Refining the Maturity Principle of Personality Development by Examining Facets, Close Others, and Comaturation

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Across adulthood, people tend to experience psychologically adaptive personality trait change, a robust finding known as the maturity principle of personality development. We identify three open areas of inquiry regarding personality maturation and address them in a preregistered study, using a sample of U. S. adults ages 30–70 who completed a battery of personality questionnaires and were rated by two close others twice over an 11- to 16-year period (N_{wave1} = 1,785, N_{wave2} = 401). First, it is unclear whether the maturity principle applies to narrower facet-level traits, as there has been little research into facet development across adulthood. We examined 47 facet scales and found that most developed adaptively across ages 30–70, but some did not mature, and three healthy facets (activity, openness to feelings, and social potency) declined significantly across adulthood, counter to the maturity principle. Second, no longitudinal research has tested whether personality maturation is perceived similarly by close others. We compared self- and other-rated development and found that close others perceived greater maturation than the self in Agreeableness, Conscientiousness, Neuroticism, and five facets. Finally, few studies have examined whether traits comature in adulthood. We found that correlated change between healthy facets was small in magnitude. Additionally, we found tighter comaturation in other-reported development than self-reported development. We use these results and past research to expand and refine our understanding of personality maturation across adulthood.

Keywords: personality traits, personality facets, lifespan development, personality development

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Across adulthood, most people tend to experience increases in personality traits that are positively related to interpersonal and occupational functioning and health, such as Agreeableness, Conscientiousness, and Emotional Stability (Bleidorn et al., 2013; Roberts et al., 2006; Specht et al., 2011). This finding, termed the maturity principle of personality development (Caspi et al., 2005; Roberts et al., 2008) has served as an organizational framework for personality development research over the past 15 years. However, at least three questions about personality maturation remain unaddressed. First, it is unclear whether the maturity principle

applies to the narrower facet-level traits that make up each major personality (e.g., Big Five) domain, as there has been surprisingly little research into personality facet development across adulthood (cf. Bleidorn et al., 2009; Costello et al., 2017; Terracciano et al., 2005). Second, it is unclear whether trait maturation plays out similarly in the eyes of the self and close others. Past research indicates that close others may perceive less trait maturation than the self over time, but this has yet to be statistically tested (Oltmanns et al., 2020; Lenhausen et al., 2020; Watson & Humrichouse, 2006). Third, the extent to which personality traits comature within people is unclear. Personality traits may mature in tandem, indicating that maturation is a broad, coordinated process. Alternatively, traits may develop relatively independent of one another, which would be indicative of narrower, trait-specific processes (Klimstra et al., 2013; Soto & John, 2012).

In this study, we addressed these three questions and synthesized past research on personality development across adulthood to expand and refine the maturity principle of personality development. We used data from a sample of Pennsylvania-residing adults aged 30–70 who completed three personality questionnaires twice over an 11- to 16-year period (total N = 1,785; longitudinal N = 401). These questionnaires (the NEO-Personality Inventory Revised, Multidimensional Personality Questionnaire, and the Cook-Medley Hostility Scale) measure 47 lower-order personality traits in total, which we classified as healthy, neutral, or unhealthy

according to expert ratings[1] (Bleidorn et al., 2020). At both time points, participants were also rated on their personality traits by two close others using the NEO Five-Factor-Inventory. We used this rich set of personality trait data to test three hypotheses. First, we tested whether narrower personality traits matured across early and middle adulthood. We hypothesized that most healthy traits would increase, and most unhealthy facets would decrease, and we identified exceptions to this general trend. Second, we tested whether trajectories of personality development reported by close others were indeed less positive than trajectories of self-reported personality development, at both the domain and facet level. Third, we explored the extent to which personality traits tended to comature, both within and across perspectives of the self and other. Overall, these analyses contribute to the growing literature on personality trait development below and beyond the Big Five and provide new information about personality maturation across adulthood.

The Maturity Principle

The maturity principle of personality development was articulated in a 2005 review by Caspi, Shiner, and Roberts, who wrote that past research has found that "Most people become more dominant, Agreeable, Conscientious, and Emotionally Stable over the course of their lives. These changes point to increasing psychological maturity over development, from adolescence to middle age. [This definition] equates maturity with the capacity to become a productive and involved contributor to society, with the process of becoming more planful, deliberate, and decisive, but also more considerate and charitable" (Caspi et al., 2005, pp. 468–469). More recent research has continued to provide support for this principle. Cross-sectional, longitudinal, and meta-analytic studies using a variety of personality trait measures have consistently replicated the trend of increasing Agreeableness and Conscientiousness and decreasing Neuroticism across early and middle adulthood, in samples from many (mostly western) nations, at both the within-person level (i.e., in a person across time) and between-person level (i.e., when comparing different ages to one another; Bleidorn et al., 2015; Costello et al., 2017; Lucas & Donnellan, 2011; Specht et al., 2011; Roberts et al., 2006; Wortman et al., 2012; Wright et al., 2011; cf. Graham et al., 2020). Researchers have also found that the maturity principle applies to other traits emblematic of the ability to be a productive, psychologically healthy member of society, like achievement (Donnellan et al., 2007), honesty/humility (Costello et al., 2017), (low) severity of personality disorders (Woods et al., 2019), and (low) psychopathy and narcissism (Zettler et al., 2020). This body of evidence makes the maturity principle one of the most strongly supported findings in personality development (Roberts & Nickel, 2017).

More recent findings have refined our understanding of personality maturation. For example, there is often a temporary disruption of adaptive development in adolescence, followed by dramatic increases in healthy traits at the beginning of adulthood (Klimstra et al., 2018; Luan et al., 2018; Soto & Tackett, 2015; cf. Brandes et al., 2020). Furthermore, the extent to which adaptive development continues into older adulthood seems to depend on sample composition (Mueller et al., 2016; Specht et al., 2011); development in this stage of life may be best construed in terms of years until death (Wagner et al., 2016). These results add granularity to the original

assertion that maturation occurs across the life span—specifically, adaptive development appears to occur from late adolescence up to the years before death. These findings open the door for further revision of the maturity principle so that it more comprehensively summarizes life span trends in adaptive personality development. We have identified three open questions about personality maturation, which we now turn to as the focus of this study.

How Do Narrower Personality Facets Mature?

Personality traits can be organized at multiple hierarchical levels. In modern research on personality development, researchers typically conceptualize traits in terms of the Big Five, which strike a parsimonious balance between bandwidth and fidelity (John et al., 2008). Using the Big Five as a template, researchers have sketched a high-level portrait of developmental trends (e.g., Roberts et al., 2006). The next logical step is to describe development in terms of the narrower facet-level traits that make up the Big Five, which will provide a higher-fidelity understanding of life span development (Schwaba et al., 2020). For example, although Neuroticism typically decreases across the life span, facets of Neuroticism, such as depressiveness and angry hostility, may develop differently from one another.

Describing development at the facet level allows researchers to further test and revise the maturity principle. Different facets may mature at different rates and different ages, which contributes information about the processes underlying life span development (Mõttus et al., 2020). For example, tender-mindedness and straightforwardness are both healthy facets of Agreeableness, though the former is more strongly associated with personal growth (Anglim et al., 2020) and the latter with (lesser) antisocial behavior (Vize et al., 2018). By separately examining development in these traits, researchers can disambiguate two different forms of maturation in Agreeableness. Furthermore, facet-level examination allows researchers to decouple the general concept of trait maturation from change specifically in Agreeableness, Conscientiousness, and Neuroticism. Indeed, facets exist on a continuum of adaptiveness: Some are especially relevant to psychological health and interpersonal functioning (e.g., depressiveness, gregariousness), and others are less so (e.g., openness to fantasy, excitement-seeking; Bleidorn et al., 2020). Even within a domain, facets often differ in their relevance to maturity. For example, within Conscientiousness, the facet of self-discipline has a stronger negative association with personality disorder symptoms than the facet of compliance (Samuel & Widiger, 2008). And, although the domains of Extraversion and Openness are often considered to be neutrally adaptive and therefore outside the scope of the maturity principle, some facets underlying the domains of Extraversion and Openness, such as gregariousness and openness to feelings, are especially relevant to the mature, healthy personality (Bleidorn et al., 2020). Using this variance across facets, we classify each narrower trait as either healthy, unhealthy, or neutral, regardless of its parent domain. Facet-level examination can thus provide information about

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[1] In this article, we consider healthy and mature traits to be synonymous because we define trait maturation as adaptive increases in healthy personality traits and decreases in unhealthy personality traits. We recognize that some perspectives disambiguate these two qualities (e.g., Hogan & Roberts, 2004; Ryff, 1989; Walker & Pitts, 1998).

whether the age-graded developmental patterns observed in past research are truly due to adaptive development in healthy traits across the personality spectrum or merely change in certain personality domains.

To date, however, there has been little research into Big Five facet development across adulthood (Bleidorn et al., 2009; Costello et al., 2017; Klimstra et al., 2018; Soto & John, 2012; Terracciano et al., 2005), and no research has explicitly tested hypotheses related to facet-level personality maturation. In one study, Terracciano et al. found that, although Agreeableness, Conscientiousness, and Neuroticism developed adaptively across ages 30 to 90, the underlying facets measured by the NEO Personality Inventory—Revised (NEO-PI-R) often exhibited different trajectories. Framing these results in terms of maturation, the facets of modesty, achievement-striving, and gregariousness did not show adaptive age-graded increases, and self-discipline and activity showed maladaptive decreases. Bleidorn et al. (2009) also provided evidence that some NEO-PI-R facets may not develop adaptively in middle adulthood among a twin sample measured over 10 years. This sample displayed adaptive development in most traits, but the facet of tender-mindedness did not increase over time, and gregariousness decreased, on average. This general pattern of results, where facets develop differentially and some fail to mature, generalizes to the remaining three studies. Klimstra et al. (2018) found no evidence for adaptive increases in positive affect, sociability, and activity across two college samples, and one sample increased maladaptively in anxiety throughout college. Soto and John (2012) found no evidence of adaptive increases in orderliness, anxiety, irritability, and social confidence in a sample of women across ages 20–60, and participants tended to decrease in gregariousness as they grew older. Finally, Costello et al. (2017) found that orderliness and enthusiasm did not increase adaptively with age across the ages 20 to 60 in an online sample.

These studies are complemented by three additional investigations into facets of the Multidimensional Personality Questionnaire (MPQ) in young adult samples. Donnellan et al. (2007) found maladaptive decreases in the traits of well-being, social potency, and social closeness across ages 18 to 28, Roberts et al. (2001) found maladaptive decreases in social closeness and no change in stress reaction across ages 18 to 26, and Blonigen et al. (2008) found evidence for maturation in all healthy traits besides social potency across ages 17 to 24.

When taken together, these studies reveal common patterns and areas for future inquiry. Though these studies sampled from different (western) populations and measured personality using different instruments, each found substantial heterogeneity in facet development, even among facets that were highly correlated at baseline and associated with the same higher-order domain. This result indicates that important information about life span development can be found in distinctions within the broader personality domains. Additionally, in each study, some facets indicative of a mature personality did not increase across adulthood, and a few healthy facets—often, those relating to an active and sociable lifestyle—declined with age. However, these results come with major caveats. The specific facets that did not show adaptive development were somewhat inconsistent across studies, and half of these studies only measured development in early adulthood (up to age 30). Furthermore, these studies were designed to describe general patterns of development, so none explicitly tested hypotheses

about facet-level personality maturation. More longitudinal research is needed that examines facet-level maturation beyond early adulthood and explicitly tests hypotheses of maturation.

Do Close Others Perceive Maturation Similarly to the Self?

In a review that sowed the seeds for the maturity principle, Hogan and Roberts (2004) argued that one's level of maturity is based equally on their identity as a psychologically well-adjusted person (i.e., their self-reports) and their reputation as a responsible, trustworthy member of the community (i.e., other-reports). Therefore, both self- and other-reports of personality development provide important information about the extent to which someone has matured. However, nearly all evidence brought to bear on the maturity principle to date has come from self-reports.

Few researchers to date have compared adult personality development in self- and informant-report data (Oltmanns et al., 2020; Lenhausen et al., 2020; Watson & Humrichouse, 2006). In one sample of U.S. newlyweds, self-reported increases in Agreeableness, Conscientiousness, and Emotional Stability were countered by other-reported decreases in these domains across 2 years (Watson & Humrichouse, 2006). In a sample of Midwestern U.S. older adults, close others (half of whom were spouses) also perceived decreases in Agreeableness and Conscientiousness over 6 years, contrasting with self-reports (Oltmanns et al., 2020). Finally, in a sample of cohabiting Dutch couples, about half of whom became parents, partners perceived steeper decreases in Agreeableness and Extraversion than the self over 2 years (Lenhausen et al., 2020).

Across each of these three studies, not only did close others often perceive less maturation than the self over time, but they often perceived maladaptive development, especially in Agreeableness. This pattern of results suggests that the self and close others may view a person's personality changes over time in quite different ways. By comparing trends in both domain- and facet-level personality development across the perspective of the self and close others, we can enrich our understanding of how personality maturation is perceived in the context of close relationships.

Do Personality Traits Comature?

The maturity principle was initially formulated to summarize a population-level trend that occurs across a wide variety of healthy traits. However, little is known about whether these traits tend to develop together within a person. When a person experiences adaptive change in one personality trait, do they tend to experience adaptive change in others as well? If traits tend to comature, it would indicate that maturation can be conceptualized as a broad, general phenomenon that affects trait development similarly across people (Soto & John, 2012). Such a finding would allow researchers to search for broadly acting mechanisms underlying this process, such as change in serotonergic functioning (Klimstra et al., 2013; Wright et al., 2019) or normative life events (Bleidorn et al., 2013; Lodi-Smith & Roberts, 2007). Furthermore, strong comaturation would indicate that adaptive trait development could be usefully summarized and studied at this broad level. On the other hand, finding that adaptive traits do not tend to codevelop would indicate that maturation likely involves many trait-specific processes, where people experience adaptive change in different

traits at different rates. Such a finding would suggest that adaptive trait development is mostly driven by many narrowly-acting mechanisms (e.g., a certain mechanism may affect some facets of Conscientiousness but not others) that may have differential effects across people (e.g., a certain mechanism may make one person more Conscientious, but make another person more Agreeable). Thus, understanding comaturation is both descriptively and theoretically useful.

To date, there has been little research into correlated change between personality traits in adulthood, limiting our knowledge of comaturation (Allemand & Martin, 2017). Most researchers examining comaturation have done so at the level of the Big Five, and two studies have provided evidence for comaturation. Klimstra et al. (2013) studied a large, representative sample of Germans and found stronger correlated change among Agreeableness, Conscientiousness, and Neuroticism (mean $r = |.30|$) than among other Big Five domains across a 4-year period, a finding that was robust across age groups. Furthermore, Lüdtke et al. (2011) found that Agreeableness, Conscientiousness, Neuroticism, and Extraversion codeveloped across college (mean $r = |.33|$), whereas Openness to Experience developed independently of these traits. This finding also provides some evidence for comaturation, but because Extraversion consists of healthy (e.g., positive affect) and neutral (excitement-seeking) facets, it is unclear whether codevelopment between Extraversion and other traits was attributable to comaturation. These studies are matched by two others that show little evidence for comaturation. Allemand et al. (2008) studied a sample of older German adults measured over a 12-year period and found strong correlated change among all traits besides Neuroticism (mean $r = |.54|$), which does not suggest comaturation but instead a decoupling of development between healthy and unhealthy traits. Similarly, Mõttus et al. (2012) found that codevelopment among Agreeableness, Conscientiousness, and Neuroticism was small in magnitude (mean $r = |.17|$) and no larger than correlated change among other Big Five traits from ages 81 to 89. Finally, Soto and John (2012) found that facets tended to codevelop within domains, but not across domains, in a small sample of U.S. women followed across early and middle adulthood, which also provides some evidence against comaturation (they did not explicitly estimate correlated change among maturity-related facets).

Across these studies, there is some evidence for correlated maturation at the level of the Big Five, which may suggest a shared mechanism underlying at least some adaptive age-graded trait development. To improve our understanding of this phenomenon, more research is needed that systematically quantifies comaturation across two forms of evidence: convergent (to what extent are changes in one maturity-relevant trait correlated with changes in other maturity-relevant traits?) and discriminant (do maturity-relevant traits codevelop more strongly than traits not relevant to maturity?).

We address these questions using a large set of facets that are differentially relevant to maturity, allowing us to test comaturation with high fidelity. Additionally, close others may have complementary or contrasting positions on comaturation. We compare comaturation across the perspectives of the self and close others to provide information about how maturation is perceived in the important context of close relationships.

The Present Study

In this study, we tested three sets of hypotheses using data from a longitudinal study of Pennsylvania-residing adults. First, we examined whether most personality traits would develop adaptively across ages 30–70 (the age range of our sample). We categorized facets as healthy, unhealthy, or neutral and described development in domains and facets by estimating a series of multilevel structural equation models (MSEMs). We hypothesized that most healthy facets would increase and most unhealthy facets would decrease, and we identified exceptions to this pattern, allowing us to evaluate how the maturity principle applies at the facet level. Second, we tested whether trajectories of personality development reported by close others would be less positive than trajectories of self-reported personality development. For each trait assessed from both self- and other-perspectives, we estimated development over the study period using latent difference score models and conducted paired t-tests to examine whether close others reported a different rate of change over the study period than the self. Third, we explored the extent to which personality traits comatured. To do this, we correlated trajectories of trait change over the study period, and we compared correlated change among (un)healthy traits with correlated change between (un)healthy traits and neutral traits. Finally, we synthesized these results with the broader body of research on personality development across adulthood, allowing us to expand and refine the maturity principle of personality development.

Method

This research was approved by the University of Pittsburgh Institutional Review Board (STUDY19040238). The preregistration for this study, masked for review, is available at [https://osf.io/fxrbp/]. First author TS preregistered the study completely blind to all study data besides sample sizes and ratings of how well close others knew participants. Authors CJH and WB were completely blind to all data. Authors AGCW and SBM had used personality data from the first wave of data in previous research (Wright et al., 2019) but were blind to all personality data from the second wave. There were no deviations from the preregistration, and analyses that were not preregistered were marked as exploratory.

Sample

Data for this study come from the two-wave University of Pittsburgh Adult Health and Behavior (AHAB) project, a registry of behavioral and biological measurements for the study of individual differences (Manuck et al., 2010). In Wave 1, $N = 1,785$ participants 30–54 years of age (843 males, 942 females, 17% non-White) were recruited via mass-mail solicitation from communities of Southwestern Pennsylvania in two periods of data collection (2001–2005; 2008–2011). At enrollment, participants were in good general health, without reported history of atherosclerotic cardiovascular disease, chronic kidney or liver disease, recent treatment for cancer, major neurological disorders, or psychotic illness. Informed consent was obtained in accordance with approved protocol guidelines at the University of Pittsburgh Institutional Review Board. Participants completed personality

questionnaires across multiple lab visits. In this study we include Wave 2 data from $N = 401$ participants 40–70 years of age (173 males, 228 females, 16% non-White) who participated between June 2017 and the date of preregistration, in February 2020. Due to the COVID-19 global pandemic, AHAB participant recruitment and data accrual were temporarily suspended in March of 2020.

Measures

Table S1 shows sample sizes, means, standard deviations, and internal consistency for all study variables across assessment waves. A covariance matrix between all variables at all waves is available at https://Osf.io/bzwm2/.

NEO Personality Inventory–Revised

At both waves, AHAB participants completed the 240-item self-report NEO Personality Inventory—Revised (NEO-PI-R; Costa & McCrae, 1992), which measures the Big Five personality trait domains (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience) as well as six facets underlying each domain (see Table 1. Wave 1 $N = 1,771$, Wave 2 $N = 393$. For each item of the NEO-PI-R, participants rated the extent to which a characteristic applies to them (e.g., "I am someone who is outgoing") on a Likert scale from 1 = *disagree strongly* to 5 = *agree strongly*, and we computed scores for each domain and facet by averaging across items. Across both waves, internal consistencies for NEO-PI-R scales were high ($\omega t = .71–.94$, $\alpha = .62–.93$; see Table S1 in the online supplementary materials for complete descriptive information, including means and *SD*s).

Multidimensional Personality Questionnaire

Participants also completed the 155-item short form of the Multidimensional Personality Questionnaire (MPQ; Patrick et al., 2002), which measures three broad personality superfactors and 11 narrower personality subfactors (which we refer to as facets) that were developed separately from the Big Five (Wave 1 $N = 1,289$, Wave 2 $N = 386$). For each MPQ item, participants read a statement (e.g., "I can be deeply moved by a sunset") and decided which choice (1 = true or 0 = false) best described them. We computed scores for each facet by averaging across items. Across both waves, internal consistencies for MPQ facets were high ($\omega t = .75–.96$, $\alpha = .68–.96$; Table S1).

Cook-Medley Hostility Scale

Finally, participants completed the 50-item Cook-Medley Hostility Scale (CMHS; Barefoot et al., 1989), which measures five narrow maladaptive traits (which we refer to as facets; Wave 1 $N = 1,777$; Wave 2 $N = 393$). For each CMHS item, participants read a statement (e.g., "No one cares much what happens to you") and decided whether it was 1 = true or 0 = false as it applied to them. We computed scores for each facet by averaging across items. Across waves, internal consistencies for CHMS facets were acceptable ($\omega t = .52–.82$, $\alpha = .34–.79$), but were low for social avoidance ($\omega ts = .54$ and $.20$, $\alpha s = .45$ and $-.06$). Despite its low internal consistency, research has found that this scale is meaningfully associated with psychiatric outcomes and spousal ratings of

personality (Han et al., 1995), so we retain it in the present analyses.

NEO-Five Factor Inventory

At both waves, up to two close others also rated the participant using the NEO Five-Factor Inventory (NEO-FFI), which measures a 60-item subset of the NEO-PI-R (Wave 1 $N = 1,672$, Wave 2 $N = 375$). Most participants (90% at Wave 1 and 93% at Wave 2) were rated by two close others (A and B). Close others were chosen by the participant, and they included spouses/partners (30% at Wave 1 and Wave 2), parents (9%/3%), siblings (12%/11%), other close relatives (12%/21%), close friends (31% at both waves), or other (6%/4%). Unfortunately, as close others were not assigned IDs, we could not track whether close others differed across waves. However, when close others were asked how well they knew the person they were rating (from 1 = *not at all* to 5 = *know very well*), 98% of close other As and 92% of close other Bs reported knowing the person they were rating either *well* or *very well*. Furthermore, self-other correlations between perspectives were similar in magnitude to what has been reported in past research (Table S2; Oltmanns & Oltmanns, 2021). As such, although close others may have differed across waves, they had substantial knowledge about the participants they were rating. The NEO-FFI can be used to measure 14 facets underlying the Big Five (Saucier, 1998); we computed scores for these facets by averaging across items. Across waves and close others, internal consistency for NEO FFI scales was $> .50$ ($\omega t = .55–.91$, $\alpha = .50–.88$), with the exception of the openness facet of unconventionality (from the perspective of close other A, $\omega ts = .75$ and $.34$, $\alpha s = .62$ and $.20$). Past research has found that this unconventionality facet is less internally consistent than other NEO-FFI facets but is nonetheless a valid construct, as it demonstrates similar temporal stability to other personality facets and reliably predicts outcomes (Klimstra et al., 2018; Schwaba et al., 2019).

Identifying (Un)Healthy Personality Facets

We next classified personality facets as healthy, unhealthy, or neutral. We classified NEO-PI-R facet scales using ratings collected by Bleidorn et al. (2020), who asked 137 experts on personality psychology to rate the psychologically healthy person in terms of the 30 NEO-PI-R facets. This placed each facet on a gradation of psychological adaptiveness that we used to classify each NEO-PI-R facet as healthy (rated as >3.5 on a scale of 1–5) or unhealthy (rated as <2.5 on a scale of 1–5) according to preregistered standards. Although classifications necessarily simplify this gradation, they are necessary for our analyses that require delineating healthy, unhealthy, and neutral facets. We classified NEO-FFI facets by matching each facet to the most relevant facet(s) of the NEO-PI-R, as all NEO-FFI items were included in the NEO-PI-R. We classified all CMHS facets as unhealthy, as these are indicators of personality dysfunction. Finally, we classified MPQ facets as healthy or unhealthy using correlations with the MPQ well-being factor found in Rushton and Irwing (2008). We classified facets that correlated $> .25$ with well-being as healthy, and we classified facets that correlated $< -.25$ with well-being as unhealthy. However, this led to the classification of aggression as a neutral trait, which we believe is incorrect. We therefore classified aggression

Table 1
Adaptiveness Classifications of Personality Facets

Scale/trait	Health rating	Adaptiveness
NEO-PI-R		
Neuroticism		
Anxiousness	2.34	−
Angry hostility	1.77	−
Depressiveness	2.01	−
Self-consciousness	2.72	neutral
Impulsivity	2.47	−
Vulnerability	2.21	−
Extraversion		
Warmth	3.95	+
Gregariousness	3.60	+
Assertiveness	3.26	neutral
Activity	3.67	+
Excitement-seeking	3.01	neutral
Positive emotions	3.91	+
Openness to experience		
Fantasy	3.03	neutral
Aesthetics	3.39	neutral
Feelings	4.00	+
Actions	3.01	neutral
Ideas	3.21	neutral
Values	3.66	+
Agreeableness		
Trust	3.24	neutral
Straightforwardness	3.90	+
Altruism	3.75	+
Compliance	3.22	neutral
Modesty	3.13	neutral
Tender-mindedness	3.66	+
Conscientiousness		
Competence	3.77	+
Order	3.56	+
Dutifulness	3.64	+
Achievement	3.53	+
Self-discipline	3.59	+
Deliberation	3.42	neutral
NEO-FFI	N/A	
Neuroticism		
Self-reproach		−
Anxiety		−
Depression		−
Extraversion		
Positive affect		+
Sociability		+
Activity		+
Openness to experience		
Aesthetic interests		neutral
Intellectual interests		neutral
Unconventionality		+
Agreeableness		
Nonantagonism		+
Prosociality		+
Conscientiousness		
Orderliness		+
Goal-striving		+
Dependability		+
MPQ	N/A	
Well-being		+
Social potency		+
Achievement		+
Social closeness		+
Stress reaction		−
Alienation		−
Aggression		−
Control		neutral

(*table continues*)

Table 1 (*continued*)

Scale/trait	Health rating	Adaptiveness
Harm avoidance		neutral
Traditionalism		neutral
Absorption		neutral
CMHS	N/A	
Cynicism		−
Hostile affect		−
Aggressive responding		−
Hostile attribution		−
Social avoidance		−

Note. NEO-PI-R = NEO Personality Inventory-Revised; NEO-FFI = NEO Five-Factor Inventory; MPQ = Multidimensional Personality Questionnaire; CMHS = Cook-Medley Hostility Scales. Health Ratings for NEO-PI-R facets come from Bleidorn et al. (2020): Facets with ratings of 3.5 or above were classified as healthy, between 2.5 and 3.5 were classified as neutral, and below 2.5 were classified as unhealthy. See full text for descriptions of classification strategies for NEO-FFI, MPQ, and CMHS facet scales.

as an unhealthy personality trait (Bleidorn et al., 2020). We present these classifications in Table 1.

Analyses

We estimated structural equation models in R (R core team, 2016) using the MplusAutomation package (Hallquist & Wiley, 2018) and Mplus Version 8.4 (Muthén & Muthén, 1998–2012). Other analyses were conducted using the packages psych (Revelle, 2013) and lavaan (Rosseel, 2012). Analysis scripts are available at https://osf.io/xmfvw. In most models, missing data were accounted for using full information maximum likelihood (FIML) estimation. However, for analyses in which we saved slope factor scores, we only included participants who provided data at both waves. All personality trait scores were grand-mean standardized to facilitate interpretation of effect sizes across time points and raters. We used Bayesian Information Criterion (BIC) to compare fits between non-nested models (Aho et al., 2014). We interpreted *p*-values of .01 or lower as significant in order to balance Type-I and Type-II error rates given the number of significance tests performed.

Results

Measurement Invariance

To establish that scores from scales used in this study were comparable across assessment waves, we estimated measurement invariance following the method proposed in Vandenberg and Lance (2000). To do this, we decomposed each Big Five scale into its constituent facets and each facet scale into its constituent items. We then estimated Big Five domain/facet scores at each wave as the common variance between the facets/items, creating a configural model. We compared the fit of this model against the fit of a nested model in which factor loadings were constrained to be equal across waves. This model tested weak measurement invariance, which is a necessary condition to compare covariances between variables across waves. Then, we compared the fit of the weak invariance model against a nested model where facet/item intercepts were also constrained to be equal across waves. This model tested strong invariance, which is necessary to meaningfully

compare the mean levels of domain and facet score across waves. In cases where imposing these constraints led to substantial decreases in model fit (ΔCFI or ΔRMSEA $\geq$ .010; Cheung & Rensvold, 2002), we sought to establish partial measurement invariance by relaxing factor loading or intercept constraints until these cutoffs were met. Finally, we used the MACS effect size derived by Nye and Drasgow (2011) to quantify the extent to which noninvariance biased mean test scores at Wave 2.

For most domain and facet scales, we were able to establish strong or partial invariance and there was little bias resulting from noninvariance across waves. Specifically, three of five Big Five self-report scales and six of ten Big Five other-report scales met cutoffs for strong invariance, and we were able to establish partial measurement invariance for the remaining scales by relaxing one or two cross-wave intercept constraints (Tables S3–S7). On average, there was little bias in Wave 2 means caused by differential scale functioning ($d = |.15|$). Regarding the 30 self-reported NEO-PI-R facets, 23 met cutoffs for strong invariance, and we were able to establish partial invariance for the remaining seven (Tables S3–S7). Again, there was little bias in means (mean $d = |.13|$). Of the 11 MPQ facets, one (social closeness) met cutoffs for strong invariance, and we were able to establish partial invariance for the remaining 10 (Table S8), with little mean bias (mean $d = |.24|$). One CMHS facet (cynicism) met the cutoff for strong invariance, and we established partial invariance for the remaining four facets with little bias in means (mean $d = |.06|$; Table S9). Finally, for the other-reported NEO-FFI traits, three facets (self-reproach, activity, and goal-striving) met traditional cutoffs for strong invariance across waves, and we were able to establish partial invariance for most other scales. However, in some cases, increase in RMSEA misfit was still greater than the .01 threshold proposed by Cheung and Rensvold (2002). According to the MACS, the mean bias in NEO-FFI facet means at Wave 2 compared with

Wave 1 was $d = |.35|$, representing a medium effect, although these biases differed across facets and were much larger for Non-antagonism ($d = 1.25$) than any other facet (Table S10).

These results indicated that Big Five scale scores and facet scale scores were meaningfully comparable across the two measurement waves with only small amounts of mean bias. The one exception was that nonantagonism scores reported by close others showed evidence for upward bias at Wave 2, which we account for when interpreting development in this scale.

Examining Age-Graded Maturation

To examine whether each trait matured across ages 30 to 70, we estimated a series of MSEMs (Sadikaj et al., 2021) as depicted in Panel A of Figure 1. These models integrate within-person personality changes and between-person age differences in personality in order to estimate an age-graded trajectory using data from all participants. Time was coded as age and centered on age 30. The within-person component of the model estimated the rate of change per year for each participant's personality trait (i.e., traits were regressed on age). Because we estimated these models using FIML, participants who contributed trait information at either two or only one age were included in the model. The between-person component of the model aggregated each participant's age-related personality trait changes into a broader trajectory spanning ages 30 to 70, the age range of our sample. Specifically, in the between-person component of the model we estimated four parameters: an intercept variance (which describes individual differences in personality trait scores at age 30, the age at which time was centered), a linear slope mean and variance (which describes the average yearly age-related change in each trait and individual differences in change, respectively), and a covariance between the intercept and slope (which describes the extent to which individual differences in age

Figure 1
Path Diagrams for Trait Change
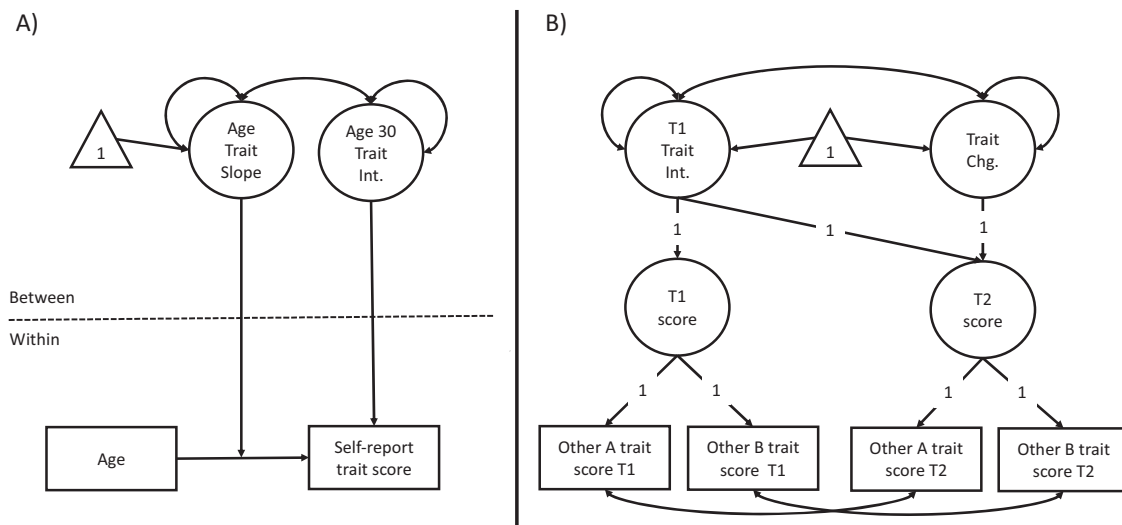
Note. Panel A depicts the multilevel structural equation model for trait change across ages 30 to 70, which we used to address H1. In this model, the mean age 30 trait intercept was constrained to zero. Panel B depicts the latent difference score model for other-reported trait change across the two study waves, which we used to address H2 and H3. A similar model was used to estimate self-reported trait change across the two study waves. Int. = intercept; Chg. = change.

30 scores are associated with age-related change). The intercept mean was fixed to 0 in order to identify the model. Participants who contributed only one wave of data informed the estimate of the means and the variance of the intercept, whereas participants who contributed two waves of data also informed the variance of the slope and covariance in this model. To test nonlinear effects, we also estimated a second series of models that included a quadratic slope factor, but each of these models fit worse to the data according to BIC. As such, we compare linear development across traits. Mplus syntax for these models is available at https://osf.io/xrzsh/.

Results indicated that most traits developed in an adaptive direction across early and middle adulthood, supporting our hypothesis that the maturity principle would generally hold at the facet level (Figure 2; see Table S11 for complete results). Yearly 99% percent CIs for each trait slope ranged from ±.005 to ±.008, which means that traits that changed less than .18 standard deviations across ages 30–70 did not change significantly at $p < .01$. At the domain level, Agreeableness increased and Neuroticism decreased, consistent with the maturity principle, although Conscientiousness remained stable. At the facet level, eight of 14 facets classified as unhealthy decreased significantly, and the remaining six did not show significant changes over the study period. Six of 18 facets classified as healthy increased significantly, and nine did not show significant changes. Importantly, though, some traits showed maladaptive developmental trajectories. Three healthy facets (activity, social potency, and openness to feelings) declined significantly, on average, over the study period. This provides support for our hypothesis that development in a small number of facets would deviate from the maturity principle.

We explored whether the extent to which a facet changed with age was correlated with its adaptiveness rating. These analyses allowed us to examine, even among traits classified as (un)healthy, if the ones more relevant to maturity changed more with age. Of the 30 NEO-PI-R facets, those that were rated as healthier (according to Table 1) underwent greater age-graded increases ($r = .43$, $p = .018$, 95% CI [.07, .68]). These results provided tentative evidence that trait changes in adulthood were related to maturation.

Although the maturity principle, as articulated in past work, posits continual adaptive development with age (e.g., Roberts & Nickel, 2017), it is possible that some traits did not show significant age-graded changes because they were already at or near ideal "mature" levels, on average, by age 30. We explored whether this was the case by comparing model-implied average trait scores at age 30 (for the traits that did not show significant maturation) to point estimates for healthy levels of NEO-PI-R facets presented in Table 1. This comparison was not preregistered. We note that these point estimates for the healthy personality were derived using a single question for each facet, rather than filling out the entire NEO-PI-R questionnaire, and that these estimates did not take into account that the healthy personality may change with age (Bleidorn et al., 2020). As such, we treat results of these exploratory analyses as tentative.

These comparisons indicated that three of nine NEO-PI-R facets that did not change with age were already near ideal "mature" levels by age 30 (Table S12). Specifically, the unhealthy facet of vulnerability was near its ideal level (2.21) by age 30, as its 95% CI contained this value ($M_{age30} = 2.16$, 95% CI [2.08, 2.23]), and the healthy facet of self-discipline was even higher than its ideal level (3.59) by age 30 ($M_{age30} = 3.67$, 95% CI [3.59, 3.75]), as was altruism (3.75; $M_{age30} = 4.03$, 95% CI [3.97, 4.06]). Conversely, the 95% CIs for the unhealthy facets of impulsiveness and anxiety remained above the point estimates for their healthy ideal levels at both age 30 and 70, and the healthy facets of positive emotions, gregariousness, order, and achievement striving remained below healthy ideal levels at both 30 and 70. This suggests that, in some cases, facets may have been sufficiently mature by age 30, which may explain why they did not show continued change across ages 30 to 70 in our sample.

Overall, of 32 facets classified as (un)healthy, 23 developed in adaptive ways consistent with the maturity principle, three developed maladaptively, and six others were not at mature levels and did not show significant change with age. Some additional takeaways from these analyses were that, for each Big Five domain beside Neuroticism, there was a visible fanning-out effect such that facets underlying the same domain showed distinctly different age-graded trajectories (see Figure 1). Furthermore, for each trait, we found significant individual differences in change (all $ps < .001$), indicating that adaptive development throughout early and middle adulthood was a typical, but not ubiquitous, phenomenon.

For each trait, we also estimated linear regressions to describe age-graded development across all participants as well as in three age cohorts: participants who began the study ages 30–39 years, 40–49 years, and 50+ years. Results of these regressions, which we present in Figures S1 and S2, recapitulate the findings from the MSEMs. For nearly all traits, each age group displayed similar patterns of maturation to one another and the overall age-graded trend. However, for a few traits, cohort trajectories differed from the overall age-graded trajectory. Specifically, for the facets of alienation and achievement, we found a relatively flat between-person trajectory from ages 30–70 but increases within each of the three age cohorts. This finding illustrates potential pitfalls associated with estimating a single trajectory composed of data from multiple age cohorts, as these cohorts may exhibit differential developmental trends.

Comparing Self- and Other-Perspectives on Maturation

Next, we compared self-and other-perspectives on maturation. To do this, we examined development in each NEO-FFI trait across the two measurement waves using latent difference score models (Panel B in Figure 1). We first estimated a model using self-report data, which included a latent intercept parameter (describing each participant's score at baseline) and a latent slope parameter (describing each participant's change across measurement occasions). These models thus describe between-person patterns (mean and variance) in within-person development (Nesselroade, 1991). We then estimated a second model using other-report data. This model was identical to the self-report model, except that scores at each measurement wave were estimated as the latent average of the two other-reports. To test our hypothesis that other-rated development would be significantly less positive than self-rated development, we saved the slope factor scores from the self-report model and compared them with the slope factor scores from the other-report model.

Overall, other-reported models fit acceptably to the data (CFIs ≥ .926 and RMSEAs ≤ .093; Table S13). Fit statistics were unavailable for self-rated models because self-rated latent difference score models were fully saturated with 0 df.
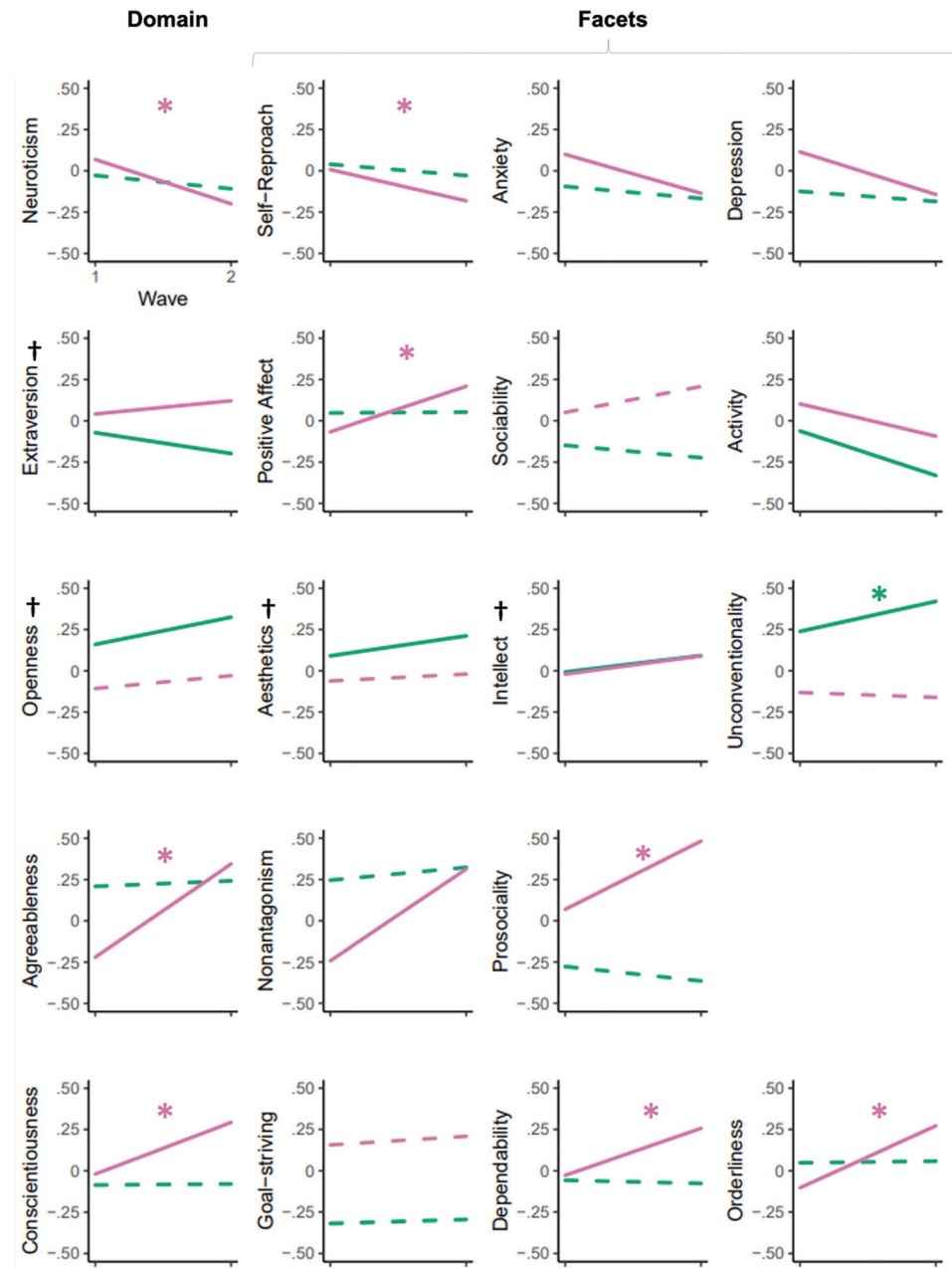
Figure 2

Maturation of Domains and Facets Across Ages 30 to 70 (N = 401)
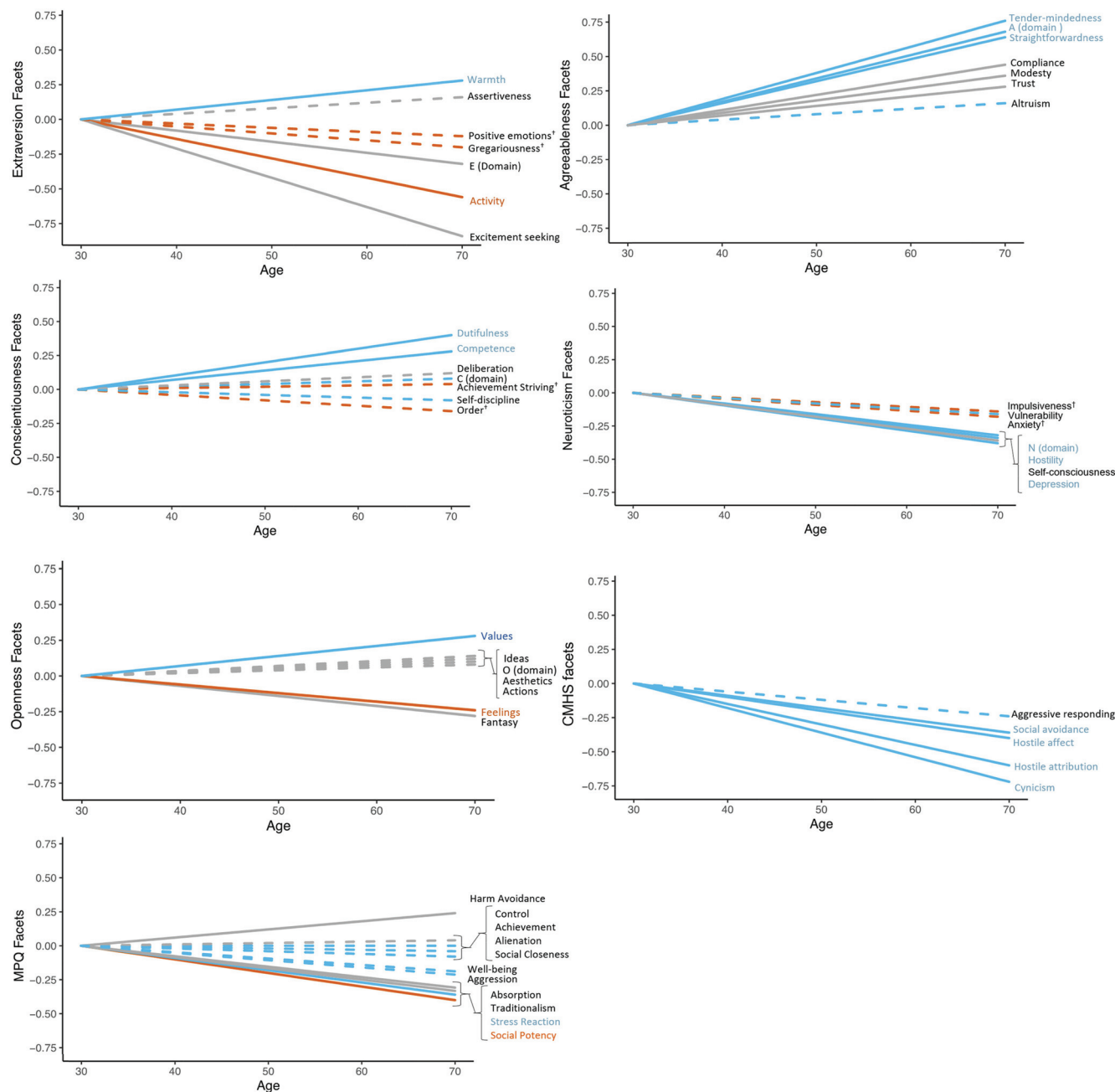
Note. Blue lines indicate development in a healthy direction, red lines indicate development in an unhealthy direction, and gray lines indicate development in neutral traits. Solid lines indicate that change was significant at $p < .01$; dashed lines indicate that change was not significant at $p < .01$. † = trait did not change significantly and average scores were below healthy levels at age 70 (Table S12). See the online article for the color version of this figure.

We visualize Big Five development from both perspectives in Figure 3. Across waves, the 99% CIs for self-reported trait change ranged from ±.08 to ±.17, and the 99% CIs for other-reported trait change ranged from ±.03 to ±.10. *p*-values and 99% CIs for each self-other comparison are reported in Table S14.

When comparing self-rated versus other-rated maturation at the domain level, close others reported steeper increases in Agreeableness and Conscientiousness, and steeper decreases in Neuroticism, than the self (*p*s < .001). At the facet level, others perceived significantly greater maturation in eight of 12 facets classified as (un)healthy, whereas the self-reported

Figure 3

*NEO-FFI Trait Development Over 15 Years From the Perspectives of the Self (Green; N = 1,771)
and Two Close Others (Pink; N = 1672)*

Note. Change significant at $p < .01$ is depicted with a solid line; change not significant at $p < .01$ is depicted with a dashed line. Significant differences in maturation between perspectives are depicted with an asterisk (see Figure S14 for *t*-tests). See the online article for the color version of this figure.

greater maturation in a single healthy facet (unconventionality). In the two facets that were classified as neutral (aesthetics and intellect), developmental estimates did not differ between self and other perspectives. We note two important caveats: First, for the facets of nonantagonism, anxiety, and depression, others reported greater maturation over time, but self-reports

indicated higher maturity levels at baseline, so self- and other-reported trajectories converged by Wave 2. Second, because measurement invariance tests indicated that Wave 2 other-reports for nonantagonism were upwardly biased, we hesitate to draw strong conclusions from comparisons involving this facet.

Taking these caveats into account, significant others reported greater maturation than the self in Agreeableness, Conscientiousness, Neuroticism, and five of 11 facets, and the self-reported greater maturation in only one facet (Unconventionality), providing strong evidence against our hypothesis that close others would perceive less maturation than the self over the study period.

Examining Comaturation

In our final set of analyses, we explored the extent to which different traits matured together within a person. To do this, we saved the slope factor scores for each domain and facet trait derived from the self-report latent difference score models described above (see Figure 1) and estimated the correlations in slope factors among all traits. That is, we estimated the between-person covariance in within-person trait change. A full codevelopmental correlation matrix is available at https://osf.io/w56ar.

At the domain level, results indicated that codevelopment among Neuroticism, Agreeableness, and Conscientiousness was strong, but not stronger than codevelopment among the other Big Five domains (see Figure 4). Neuroticism, in particular, codeveloped strongly with each of the other Big Five domains. Thus, people who changed in one Big Five domain tended to change in other domains as well, but comaturation was not discriminable from general codevelopment.

Results of facet-level analyses were more nuanced (see Figure 4). Personality facets matured largely independently of one another: The average correlated change among healthy and unhealthy facets was $r_{co\text{-}dev} = |.11|$. Codevelopment was similar in magnitude when examining comaturation among only healthy facets or among only unhealthy facets. Furthermore, codevelopment among healthy and unhealthy facets was no stronger, on average, than codevelopment between (un)healthy facets and neutral facets, or codevelopment among just neutral facets, providing no evidence for discriminability between comaturation and general codevelopment across facets.

Finally, we explored codevelopmental patterns among the six NEO-PI-R facets underlying each of the Big Five domains, regardless of their adaptivity ratings. On average, the facets of each domain codeveloped more strongly with each other than with facets of other domains (see Figure 4). Additionally, there was relatively strong codevelopment among the 18 total facets underlying Agreeableness, Conscientiousness, and Neuroticism ($M_{rchange} = |.30|$) compared to other facet clusters.

Figure 4
Comaturation Among Personality Facets (N = 393)
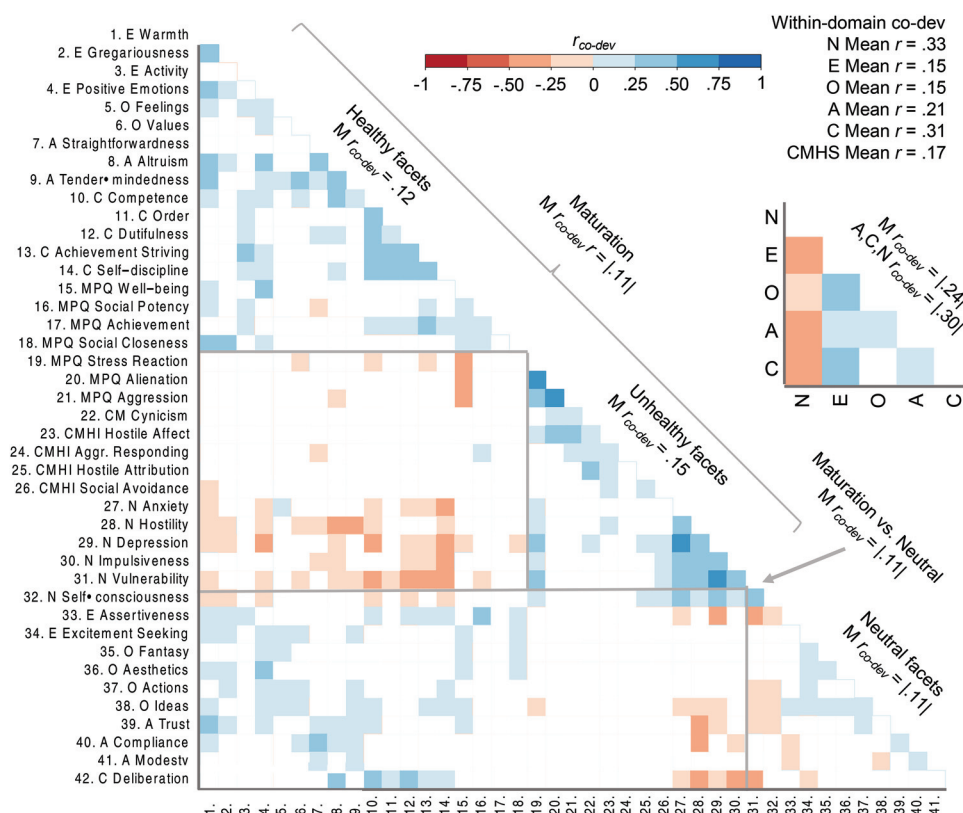
Note. E = extraversion; O = openness to experience; A = agreeableness; C = conscientiousness; N = neuroticism; MPQ = Multidimensional Personality Questionnaire; CMHS = Cook-Medley Hostility Scale. Facets were classified as healthy, unhealthy, or neutral according to Table 1. Correlated change that was significant at $p < .01$ was depicted in blue or red; correlated change not significant at $p < .01$ was depicted in white. "Maturation" comprises healthy and unhealthy facets. See the online article for the color version of this figure.

Overall, these results indicated that people who changed in one domain or facet were somewhat more likely to change in other facets, especially if those other facets were categorized under the same Big Five trait. However, comaturation was not stronger than general codevelopment.

Finally, we examined comaturation using data from self- and other-reports of the NEO-FFI traits using the same methodology as described above. Results of these models indicated that correlated change among the Big Five was stronger in other-report data than in self-report data (see Figure 5). Furthermore, there was significant correlated change across self- and other-reports for the domains of Neuroticism ($r = .21$), Extraversion ($r = .23$), and Conscientiousness ($r = .18$), providing convergent evidence for the validity of domain change over the study period.

This pattern of results largely replicated at the facet level. Facets comatured twice as strongly in other-reported data compared with self-report data, indicating that others perceived much tighter comaturation than the self (see Figure 5). Indeed, the average codevelopment among other-rated facets was $r = |.26|$, whereas the codevelopment among self-rated facets was $|r = .13|$. However, self- and other-reports only somewhat agreed on facet-level change, as cross-rater same-trait codevelopmental estimates were significant for only seven of 14 facets.

Discussion

In this study, we tested three preregistered hypotheses regarding personality trait maturation in adulthood. First, we found strong

support for our hypothesis that most, but not all, personality facets would show adaptive development across midlife. In this sample, most facets changed in the direction of greater psychological maturity or were already at high levels of maturity at age 30, and only three facets showed maladaptive change across ages 30 to 70. Second, contrary to past research, we found more pronounced Big Five maturation in other- than self-reports. Third, we found mixed evidence for comaturation across the study period: correlated change among (un)healthy facets was small in magnitude and no greater than correlated change among all facets. We next discuss these three sets of results in more detail and conclude by summarizing the current state of research on personality maturation.

Age-Graded Personality Maturation

We found that most personality traits developed adaptively across ages 30–70. Specifically, the Big Five domains of Agreeableness and Neuroticism showed adaptive changes, and of the 32 facets classified as healthy or unhealthy, 15 developed adaptively, and only three developed maladaptively. At the domain level, these results are consistent with a large body of research that has shown age-graded maturation in Agreeableness, Conscientiousness, and Neuroticism (Roberts et al., 2006; Roberts & Nickel, 2017) and provide support for the maturity principle of personality development. At the facet level, these results provide important evidence that a wide variety of narrower personality traits linked to physical and mental health as well as interpersonal functioning

Figure 5

Correlated Change Among NEO-FFI Domains and Facets Across Self- (N = 393) and Close Other- (N = 375) Perspectives
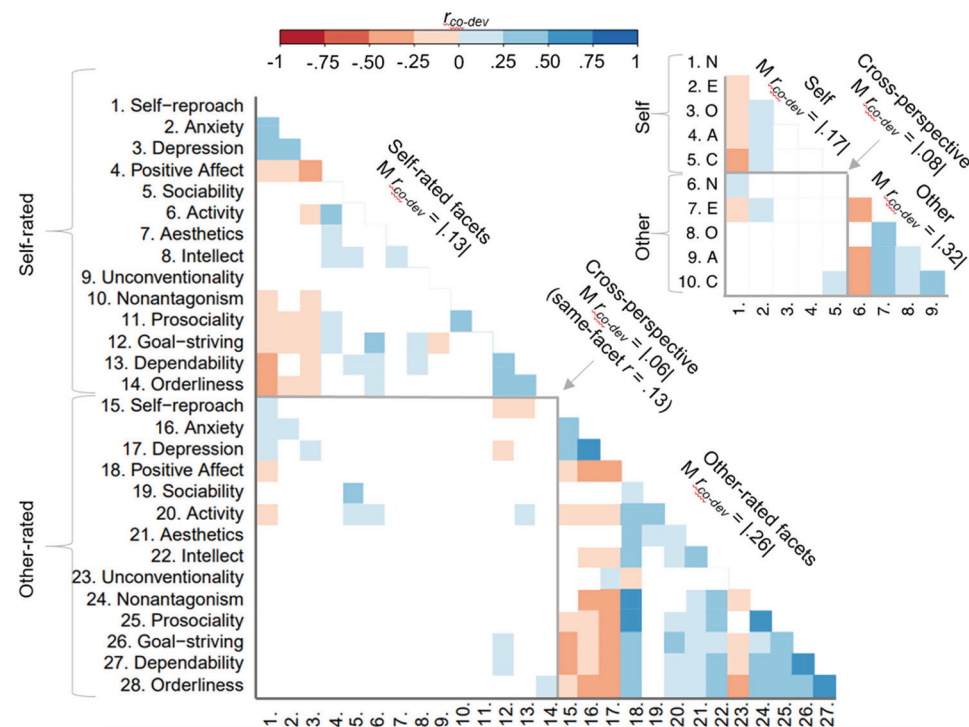
Note. Correlated change not significant at $p < .01$ are depicted in white. The two assessment waves were, on average, 14.72 years apart ($SD = 2.99$). See the online article for the color version of this figure.

also change adaptively across adulthood. Indeed, traits that were more adaptive showed greater age-graded increases, supporting the notion that mean-level personality trait change in adulthood can be summarized, parsimoniously, as a trend toward maturation.

Though most traits developed adaptively across adulthood, nine healthy traits did not show significant changes with age. Did these traits fail to mature? Follow-up exploratory analyses suggested that these traits may have already been at healthy levels by age 30, when the youngest participants began the study, which indicates that these traits may have undergone sufficient maturation earlier in the life span. However, it is unclear what the ideal mature level of a trait is. Research has shown that highly conscientious, agreeable, and emotionally stable people generally still desire continued increases in these traits (Hudson et al., 2020), and that associations between Conscientiousness and positive outcomes hold even among high scorers (Roberts & Nickel, 2017), which suggests that there may be no limit to adaptive trait change. Identifying whether a lack of mean-level change in healthy traits is maladaptive can be addressed more precisely in future research that measures the entire maturation process from adolescence into later life and links trajectories of maturation to life outcomes.

In addition, three healthy facets showed maladaptive age-graded decreases: openness to feelings, social potency, and activity each declined, on average, across the ages of 30 to 70. This result is partly consistent with previous studies on facet-level personality development in adulthood, which also reported decreases in traits related to social activity, like gregariousness and activity (Bleidorn et al., 2009; Soto & John, 2012; Terracciano et al., 2005). However, none of these studies found age-graded decreases in facets of openness. So, do these findings refute the maturity principle? The answer here is not straightforward. Our ratings of adaptiveness were derived from Bleidorn et al. (2020), who measured adaptiveness without respect to age. Whether a trait is relevant to healthy functioning likely changes across the life span. As people age and experience major life events such as parenthood, their social networks tend to decrease in size and become more familial (Wrzus et al., 2013) and they place less importance on social goals (Atherton et al., 2020). As such, age-graded declines in activity and social potency may reflect changes in social priorities toward family and away from meeting new people, rather than maladaptive development (Roberts et al., 2006).

Regarding the trait of openness to feelings, which measures a person's tendency to value and access complex, varied emotions (Terracciano et al., 2003), age-graded declines are likely maladaptive, but because no other research has found age-graded decreases in this trait, and highly related measures of emotional complexity often increase with age (Ready et al., 2012), we hesitate to draw strong conclusions from this result. Absent replicable evidence of maladaptive change in traits that are relevant to healthy functioning at all points in the life span, such as anxiety and cooperativeness, we do not think that these findings invalidate the maturity principle. Rather, they add nuance to our understanding of maturation as a process of continual adaptation to developmental challenges that change with age (Erikson, 1959; Loevinger, 1976).

As a final point, some of the facets that changed the most with age in this study were not especially relevant to maturity, such as openness to fantasy and excitement seeking. These two facets also showed some of the greatest age-graded decreases in past research (Bleidorn et al., 2009; Terracciano et al., 2005).

Describing development in traits like these may require companion principles to the maturity principle of life span development. These principles can expand beyond maturation-based accounts to incorporate theories of motivational and biological development across adulthood from neighboring fields (e.g., selection-optimization-compensation meta-theory from life span aging research; Baltes, 1997). Overall, the varied trajectories across facets, even within the same domain, indicate that a wealth of developmental information is lurking at levels below the Big Five. Future research that examines development in narrower traits will thus be useful in refining our understanding of personality development across adulthood.

Multirater Perspectives on Personality Maturation

We compared the average magnitude of personality trait maturation between self-reports and reports from two close others. We found that, in three Big Five domains and five of 12 NEO-FFI facets, other-reported development in adaptive traits was more positive than self-reported development. This provides evidence that the maturity principle is not an artifact of self-ratings, as close others indeed reported adaptive increases across the Big Five domains and many personality facets. In the language of Hogan and Roberts (2004), these results suggest that people matured in terms of both self-perceived identity and other-perceived reputation.

This finding stands in contrast to the few other studies that have compared Big Five development across perspectives, which have found less maturation in other-reports compared to self-reports (Lenhausen et al., 2020; Oltmanns et al., 2020; Watson & Humrichouse, 2006). One reason for these differing results might be in the type of relationships across studies. In two past studies (Lenhausen et al., 2020; Watson & Humrichouse, 2006), close others were romantic partners in relatively new relationships, whereas in this study, only 30% of close others were romantic partners, and, given the age of this sample, were likely in well-established romantic relationships. New romantic relationships may be subject to a honeymoon effect, where partners initially have an overly positive view of one another that gradually wears off (Watson & Humrichouse, 2006). This would downwardly bias healthy development in a way that applies less to long-term relationships and other types of relationships such as friendships. More research on personality development in adulthood from the perspective of close others is needed to unravel the discrepancies across these initial studies and provide a more diverse evidentiary basis for claims of personality maturation across adulthood.

Comaturation Among Personality Facets

Our third aim was to investigate comaturation among personality facets. We found that people who changed adaptively in one facet were slightly more likely to experience adaptive change in other facets, but this comaturation was no stronger in magnitude than general codevelopment across all facets. This pattern of results provides preliminary evidence that maturation is not a coordinated, simultaneous process that explains a large proportion of development across traits. Rather, we found that the vast majority of adaptive facet change occurred independently of adaptive change in other facets, suggesting that facet development may be

better conceptualized as many narrowly-acting processes that affect traits in isolation (Soto & John, 2012). Additional studies of codevelopment among healthy, unhealthy, and neutral traits are needed to provide further evidence about the extent of trait comaturation.

These results should be considered in light of our decision to operationalize maturation in terms of change in (un)healthy traits. Maturation is often discussed broadly in terms of change in Agreeableness, Conscientiousness, and Neuroticism (Roberts & Nickel, 2017), which provides an alternate rubric by which to evaluate maturation and comaturation. Indeed, when we explored codevelopment among all 18 NEO-PI-R facets from these three domains (regardless of adaptiveness), we found that correlated change was stronger than among other clusters of personality facets. These results provide evidence that there may be some common process underlying codevelopment among facets of Agreeableness, Conscientiousness, and Neuroticism regardless of facet adaptivity ratings. A candidate mechanism for this process is serotonergic functioning (DeYoung et al., 2002; Wright et al., 2019), which has been linked to these three domains and psychological maturity in past research.

Finally, an interesting trend emerged when we compared comaturation across the perspectives of the self and close others: Close others reported stronger comaturation than the self, as indicated by substantially higher correlated change across healthy and unhealthy traits. This pattern of findings suggests that close others may view adaptive development as a broader and less differentiated process. In other words, change in a person's reputation may be less nuanced than change in their self-perceptions. Future research is needed to replicate this finding, which we did not predict a priori.

Limitations

The present study comes with some important limitations. The first concerns the operationalization and measurement of personality adaptivity. We classified traits as either healthy, unhealthy, or neutral in order to compare development across these three categories. We acknowledge that, in reality, trait adaptiveness is a continuous rather than categorical concept, implying that some traits may be more or less healthy than others. Furthermore, our trait classification was based on empirical correlations with well-being and ratings of the healthy personality. These ratings reflect normative, average ratings; however, they cannot capture more unique or idiosyncratic pathways to maturity which may vary across settings, individuals, and developmental stages (Erikson, 1959; Ryff, 1989).

The unique strengths of this dataset, such as the longitudinal measurement of many personality facets from both self- and other-perspectives, should be considered alongside its major design limitations. Specifically, our analyses of maturation were limited by our two-wave longitudinal design. Longitudinal models based on two waves of data provide less reliable and robust estimates of change than those that include three or more measurements (Duncan et al., 2013). Relatedly, only 401 of the 1,785 participants contributed two personality measurements. Though our analyses that describe maturation from age 30 to age 70 incorporate measurements from all participants, the fact that most only contributed one wave of data means that between-person age differences in personality played an especially strong role in estimates of age-graded change compared to within-person age changes in personality.

An additional limitation of this study is that we did not measure which other-raters were consistent across measurement waves. At both waves, raters generally knew their targets quite well, and correspondence between self- and other-rated personality was similar in magnitude to what has been found in past research. This indicates that even when raters changed, the validity of their reports likely did not. However, this design is different from past research on other-rated personality development, in which the same close others provided trait ratings at both measurement waves or change in raters was controlled for statistically (Lenhausen et al., 2020; Oltmanns et al., 2020; Watson & Humrichouse, 2006). This difference may have implications for the extent to which close others perceived adaptive personality trait development. Specifically, in this study, participants may have nominated different other-raters at Wave 2 when their relationship to their Wave 1 rater deteriorated, whereas in past research, even other-raters with strained relationships were retained in the sample—and these other-raters may have rated their targets less positively (Vandermeer et al., 2018). Future research is needed to identify the extent to which constancy and change in raters affects the extent to which close others perceive personality trait maturation.

Finally, our sample was homogenous in terms of race (83% of AHAB participants are White) and geography (all were from the Midwestern U.S.), which constrains the generalizability of results to other groups.

Conclusion

A broad evidentiary base suggests that personality traits develop adaptively across adulthood. Using results from this study and past research, we close by proposing an expanded maturity principle of personality development. In this list, we describe common findings and caveats regarding variation across traits, people, and samples. These caveats underscore how there are few absolutes in personality development (and behavioral science in general).

- Across adulthood, people show increases in a wide spectrum of broad and narrow traits emblematic of mental and physical health, interpersonal functioning, and productivity (Caspi et al., 2005). However, not all traits mature alike. Even highly correlated traits mature at different rates, and in most studies of facet-level development some healthy personality traits show maladaptive declines, oftentimes those associated with social engagement (e.g., Donnellan et al., 2007; Terracciano et al., 2005).
- Adaptive development generally occurs from late adolescence (e.g., Klimstra et al., 2018; Luan et al., 2018) up to the years preceding death (e.g., Wagner et al., 2016), with changes that are most pronounced in emerging adulthood (ages 18–30; Roberts & Davis, 2016). However, in some samples, adaptive development begins earlier in life (e.g., Brandes et al., 2020) and extends into very old age (e.g., Mueller et al., 2016).
- On average, traits only co-mature within people to a small extent, as adaptive development in one trait is mostly independent of adaptive development in others (e.g., Allemand & Martin, 2017). Traits that are more strongly associated tend to co-mature more strongly (e.g., Soto & John, 2012).

- Early and accumulating evidence suggests that the rates of adaptive development in personality traits may differ across self- and other-reported perspectives (e.g., Oltmanns et al., 2020). While some studies indicated that others may perceive development less positively than the self, the present research finds the opposite pattern. Very few studies have examined personality development across perspectives, highlighting the need for more research on this topic.
- Rates of adaptive development differ across people (e.g., Schwaba & Bleidorn, 2018), and some people do not mature with age (e.g., Roberts et al., 2001).
- There is heterogeneity in adaptive development across samples (e.g., Bleidorn et al., 2013), and some show little evidence for maturation (e.g., Graham et al., 2020).

We anticipate future research on personality maturation that provides additional evidence for these common trends, and, just as importantly, clarifies the boundary conditions under which they are and are not found.

References

Aho, K., Derryberry, D., & Peterson, T. (2014). Model selection for ecologists: The worldviews of AIC and BIC. *Ecology*, *95*(3), 631–636. https://doi.org/10.1890/13-1452.1

Allemand, M., Zimprich, D., & Martin, M. (2008). Long-term correlated change in personality traits in old age. *Psychology and Aging*, *23*(3), 545–557. https://doi.org/10.1037/a0013239

Allemand, M., & Martin, M. (2017). On correlated change in personality. *European Psychologist*, *21*(1), 237–253. https://doi.org/10.1027/1016-9040/a000256

Anglim, J., Horwood, S., Smillie, L. D., Marrero, R. J., & Wood, J. K. (2020). Predicting psychological and subjective well-being from personality: A meta-analysis. *Psychological Bulletin*, *146*(4), 279–323. https://doi.org/10.1037/bul0000226

Atherton, O. E., Grijalva, E., Roberts, B. W., & Robins, R. W. (2020). Stability and change in personality traits and major life goals from college to midlife. *Personality and Social Psychology Bulletin*, *47*(5), 841–858. https://doi.org/10.1177/0146167220949362

Baltes, P. B. (1997). On the incomplete architecture of human ontogeny: Selection, optimization, and compensation as foundation of developmental theory. *American Psychologist*, *52*(4), 366.

Barefoot, J. C., Dodge, K. A., Peterson, B. L., Dahlstrom, W. G., & Williams, R. B., Jr. (1989). The Cook-Medley hostility scale: Item content and ability to predict survival. *Psychosomatic Medicine*, *51*(1), 46–57. https://doi.org/10.1097/00006842-198901000-00005

Bleidorn, W., Hopwood, C. J., Ackerman, R. A., Witt, E. A., Kandler, C., Riemann, R., Samuel, D. B., & Donnellan, M. B. (2020). The healthy personality from a basic trait perspective. *Journal of Personality and Social Psychology*, *118*(6), 1207–1225. https://doi.org/10.1037/pspp0000231

Bleidorn, W., Kandler, C., Riemann, R., Spinath, F. M., & Angleitner, A. (2009). Patterns and sources of adult personality development: Growth curve analyses of the NEO PI-R scales in a longitudinal twin study. *Journal of Personality and Social Psychology*, *97*(1), 142–155. https://doi.org/10.1037/a0015434

Bleidorn, W., Klimstra, T. A., Denissen, J. J., Rentfrow, P. J., Potter, J., & Gosling, S. D. (2013). Personality maturation around the world: A cross-cultural examination of social-investment theory. *Psychological Science*, *24*(12), 2530–2540. https://doi.org/10.1177/0956797613498396

Blonigen, D. M., Carlson, M. D., Hicks, B. M., Krueger, R. F., & Iacono, W. G. (2008). Stability and change in personality traits from late adolescence to early adulthood: A longitudinal twin study. *Journal of Personality*, *76*(2), 229–266. https://doi.org/10.1111/j.1467-6494.2007.00485.x

Brandes, C. M., Kushner, S. C., Herzhoff, K., & Tackett, J. L. (2020). Facet-level personality development in the transition to adolescence: Maturity, disruption, and gender differences. *Journal of Personality and Social Psychology*, *121*(5), 1095–1111. https://doi.org/10.1037/pspp0000367

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annual Review of Psychology*, *56*(1), 453–484. https://doi.org/10.1146/annurev.psych.55.090902.141913

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, *9*(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5

Costa, P. T., Jr., & McCrae, R. R. (1992). *NEO PI-R: Professional manual*. Psychological Assessment Resources.

Costello, C., Srivastava, S., & Saucier, G. (2017). Stability and change in the Big Five and Big Six: New tests of the maturity and cumulative continuity principles. https://doi.org/10.31234/osf.io/b36tv

DeYoung, C. G., Peterson, J. B., & Higgins, D. M. (2002). Higher-order factors of the Big Five predict conformity: Are there neuroses of health? *Personality and Individual Differences*, *33*(4), 533–552. https://doi.org/10.1016/S0191-8869(01)00171-4

Donnellan, M. B., Conger, R. D., & Burzette, R. G. (2007). Personality development from late adolescence to young adulthood: Differential stability, normative maturity, and evidence for the maturity-stability hypothesis. *Journal of Personality*, *75*(2), 237–263. https://doi.org/10.1111/j.1467-6494.2007.00438.x

Duncan, T. E., Duncan, S. C., & Strycker, L. A. (2013). *An introduction to latent variable growth curve modeling: Concepts, issues, and application*. Routledge.

Erikson, E. (1959). Identity and the life cycle. *Psychological Issues*, *1*, 18–164.

Graham, E. K., Weston, S. J., Gerstorf, D., Yoneda, T. B., Booth, T., Beam, C. R., Petkus, A. J., Drewelies, J., Hall, A. N., Bastarache, E. D., Estabrook, R., Katz, M. J., Turiano, N. A., Lindenberger, U., Smith, J., Wagner, G. G., Pedersen, N. L., Allemand, M., Spiro, A., . . . Mroczek, D. K. (2020). Trajectories of Big Five personality traits: A coordinated analysis of 16 longitudinal samples. *European Journal of Personality*, *34*(3), 301–321. https://doi.org/10.1002/per.2259

Hallquist, M. N., & Wiley, J. F. (2018). MplusAutomation: An R package for facilitating large-scale latent variable analyses in Mplus. *Structural Equation Modeling*, *25*(4), 621–638. https://doi.org/10.1080/10705511.2017.1402334

Han, K., Weed, N. C., Calhoun, R. F., & Butcher, J. N. (1995). Psychometric characteristics of the MMPI-2 Cook-Medley Hostility Scale. *Journal of Personality Assessment*, *65*(3), 567–585. https://doi.org/10.1207/s15327752jpa6503_15

Hogan, R., & Roberts, B. W. (2004). A socioanalytic model of maturity. *Journal of Career Assessment*, *12*(2), 207–217. https://doi.org/10.1177/1069072703255882

Hudson, N. W., Fraley, R. C., Chopik, W. J., & Briley, D. A. (2020). Change goals robustly predict trait growth: A mega-analysis of a dozen intensive longitudinal studies examining volitional change. *Social Psychological & Personality Science*, *11*(1), 723–732. https://doi.org/10.1177/1948550619878423

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: History, measurement, and conceptual issues. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114–158). Guilford Press.

Klimstra, T. A., Bleidorn, W., Asendorpf, J. B., Van Aken, M. A., & Denissen, J. J. (2013). Correlated change of Big Five personality traits across the lifespan: A search for determinants. *Journal of Research in Personality*, *47*(6), 768–777. https://doi.org/10.1016/j.jrp.2013.08.004

Klimstra, T. A., Noftle, E. E., Luyckx, K., Goossens, L., & Robins, R. W. (2018). Personality development and adjustment in college: A

multifaceted, cross-national view. *Journal of Personality and Social Psychology*, *115*(2), 338–361. https://doi.org/10.1037/pspp0000205

Lenhausen, M. R., Van Scheppingen, M. A., & Bleidorn, W. (2020). Self- and partner-reported personality development in romantic couples. *European Journal of Personality*. Advance online publication. https://doi.org/10.1177/0890207020969011

Lodi-Smith, J., & Roberts, B. W. (2007). Social investment and personality: A meta-analysis of the relationship of personality traits to investment in work, family, religion, and volunteerism. *Personality and Social Psychology Review*, *11*(1), 68–86. https://doi.org/10.1177/1088868306294590

Loevinger, J. (1976). *Ego development*. Jossey-Bass.

Luan, Z., Poorthuis, A. M. G., Hutteman, R., Asendorpf, J. B., Denissen, J. J. A., & van Aken, M. A. G. (2018). See me through my eyes: Adolescent-parent agreement in personality predicts later self-esteem development. *International Journal of Behavioral Development*, *42*(1), 17–25. https://doi.org/10.1177/0165025417690263

Lucas, R. E., & Donnellan, M. B. (2011). Personality development across the life span: Longitudinal analyses with a national sample from Germany. *Journal of Personality and Social Psychology*, *101*(4), 847–861. https://doi.org/10.1037/a0024298

Lüdtke, O., Roberts, B. W., Trautwein, U., & Nagy, G. (2011). A random walk down university avenue: Life paths, life events, and personality trait change at the transition to university life. *Journal of Personality and Social Psychology*, *101*(3), 620–637. https://doi.org/10.1037/a0023743

Manuck, S. B., Phillips, J. E., Gianaros, P. J., Flory, J. D., & Muldoon, M. F. (2010). Subjective socioeconomic status and presence of the metabolic syndrome in midlife community volunteers. *Psychosomatic Medicine*, *72*(1), 35–45. https://doi.org/10.1097/PSY.0b013e3181c484dc

Mõttus, R., Johnson, W., Starr, J. M., & Deary, I. J. (2012). Correlates of personality trait levels and their changes in very old age: The Lothian birth cohort 1921. *Journal of Research in Personality*, *46*(3), 271–278. https://doi.org/10.1016/j.jrp.2012.02.004

Mõttus, R., Wood, D., Condon, D. M., Back, M., Baumert, A., Costantini, G., Epskamp, S., Greiff, S., Johnson, W., Lukaszewski, A., Murray, A., Revelle, W., Wright, A. G. C., Yarkoni, T., Ziegler, M., & Zimmerman, J. (2020). Descriptive, predictive and explanatory personality research: Different goals, different approaches, but a shared need to move beyond the Big Few traits. *European Journal of Personality*, *34*(6), 1175–1201. https://doi.org/10.1002/per.2311

Mueller, S., Wagner, J., Drewelies, J., Duezel, S., Eibich, P., Specht, J., Demuth, I., Steinhagen-Thiessen, E., Wagner, G. G., & Gerstorf, D. (2016). Personality development in old age relates to physical health and cognitive performance: Evidence from the Berlin Aging Study II. *Journal of Research in Personality*, *65*(12), 94–108. https://doi.org/10.1016/j.jrp.2016.08.007

Muthén, L. K., & Muthén, B. O. (1998–2012). *Mplus user's guide, 7th edition*.

Nesselroade, J. R. (1991). Interindividual differences in intraindividual change. In L. M. Collins & J. L. Horn (Eds.), *Best methods for the analysis of change: Recent advances, unanswered questions, future directions* (pp. 92–105). American Psychological Association. https://doi.org/10.1037/10099-006

Nye, C. D., & Dragow, F. (2011). Effect size indices for analyses of measurement equivalence: Understanding the practical importance of differences between groups. *Journal of Applied Psychology*, *96*(5), 966–980. https://doi.org/10.1037/a0022955

Oltmanns, J. R., Jackson, J. J., & Oltmanns, T. F. (2020). Personality change: Longitudinal self-other agreement and convergence with retrospective-reports. *Journal of Personality and Social Psychology*, *118*(5), 1065–1079. https://doi.org/10.1037/pspp0000238

Oltmanns, J. R., & Oltmanns, T. (2021). Self–other agreement on ratings of personality disorder symptoms and traits: Three meta-analyses. In T. D.

Letzring, & J. S. Spain (Eds.), *The oxford handbook of accurate personality judgment*. Oxford.

Patrick, C. J., Curtin, J. J., & Tellegen, A. (2002). Development and validation of a brief form of the Multidimensional Personality Questionnaire. *Psychological Assessment*, *14*(2), 150–163. https://doi.org/10.1037/1040-3590.14.2.150

R Core Team. (2016). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing.

Ready, R. E., Åkerstedt, A. M., & Mroczek, D. K. (2012). Emotional complexity and emotional well-being in older adults: Risks of high neuroticism. *Aging & Mental Health*, *16*(1), 17–26. https://doi.org/10.1080/13607863.2011.602961

Revelle, W. (2013). psych: Procedures for Personality and Psychological Research. Northwestern University, Evanston, IL. http://CRAN.R-project.org/package=psych

Roberts, B. W., Caspi, A., & Moffitt, T. E. (2001). The kids are alright: Growth and stability in personality development from adolescence to adulthood. *Journal of Personality and Social Psychology*, *81*(4), 670–683. https://doi.org/10.1037/0022-3514.81.4.670

Roberts, B. W., & Davis, J. P. (2016). Young adulthood is the crucible of personality development. *Emerging Adulthood*, *4*(5), 318–326.

Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin*, *132*(1), 1–25. https://doi.org/10.1037/0033-2909.132.1.1

Roberts, B. W., Wood, D., & Caspi, A. (2008). Development of personality traits in adulthood. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 375–398). Guilford Press.

Roberts, B. W., & Nickel, L. (2017). A critical evaluation of the neo-socio-analytic model of personality. In J. Specht (Ed.), *Personality development across the life span* (pp. 157–177). Elsevier. https://doi.org/10.1016/B978-0-12-804674-6.00011-9

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*(2), 1–36. https://doi.org/10.18637/jss.v048.i02

Rushton, J. P., & Irwing, P. (2008). A general factor of personality (GFP) from two meta-analyses of the Big Five: Digman (1997) and Mount, Barrick, Scullen, and Rounds (2005). *Personality and Individual Differences*, *45*(7), 679–683. https://doi.org/10.1016/j.paid.2008.07.015

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*(6), 1069–1081. https://doi.org/10.1037/0022-3514.57.6.1069

Sadikaj, G., Wright, A. G., Dunkley, D. M., Zuroff, D. C., & Moskowitz, D. S. (2021). Multilevel structural equation modeling for intensive longitudinal data: A practical guide for personality researchers. In J. F. Rauthmann (Ed.), *The handbook of personality dynamics and processes* (pp. 855–885). Academic Press.

Samuel, D. B., & Widiger, T. A. (2008). A meta-analytic review of the relationships between the five-factor model and *DSM–IV*-TR personality disorders: A facet level analysis. *Clinical Psychology Review*, *28*(8), 1326–1342. https://doi.org/10.1016/j.cpr.2008.07.002

Saucier, G. (1998). Replicable item-cluster subcomponents in the NEO Five-Factor Inventory. *Journal of Personality Assessment*, *70*(2), 263–276. https://doi.org/10.1207/s15327752jpa7002_6

Schwaba, T., & Bleidorn, W. (2018). Individual differences in personality change across the adult life span. *Journal of Personality*, *86*(3), 450–464.

Schwaba, T., Rhemtulla, M., Hopwood, C. J., Bleidorn, W. (2020). A facet atlas: Visualizing networks that describe the blends, cores, and peripheries of personality structure. *PLoS ONE*, *15*(7), e0236893. https://doi.org/10.1111/jopy.12458

Schwaba, T., Robins, R. W., Grijalva, E., & Bleidorn, W. (2019). Does openness to experience matter in love and work? Domain, facet, and

developmental evidence from a 24-year longitudinal study. *Journal of Personality*, 87(5), 1074–1092. https://doi.org/10.1111/jopy.12458

Soto, C. J., & John, O. P. (2012). Development of big five domains and facets in adulthood: Mean-level age trends and broadly versus narrowly acting mechanisms. *Journal of Personality*, 80(4), 881–914. https://doi.org/10.1111/j.1467-6494.2011.00752.x

Soto, C. J., & Tackett, J. L. (2015). Personality traits in childhood and adolescence: Structure, development, and outcomes. *Current Directions in Psychological Science*, 24(5), 358–362. https://doi.org/10.1177/0963721415589345

Specht, J., Egloff, B., & Schmukle, S. C. (2011). Stability and change of personality across the life course: The impact of age and major life events on mean-level and rank-order stability of the Big Five. *Journal of Personality and Social Psychology*, 101(4), 862–882. https://doi.org/10.1037/a0024950

Terracciano, A., McCrae, R. R., Brant, L. J., & Costa, P. T., Jr. (2005). Hierarchical linear modeling analyses of the NEO-PI-R scales in the Baltimore Longitudinal Study of Aging. *Psychology and Aging*, 20(3), 493–506. https://doi.org/10.1037/0882-7974.20.3.493

Terracciano, A., McCrae, R. R., Hagemann, D., & Costa, P. T., Jr. (2003). Individual difference variables, affective differentiation, and the structures of affect. *Journal of Personality*, 71(5), 669–703. https://doi.org/10.1111/1467-6494.7105001

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 3(1), 4–70. https://doi.org/10.1177/109442810031002

Vandermeer, M. R., Kotelnikova, Y., Simms, L. J., & Hayden, E. P. (2018). Spousal agreement on partner personality ratings is moderated by relationship satisfaction. *Journal of Research in Personality*, 76(10), 22–31. https://doi.org/10.1016/j.jrp.2018.07.005

Vize, C. E., Miller, J. D., & Lynam, D. R. (2018). FFM facets and their relations with different forms of antisocial behavior: An expanded meta-analysis. *Journal of Criminal Justice*, 57(4), 67–75. https://doi.org/10.1016/j.jcrimjus.2018.04.004

Wagner, J., Ram, N., Smith, J., & Gerstorf, D. (2016). Personality trait development at the end of life: Antecedents and correlates of mean-level trajectories. *Journal of Personality and Social Psychology*, 111(3), 411–429. https://doi.org/10.1037/pspp0000071

Walker, L. J., & Pitts, R. C. (1998). Naturalistic conceptions of moral maturity. *Developmental Psychology*, 34(3), 403–419. https://doi.org/10.1037/0012-1649.34.3.403

Watson, D., & Humrichouse, J. (2006). Personality development in emerging adulthood: Integrating evidence from self-ratings and spouse ratings. *Journal of Personality and Social Psychology*, 91(5), 959–974. https://doi.org/10.1037/0022-3514.91.5.959

Woods, W. C., Edershile, E. A., Wright, A. G. C., & Lenzenweger, M. F. (2019). Illuminating ipsative change in personality disorder and normal personality: A multimethod examination from a prospective longitudinal perspective. *Personality Disorders*, 10(1), 80–86. https://doi.org/10.1037/per0000302

Wortman, J., Lucas, R. E., & Donnellan, M. B. (2012). Stability and change in the Big Five personality domains: Evidence from a longitudinal study of Australians. *Psychology and Aging*, 27(4), 867–874. https://doi.org/10.1037/a0029322

Wright, A. G. C., Creswell, K. G., Flory, J. D., Muldoon, M. F., & Manuck, S. B. (2019). Neurobiological functioning and the personality-trait hierarchy: Central serotonergic responsivity and the stability meta-trait. *Psychological Science*, 30(10), 1413–1423. https://doi.org/10.1177/0956797619864530

Wright, A. G. C., Pincus, A. L., & Lenzenweger, M. F. (2011). Development of personality and the remission and onset of personality pathology. *Journal of Personality and Social Psychology*, 101(6), 1351–1358. https://doi.org/10.1037/a0025557

Wrzus, C., Hänel, M., Wagner, J., & Neyer, F. J. (2013). Social network changes and life events across the life span: A meta-analysis. *Psychological Bulletin*, 139(1), 53–80. https://doi.org/10.1037/a0028601

Zettler, I., Moshagen, M., & Hilbig, B. E. (2020). Stability and change: The Dark Factor of Personality shapes dark traits. *Social Psychological & Personality Science*, 12(6), 974–983. https://doi.org/10.1177/1948550620953288