ($B = .314$ (.043); 95% CI [.229, .398], $p < .001$, $\beta = .078$), and agreeableness ($B = .835$ (.046); 95% CI [.744, .925], $p < .001$, $\beta = .189$). These relationships were evident when controlling for sociodemographic characteristics, which were also positively related to prosociality: (*education:* $B = .080$ (.009); 95% CI [.062, .097], $p < .001$, $\beta = .091$; *income:* $B = .052$ (.013); 95% CI [.026, .078], $p < .001$, $\beta = .040$; *number of children:* $B = .079$ (.015); 95% CI [.049, .109], $p < .001$, $\beta = .054$; *female:* $B = .525$ (.046); 95% CI [.434, .616], $p < .001$, $\beta = .120$).

Next, we examined how the trajectory of prosociality across adulthood differed across levels of the predictors (Table 3, Model 3). Results were used to generate model-predicted values of prosociality across age for low, average, and high levels of the predictors (Figure 2A–2G). As shown in Table 3, the main effects for each of the predictors persisted in Model 3, indicating that prosociality is higher for individuals who report higher perceived control, control strivings, and agreeableness. The main effects for education, income, number of children, and identifying as female similarly remained positive and significant.

Significant three-way interactions emerged between age, assessment wave, and perceived control ($B = -.006$ (.002); 95% CI [−.010, −.002], $p = .008$) and control striving ($B = .008$ (.004); 95% CI [.000, .016], $p = .048$). Simple slopes with region of significance analyses (Preacher et al., 2006) were conducted to examine at which ages the slope (i.e., change across assessment waves) in prosociality was significant for individuals reporting high (+1 *SD*) or low levels (−1 *SD*) of perceived control and control striving, respectively. As shown in Figure 2A, high levels of perceived control was related to increasing prosociality up to age 46; however, simple slopes and region of significance analyses indicated that this increase was nonsignificant ($ps > .05$). Prosociality then began to decline, nonsignificantly from age 47 to 55 ($ps > .05$), and significantly from age 56 through 92 ($ps < .05$). Low levels of perceived control was related to significantly decreasing prosociality until age 67 ($ps < .05$), and nonsignificantly decreasing prosociality from age 68 through 92 ($ps > .05$). Further evinced in Figure 2A, these results suggest that individual differences in perceived control are most strongly associated with differences in prosociality during midadulthood.

Turning to control strivings (Figure 2B), simple slopes and region of significance analyses indicated that high levels of control strivings (+1 *SD*) were associated with significantly decreasing prosociality until age 77 ($ps < .05$), and nonsignificantly decreasing prosociality from age 78 to 92 ($ps > .05$). Low levels of control strivings (−1 *SD*) were associated with nonsignificantly increasing prosociality until age 49 ($ps > .05$), nonsignificantly decreasing prosociality from age 50 through 61 ($ps > .05$), and significantly decreasing prosociality from ages 62 through 92 ($ps < .05$). When combined with the significant main effect of control strivings, and as depicted in Figure 2B, these results suggest that control strivings are most strongly associated with lowered prosociality during young and late-adulthood.

As seen in Table 3, the main effect of agreeableness on age was significant ($B = .920$ (.065); 95% CI [.792, 1.05], $p < .001$), but the three-way interaction between agreeableness, age, and wave, and the lower-order two-way interactions were nonsignificant ($ps > .05$). As depicted in Figure 2C, these results suggest that

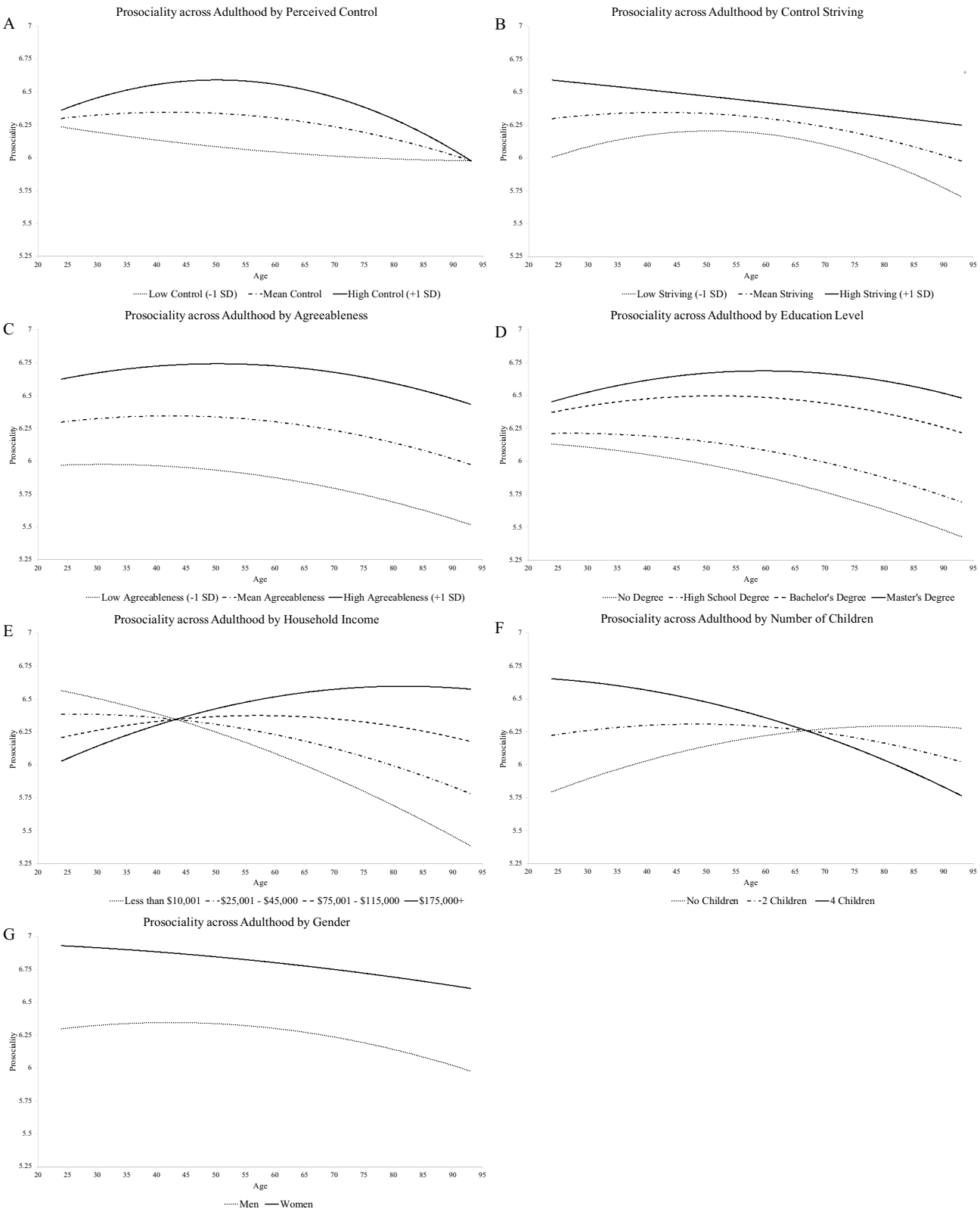

Figure 2. Prosociality across adulthood by levels of perceived control (A), control striving (B), agreeableness (C), education (D), household income (E), number of children (F), and gender (G).

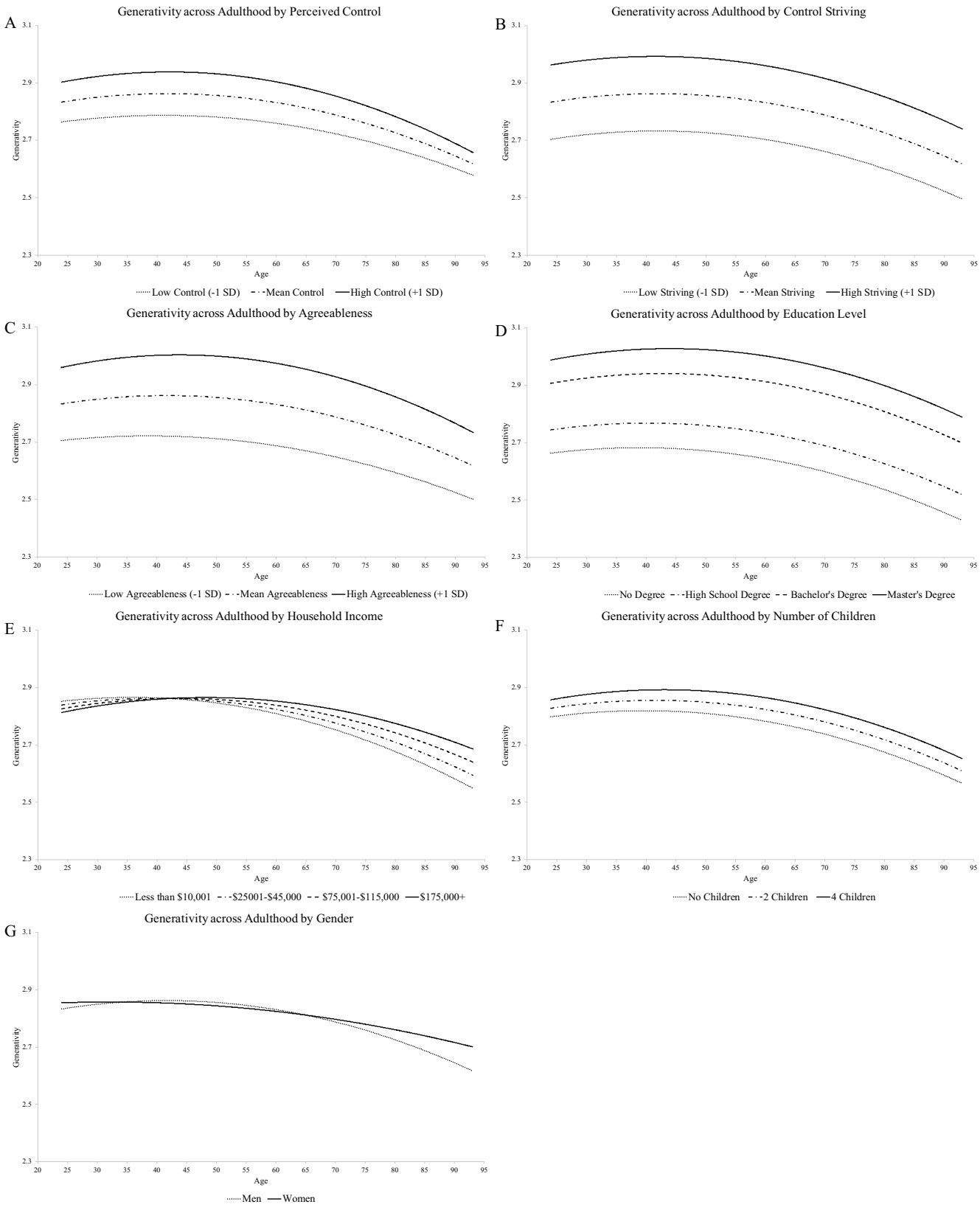

Figure 3. Generativity across adulthood by levels of perceived control (A), control striving (B), agreeableness (C), education (D), household income (E), number of children (F), and gender (G).

Table 2
Pairwise Correlations for Study Variables, by Wave

Variable	1	2	3	4	5	6	7	8	9
Wave 1									
1. Prosociality									
2. Generativity	.44***								
3. Perceived control	.16***	.27***							
4. Control striving	.21***	.37***	.42***						
5. Agreeableness	.28***	.33***	.13***	.33***					
6. Education	.05***	.19***	.17***	.03*	−.09***				
7. Household income	.04**	.11***	.17***	.06***	−.07***	.31***			
8. Number of children	.08***	.04**	−.05**	.05**	.05**	−.18***	.01		
9. Gender (1 = female)	.17***	.05**	−.08***	−.00	.27***	−.10***	−.13***	.02	
10. Age	.03*	.00	−.09***	.08***	.07***	−.10***	−.08***	.40***	.00
Wave 2									
1. Prosociality									
2. Generativity	.47***								
3. Perceived control	.19***	.30***							
4. Control striving	.19***	.39***	.44***						
5. Agreeableness	.28***	.33***	.26***	.31***					
6. Education	.10***	.22***	.16***	.04*	−.10***				
7. Household income	.07***	.09***	.17***	.05**	−.10***	.34***			
8. Number of children	.03*	.04*	−.01	.04**	.05**	−.16***	−.03*		
9. Gender (1 = female)	.13***	.02	−.07***	.02	.28***	−.11***	−.11***	.02	
10. Age	−.03	−.04*	−.04**	.05**	.11***	−.14***	−.28***	.27***	−.03
Wave 3									
1. Prosociality									
2. Generativity	.44***								
3. Perceived control	.17***	.30***							
4. Control striving	.16***	.37***	.43***						
5. Agreeableness	.24***	.32***	.14***	.31***					
6. Education	.18***	.23***	.19***	.02	−.07***				
7. Household income	.09***	.14***	.22***	.10***	−.06*	.38***			
8. Number of children	.00	.05*	.02	.05**	.07***	−.10***	−.04		
9. Gender (1 = female)	.15***	.06**	−.07***	.03	.29***	−.12***	−.17***	.02	
10. Age	−.05*	−.07**	−.07***	.01	.05*	−.12***	−.29***	.22***	−.03

* $p < .05$. ** $p < .01$. *** $p < .001$.

agreeableness is associated with consistently higher levels of prosociality across adulthood.

Turning to the covariates, as seen in Table 3, significant main effects were present for all covariates (education, income, number of children, gender; $ps < .05$), and lower-order (two-way) significant interactions were present for education, income, and number of children ($ps < .05$). None of the three-way interactions between the covariates and age and wave were significant. The trajectories are plotted in Figure 2D–2G.

Simple slope with region of significance analyses examined the significant interaction between education and slope, and found that individuals with a 2-year degree or less reported significantly decreasing prosociality across assessment waves ($ps < .05$), whereas those with higher levels of education reported nonsignificant changes in prosociality across waves ($ps > .05$). As seen in Figure 2D, this suggests that higher education is linked with higher prosociality across adulthood, and that these differences become more pronounced over time. Regarding income, simple slope with region of significance analyses examining the significant two-way interaction between income and age found that age was significantly negatively associated with prosociality for individuals with yearly household incomes less than $45,000 ($ps < .05$), nonsignificantly associated with prosociality for individuals with incomes between $45,001 and $115,000 ($ps > .05$), and significantly positively associated with prosociality for individuals with incomes greater than $115,000 ($ps < .05$). As shown in Figure 2E, this suggests that household income is more positively associated with prosociality at later ages. However, the association between household income and prosociality is not uniformly positive across adulthood, with lower levels of income associated with greater prosociality in young-adulthood. Simple slopes with region of significance analyses for the significant two-way interaction between number of children and age indicated that age was significantly positively associated with prosociality for childless individuals ($ps < .05$), nonsignificantly associated with prosociality for individuals with 1 or 2 children ($ps > .05$), and significantly negatively associated with prosociality with 3 or more children ($ps < .05$). As shown in Figure 2F, when combined with the significant positive main effect of children on prosociality, this suggests that having more children is associated with greater prosociality from young through midadulthood, but having fewer children is associated with greater prosociality in late-adulthood. No significant interactions emerged for gender, and as shown in Figure 2G, this suggests that women report consistently greater levels of prosociality than do men across adulthood.

Generativity. Results of the multilevel models predicting generativity are presented in Table 4. The results collectively support Hypothesis 2, in that higher levels of generativity were

Table 3
Results of Multilevel Growth Curve Models Predicting Prosociality

Variable	Model 1	Model 2	Model 3
Intercept	6.632 (.031)	6.343 (.038)	6.390 (.044)
Wave	−.063 (.029)*	−.058 (.029)*	−.081 (.046)
Age	.004 (.003)	.000 (.002)	.002 (.003)
Wave × Age	−.009 (.002)***	−.005 (.002)**	−.005 (.003)
Perceived control		.203 (.024)***	.204 (.032)***
By wave			.042 (.033)
By age			.005 (.002)*
By wave and age			−.006 (.002)**
Primary control striving		.314 (.043)***	.376 (.061)***
By wave			−.141 (.059)*
By age			−.006 (.004)
By wave and age			.008 (.004)*
Agreeableness		.835 (.046)***	.920 (.065)***
By wave			−.108 (.06)
By age			.008 (.004)
By wave and age			−.002 (.004)
Education		.080 (.009)***	.062 (.012)***
By wave			.032 (.012)**
By age			.001 (.001)
By wave and age			−.000 (.001)
Income		.052 (.013)***	.058 (.018)**
By wave			−.018 (.019)
By age			.005 (.001)***
By wave and age			−.000 (.001)
Number of children		.079 (.015)***	.077 (.020)***
By wave			−.009 (.020)
By age			−.005 (.001)***
By wave and age			.000 (.001)
Gender (female = 1)		.525 (.046)***	.548 (.061)***
By wave			−.040 (.059)
By age			−.003 (.004)
By wave and age			.003 (.004)
Random effects			
Intercept	1.410 (.044)	1.178 (.051)	1.168 (.050)
Wave	.333 (.110)	.343 (.107)	.326 (.112)
Residual	1.690 (.029)	1.693 (.029)	1.687 (.029)
Correlation (constant, wave)	−.193 (.109)	−.248 (.118)	−.234 (.126)
Deviance	51855	50744	50626

Note. Analyzed sample: 6,176 participants, 12,002 observations. Random-effect parameter estimates displayed as standard deviations. Unstandardized coefficient (standard error) presented.
* $p < .05$. ** $p < .01$. *** $p < .001$.

predicted by perceived control ($B = .067$ (.006) [.055, .079], $p < .001$, $\beta = .106$), primary control striving ($B = .237$ (.011) [.215, .259], $p < .001$, $\beta = .202$), and agreeableness ($B = .283$ (.012) [.260, .307], $p < .001$, $\beta = .221$). These relationships were evident when controlling for sociodemographic characteristics, which were also positively related to generativity (*education:* $B = .044$ (.003) [.039, .049], $p < .001$, $\beta = .174$; *income:* $B = .007$ (.003) [.000, .013], $p = .045$, $\beta = .018$; *number of children:* $B = .021$ (.004) [.013, .029], $p < .001$, $\beta = .050$), with the exception of gender which was nonsignificantly related (*female:* $B = .006$ (.013) [−.020, .031], $p = .675$, $\beta = .004$).

Next, we examined how the trajectory of generativity across adulthood differed across levels of the predictors (Table 4, Model 3). Results were used to generate model-predicted values of generativity across age for low, average, and high levels of the predictors (Figure 3A–3G). As shown in Table 4, the main effects for each of the predictors persisted in Model 3, indicating that generativity is higher for individuals who report higher perceived control, control strivings, and agreeableness. The main effects for education, income, number of children, and identifying as female similarly remained consistent with Model 2.

Although no three-way interactions were significant, there was a significant interaction between perceived control and assessment wave. Simple slope with region of significance analyses indicated that generativity increased across waves ($ps < .05$) for individuals reporting average or higher levels of perceived control (5.308; −.205 *SD* from the mean), but did not significantly change for individuals with lower levels of perceived control ($ps > .05$). Similar to the findings for prosociality, albeit to a lesser extent, the results from Model 3 collectively suggest that perceived control is most strongly associated with generativity during midadulthood (Figure 3A). No two-way or three-way interactions were significant for control strivings or agreeableness. This suggests that these variables are consistently positively associated with generativity across adulthood.

Turning to the covariates, the only significant interaction was between household income and assessment wave. Simple slope

Table 4
Results of Multilevel Growth Curve Models Predicting Generativity

Variable	Model 1	Model 2	Model 5
Intercept	2.826 (.009)	2.819 (.010)	2.815 (.012)
Wave	.010 (.008)	.016 (.007)*	.031 (.012)**
Age	.000 (.001)	−.001 (.001)	−.001 (.001)
Wave × Age	−.003 (.000)***	−.002 (.000)***	−.003 (.001)***
Sense of control		.067 (.006)***	.058 (.008)***
By wave			.016 (.008)*
By age			−.000 (.001)
By wave and age			−.000 (.001)
Primary control striving		.237 (.011)***	.237 (.015)***
By wave			.000 (.015)
By age			−.000 (.001)
By wave and age			−.000 (.001)
Agreeableness		.283 (.012)***	.299 (.017)***
By wave			−.013 (.015)
By age			.001 (.001)
By wave and age			−.001 (.001)
Education		.044 (.003)***	.044 (.003)***
By wave			−.000 (.003)
By age			.000 (.000)
By wave and age			−.000 (.000)
Income		.007 (.003)*	.015 (.005)**
By wave			−.012 (.005)*
By age			.001 (.000)
By wave and age			.000 (.000)
Number of children		.021 (.004)***	.026 (.005)***
By wave			−.008 (.005)
By age			.000 (.000)
By wave and age			−.000 (.000)
Gender (female = 1)		.006 (.013)	.013 (.016)
By wave			−.023 (.015)
By age			−.000 (.001)
By wave and age			.002 (.001)
Random effects			
Intercept	.507 (.008)	.407 (.008)	.406 (.008)
Wave	.121 (.016)	.122 (.015)	.122 (.015)
Residual	.377 (.006)	.373 (.006)	.372 (.006)
Correlation (constant, wave)	−.106 (.058)	−.216 (.057)	−.211 (.058)
Deviance	20077	17892	17868

Note. Analyzed sample: 6,176 participants, 12,002 observations. Random-effect parameter estimates displayed as standard deviations. Unstandardized coefficient (standard error) presented.
* $p < .05$. ** $p < .01$. *** $p < .001$.

with region of significance analyses indicated that generativity increased across waves for individuals with annual household incomes less than $75,000 (*p*s < .05), but did not significantly change across waves for individuals with higher incomes (*p*s > .05). When combined with the significant positive main effect of income, and the nonsignificant positive two-way and three-way interactions, as shown in Figure 3E, household income was inversely related with generativity in young adulthood but increasingly positively associated with generativity as individuals progress through later stages of adulthood. Education (Figure 3D) and number of children (Figure 3F) were consistently positively associated with generativity across adulthood. The results also suggest that males and females report similar levels of generativity across adulthood (Figure 3G).

Discussion

Collectively, our findings highlight the development of prosociality and generativity across adulthood and the motivational influences that underlie this development. We find that prosociality and generativity peak in midadulthood, but generativity peaks a decade later (56 years of age) than prosociality (45 years of age). Our findings further suggest that perceived control and control strivings (*expectancy*) and agreeableness (*value*) positively relate to prosociality and generativity across adulthood. However, these constructs have distinct relationships with prosociality and generativity trajectories, with the trajectory of prosociality more likely to differ across levels of our predictors than generativity.

Development of Prosociality and Generativity Across Adulthood

According to the motivational theory of life span development (Heckhausen et al., 2010, 2019), individuals are most likely to match their level of engagement to their opportunities. Our findings regarding a midlife peak for prosociality and generativity reflect when age period when the expectancy that one's prosocial intentions can be realized is highest (Heckhausen, 2001). This

peak corresponds with theorized trajectories of domain-general control capacity, which similarly peaks during midlife (Heckhausen et al., 2010, 2019), and prior research suggesting that generativity, a distinct but related form of prosociality, peaks in midlife (Einolf, 2014; Keyes & Ryff, 1998; McAdams et al., 1993). Midlife is a time when agreeableness is high and stable (Roberts & Mroczek, 2008; Specht et al., 2011) and individuals are most likely to have caregiving demands (Fingerman et al., 2011; Grundy & Henretta, 2006). Being aware of others' needs (value) combined with feeling that one can help (expectancy) consistently links with prosociality (Habashi et al., 2016; Penner, 2002; Penner et al., 2005). Our research confirms the importance of these components, providing a novel extension by illustrating their contribution to the development of prosociality across adulthood.

Although we found midlife peaks for both generativity and prosociality, the age at which generativity peaked was a decade later than prosociality. Moreover, the trajectory of prosociality was more responsive to individual differences in our predictors. Previous research suggests generativity peaks in midlife, but also has considerable stability across adulthood (Einolf, 2014). Our findings converge with this and suggest that prosociality and generativity are related but distinct constructs. However, our measures of prosociality and generativity are not specific to any domain of life. There are likely differences in prosociality across life domains (e.g., work, family, community) that follow their own developmental progressions. Our measure of prosociality is particularly broad, and explicitly asks individuals to "take into account all that you do, in terms of time, money, or concern, on your job, and for your family, friends, and the community." This likely masked age-graded shifts in prosociality across life-domains. Whether individuals answered this question in a way that reflected contributory demands of life-domains across adulthood (e.g., childcare, eldercare, work), or their contributions above and beyond these norms is unknown. Although these findings provide a good starting point, future research is needed to better understand the observed trajectories of prosociality and generativity across adulthood.

Predictors of Prosociality and Generativity Across Adulthood

We found that individuals who perceived greater control over their lives reported greater prosociality and generativity (Figures 2A and 3A). Similarly, people who reported greater control strivings also reported greater prosociality and generativity (Figures 2B and 3B). Perceived control and control strivings reflect the expectancy that one's actions, including prosocial ones, can be effectively realized. Although these two expectancy components had positive relationships with prosociality and generativity, they had unique patterns across adulthood. Specifically, the results suggest that individual differences in perceived control have the strongest effect on prosociality (and to a lesser extant, generativity) during midadulthood, while individual differences in control strivings have the strongest effects on prosociality during young and late adulthood. Midadulthood represents the peak-period in the life span for most individuals' control over their lives (Heckhausen et al., 2010, 2019), and accordingly our results suggest that individual differences in this peak may be important for individuals' prosociality. Midadulthood also represents a peak-period in the life span for the structure rigidity of one's life (Heckhausen & Buchmann, 2019), and accordingly our results suggest that individual differences in striving to control one's development has a weaker relationship with prosociality than in the comparatively less-structured life stages of young and late adulthood.

Consistent with prior work (Caprara et al., 2012; Ferguson et al., 2019; Habashi et al., 2016; Penner, 2002; Penner et al., 2005), agreeableness was related with increased prosociality and generativity during adulthood. In contrast to control strivings and perceived control, our results suggest that agreeableness is consistently positively associated with prosociality and generativity across adulthood (Figures 2C and 3C). Agreeableness may more strongly link to individuals' extraordinary prosociality, which our measures may not have captured. If so, we would expect to see agreeableness becoming increasingly pronounced across adulthood, especially during life stages with less structured prosocial contributions (e.g., young and late-adulthood).

Notably, our findings controlled for demographic covariates (SES, number of children, and gender) that were positively related to prosociality and generativity in our study, and have been linked to prosociality in prior research. Education and household income both became more positively associated with prosociality at later stages of adulthood, though unique patterns emerged for income with inverse relationships observed during young-adulthood. We contribute to the conflicting literature examining links between SES and prosociality (e.g., Benenson et al., 2007; Callan et al., 2017; Guinote et al., 2015; Korndörfer et al., 2015; Nettle et al., 2011; Piff et al., 2010), and offer a novel yet untested possibility that SES facets differentially relate to prosociality, and that these relationships further differ across life stages. We find similarly suggestive patterns for the link between the number of children one has and their prosociality, with number of children positively related to prosociality during young adulthood and inversely related during late-adulthood. This may reflect childcare obligations in early life (Brown & Brown, 2015; Preston, 2013), which then lead to increased prosocial contributions for individuals at later stages of adulthood who did not have these contributory desires satiated by earlier childcare experiences. Consistent with prior findings (e.g., Bureau of Labor Statistics, 2003–2018), we find that women report consistently higher levels of prosociality than men across adulthood. We did not, however, find gender differences in generativity. Prior research on gender differences in generativity is mixed (e.g., An & Cooney, 2006; Einolf, 2014; Keyes & Ryff, 1998), necessitating further research to better understand how gender relates with generativity during adulthood.

Limitations

The large-scale and longitudinal nature of this study offers insights into our understanding of how prosociality and generativity develop across adulthood. That being said, limitations remain. First, the sample is predominantly White and middle class, with most observations during midadulthood. A more ethnically and socioeconomically diverse sample consistently covering adulthood would more fully examine the development of prosociality and generativity across adulthood. Second, our broad measures of prosociality and generativity are not domain specific. Prosociality likely operates differently across life domains (e.g., family, work)

and future research should examine domain-specific differences in prosociality and generativity across adulthood.

Third, we relied on single-item measures for one of our outcome variables (prosociality) and our demographic covariates (gender, household income, education level, and number of children). Moreover, our primary predictor variables (perceived control, control strivings, and agreeableness) do not fully capture individuals' prosocial expectancy and value. There are other ways to measure these constructs, our predictors imperfectly align with our theoretical framework, and there are likely other predictors of prosociality and generativity not captured in the current study. Future research using more or different items may help unpack the unique versus collective effects of expectancy and value on prosociality and generativity across adulthood.

Fourth, while this work examines how perceived control, control strivings, and agreeableness shape prosociality and generativity, these relationships are likely reciprocal. The present study uses longitudinal data with widely spread assessment waves (average of 9 years), during which many engagement cycles and life events likely come and go. To allow an examination of the coordinated development of these relationships across adulthood, future studies would benefit from more frequent and closely spaced assessments.

Finally, the observed relationships illuminate prosociality and generativity across adulthood; however, they should be viewed with caution. The size of many of our predicted relationships was small, calling into question the meaningfulness of these relationships. Findings from supplemental analyses with only participants who had complete data on all three study waves were consistent with the primary analyses, with the exception of the following differences: household income was no longer a significant predictor of generativity; control striving and education no longer moderated the relationship between assessment wave and prosociality; education and income no longer moderated the relationship between age and prosociality. Accordingly, future research should examine the meaningfulness and replicability of our findings.

Conclusion

Our study integrates motivational and developmental perspectives to contribute to our understanding of prosociality and generativity across adulthood. We find that individuals' prosociality and generativity rise through young adulthood, peak in midlife, and decline in late adulthood. We also find that prosociality and generativity reflect individuals' perceived control, control strivings, and agreeableness across adulthood. According to our theoretical framework, these constructs collectively enhance one's prosocial and generative expectancy and value, and in turn, overall prosociality and generativity. We further contribute to the literature with unique insights into how key sociodemographics, including education, income, gender, and number of children, are associated with generativity and prosociality across adulthood. Our findings also support the notion that prosociality and generativity are related but distinct constructs. The trajectory of prosociality peaked a decade earlier than generativity, and was more responsive to individual differences in control-related and demographic predictors. This greater responsiveness of prosocial trajectories may offer potential for interventions designed to increase individual's contributions to other's well-being.

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