

Refining the maturity principle of personality development by examining facets, close others, and comaturation

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1 Abstract

2 Across adulthood, people tend to experience psychologically adaptive personality trait change, a robust
3 finding known as the maturity principle of personality development. We identify three open areas of
4 inquiry regarding personality maturation and address them in a pre-registered study, using a sample of
5 US adults ages 30-70 who completed a battery of personality questionnaires and were rated by two
6 close others twice over an 11-to-16 year period ($N_{\text{wave1}} = 1,785$, $N_{\text{wave2}} = 401$). First, it is unclear whether
7 the maturity principle applies to narrower facet-level traits, as there has been little research into facet
8 development across adulthood. We examined 47 facet scales and found that most developed adaptively
9 across ages 30-70, but some did not mature, and three healthy facets (Activity, Openness to Feelings,
10 and Social Potency) declined significantly across adulthood, counter to the maturity principle. Second,
11 no longitudinal research has tested whether personality maturation is perceived similarly by close
12 others. We compared self- and other- rated development and found that close others perceived greater
13 maturation than the self in Agreeableness, Conscientiousness, Neuroticism, and five facets. Finally, few
14 studies have examined whether traits co-mature in adulthood. We found that correlated change
15 between healthy facets was small in magnitude. Additionally, we found tighter co-maturation in other-
16 reported development than self-reported development. We use these results and past research to
17 expand and refine our understanding of personality maturation across adulthood.

18

19 **Keywords:** *Personality Traits, Personality Facets, Lifespan Development, Personality Development*

20 Across adulthood, most people tend to experience increases in personality traits that are
21 positively related to interpersonal and occupational functioning and health, such as agreeableness,
22 conscientiousness, and emotional stability (Bleidorn et al., 2013; Roberts et al., 2006; Specht et al.,
23 2011). This finding, termed the maturity principle of personality development (Caspi et al., 2005;
24 Roberts et al., 2008) has served as an organizational framework for personality development research
25 over the past 15 years. However, at least three questions about personality maturation remain
26 unaddressed. First, it is unclear whether the maturity principle applies to the narrower facet-level traits
27 that make up each major personality (e.g., Big Five) domain, as there has been surprisingly little research
28 into personality facet development across adulthood (c.f. Bleidorn et al., 2009; Costello et al., 2017;
29 Terracciano et al., 2005). Second, it is unclear whether trait maturation plays out similarly in the eyes of
30 the self and close others. Past research indicates that close others may perceive less trait maturation
31 than the self over time, but this has yet to be statistically tested (Oltmanns et al., 2020; Lenhausen et al.,
32 2020; Watson & Humrichouse, 2006). Third, the extent to which personality traits co-mature within
33 people is unclear. Personality traits may mature in tandem, indicating that maturation is a broad,
34 coordinated process. Alternatively, traits may develop relatively independent of one another, which
35 would be indicative of narrower, trait-specific processes (Klimstra et al., 2013; Soto & John, 2012).

36 In this study, we addressed these three questions and synthesized past research on personality
37 development across adulthood to expand and refine the maturity principle of personality development.
38 We used data from a sample of Pennsylvania-residing adults aged 30-70 who completed 3 personality
39 questionnaires twice over an 11-to-16-year period (Total N = 1,785; longitudinal N = 401). These
40 questionnaires (the NEO-Personality Inventory Revised, Multidimensional Personality Questionnaire,
41 and the Cook-Medley Hostility Scale) measure 47 lower-order personality traits in total, which we

42 classified as healthy, neutral, or unhealthy according to expert ratings¹ (Bleidorn et al., 2020). At both
43 time points, participants were also rated on their personality traits by two close others using the NEO
44 Five-Factor-Inventory. We used this rich set of personality trait data to test three hypotheses. First, we
45 tested whether narrower personality traits matured across early and middle adulthood. We
46 hypothesized that most healthy traits would increase, and most unhealthy facets would decrease, and
47 we identified exceptions to this general trend. Second, we tested whether trajectories of personality
48 development reported by close others were indeed less positive than trajectories of self-reported
49 personality development, at both the domain and facet level. Third, we explored the extent to which
50 personality traits tended to co-mature, both within and across perspectives of the self and other.
51 Overall, these analyses contribute to the growing literature on personality trait development below and
52 beyond the Big Five and provide new information about personality maturation across adulthood.

53 **The Maturity Principle**

54 The maturity principle of personality development was articulated in a 2005 review by Caspi,
55 Shiner, and Roberts, who wrote that past research has found that *“Most people become more dominant,*
56 *agreeable, conscientious, and emotionally stable over the course of their lives. These changes point to*
57 *increasing psychological maturity over development, from adolescence to middle age. [This definition]*
58 *equates maturity with the capacity to become a productive and involved contributor to society, with the*
59 *process of becoming more planful, deliberate, and decisive, but also more considerate and charitable.”*
60 (pp. 468-469). More recent research has continued to provide support for this principle. Cross-sectional,
61 longitudinal, and meta-analytic studies using a variety of personality trait measures have consistently
62 replicated the trend of increasing Agreeableness and Conscientiousness and decreasing Neuroticism

¹ In this paper, 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).

63 across early and middle adulthood, in samples from many (mostly western) nations, at both the within-
64 person level (i.e. in a person across time) and between-person level (i.e. when comparing different ages
65 to one another) (Bleidorn et al., 2015; Costello et al., 2017; Lucas & Donnellan, 2011; Specht et al., 2011;
66 Roberts et al., 2006; Wortman et al., 2012; Wright et al., 2011; c.f. Graham et al., 2020). Researchers
67 have also found that the maturity principle applies to other traits emblematic of the ability to be a
68 productive, psychologically healthy member of society, like Achievement (Donnellan et al., 2007),
69 Honesty/Humility (Costello et al., 2017), (low) severity of personality disorders (Woods et al., 2019), and
70 (low) Psychopathy and Narcissism (Zettler et al., 2020). This body of evidence makes the maturity
71 principle one of the most strongly supported findings in personality development (Roberts & Nickel,
72 2017).

73 More recent findings have refined our understanding of personality maturation. For example,
74 there is often a temporary disruption of adaptive development in adolescence, followed by dramatic
75 increases in healthy traits at the beginning of adulthood (Klimstra et al., 2018; Luan et al., 2017; Soto &
76 Tackett, 2015; c.f. Brandes et al., 2020). Furthermore, the extent to which adaptive development
77 continues into older adulthood seems to depend on sample composition (Mueller et al., 2016; Specht et
78 al., 2011); development in this stage of life may be best construed in terms of years until death (Wagner
79 et al., 2016). These results allow us to add granularity to the original assertion that maturation occurs
80 across the lifespan -- specifically, adaptive development appears to occur from late adolescence up to
81 the years before death. These findings open the door for further revision of the maturity principle so
82 that it more comprehensively summarizes lifespan trends in adaptive personality development. We have
83 identified three open questions about personality maturation, which we now turn to as the focus of this
84 study.

85 **How Do Narrower Personality Facets Mature?**

86 Personality traits can be organized at multiple hierarchical levels. In modern research on
87 personality development, researchers typically conceptualize traits in terms of the Big Five, which strike
88 a parsimonious balance between bandwidth and fidelity (John et al., 2008). Using the Big Five as a
89 template, researchers have sketched a high-level portrait of developmental trends (e.g. Roberts et al.,
90 2006). The next logical step is to describe development in terms of the narrower facet-level traits that
91 make up the Big Five, which will provide a higher-fidelity understanding of lifespan development
92 (Schwaba et al., 2020). For example, although Neuroticism typically decreases across the lifespan, facets
93 of Neuroticism, such as Depressiveness and Angry Hostility, may develop differently from one another.

94 Describing development at the facet level allows researchers to further test and revise the
95 maturity principle. Different facets may mature at different rates and different ages, which contributes
96 information about the processes underlying lifespan development (Möttus et al., 2020). For example,
97 Tender-mindedness and Straightforwardness are both healthy facets of Agreeableness, though the
98 former is more strongly associated with personal growth (Anglim et al., 2019) and the latter with (lesser)
99 antisocial behavior (Vize et al., 2018). By separately examining development in these traits, researchers
100 can disambiguate two different forms of maturation in Agreeableness. Furthermore, facet-level
101 examination allows researchers to decouple the general concept of trait maturation from change
102 specifically in Agreeableness, Conscientiousness, and Neuroticism. Indeed, facets exist on a continuum
103 of adaptiveness: some are especially relevant to psychological health and interpersonal functioning (e.g.
104 Depressiveness, Gregariousness), and others are less so (e.g. Openness to Fantasy, Excitement-seeking;
105 Bleidorn et al., 2020). Even within a domain, facets often differ in their relevance to maturity. For
106 example, within Conscientiousness, the facet of Self-Discipline has a stronger negative association with
107 personality disorder symptoms than the facet of Compliance (Samuel & Widiger, 2008). And, although
108 the domains of Extraversion and Openness are often considered to be neutrally adaptive and therefore
109 outside the scope of the maturity principle, some facets underlying the domains of Extraversion and

110 Openness, such as Gregariousness and Openness to Feelings, are especially relevant to the mature,
111 healthy personality (Bleidorn, 2020). Using this variance across facets, we classify each narrower trait as
112 either healthy, unhealthy, or neutral, regardless of its parent domain. Facet-level examination can thus
113 provide information about whether the age-graded developmental patterns observed in past research
114 are truly due to adaptive development in healthy traits across the personality spectrum or merely
115 change in certain personality domains.

116 To date, however, there has been little research into Big Five facet development across
117 adulthood (Bleidorn et al., 2009; Costello et al., 2017; Klimstra et al., 2018; Soto & John, 2012;
118 Terracciano et al., 2005), and no research has explicitly tested hypotheses related to facet-level
119 personality maturation. In one study, Terracciano and colleagues found that, although Agreeableness,
120 Conscientiousness, and Neuroticism developed adaptively across ages 30 to 90, the underlying facets
121 measured by the NEO Personality Inventory – Revised (NEO-PI-R) often exhibited different trajectories.
122 Framing these results in terms of maturation, the facets of Modesty, Achievement-striving, and
123 Gregariousness did not show adaptive age-graded increases, and Self-Discipline and Activity showed
124 maladaptive decreases. Bleidorn and colleagues (2009) also provided evidence that some NEO-PI-R
125 facets may not develop adaptively in middle adulthood among a twin sample measured over 10 years.
126 This sample displayed adaptive development in most traits, but the facet of Tender-mindedness did not
127 increase over time, and Gregariousness decreased, on average. This general pattern of results, where
128 facets develop differentially and some fail to mature, generalizes to the remaining three studies.
129 Klimstra and colleagues (2018) found no evidence for adaptive increases in Positive Affect, Sociability,
130 and Activity across two college samples, and one sample increased maladaptively in Anxiety throughout
131 college. Soto and John (2012) found no evidence of adaptive increases in Orderliness, Anxiety,
132 Irritability, and Social Confidence in a sample of women across ages 20-60, and participants tended to
133 decrease in Gregariousness as they grew older. Finally, Costello and colleagues (2017) found that

134 Orderliness and Enthusiasm did not increase adaptively with age across the ages 20 to 60 in an online
135 sample. These studies are complemented by three additional investigations into facets of the
136 Multidimensional Personality Questionnaire (MPQ) in young adult samples. Donnellan and colleagues
137 (2007) found maladaptive decreases in the traits of Well-Being, Social Potency, and Social Closeness
138 across ages 18 to 28, Roberts and colleagues (2001) found maladaptive decreases in Social Closeness
139 and no change in Stress Reaction across ages 18 to 26, and Bloninger and colleagues (2008) found
140 evidence for maturation in all healthy traits besides Social Potency across ages 17 to 24.

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

154 **Do Close Others Perceive Maturation Similarly to the Self?**

155 In a review that sowed the seeds for the maturity principle, Hogan and Roberts (2004) argue
156 that one's level of maturity is based equally on their identity as a psychologically well-adjusted person
157 (i.e., their self-reports) and their reputation as a responsible, trustworthy member of the community

158 (i.e., other-reports). Therefore, both self- and other- reports of personality development provide
159 important information about the extent to which someone has matured. However, nearly all evidence
160 brought to bear on the maturity principle to date has come from self-reports.

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

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

176 **Do Personality Traits Co-Mature?**

177 The maturity principle was initially formulated to summarize a population-level trend that
178 occurs across a wide variety of healthy traits. However, little is known about whether these traits tend
179 to develop together within a person. When a person experiences adaptive change in one personality
180 trait, do they tend to experience adaptive change in others as well? If traits tend to co-mature, it would
181 indicate that maturation can be conceptualized as a broad, general phenomenon that affects trait

182 development similarly across people (Soto & John, 2012). Such a finding would allow researchers to
183 search for broadly acting mechanisms underlying this process, such as change in serotonergic
184 functioning (Klimstra et al., 2013; Wright et al., 2019) or normative life events (Bleidorn et al., 2013;
185 Lodi-Smith & Roberts, 2007). Furthermore, strong co-maturation would indicate that adaptive trait
186 development could be usefully summarized and studied at this broad level. On the other hand, finding
187 that adaptive traits do not tend to co-develop would indicate that maturation likely involves many trait-
188 specific processes, where people experience adaptive change in different traits at different rates. Such a
189 finding would suggest that adaptive trait development is mostly driven by many narrowly-acting
190 mechanisms (e.g., a certain mechanism may affect some facets of Conscientiousness but not others)
191 that may have differential effects across people (e.g., a certain mechanism may make one person more
192 Conscientious, but make another person more Agreeable). Thus, understanding co-maturation is both
193 descriptively and theoretically useful.

194 To date, there has been little research into correlated change between personality traits in
195 adulthood, limiting our knowledge of co-maturation (Allemand & Martin, 2016). Most researchers
196 examining co-maturation have done so at the level of the Big Five, and two studies have provided
197 evidence for co-maturation. Klimstra and colleagues (2013) studied a large, representative sample of
198 Germans and found stronger correlated change among Agreeableness, Conscientiousness, and
199 Neuroticism (mean $r \sim |.30|$) than among other Big Five domains across a 4-year period, a finding that
200 was robust across age groups. Furthermore, Lütcke and colleagues (2011) found that Agreeableness,
201 Conscientiousness, Neuroticism, and Extraversion co-developed across college (mean $r = |.33|$),
202 whereas Openness to Experience developed independently of these traits. This finding also provides
203 some evidence for co-maturation, but because Extraversion consists of healthy (e.g. Positive Affect) and
204 neutral (Excitement-Seeking) facets, it is unclear whether co-development between Extraversion and
205 other traits was attributable to co-maturation. These studies are matched by two others that show little

206 evidence for co-maturation. Allemand and colleagues (2008) studied a sample of older German adults
207 measured over a 12-year period and found strong correlated change among all traits besides
208 Neuroticism (mean $r = |.54|$), which does not suggest co-maturation but instead a decoupling of
209 development between healthy and unhealthy traits. Similarly, Möttus and colleagues (2012) found that
210 co-development among Agreeableness, Conscientiousness, and Neuroticism was small in magnitude
211 (mean $r = |.17|$) and no larger than correlated change among other Big Five traits from ages 81 to 89.
212 Finally, Soto and John (2012) found that facets tended to co-develop within domains, but not across
213 domains, in a small sample of US women followed across early and middle adulthood, which also
214 provides some evidence against co-maturation (they did not explicitly estimate correlated change
215 among maturity-related facets).

216 Across these studies, there is some evidence for correlated maturation at the level of the Big
217 Five, which may suggest a shared mechanism underlying at least some adaptive age-graded trait
218 development. To improve our understanding of this phenomenon, more research is needed that
219 systematically quantifies co-maturation across two forms of evidence: convergent (to what extent are
220 changes in one maturity-relevant trait correlated with changes in other maturity-relevant traits?) and
221 discriminant (do maturity-relevant traits co-develop more strongly than traits not relevant to maturity?).
222 We address these questions using a large set of facets that are differentially relevant to maturity,
223 allowing us to test co-maturation with high fidelity. Additionally, close others may have complementary
224 or contrasting positions on co-maturation. We compare co-maturation across the perspectives of the
225 self and close others to provide information about how maturation is perceived in the important context
226 of close relationships.

227 **The Present Study**

228 In this study, we tested three sets of hypotheses using data from a longitudinal study of
229 Pennsylvania-residing adults. First, we examined whether most personality traits would develop

230 adaptively across ages 30-70 (the age range of our sample). We categorized facets as healthy, unhealthy,
231 or neutral and described development in domains and facets by estimating a series of Multilevel
232 Structural Equation Models (MSEMs). We hypothesized that most healthy facets would increase and
233 most unhealthy facets would decrease, and we identified exceptions to this pattern, allowing us to
234 evaluate how the maturity principle applies at the facet level. Second, we tested whether trajectories of
235 personality development reported by close others would be less positive than trajectories of self-
236 reported personality development. For each trait assessed from both self- and other- perspectives, we
237 estimated development over the study period using latent difference score models and conducted
238 paired t-tests to examine whether close others reported a different rate of change over the study period
239 than the self. Third, we explored the extent to which personality traits co-matured. To do this, we
240 correlated trajectories of trait change over the study period, and we compared correlated change in
241 (un)healthy traits with correlated change between (un)healthy traits and neutral traits. Finally, we
242 synthesized these results with the broader body of research on personality development across
243 adulthood, allowing us to expand and refine the maturity principle of personality development.

244 **Methods**

245 This research was approved by the University of Pittsburgh Institutional Review Board
246 (STUDY19040238). The pre-registration for this study is available at <https://osf.io/fxrbp/> First author T.S.
247 pre-registered the study completely blind to all study data besides sample sizes and ratings of how well
248 close others knew participants. Authors C.J.H and W.B. were completely blind to all data. Authors
249 A.G.C.W. and S.B.M. had used personality data from the first wave of data in previous research (Wright
250 et al., 2020) but were blind to all personality data from the second wave. There were no deviations from
251 the pre-registration, and analyses that were not pre-registered were marked as exploratory.

252 **Sample**

253 Data for this study come from the two-wave University of Pittsburgh Adult Health and Behavior
254 (AHAB) project, a registry of behavioral and biological measurements for the study of individual
255 differences (Manuck et al., 2010). In Wave 1, N = 1,785 participants 30-54 years of age (843 males, 942
256 females, 17% non-white) were recruited via mass-mail solicitation from communities of Southwestern
257 Pennsylvania in two periods of data collection (2001-2005; 2008-2011). At enrollment, participants were
258 in good general health, without reported history of atherosclerotic cardiovascular disease, chronic
259 kidney or liver disease, recent treatment for cancer, major neurological disorders, or psychotic illness.
260 Informed consent was obtained in accordance with approved protocol guidelines at the University of
261 Pittsburgh Institutional Review Board. Participants completed personality questionnaires across multiple
262 lab visits. In this study we include Wave 2 data from N = 401 participants 40-70 years of age (173 males,
263 228 females, 16% non-white) who participated between June, 2017 and the date of pre-registration, in
264 February 2020. Due to the COVID-19 global pandemic, AHAB participant recruitment and data accrual
265 were temporarily suspended in March of 2020.

266 **Measures**

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

270 **NEO Personality Inventory - Revised**

271 At both waves, AHAB participants completed the 240-item self-report NEO Personality Inventory
272 – Revised (NEO-PI-R; Costa & McCrae, 1992), which measures the Big Five personality trait domains
273 (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience) as well as
274 six facets underlying each domain (See Table 1. Wave 1 N = 1,771, Wave 2 N = 393). For each item of the
275 NEO-PI-R, participants rated the extent to which a characteristic applies to them (e.g., “I am someone
276 who is outgoing”) on a Likert scale from “Disagree Strongly” (1) to “Agree Strongly” (5), and we

277 computed scores for each domain and facet by averaging across items. Across both waves, internal
278 consistencies for NEO-PI-R scales were high ($\omega_t = .71-.94$, $\alpha = .62-.93$; see Table S1 in the Online
279 Supplementary Materials for complete descriptive information, including Means and SDs).

280 **Multidimensional Personality Questionnaire**

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

288 **Cook-Medley Hostility Scale**

289 Finally, participants completed the 50-item Cook-Medley Hostility Scale (CMHS; Barefoot et al.,
290 1989), which measures five narrow maladaptive traits (which we refer to as facets; Wave 1 $N = 1777$,
291 Wave 2 $N = 393$). For each CMHS item, participants read a statement (e.g. “No one cares much what
292 happens to you”) and decided whether it was True (1) or False (0) as it applied to them. We computed
293 scores for each facet by averaging across items. Across waves, internal consistencies for CHMS facets
294 were acceptable ($\omega_t = .52-.82$, $\alpha = .34-.79$), but were low for Social Avoidance ($\omega_t = .54$ and $.20$, $\alpha = .45$
295 and $-.06$). Despite its low internal consistency, research has found that this scale is meaningfully
296 associated with psychiatric outcomes and spousal ratings of personality (Han et al., 1995), so we retain it
297 in the present analyses.

298 **NEO-Five Factor Inventory**

299 At both waves, up to two close others also rated the participant using the NEO Five-Factor
300 Inventory (NEO-FFI), which measures a 60-item subset of the NEO-PI-R (Wave 1 $N = 1,672$, Wave 2 $N =$

301 375). Most participants (90% at wave 1 and 93% at wave 2) were rated by two close others (A and B).
302 Close others were chosen by the participant, and they included spouses/partners (30% at wave 1 and
303 wave 2), parents (9%/3%), siblings (12%/11%), other close relatives (12%/21%), close friends (31% at
304 both waves), or other (6%/4%). Unfortunately, as close others were not assigned IDs, we could not track
305 whether close others differed across waves. However, when close others were asked how well they
306 knew the person they were rating (from 1 – *Not at all* to 5- *Know very well*), 98% of close other As and
307 92% of close other Bs reported knowing the person they were rating either “well” or “very well.”
308 Furthermore, self-other correlations between perspectives were similar in magnitude to what has been
309 reported in past research (Table S2; Oltmanns & Oltmanns, 2019). As such, although close others may
310 have differed across waves, they had substantial knowledge about the participants they were rating. The
311 NEO-FFI can be used to measure 14 facets underlying the Big Five (Saucier, 1998); we computed scores
312 for these facets by averaging across items. Across waves and close others, internal consistency for NEO
313 FFI scales was $> .50$ ($\omega_t = .55-.91$, $\alpha = .50-.88$), with the exception of the Openness facet of
314 unconventionality (from the perspective of close other A, $\omega_t = .75$ and $.34$, $\alpha = .62$ and $.20$). Past
315 research has found that this unconventionality facet is less internally consistent than other NEO-FFI
316 facets but is nonetheless a valid construct, as it demonstrates similar temporal stability to other
317 personality facets and reliably predicts outcomes (Klimstra et al., 2017; Schwaba et al., 2019).

318 **Identifying (un)healthy personality facets**

319 We next classified personality facets as healthy, unhealthy, or neutral. We classified NEO-PI-R
320 facet scales using ratings collected by Bleidorn and colleagues (2020), who asked 137 experts on
321 personality psychology to rate the psychologically healthy person in terms of the 30 NEO-PI-R facets.
322 This placed each facet on a gradation of psychological adaptiveness that we used to classify each NEO-
323 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)
324 according to pre-registered standards. Although classifications necessarily simplify this gradation, they

325 are necessary for our analyses that require grouping healthy, unhealthy, and neutral facets. We
 326 classified NEO-FFI facets by matching each facet to the most relevant facet(s) of the NEO-PI-R, as all
 327 NEO-FFI items were included in the NEO-PI-R. We classified all CMHS facets as unhealthy, as these are
 328 indicators of personality dysfunction. Finally, we classified MPQ facets as healthy or unhealthy using
 329 correlations with the MPQ well-being factor found in Rushton and Irwing (2008). We classified facets
 330 that correlated $> .25$ with well-being as healthy, and we classified facets that correlated $< -.25$ with well-
 331 being as unhealthy. However, this led to the classification of aggression as a neutral trait, which we
 332 believe is incorrect. We therefore classified aggression as an unhealthy personality trait (Bleidorn et al.,
 333 2020). We present these classifications in Table 1.

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
Harm avoidance		neutral
Traditionalism		neutral
Absorption		neutral
CMHS	N/A	
Cynicism		-
Hostile affect		-
Aggressive responding		-
Hostile attribution		-

Social avoidance

-

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

339

Analyses

341 We estimated structural equation models in R (R core team, 2016) using the MplusAutomation
342 package (Hallquist & Riley, 2018) and Mplus version 8.4 (Muthén & Muthén, 2008-2012). Other analyses
343 were conducted using the packages psych (Revelle, 2008) and lavaan (Rosseel, 2012). Analysis scripts are
344 available at <https://osf.io/xmfvw/> In most models, missing data were accounted for using Full
345 Information Maximum Likelihood (FIML) estimation. However, for analyses in which we saved slope
346 factor scores, we only included participants who provided data at both waves. All personality trait scores
347 were grand-mean standardized to facilitate interpretation of effect sizes across time points and raters.
348 We used Bayesian Information Criterion to compare fits between non-nested models (Aho et al., 2014).
349 We interpreted p -values of .01 or lower as significant in order to balance type-I and type-II error rates
350 given the number of significance tests performed.

351

Results**Measurement Invariance**

353 To establish that scores from scales used in this study were comparable across assessment
354 waves, we estimated measurement invariance following the method proposed in Vandenberg and Lance
355 (2000). To do this, we decomposed each Big Five scale into its constituent facets, and each facet scale
356 into its constituent items. We then estimated Big Five domain/facet scores at each wave as the common
357 variance between the facets/items, creating a configural model. We compared the fit of this model

358 against the fit of a nested model in which factor loadings were constrained to be equal across waves.
359 This model tested weak measurement invariance, which is a necessary condition to compare
360 covariances between variables across waves. Then, we compared the fit of the weak invariance model
361 against a nested model where facet/item intercepts were also constrained to be equal across waves.
362 This model tested strong invariance, which is necessary to meaningfully compare the mean levels of
363 domain and facet score across waves. In cases where imposing these constraints led to substantial
364 decreases in model fit (ΔCFI or $\Delta\text{RMSEA} \geq .010$; Cheung & Rensvold, 2002), we sought to establish partial
365 measurement invariance by relaxing factor loading or intercept constraints until these cutoffs were met.
366 Finally, we used the MACS effect size derived by Nye and Drasgow (2011) to quantify the extent to
367 which noninvariance biased mean test scores at wave 2.

368 For most domain and facet scales, we were able to establish strong or partial invariance and
369 there was little bias resulting from noninvariance across waves. Specifically, three of five Big Five self-
370 report scales and six of ten Big Five other-report scales met cutoffs for strong invariance, and we were
371 able to establish partial measurement invariance for the remaining scales by relaxing one or two cross-
372 wave intercept constraints (Tables S3-S7). On average, there was little bias in wave 2 means caused by
373 differential scale functioning ($d = |.15|$). Regarding the 30 self-reported NEO-PI-R facets, 23 met cutoffs
374 for strong invariance, and we were able to establish partial invariance for the remaining seven (Tables
375 S3-S7). Again, there was little bias in means (mean $d = |.13|$). Of the 11 MPQ facets, one (Social
376 Closeness) met cutoffs for strong invariance, and we were able to establish partial invariance for the
377 remaining ten (Table S8), with little mean bias (mean $d = |.24|$). One CMHS facet (Cynicism) met the
378 cutoff for strong invariance, and we established partial invariance for the remaining four facets with
379 little bias in means (mean $d = |.06|$; Table S9). Finally, for the other-reported NEO-FFI traits, three facets
380 (Self-reproach, Activity, and Goal-striving) met traditional cutoffs for strong invariance across waves, and
381 we were able to establish partial invariance for most other scales. However, in some cases, increase in

382 RMSEA misfit was still greater than the .01 threshold proposed by Cheung and Rensvold (2002).
383 According to the MACS, the mean bias in NEO-FFI facet means at wave 2 compared to wave 1 was $d =$
384 $|.35|$, representing a medium effect, although these biases differed across facets and were much larger
385 for non-antagonism ($d = 1.25$) than any other facet (Table S10).

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

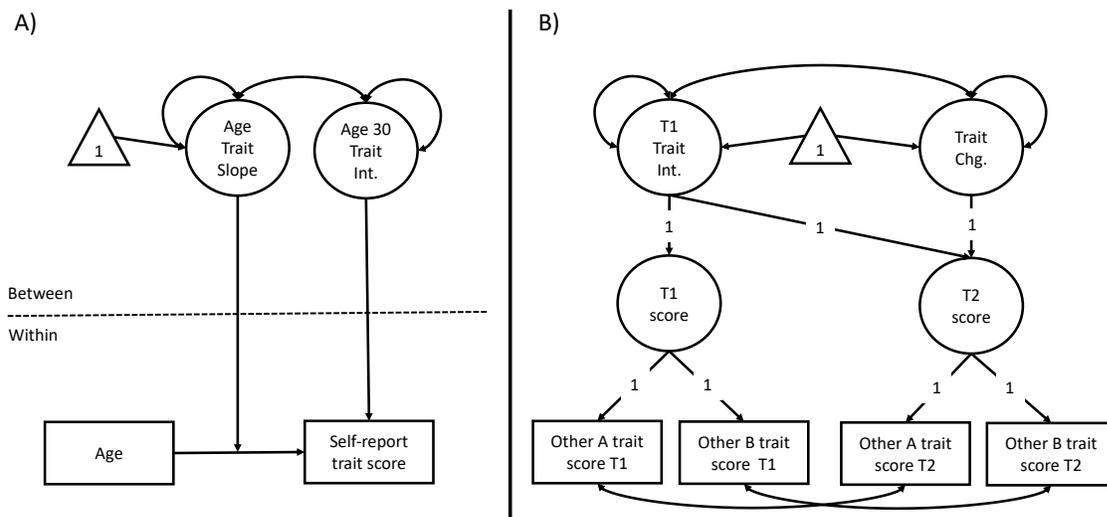
390 **Examining Age-graded Maturation**

391 To examine whether each trait matured across ages 30 to 70, we estimated a series of
392 Multilevel Structural Equation Models (MSEMs; Sadikaj et al., 2020 as depicted in panel A of Figure 1.
393 These models integrate within-person personality changes and between-person age differences in
394 personality in order to estimate an age-graded trajectory using data from all participants. Time was
395 coded as age and centered on age 30. The within-person component of the model estimated the rate of
396 change per year for each participant's personality trait (i.e., traits were regressed on age). Because we
397 estimated these models using FIML, participants who contributed trait information at either two or only
398 one age were included in the model. The between-person component of the model aggregated each
399 participant's age-related personality trait changes into a broader trajectory spanning ages 30 to 70, the
400 age range of our sample. Specifically, in the between-person component of the model we estimated
401 four parameters: an intercept variance (which describes individual differences in personality trait scores
402 at age 30, the age at which time was centered), a linear slope mean and variance (which describes the
403 average yearly age-related change in each trait and individual differences in change, respectively), and a
404 covariance between the intercept and slope (which describes the extent to which individual differences
405 in age 30 scores are associated with age-related change). The intercept mean was fixed to 0 in order to

406 identify the model. Participants who contributed only one wave of data informed the estimate of the
 407 means and the variance of the intercept, whereas participants who contributed two waves of data also
 408 informed the variance of the slope and covariance in this model. To test nonlinear effects, we also
 409 estimated a second series of models that included a quadratic slope factor, but each of these models fit
 410 worse to the data according to BIC. As such, we compare linear development across traits. Mplus syntax
 411 for these models is available at <https://osf.io/xrzsh/>

412

413 Figure 1: Path diagrams for trait change



414

415 Note: Panel A depicts the multilevel Structural Equation model for trait change across ages 30 to 70,

416 which we used to address H1. In this model, the mean Age 30 trait intercept was constrained to zero.

417 Panel B depicts the latent difference score model for other-reported trait change across the two study

418 waves, which we used to address H2 and H3. A similar model was used to estimate self-reported trait

419 change across the two study waves. Int. = Intercept. Chg. = Change.

420

421 Results indicated that most traits developed in an adaptive direction across early and middle

422 adulthood, supporting our hypothesis that the maturity principle would generally hold at the facet level

423 (Figure 1; see Table S11 for complete results). Yearly 99% percent Confidence Intervals for each trait
424 slope ranged from +/- .005 to +/- .008, which means that traits that changed less than 0.18 standard
425 deviations across ages 30-70 did not change significantly at $p < .01$. At the domain level, Agreeableness
426 increased and Neuroticism decreased, consistent with the maturity principle, although
427 Conscientiousness remained stable. At the facet level, eight of 14 facets classified as unhealthy
428 decreased significantly, and the remaining six did not show significant changes over the study period. Six
429 of 18 facets classified as healthy increased significantly, and nine did not show significant changes.
430 Importantly, though, some traits showed maladaptive developmental trajectories. Three healthy facets
431 (Activity, Social Potency, and Openness to Feelings) declined significantly, on average, over the study
432 period. This provides support for our hypothesis that development in a small number of facets would
433 deviate from the maturity principle.

434 We explored whether the extent to which a facet changed with age was correlated with its
435 adaptiveness rating. These analyses allowed us to examine, even among traits classified as (un)healthy,
436 if the ones more relevant to maturity changed more with age. Of the 30 NEO-PI-R facets, those that
437 were rated as healthier (according to Table 1) underwent greater age-graded increases ($r = .43, p = .018,$
438 $95\% \text{ CI } [.07, .68]$). These results provided tentative evidence that trait changes in adulthood were
439 related to maturation.

440 Although the maturity principle, as articulated in past work, posits continual adaptive
441 development with age (e.g., Roberts & Nickel, 2017), it is possible that some traits did not show
442 significant age-graded changes because they were already at or near ideal “mature” levels, on average,
443 by age 30. We explored whether this was the case by comparing model-implied average trait scores at
444 age 30 (for the traits that did not show significant maturation) to point estimates for healthy levels of
445 NEO-PI-R facets presented in Table 1. This comparison was not pre-registered. We note that these point
446 estimates for the healthy personality were derived using a single question for each facet, rather than

447 filling out the entire NEO-PI-R questionnaire, and that these estimates did not take into account that the
448 healthy personality may change with age (Bleidorn et al., 2020). As such, we treat results of these
449 exploratory analyses as tentative.

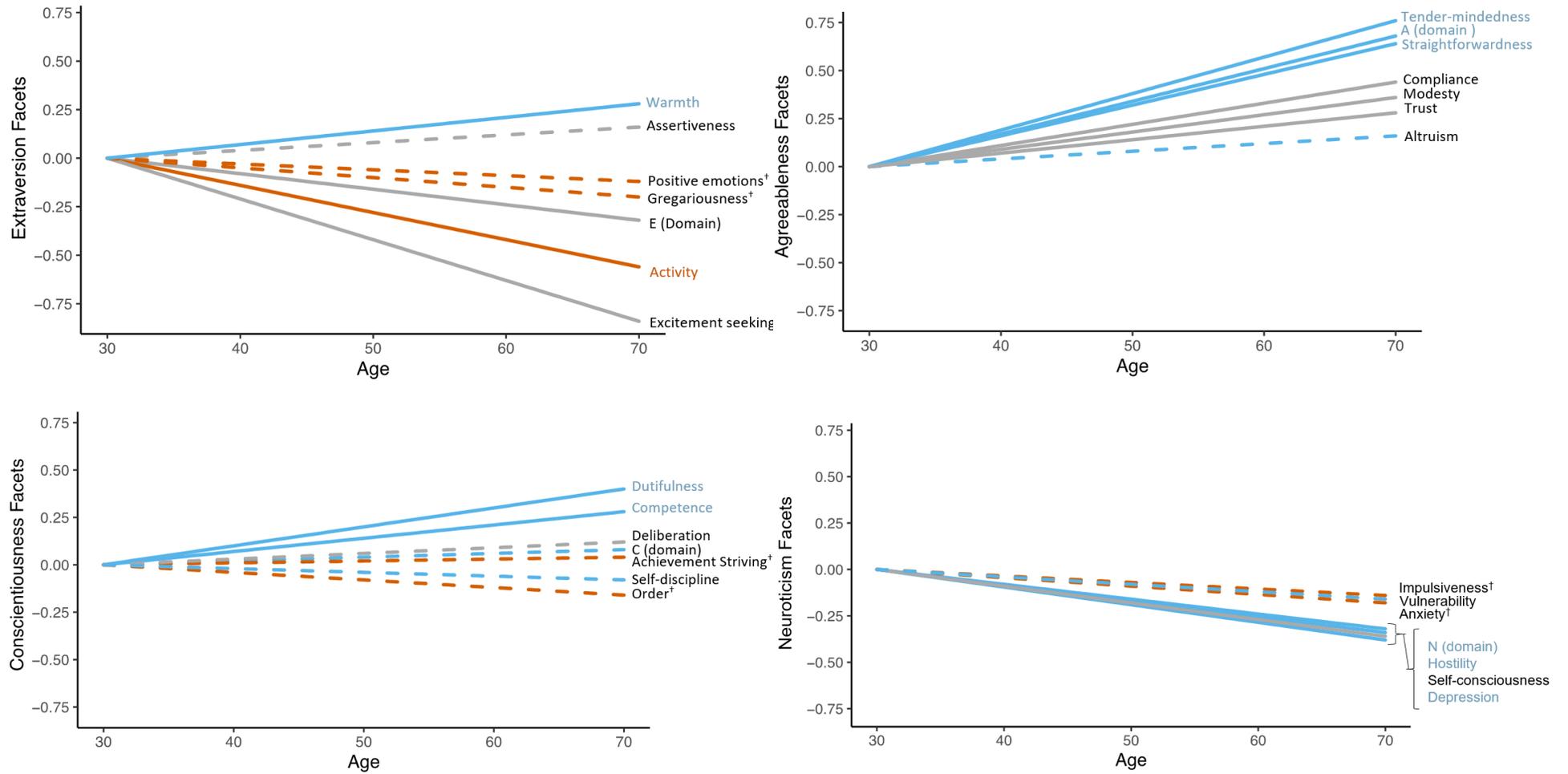
450 These comparisons indicated that three of nine NEO-PI-R facets that did not change with age
451 were already near ideal “mature” levels by age 30 (Table S12). Specifically, the unhealthy facet of
452 Vulnerability was near its ideal level (2.21) by age 30, as its 95% confidence interval contained this value
453 ($M_{\text{age}30} = 2.16$, 95% CI = [2.08, 2.23]), and the healthy facet of Self-Discipline was even higher than its
454 ideal level (3.59) by age 30 ($M_{\text{age}30} = 3.67$, 95% CI = [3.59, 3.75]), as was Altruism (3.75; $M_{\text{age}30} = 4.03$,
455 95% CI = [3.97, 4.06]). Conversely, the 95% confidence intervals for the unhealthy facets of
456 Impulsiveness and Anxiety remained above the point estimates for their healthy ideal levels at both age
457 30 and 70, and the healthy facets of Positive Emotions, Gregariousness, Order, and Achievement Striving
458 remained below healthy ideal levels at both 30 and 70. This suggests that, in some cases, facets may
459 have been sufficiently mature by age 30, which may explain why they did not show continued change
460 across ages 30 to 70 in our sample.

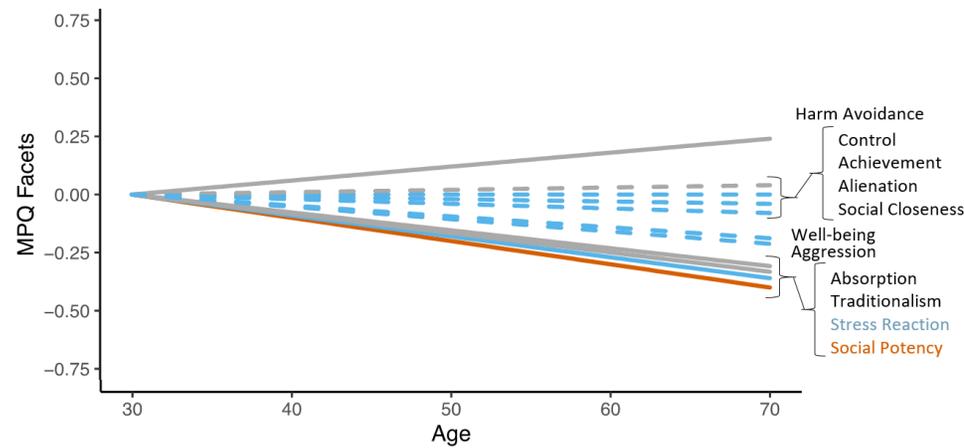
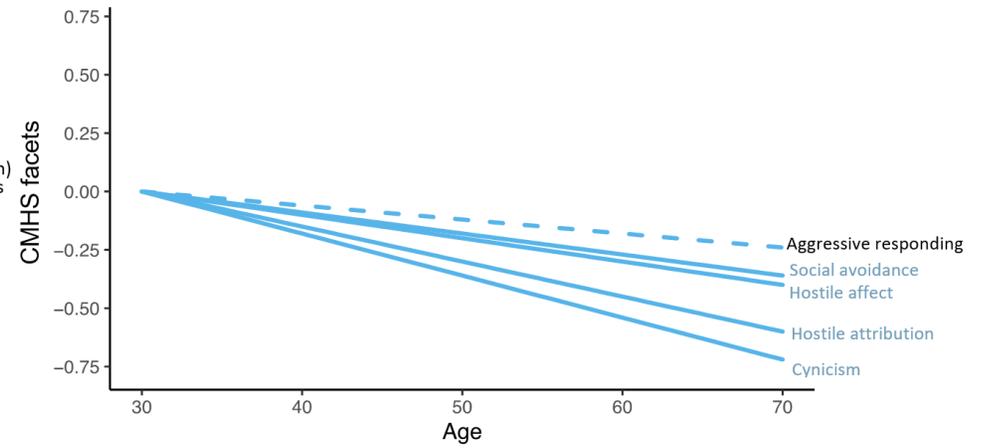
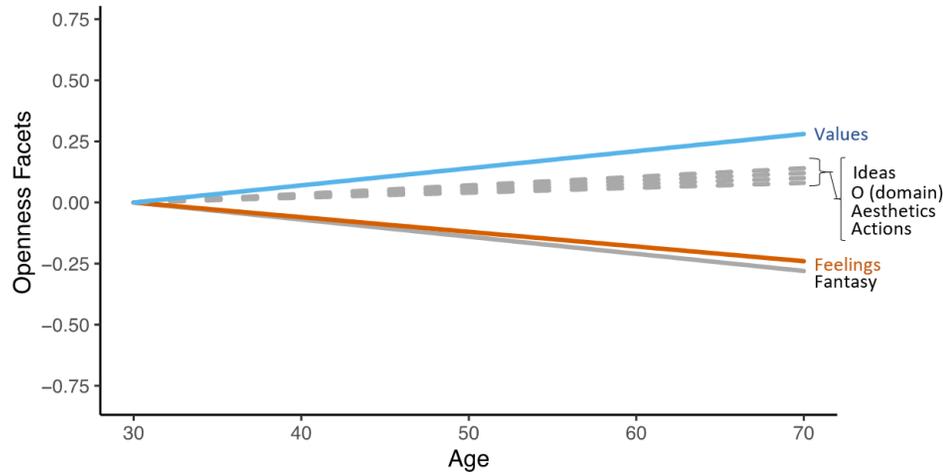
461 Overall, then, of 32 facets classified as (un)healthy, 23 developed in adaptive ways consistent
462 with the maturity principle, 3 developed maladaptively, and 6 others were not at mature levels and did
463 not show significant change with age. Some additional takeaways from these analyses were that, for
464 each Big Five domain beside Neuroticism, there was a visible fanning-out effect such that facets
465 underlying the same domain showed distinctly different age-graded trajectories (Figure 1). Furthermore,
466 for each trait, we found significant individual differences in change (all $ps < .001$), indicating that
467 adaptive development throughout early and middle adulthood was a typical, but not ubiquitous,
468 phenomenon.

469 For each trait, we also estimated linear regressions to describe age-graded development across
470 all participants as well as in three age cohorts: participants who began the study ages 30-39 years, 40-49

471 years, and 50+ years. Results of these regressions, which we present in Figures S1 and S2, recapitulate
472 the findings from the mSEMs. For nearly all traits, each age group displayed similar patterns of
473 maturation to one another and the overall age-graded trend. However, for a few traits, cohort
474 trajectories differed from the overall age-graded trajectory. Specifically, for the facets of alienation and
475 achievement, we found a relatively flat trajectory from ages 30-70 but increases within each of the three
476 age cohorts. This finding illustrates potential pitfalls associated with estimating a single trajectory
477 composed of data from multiple age cohorts, as these cohorts may exhibit differential developmental
478 trends.

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)

450 Comparing Self- and Other- Perspectives on Maturation

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

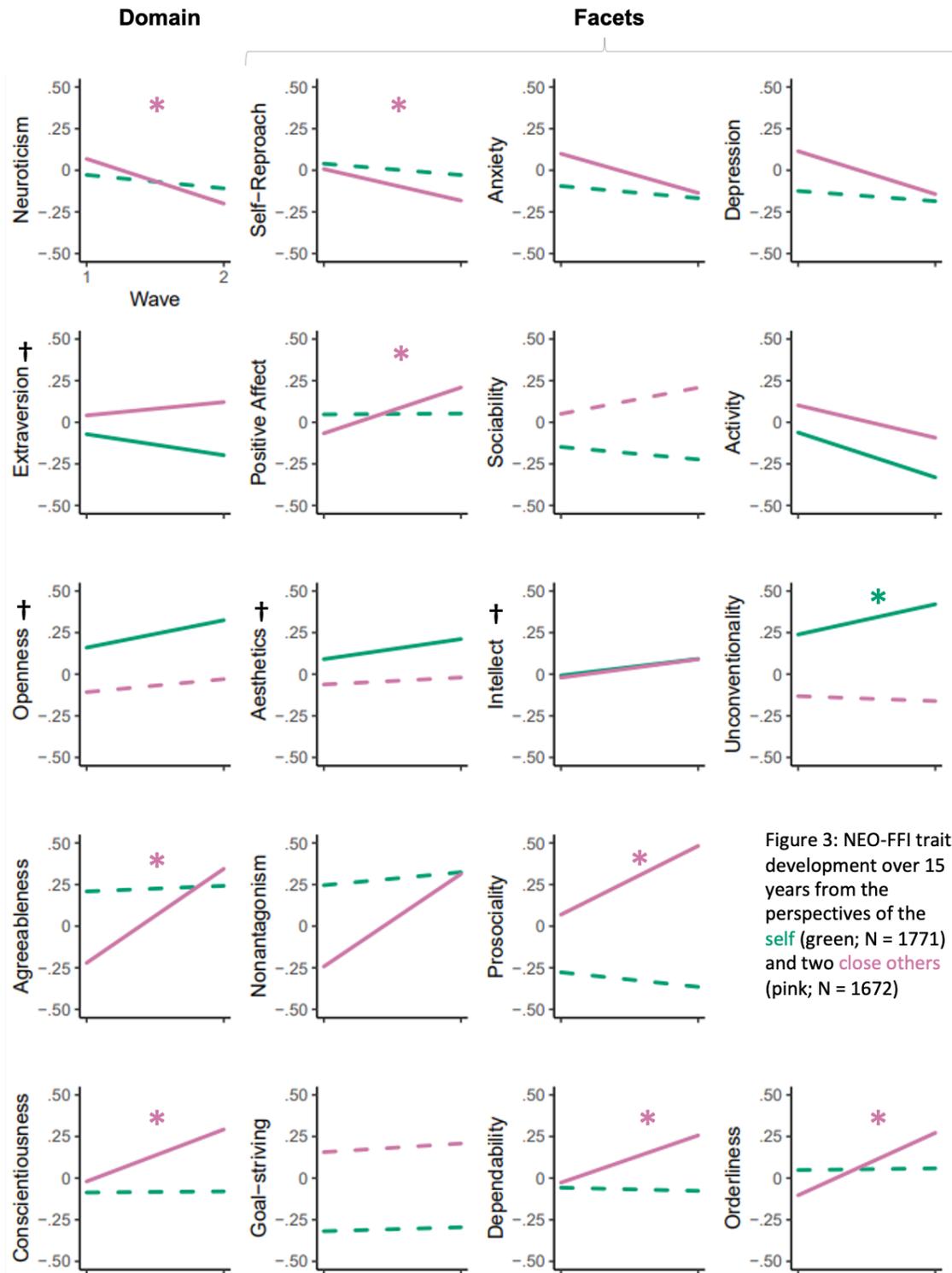
462 Overall, other-reported models fit acceptably to the data (CFIs $\geq .926$ and RMSEAs $\leq .093$; Table
463 S13). Fit statistics were unavailable for self-rated models because self-rated latent difference score
464 models were fully saturated with 0 *df*. We visualize Big Five development from both perspectives in
465 Figure 2. Across waves, the 99% Confidence Intervals for self-reported trait change ranged from +/- .08
466 to +/- .17, and the 99% Confidence Intervals for other-reported trait change ranged from +/- .03 to +/-
467 .10. *p*-values and 99% CIs for each self-other comparison are reported in Table S14.

468 When comparing self-rated versus other-rated maturation at the domain level, close others
469 reported steeper increases in Agreeableness and Conscientiousness, and steeper decreases in
470 Neuroticism, than the self (*ps* < .001). At the facet level, others perceived significantly greater
471 maturation in eight of 12 facets classified as (un)healthy, whereas the self reported greater maturation
472 in a single healthy facet (Unconventionality). In the two facets that were classified as neutral (Aesthetics
473 and Intellect), developmental estimates did not differ between self and other perspectives. We note two

474 important caveats: First, for the facets of Non-antagonism, Anxiety, and Depression, others reported
475 greater maturation over time, but self-reports indicated higher maturity levels at baseline, so self- and
476 other- reported trajectories converged by wave 2. Second, because measurement invariance tests
477 indicated that wave 2 other-reports for Non-antagonism were upwardly biased, we hesitate to draw
478 strong conclusions from comparisons involving this facet.

479 Taking these caveats into account, significant others reported greater maturation than the self
480 in Agreeableness, Conscientiousness, Neuroticism, and 5 of 11 facets, and the self reported greater
481 maturation in only one facet (Unconventionality), providing strong evidence against our hypothesis that
482 close others would perceive less maturation than the self over the study period.

483



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).

484 Examining Co-maturation

485 In our final set of analyses, we explored the extent to which different traits matured together
486 within a person. To do this, we saved the slope factor scores for each domain and facet trait derived
487 from the self-report latent difference score models described above (see Figure S1 for a path diagram)
488 and estimated the correlations in slope factors among all traits. That is, we estimated the between-
489 person covariance in within-person trait change. A full co-developmental correlation matrix is available
490 at <https://osf.io/w56ar/>

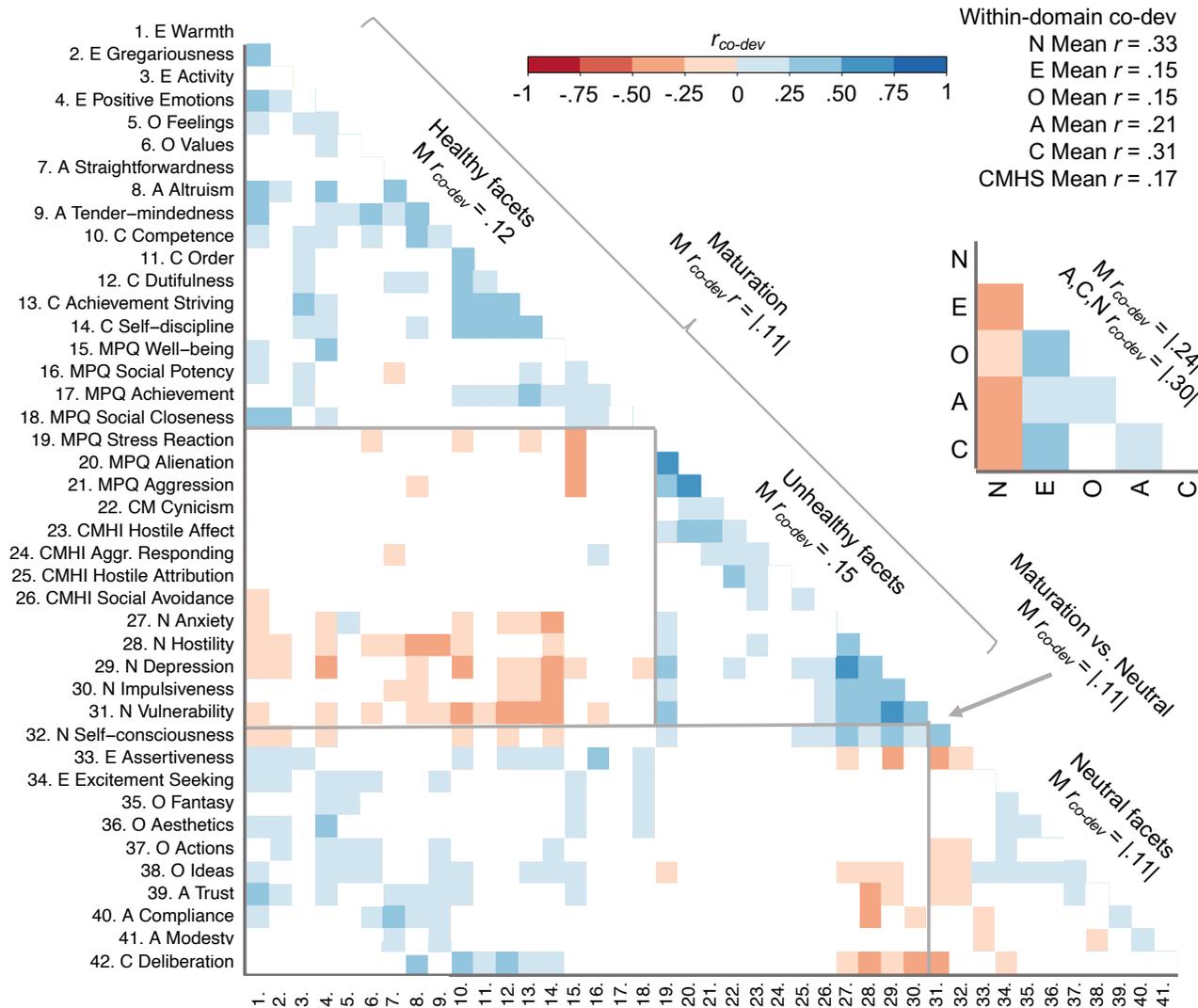
491 At the domain level, results indicated that co-development among Neuroticism, Agreeableness,
492 and Conscientiousness was strong, but not stronger than co-development among the other Big Five
493 domains (See Figure 3). Neuroticism, in particular, co-developed strongly with each of the other Big Five
494 domains. Thus, people who changed in one Big Five domain tended to change in other domains as well,
495 but co-maturation was not discriminable from general co-development.

496 Results of facet-level analyses were more nuanced (Figure 3). Personality facets matured largely
497 independently of one another: the average correlated change among healthy and unhealthy facets was
498 $r_{co-dev} = .11$. Co-development was similar in magnitude when examining co-maturation among only
499 healthy facets or among only unhealthy facets. Furthermore, co-development among healthy and
500 unhealthy facets was no stronger, on average, than co-development between (un)healthy facets and
501 neutral facets, or co-development among just neutral facets, providing no evidence for discriminability
502 between co-maturation and general co-development across facets.

503 Finally, we explored co-developmental patterns among the six NEO-PI-R facets underlying each
504 of the Big Five domains, regardless of their adaptivity ratings. On average, the facets of each domain co-
505 developed more strongly with each other than with facets of other domains (Figure 3). Additionally,
506 there was relatively strong co-development among the 18 total facets underlying Agreeableness,
507 Conscientiousness, and Neuroticism (Mean $r_{change} = .30$) compared to other facet clusters.

508 Overall, these results indicated that people who changed in one domain or facet were
509 somewhat more likely to change in other facets, especially if those other facets were categorized under
510 the same Big Five trait. However, co-maturation was not stronger than general co-development.
511 .

Figure 4. Co-maturation among personality facets (N = 393)



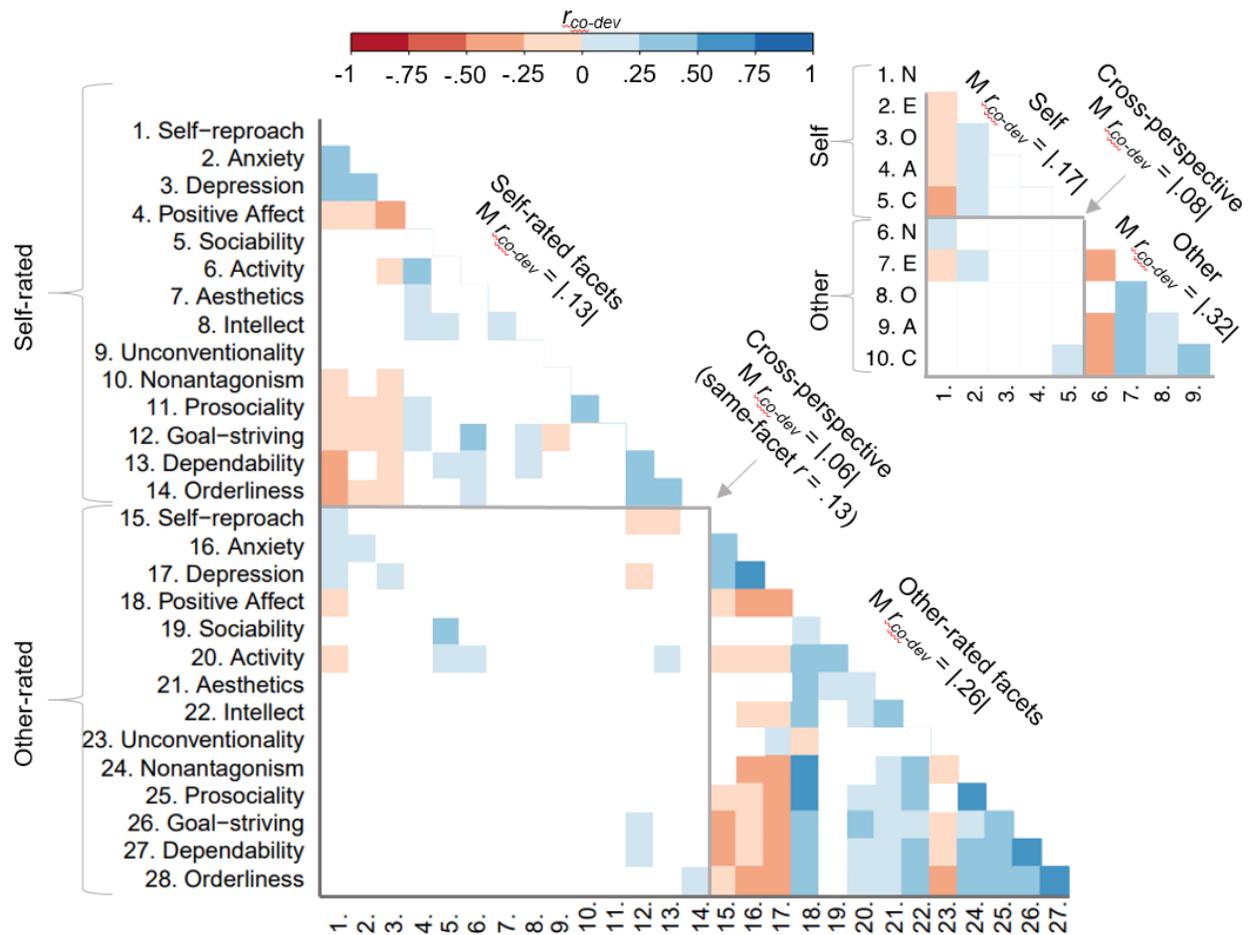
Note. E = Extraversion. O = Openness to Experience. A = Agreeableness. C = Conscientiousness. N = Neuroticism. MPQ = Multidimensional Personality Questionnaire. CMHS = Cook-Medley Hostility Scale. Facets were classified as healthy, unhealthy, or neutral according to Table 1. Correlated change that was 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.

504

505 Finally, we examined co-maturation using data from self and other reports of the NEO-FFI traits
506 using the same methodology as described above. Results of these models indicated that correlated
507 change among the Big Five was stronger in other-report data than in self-report data (Figure 4).
508 Furthermore, there was significant correlated change across self- and other- reports for the domains of
509 Neuroticism ($r = .21$), Extraversion ($r = .23$), and Conscientiousness ($r = .18$), providing convergent
510 evidence for the validity of domain change over the study period.

511 This pattern of results largely replicated at the facet level. Facets co-matured twice as strongly in
512 other-reported data compared to self-report data, indicating that others perceived much tighter co-
513 maturation than the self (Figure 4). Indeed, the average co-development among other-rated facets was r
514 $= |.26|$, whereas the co-development among self-rated facets was $|r = .13|$. However, self- and other-
515 reports only somewhat agreed on facet-level change, as cross-rater same-trait co-developmental
516 estimates were significant for only seven of 14 facets.

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).

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Discussion

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In this study, we tested three pre-registered 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 co-maturation 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.

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Age-graded Personality Maturation

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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, 23 developed adaptively. 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 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 towards maturation.

539

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Though most traits developed adaptively across adulthood, nine (un)healthy traits did not show significant changes with age. Did these traits fail to mature? Follow-up exploratory analyses suggested

541 that these traits may have already been at healthy levels by age 30, when the youngest participants
542 began the study, which indicates that these traits may have undergone sufficient maturation earlier in
543 the lifespan. However, it is unclear what the ideal mature level of a trait is. Research has shown that
544 highly Conscientious, Agreeable, and Emotionally Stable people generally still desire continued increases
545 in these traits (Hudson et al., 2020), and that associations between Conscientiousness and positive
546 outcomes hold even among high scorers (Nickel et al., 2019), which suggests that there may be no limit
547 to adaptive trait change. Identifying whether a lack of mean-level change in healthy traits is maladaptive
548 can be addressed more precisely in future research that measures the entire maturation process from
549 adolescence into later life and links trajectories of maturation to life outcomes.

550 In addition, three (un)healthy facets showed maladaptive age-graded decreases: Openness to
551 Feelings, Social Potency, and Activity each declined, on average, across the ages of 30 to 70. This result is
552 partly consistent with previous studies on facet-level personality development in adulthood, which also
553 reported decreases in traits related to social activity, like Gregariousness and Activity (Bleidorn et al.,
554 2009; Soto & John, 2012; Terracciano et al., 2005). However, none of these studies found age-graded
555 decreases in facets of Openness. So, do these findings refute the maturity principle? The answer here is
556 not straightforward. Our ratings of adaptiveness were derived from Bleidorn and colleagues (2020), who
557 measured adaptiveness without respect to age. Whether a trait is relevant to healthy functioning likely
558 changes across the lifespan. As people age and experience major life events such as parenthood, their
559 social networks tend to decrease in size and become more familial (Wrzus et al., 2013) and they place
560 less importance on social goals (Atherton et al., 2020). As such, age-graded declines in Activity and Social
561 Potency may reflect changes in social priorities towards family and away from meeting new people,
562 rather than maladaptive development (Roberts et al., 2006).

563 Regarding the trait of Openness to Feelings, which measures a person's tendency to value and
564 access complex, varied emotions (Terracciano et al., 2003), age-graded declines are likely maladaptive,

565 but because no other research has found age-graded decreases in this trait, and highly related measures
566 of emotional complexity often increase with age (Ready et al., 2012), we hesitate to draw strong
567 conclusions from this result. Absent replicable evidence of maladaptive change in traits that are relevant
568 to healthy functioning at all points in the lifespan, such as Anxiety and Cooperativeness, we do not think
569 that these findings invalidate the maturity principle. Rather, they add nuance to our understanding of
570 maturation as a process of continual adaptation to developmental challenges that change with age
571 (Erikson, 1959; Loevinger, 1976).

572 As a final point, some of the facets that changed the most with age in this study were not
573 especially relevant to maturity, such as Openness to Fantasy and Excitement Seeking. These two facets
574 also showed some of the greatest age-graded decreases in past research (Bleidorn et al., 2009;
575 Terracciano et al., 2005). Describing development in traits like these may require companion principles
576 to the maturity principle of lifespan development. These principles can expand beyond maturation-
577 based accounts to incorporate theories of motivational and biological development across adulthood
578 from neighboring fields (e.g. Selection-Optimization-Compensation Meta-Theory from lifespan aging
579 research; Baltes, 1989). Overall, the varied trajectories across facets, even within the same domain,
580 indicate that a wealth of developmental information is lurking at levels below the Big Five. Future
581 research that examines development in narrower traits will thus be useful in refining our understanding
582 of personality development across adulthood.

583 **Multi-Rater Perspectives on Personality Maturation**

584 We compared the average magnitude of personality trait maturation between self-reports and
585 reports from two close others. We found that, in three Big Five domains and five of 12 NEO-FFI facets,
586 other-reported development in adaptive traits was more positive than self-reported development. This
587 provides evidence that the maturity principle is not an artifact of self-ratings, as close others indeed
588 reported adaptive increases across the Big Five domains and many personality facets. In the language of

589 Hogan and Roberts (2004), these results suggest that people matured in terms of both self-perceived
590 identity and other-perceived reputation.

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

604 **Co-maturation among Personality Facets**

605 Our third aim was to investigate co-maturation among personality facets. We found that people
606 who changed adaptively in one facet were slightly more likely to experience adaptive change in other
607 facets, but this co-maturation was no stronger in magnitude than general co-development across all
608 facets. This pattern of results provides preliminary evidence that maturation is not a coordinated,
609 simultaneous process that explains a large proportion of development across traits. Rather, we found
610 that the vast majority of adaptive facet change occurred independently of adaptive change in other
611 facets, suggesting that facet development may be better conceptualized as many narrowly-acting
612 processes that affect traits in isolation (Soto & John, 2012). Additional studies of co-development among

613 healthy, unhealthy, and neutral traits are needed to provide further evidence about the extent of trait
614 co-maturation.

615 These results should be considered in light of our decision to operationalize maturation in terms
616 of change in (un)healthy traits. Maturation is often discussed broadly in terms of change in
617 Agreeableness, Conscientiousness, and Neuroticism (Nickel & Roberts, 2017), which provides an
618 alternate rubric by which to evaluate maturation and co-maturation. Indeed, when we explored co-
619 development among all 18 NEO-PI-R facets from these three domains (regardless of adaptiveness), we
620 found that correlated change was stronger than among other clusters of personality facets. These
621 results provide evidence that there may be some common process underlying co-development among
622 facets of Agreeableness, Conscientiousness, and Neuroticism regardless of facet adaptivity ratings. A
623 candidate mechanism for this process is serotonergic functioning (DeYoung et al., 2002; Wright et al.,
624 2019), which has been linked to these three domains and psychological maturity in past research.

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

631 **Limitations**

632 The present study comes with some important limitations. The first concerns the
633 operationalization and measurement of personality adaptivity. We classified traits as either healthy,
634 unhealthy, or neutral in order to compare development across these three categories. We acknowledge
635 that, in reality, trait adaptiveness is a continuous rather than categorical concept, implying that some
636 traits may be more or less healthy than others. Furthermore, our trait classification was based on

637 empirical correlations with well-being and ratings of the healthy personality. These ratings reflect
638 normative, average ratings; however, they cannot capture more unique or idiosyncratic pathways to
639 maturity which may vary across settings, individuals, and developmental stages (Ryff, 1989; Erikson,
640 1959).

641 The unique strengths of this dataset, such as the longitudinal measurement of many personality
642 facets from both self- and other- perspectives, should be considered alongside its major design
643 limitations. Specifically, our analyses of maturation were limited by our two-wave longitudinal design.
644 Longitudinal models based on two waves of data provide less reliable and robust estimates of change
645 than those that include three or more measurements (Duncan et al., 2006). Relatedly, only 401 of the
646 1,785 participants contributed two personality measurements. Though our analyses that describe
647 maturation from age 30 to age 70 incorporate measurements from all participants, the fact that most
648 only contributed one wave of data means that between-person age differences in personality played an
649 especially strong role in estimates of age-graded change compared to within-person age changes in
650 personality.

651 An additional limitation of this study is that we did not measure which other-raters were
652 consistent across measurement waves. At both waves, raters generally knew their targets quite well,
653 and correspondence between self- and other-rated personality was similar in magnitude to what has
654 been found in past research. This indicates that even when raters changed, the validity of their reports
655 likely did not. However, this design is different from past research on other-rated personality
656 development, in which the same close others provided trait ratings at both measurement waves or
657 change in raters was controlled for statistically (Lenhausen et al., 2020; Oltmanns et al., 2020; Watson &
658 Humrichouse, 2006). This difference may have implications for the extent to which close others
659 perceived adaptive personality trait development. Specifically, in this study, participants may have
660 nominated different other-raters at wave 2 when their relationship to their wave 1 rater deteriorated,

661 whereas in past research, even other-raters with strained relationships were retained in the sample –
662 and these other-raters may have rated their targets less positively (Vandermeer et al., 2018). Future
663 research is needed to identify the extent to which constancy and change in raters affects the extent to
664 which close others perceive personality trait maturation.

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

668 **Conclusion**

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

- 674 • Across adulthood, people show increases in a wide spectrum of broad and narrow traits
675 emblematic of mental and physical health, interpersonal functioning, and productivity (Caspi et
676 al., 2005). However, not all traits mature alike. Even highly correlated traits mature at different
677 rates, and in most studies of facet-level development some healthy personality traits show
678 maladaptive declines, oftentimes those associated with social engagement (e.g., Donnellan et
679 al., 2007; Terracciano et al., 2005).
- 680 • Adaptive development generally occurs from late adolescence (e.g., Klimstra et al., 2018; Luan
681 et al., 2017) up to the years preceding death (e.g., Wagner et al., 2016), with changes that are
682 most pronounced in emerging adulthood (ages 18-30) (Roberts & Davis, 2016). However, in
683 some samples, adaptive development begins earlier in life (e.g., Brandes et al., 2020) and
684 extends into very old age (e.g., Mueller et al., 2016).

- 685 • On average, traits only co-mature within people to a small extent, as adaptive development in
686 one trait is mostly independent of adaptive development in others (e.g., Allemand & Martin,
687 2016). Traits that are more strongly associated tend to co-mature more strongly (e.g. Soto &
688 John, 2012)
- 689 • Early and accumulating evidence suggests that the rates of adaptive development in personality
690 traits may differ across self- and other-reported perspectives (e.g. Oltmanns et al., 2020). While
691 some studies indicated that others may perceive development less positively than the self, the
692 present research finds the opposite pattern. Very few studies have examined personality
693 development across perspectives, highlighting the need for more research on this topic.
- 694 • Rates of adaptive development differ across people (e.g., Schwaba & Bleidorn, 2018), and some
695 people do not mature with age (e.g., Roberts et al., 2001).
- 696 • There is heterogeneity in adaptive development across samples (e.g. Bleidorn et al., 2013), and
697 some show little evidence for maturation (e.g. Graham et al., 2020).

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

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