Social expectations as a possible mechanism for adult personality change: Limited empirical evidence for the social investment principle

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Abstract
Objective: Personality traits change in both mean levels and variance across the life span but the mechanisms underlying these developmental trends remain unclear. Social Investment Principle (SIP) suggests that social expectations drive personality changes in adulthood. Accordingly, we tested whether differences between personality traits in social expectations for them can explain their different change trajectories in young adulthood.

Methods: A pool of 257 personality items was used to measure personality traits’ means and variances (N = 1096), and levels expected by friends, partners and bosses/supervisors (N = 121).

Results: Raters were consistent in their expectations for how young adults should think, feel and behave. Traits under stronger expectations had higher mean levels and lower variances than traits under lower expectations; trait means and variances increased with age, but inconsistently with the SIP, these increases were unrelated to the traits' expected levels.

Conclusion: Our results are only partially consistent with the SIP.

Keywords
mean-level, personality development, social expectations, social investment principle, variance

1 | INTRODUCTION

Personality traits change across the life span in both mean levels and variances (Mõttus et al., 2016; Mõttus, Soto, & Slobodskaya, 2017; Roberts & DelVecchio, 2000; Soto, 2016). Mean-level personality change, also referred to as normative change, refers to changes in average personality trait levels in a population over time (Roberts, Walton, et al., 2005; Soto, 2016; Soto et al., 2011). On average, people’s personality traits tend to change in socially desirable directions (Allemand et al., 2008; Ausmees et al., 2022; Caspi et al., 2005; Donnellan & Lucas, 2008), with people becoming more agreeable, conscientious, and emotionally stable across adulthood (Bleidorn et al., 2018; Roberts et al., 2006). This is referred to as the maturity principle of personality development (Bleidorn & Schwaba, 2017). In addition to these changes, people also tend to become less extraverted and open to experiences with age (Wortman et al., 2012).
Age differences in trait variance offer another way to describe developmental trends (Mõttus et al., 2016). The magnitude of individual differences in personality traits tends to increase from childhood until mid-adolescence and plateau thereafter (Kandler & Zapko-Willmes, 2017; Mõttus et al., 2019; Mõttus, Soto, & Slobodskaya, 2017). Such increases mostly pertain to the traits’ genetic variance components, possibly caused by gene–environment transactions whereby self-selected environments magnify pre-existing individual differences (Mõttus et al., 2019) and/or by gene–environment interactions whereby environments moderate the expression of genetic dispositions (Kandler & Zapko-Willmes, 2017). For example, extraverted people may practice their social skills by actively participating in social events, allowing them to appear even more extraverted in those situations. In comparison, introverted people may tend to avoid social events and consequently have fewer opportunities to practice their social skills, thus becoming more socially insecure and, as a result, less likely to take part in social events in the future.

1.1 Explaining the patterns

Social Investment Principle (SIP) (Roberts, Wood, et al., 2005) is one of the leading attempts to explain these trait changes. The SIP suggests that traits mature as individuals are confronted with new social expectations, commit to new social roles and alter their behavior accordingly, especially to accommodate major life transitions in early adulthood such as entering the workforce and getting married (Denissen et al., 2013; Roberts, Wood, et al., 2005). There may be common age-graded life tasks that apply to many people around similar ages and come with the expectations that individuals act in a more mature way, which can lead to mean-level changes towards greater maturity (Bleidorn, 2015; Hennecke et al., 2014). For example, if important others in young individuals’ lives expect them to be hard-working students, reliable and loving partners, and/or responsible parents, it is plausible that these individuals follow these expectations and adjust their behaviors accordingly, changing in relevant personality traits as a result.

According to the SIP, although individuals encounter unique challenges in these transitions, which can help to sustain or even accentuate individual differences, a substantial proportion of people within different cultures experience similar life transitions at approximately the same time and change towards a similar pattern of expected traits (Roberts, Wood, et al., 2005). People are often rewarded for behaving in socially expected ways and punished for countering these expectations (Roberts, Wood, et al., 2005). If so, people should tend to become more alike over time as most strive to receive rewards and avoid punishments, especially in traits associated with high social expectations. That is, generally shared social expectations should act to decrease the magnitudes of individual differences, counteracting or even reversing the possible increases in variance due to person-environment transactions (Mõttus et al., 2019), especially for traits under strongest expectations.

Not all personality traits are alike, with behaviors associated with some traits likely subject to stronger social pressures than others. This provides us with a possibility to test the hypotheses described above. Specifically, we should expect that it is especially the traits under relatively stronger social pressure (high expectations) that (a) change in mean levels commensurate with the expectations and (b) decrease in variance the most or at least increase the least in variance if there is a general trend for increasing variance. To test this, we can describe developmental trends in personality traits using a diverse pool of traits that vary in social expectations for them on the one hand and how their means and variance change with age on the other hand.

Based on similar reasoning, Wood and Roberts (2006) tested the extent to which expectations for behavior in age-graded roles mirror mean-level changes in the Big Five traits: increases for emotional stability, agreeableness and conscientiousness, and decreases for extraversion and openness. Specifically, they examined age-graded expectations for high school students, college students, parents, and grandparents and found that expectations for behavior in age-graded roles mirrored the Big Five’s mean-level changes in both college students and the older sample. These findings supported the SIP by showing that age-graded expectations are reflected in normative personality development, with people becoming more agreeable, conscientious, emotionally stable, and less extraverted. However, this study examined broad patterns of mean-level changes in the Big Five traits without formally testing the traits’ differences in the change trajectories and expectations, which would have been challenging given their focus on just five traits. It also did not test personality trait variance change in relation to age-graded expectations.

1.2 Development in the personality traits hierarchy

Most existing research on personality development has been based on the Big Five domains (Mõttus et al., 2020), but these are not the only ways to represent personality differences among people. Personality traits form a hierarchy, so that the Big Five domains can be split into facets and even more specific traits, nuances. Facets are groups of items that are more strongly correlated with each other within the Big Five domains. Nuances are the lowest level of the personality hierarchy and can often be indexed by
individual items or groups of very similar items (Condon et al., 2020). Lower levels of the personality hierarchy (facets and nuances) usually contain unique personality variance above and beyond domains (Jang et al., 1998). For example, facets show varied developmental age trajectories compared to their domains (Mõttus et al., 2015; Mõttus & Rozgonjuk, 2021; Soto et al., 2011; Terracciano et al., 2006), and nuances also show age trends different from their facets (Hang et al., 2021; McCrae, 2015; Mõttus et al., 2015; Mõttus, Soto, & Slobodskaya, 2017).

Besides potentially a more refined description of the population-level patterns of personality development (Hang et al., 2021), nuance-level analyses allow us to study systematic variations between personality traits in their developmental trends and intersections with other trait-level features such as social expectations for them (Mõttus et al., 2020; Mõttus & Rozgonjuk, 2021). For example, Hang et al. (2022) capitalized on variations between traits to investigate whether social expectations and ability to catch up with these expectations (self-regulatory ability to adapt to social expectations) can explain the personality changes during childhood and adolescence. Specifically, they quantified the mean-level changes for 94 nuance-level traits and the degrees to which these traits reflect social expectations, as well as how much self-regulatory ability was required to meet these expectations. Nuance-level traits’ overall means were linked with social expectations, but social expectations were not linked with the nuance-level traits’ mean-level age trajectories, apart from a slight uptick characterizing the most socially desirable traits in late adolescence (Hang et al., 2022). Being more numerous and capturing varied developmental trends, nuances allow testing hypotheses about differences between traits better than the Big Five domains.

Here, we also leverage the empirical fact that personality traits vary with age along many dimensions, examining personality development at the level of nuances. To operationalize nuances, we used a diverse item pool of 257 items selected to measure personality as comprehensively as possible by capturing unique item-level information. To quantify socially expected levels of these personality nuances, we asked young adults to rate the items in terms of social expectations for them, from the points of views of important others for the young people: friends, intimate partners, and bosses/ supervisors. Since people in different social roles might have different expectations for others’ behaviors, measuring young adults’ perceived level of social expectations from different points of view provided us with more generalizable assessments of social expectations. Arguably, the degree of social expectations only matters if individuals are affected by them, thus, measuring social expectations as perceived by their targets (young people themselves) is more suitable than measuring them in those assumed to hold these expectations (the important others of the young people). Social expectations may change most prominently during early adulthood, since many new social roles are established during this developmental stage (Bleidorn et al., 2013). We therefore explored the associations of social expectations with age differences in personality trait mean levels and variance for young adults (18 to 30 years).

This study differs from that of Hang et al. (2022), in several fundamental ways. First, the two studies examine different developmental stages. Hang et al. (2022) focused on childhood and adolescence, whereas here we focused on adulthood. Second, although both studies used a nuance-level analysis to examine systematic variability among many personality traits in their various properties, Hang et al. (2022) used a traditional personality inventory (CCQ) which was not specifically designed to measure nuances. Here we used a newly developed personality item pool deliberately designed to measure nuances, thus overcoming one key limitation of the previous study. Third, the previous study only focused on mean-level changes of personality, but personality traits may also change in variance throughout the lifespan, which we considered in the present study. Finally, here we specifically evaluate the findings in relation to the SIP, whereas Hang et al. (2022) focused on potential mechanisms explaining personality change in childhood and adolescence such as the intersection of expectations with the still-developing ability to meet them (Denissen et al., 2013).

### 1.3 Summary of the present research

In sum, the present study examines whether social expectations could be a potential mechanism to explain mean-level personality trait differences and trait variance differences during young adulthood. We hypothesized that (a) traits with higher social expectations would tend to have higher mean-level scores; (b) traits under stronger social expectations would tend to have stronger age differences, changing in line with expectations, than those under lower expectations; and (c) traits with stronger social expectations would have lower variance than traits with weaker social expectations and (d) their variance would decline even more with age.

### 2 Method

#### 2.1 Measures

**2.1.1 The 257-items personality questionnaire**

We used a pool of 257 items to measure young adults’ personality traits and social expectations for these traits. This
item pool was not driven by any prior conceptual model of personality; instead, we selected items to be individually informative using an iterative trial-and-replacement process (Henry & Mõttus, 2022). First, the majority of items of this personality item pool was assembled from the International Personality Item Pool (IPIP) (Goldberg, 1990) and the Synthetic Aperture Personality Assessment (SAPA) (Condon, 2018). Second, standard deviations of items were calculated using the Eugene Springfield Community Sample (Goldberg, 2008). From among highly correlated items, only items with relatively higher standard deviations were selected, as these items likely capture more information at the population-level (Goldberg et al., 2006). Third, items which were comparatively linguistically complex were removed (e.g., items contained more ambiguity in interpretations and items used infrequent words). Finally, items that were not covered by the Big Five or HEXACO domains measuring competitiveness, humor, sexuality, attractiveness, gratitude, and the Dark Triad were included. These items were iteratively tested for re-test reliability and items with comparatively lower re-test reliability were removed (generally those with 2-week retest correlations below 0.60) and other items were included in their place (Henry & Mõttus, 2022). At each iteration, items with excessive redundancy were removed. These steps as well as the psychometric properties of the items are described in Henry and Mõttus (2022).

One reason that we did not use one of the traditional personality inventories is that there are no theoretical models to justify which items should be used in nuance-level personality research (Mõttus & Rozgonjuk, 2021). Items chosen in the low-dimensional approaches (e.g., the Big Five) aim to measure broader trait domains and facets rather than purposefully capture unique item-level information. Instead, research such as ours should strive to use a more comprehensive item pool, and does not require being a priori aligned with any hierarchical structured trait model (Condon et al., 2020).

2.2 | Participants

2.2.1 | Mean levels of personality traits and personality variances

Participants were drawn from pre-existing datasets that had been collected for various research projects, including for estimating the re-test reliability of the items. Some participants were recruited from the online research platform Prolific, others were recruited from social media (e.g., Facebook). There were 1436 individuals (mean age = 27.60 years, 577 males, 844 females, and nine with unknown gender) in the initial sample, from which we selected participants aged between 18 and 30 years old ($N = 1096$, mean age = 23.04 years; 446 males, 641 females, and eight with unknown gender). Participants were instructed to rate their own personality traits with each of the 257 items, using a 6-point Likert scale ranging from 1 (very inaccurate) to 6 (very accurate).

2.2.2 | Socially expected personality trait levels

To assess social expectations, we recruited young adults from the online research platform Prolific and compensated them with £3. A total of 121 individuals rated social expectations (mean age = 24 years, 69 males, 51 females and one with unknown gender). See Table 1 for descriptive statistics. The young adults were asked to rate each of the 257 item in terms of whether their friends, intimate partners or bosses/supervisors would generally approve or disapprove of their thinking, feeling or behaving in the way described in these items. In other words, they were asked to rate each item in terms of how much social pressure they perceived to behave in these ways, from either their friends, partners or bosses/supervisors. For example, for friend’s perspective, when participants answered the question ‘I often stop working if it becomes too hard’, they needed to answer about the extent to which their friends would approve that they stop working if it becomes too hard. Participants provided the ratings on a 5-point Likert scale ranging from 1 (strongly disapprove) to 5 (strongly approve).

2.3 | Data analysis

Statistical analyses were carried out in R. The data and R code are made publicly available at Online Supplemental Material (OSF).

First, we investigated whether ratings of social expectations for young adults’ traits were consistent using a two-way average absolute random-rater intra-class

<table>
<thead>
<tr>
<th>Raters’ perspective</th>
<th>Friends</th>
<th>Partners</th>
<th>Bosses/supervisors</th>
</tr>
</thead>
<tbody>
<tr>
<td>$N$</td>
<td>41</td>
<td>41</td>
<td>39</td>
</tr>
<tr>
<td>Rater age</td>
<td>$(M = 23.88)$</td>
<td>$(M = 23.63)$</td>
<td>$(M = 24.54)$</td>
</tr>
<tr>
<td>Number of males</td>
<td>24</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>ICC</td>
<td>0.95</td>
<td>0.96</td>
<td>0.96</td>
</tr>
</tbody>
</table>

Abbreviation: ICC, intraclass correlation of (random) average rater.
correlations (ICCs) in the psych package version 2.0.9 (Revelle et al., 2021). Second, we used eta-squares to assess the perspective-group differences (friends vs. partners vs. bosses) in the ratings. We also collapsed the ratings within each rating condition (friends, partners, bosses) and calculated the Pearson correlations between the mean social expectations ratings (across all items).

To investigate associations between nuance-level personality traits’ mean levels and variances on the one hand with age and social expectations for these traits on the other hand, we used multi-level models (or linear mixed-effects models) in the lme4 package version 1.1–25 (Bates et al., 2014). Dependent variables were either the means or standard deviations of each item from 18 to 30 years (we defined age in terms of 13 age levels with 18 being the first age level giving N = 13 × 257 = 3341 observations), whereas independent variables were the ages to which these mean levels corresponded (13 individual observations for each of the 257 items) and the social expectations for the items to which the mean levels corresponded (257 expectations for each of the 13 ages). We built two sets of models, respectively examining the effects of age, social expectations and their interaction on item means or standard deviations. All models included a random effect for items (allowing them to have different mean levels) and random slopes for the effects of age per item (allowing differences between items in their age trends). The interaction terms between age and expectations represented the key parameters: if significant, they would show that age differences in items’ means/variances would depend on the expectations for these items. We report fixed effects, which summarize general associations across all items. Personality trait mean levels, variances and social expectations were standardized before building the models and age was re-scaled, so that 18 became 0 (i.e., 18 was subtracted from each age to make it represent 0). Age was also divided by 10 before building the model to avoid model convergence issues due to large differences in variances among individual variables. Personality traits and social expectations were reverse coded where needed so that all items were keyed in the socially desirable directions throughout the analyses (based on the mean of the social expectation ratings, collapsed across all rating conditions). We compared performance between the baseline model (i.e., predicting mean levels by age and expectations) and the model with the interaction term (i.e., predicting mean levels by age and expectations plus the interaction between the two) using the Bayesian Information Criterion (BIC), with a lower BIC being indicative of a better fitting yet more parsimonious model. We also compared performance between the model with age only and the model with age and social expectations.

3  |  RESULTS

3.1  |  Did raters agree about social expectations for young adults’ personality traits?

The ICCTs of the ratings for social expectations were high for each ratings conditions, ranging from 0.95 to 0.96 (see Table 1). Also, after applying Bonferroni correction for multiple testing, the means of only two items (‘often stop working if it becomes too hard’ and ‘I am satisfied with my relationships’) significantly varied across the three rating conditions, suggesting that social expectations were similarly rated regardless of their perceived source: the rating condition explained an average of 3% of variance in the social expectation ratings. Likewise, the mean profiles of the 257 ratings correlated from 0.91 to 0.94 between the three conditions. When collapsed across conditions, the ratings’ average ICC increased to 0.98. We therefore combined ratings from all three perspectives in all subsequent analyses. We also examined the effect of age on expectation ratings and found that what is expected at younger ages (18- to 24-year-olds) is not different from what is expected at older ages (25- to 30-year-olds) (see Table S1 in the supplementary material for detailed information).

3.2  |  Traits’ mean levels and their changes

In a multi-level model, the means of the 257 items for each age were predicted from the social expectation ratings for these items and age. Personality traits (indexed with these items) with higher social expectations were more likely to have higher means, supporting our hypothesis that young adults’ personality traits generally comply with social expectations (Table 2). In the same model, personality trait mean levels tended to be higher at later ages. Since the traits had been keyed in the socially desirable direction, this suggests a general normative shift towards more desirable trait levels. However, the interaction between age and social expectations was not statistically significant (see Table 2), and the Bayesian Information Criterion (BIC) fit index also favored the model without the interaction term over the model with the interaction term (BIC = 2391 vs. BIC = 2399, respectively). The model with social expectations (BIC = 2399) however showed better performance than the model without expectations (BIC =2618). Thus, age differences in mean levels changed irrespective of social expectations for these traits. To illustrate the patterns, we rearranged the items into three groups based on whether they were subject to high, medium, or low expectations. Figure 1 shows that items subject to high social expectations show the highest personality
trait mean levels, whereas items subject to low social expectations showed the lowest personality trait mean levels.

### 3.3 Traits’ variances and their changes

To predict traits’ variances from social expectations and age at which the variances were calculated, we used the same model as above but replaced items’ means with their standard deviations. There was a relatively strong negative association between traits’ standard deviations and social expectations, as well as a positive association between traits’ variance and age. The interaction between age and social expectations was nominally significant (see Table 2). But after applying Bonferroni corrections for multiple testing, the interaction term became non-significant, and the BIC also favored the model without the interaction term over the model with the interaction term (BIC = 6296 vs. BIC = 6300, respectively). The model with social expectations (BIC = 6300) however showed better performance than the model without social expectations (BIC = 6440).

Figure 2 shows that traits with high expectations showed the lowest level of variance, and traits with low expectations showed the highest level of personality variance. Traits with medium and low levels of expectations may have shown slightly higher variance increases than traits with high expectations, but the interaction was very weak and therefore we did not see support for it.

### 4 DISCUSSION

The SIP is one of the leading attempts to explain personality development. The principle has been indirectly supported by individuals becoming, on average, Table 2 The effects of social expectations and age on personality trait mean levels, variances and their changes.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Mean-level</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Soc</td>
<td>Age</td>
</tr>
<tr>
<td>β</td>
<td>0.700</td>
<td>0.117</td>
</tr>
<tr>
<td>SE</td>
<td>0.049</td>
<td>0.025</td>
</tr>
<tr>
<td>p</td>
<td>&lt;.001***</td>
<td>&lt;.001***</td>
</tr>
<tr>
<td>Std β</td>
<td>0.699</td>
<td>0.044</td>
</tr>
<tr>
<td>95% Lower CI</td>
<td>0.602</td>
<td>0.068</td>
</tr>
<tr>
<td>95% Upper CI</td>
<td>0.796</td>
<td>0.167</td>
</tr>
</tbody>
</table>

Note: There were 121 participants who reported on both age and social expectations that tested the effect of age, social expectations and their interactions. There is little difference between the unstandardized and standardized betas of social expectations because the variables were standardized. Abbreviations: CI, 95% confidence interval; Soc, social expectations. Std β, standardized beta.

*p < .05; ***p < .001.

Figure 1 The effect of different levels of social expectations and age on mean levels of personality traits. The items were divided into three groups based on the high, medium and low expectations for them (lowest (<0.33), middle (≥0.33, ≤0.66) and highest (>0.66) third of the items). The y-axis represents standardized item mean scores.
more agreeable, conscientious and emotionally stable in adulthood after committing to different social roles (Asselmann & Specht, 2020; Hudson et al., 2012; Lodi-Smith & Roberts, 2007), although such evidence is inconsistent across studies (Bleidorn et al., 2020). But change may be more likely triggered by how people think they are expected to change rather than by their new roles per se (Wood & Roberts, 2006). Indeed, according to SIP, it is the expectations attached to each social role that reward individuals to behave in certain ways and can then lead to changes in personality traits if the behaviors are repeated and internalized. As yet, however, there is limited empirical evidence linking social expectations to personality changes (Wood & Roberts, 2006).

4.1 | Our findings and the SIP

Comparing traits offered us one yet under-explored approach to test the SIP: if personality trait mean levels shift towards maturity with age, then traits that are expected to increase the most should in fact have the highest mean levels and strongest increases in them. Moreover, individuals’ trait levels should become more similar over time, especially in traits that are under the strongest social pressure, since most people would tend to converge towards the socially expected trait levels. Using nuance-level analysis that is particularly well suited for hypotheses regarding differences between traits, our study is among the few to offer evidence for or against social expectations being a potential mechanism for personality differences during early adulthood.

Based on mean-level trait changes, our results partly support SIP. First, socially expected traits tended to have comparatively higher means among older participants, suggesting that on average people adopt more socially desirable personality traits as they grow older. This result supports previous literature on SIP, hypothesizing that adults learn from their experiences and this leads traits’ mean levels to change in a socially desirable directions (Ausmees et al., 2022; Wood & Roberts, 2006). Second, the pattern of the traits’ means complied with the pattern of social expectations. On average, personality traits with higher expectations had higher mean levels than traits subject to lower expectations. These findings imply that high social expectations could be one of the sources guiding mean-level personality change in early adulthood. Similar findings have been found in educational settings. For example, teachers’ expectations showed significant correlations with students’ academic performances (Szumski & Karwowski, 2019; Tsiplakides & Keramida, 2010). Whereas these results are consistent with SIP, there are alternative explanations that will need to be ruled out in future research. For example, traits under stronger social expectations could have higher means as a result of socially desirable responding style, which is why the tendency for greater personality maturation with age appear smaller in traits’ informant-reports (Ausmees et al., 2022).

But our third and perhaps most critical finding did not support SIP. According to SIP, we hypothesized that traits’ age differences should be moderated by the expectations for them, so that traits with especially strong expectations should show comparatively larger increases in means. But the interaction between age and social expectations were not significant, suggesting that age differences in personality traits’ mean levels are not moderated by social expectations for these traits.

Likewise, although SIP’s advocates have not always articulated clear hypotheses about the magnitudes of individual differences, it follows from the SIP that people
should become more alike under high social expectations since stronger awards/punishments are naturally attached to high expectations (Bleidorn, 2015; Roberts, Wood, et al., 2005). Logically, then, the magnitudes of individual differences should decrease in later adulthood since people converge towards more socially desirable trait levels, especially (or at least) for traits that are under high social expectations. We examined this hypothesis by testing whether trait variance decreased with age and traits with stronger expectations had lower variance, and whether expectations moderated the association between age and personality variance. On the one hand, traits under higher social expectations did have lower variances than traits under lower expectations, which supports the SIP. On the other hand, contrary to our hypothesis, personality trait variance was higher at later ages. This could be due to gene–environment correlations strengthening predispositions (Caspi & Roberts, 2001; Mõttus et al., 2019). Moreover, trait variance was not associated with the interaction between age and social expectations, indicating that age-trends in variance were not moderated by the degrees to which the traits were subject to social expectations. So, there was no evidence that strong social expectations for traits would lead to loss of this information (Mõttus et al., 2020). Because our “sample” was a pool of personality items rather than a group of participants, we could use different participants to assess traits’ means/variances and social expectations, helping us to avoid single-sample confounds. Second, to assess age differences in and expectations for personality traits, we used a diverse item pool specifically designed to study item-level traits.

4.3 | Strengths and limitations

The present research had a number of strengths. First, we used an underused research design to study systematic variability among many traits in their properties such as expectations, means, variances and age-differences (Mõttus et al., 2020). Because our “sample” was a pool of personality items rather than a group of participants, we could use different participants to assess traits’ means/variances and social expectations, helping us to avoid single-sample confounds. Second, to assess age differences in and expectations for personality traits, we used a diverse item pool specifically designed to study item-level traits.

Item-level analysis that capture personality nuances in addition to broader trait constructs had several advantages in this study. First, nuances, here indexed by single items, usually offer unique information beyond the Big Five domains and facets, and aggregating them into higher order traits would lead to loss of this information (Mõttus et al., 2015; Mõttus & Rozgonjuk, 2021; Soto et al., 2011; Terracciano et al., 2006). The more information about age differences and social expectations a research design can harvest, the higher the chance that any relations among them can be discovered—should they exist. Second, nuances provide new ways of conducting research and answering questions that could not be analyzed by only relying on the Big Five domains or even a smaller set of facets. We tested the systematic covariation among personality traits’ age differences and social expectations. This could only be done using many traits, simply because the five domains are not enough to do so ($N = 5$).

However, nuance-level analyses also have important caveats, some of which we attempted to address. Generally, there are few personality inventories that have been designed to measure nuances, although our item pool and perhaps some other tests like The California Adult Q-Sort (Block & Block, 1980) are exceptions. The majority of modern personality inventories are designed to measure the Big Five or other higher order traits, sometimes through assessing a selection of their facets. Our item pool was new and in many ways less tested than widely used inventories. Second, individual personality test items are inevitably less reliable than aggregate trait scores. However, our item pool was iteratively selected to contain items with relatively higher reliability (Henry & Mõttus, 2022). Moreover, single items and even their unique variance, after domains’ and facets’ variance has been removed, often retain trait-like properties such as cross-method agreement, rank-order stability, and heritability (Mõttus
et al., 2014; Mõttus, Kandler, et al., 2017). Nuances usually also offer better predictive power than broader trait aggregates for many life outcomes (Revelle et al., 2021; Seebeth & Mõttus, 2018; Stewart et al., 2022), besides demonstrating unique developmental trends (e.g., Mõttus & Rozgonjuk, 2021). All this could not be possible if items were highly unreliable. Finally, it can be difficult to analyses many nuances and explain the complex findings that can be drawn from nuance-based analysis, although this probably reflects a fact of nature that human mind and its development are many-dimensional and complex (Mõttus et al., 2020). In sum, there are both advantages and disadvantages to nuance-levels analysis, and they are better suited to some question than to others.

We note two further caveats. First, we used cross-sectional data rather than longitudinal data, which restricted our ability to draw inferences on personality change across the life span. Future studies could investigate whether the present findings extend to longitudinal data for both mean level personality, personality variance, and social expectations. Second, we only investigated young adults aged between 18 and 30 years. The pattern of personality differences might be better studied using a broader age range since some people engage in important social roles early or later than others. Future studies could test this idea with a broader age range and compare personality across generations to test how social expectations could influence personality traits across time. Moreover, different social roles might impact personality change so it would be interesting to measure them in future studies (e.g., being a parent, student, co-habiting with someone, employed etc.).

4.4 | The novelty of the study

Two of our key findings—that socially desirable personality traits’ mean levels were higher later in people’s late 20s than earlier in their adulthood, and that personality traits under stronger social expectations had higher mean levels than traits under lower expectations—confirm earlier studies (e.g., Bleidorn et al., 2013; Klimstra et al., 2009). One novelty of this study is to provide new evidence in relation to the SIP; building on recent findings that personality varies with age along many dimensions and being able to measure these, we tested whether personality trait increases were more pronounced for traits under stronger social expectations, as suggested by the SIP. Also, we explored age differences in personality trait variance, and to our knowledge only one study has previously addressed this question in adulthood (Mõttus et al., 2016). Although there is a substantial number of studies that have drawn on correlations between age-graded roles such as marriage, parents, and employment with personality change (e.g., Hutteman et al., 2014; Jokela et al., 2009; Neyer & Asendorpf, 2001; Specht et al., 2011), there is a dearth of research on the direct relations between age-graded role related expectations and personality trait change. Wood and Roberts (2006) is one of the few studies that tested the extent to which expectations for behavior in age-graded role mirror mean-level personality changes, but this study only included mean-level personality change and did not investigate changes in personality variance. They also only focused on the Big Five traits. It should be noted that two of our findings—no evidence for traits under stronger social expectations changing more with age and personality trait variance increasing rather than decreasing in early adulthood—are not well known at all. In fact, they contradicted our hypotheses based on a well-known idea from personality development literature, the SIP.

4.5 | Conclusions

Based on the SIP, social expectations should contribute to personality differences in both mean levels and variances during (young) adulthood. In our results, personality traits under stronger social expectations had higher mean levels and lower variances than traits under lower expectations, and traits tended to change in socially expected directions on average. However, contrary to the SIP, traits under comparatively stronger expectations did not change any more than those under lesser expectations and traits’ variances tended to increase rather than decrease with age. Overall, our results are only partially consistent with the SIP, and other mechanisms will need to be sought to understand why personality changes across the lifespan.

AUTHOR CONTRIBUTIONS

Yuzhan Hang contributed to conceiving the study, conducted the data analysis and drafted the manuscript. Lydia Gabriela Speyer provided critical feedback on drafts. Aja Louise Murray provided critical feedback on drafts. Michelle Luciano provided critical feedback on drafts. René Mõttus provided critical feedback on drafts. All authors read and approved the final manuscript.

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ETHICS APPROVAL STATEMENT

The study received ethical approval from the Ethics Committee of the School of Philosophy Psychology and Language Sciences at the University of Edinburgh.
REFERENCES


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