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Social Psychological and Personality Science
2021, Vol. 12(1) 118-130

DOI: 10.1177/1948550619900572
journals.sagepub.com/home/spp
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# Do Links Between Personality and Life Outcomes Generalize? Testing the Robustness of Trait–Outcome Associations Across Gender, Age, Ethnicity, and Analytic Approaches

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## Abstract

The Big Five personality traits have been linked with a broad range of consequential life outcomes. The present research systematically tested whether such trait–outcome associations generalize across gender, age, ethnicity, and analytic approaches that control for demographic and personality covariates. Analyses of nationally representative samples from the Life Outcomes of Personality Replication project ($N = 6{,}126$) indicated that (a) most trait–outcome associations do generalize across gender, age, and ethnicity; (b) controlling for overlap between personality traits substantially reduces the strength of many associations; and (c) several dozen trait–outcome associations proved highly generalizable across all analyses. These findings have important implications for evaluating the robustness of the personality–outcome literature, updating the canon of established trait–outcome associations, and conducting future research.

## Keywords

Big Five, generalizability, life outcomes, metascience, personality

How does someone's personality affect the course of their life? Much research has linked personality traits with consequential outcomes (Ozer & Benet-Martinez, 2006; Roberts et al., 2007). Such trait–outcome associations have increasingly led psychologists, educators, economists, and others to consider the relevance of personality for real-world applications and public policy (Bleidorn et al., in press; Kautz et al., 2014; Organisation for Economic Co-operation and Development, 2015). Moreover, despite recent metascientific scholarship questioning the replicability of behavioral science (Camerer et al., 2016, 2018; Cova et al., in press; Open Science Collaboration, 2015; Simmons et al., 2011), many links between personality traits and life outcomes can be replicated (Soto, 2019).

However, important questions remain about the robustness of personality–outcome links. For example, although trait–outcome associations appear *replicable* (i.e., a researcher who closely repeats a previous study can expect to obtain similar results), it is unclear whether they are also *generalizable* (i.e., whether they can be observed using meaningfully different populations, operationalizations, and analytic approaches). Therefore, the present research was conducted to test whether links between personality traits and consequential life outcomes generalize (a) between men and women, (b) between young adult and age-representative samples, (c) between majority and minority ethno-cultural groups, and (d) across analytic approaches that control for demographic and personality covariates.

## *Links Between the Big Five Traits and Life Outcomes*

A personality trait is a characteristic pattern of thinking, feeling, or behaving that tends to be reasonably consistent over time and across relevant situations (Allport, 1961). Research examining the structure of both personality questionnaires and everyday language indicates that many specific traits can be organized in terms of five broad personality domains known as the Big Five: Extraversion, Agreeableness, Conscientiousness, Negative Emotionality (or Neuroticism), and Open-Mindedness (or Openness to Experience; Goldberg, 1993; John et al., 2008; McCrae & John, 1992).

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Each of the Big Five has been linked with important behaviors and life outcomes (Ozer & Benet-Martinez, 2006; Roberts et al., 2007). For example, Extraversion has been linked with social status and well-being, Agreeableness with volunteerism and religious beliefs, Conscientiousness with occupational performance and health, Negative Emotionality with ill-being and psychopathology, and Open-Mindedness with political views and occupational interests. Recently, the Life Outcomes of Personality Replication (LOOPR) Project (Soto, 2019) attempted to closely replicate 78 specific trait–outcome associations drawn from a landmark review of the personality–outcome literature (Ozer & Benet-Martinez, 2006). This project successfully replicated approximately 85% of the hypothesized associations, with effect sizes typically about 80% as strong as the originally published results. Thus, trait–outcome associations appear to be reasonably—but not perfectly—replicable.

### Testing the Generalizability of Trait–Outcome Associations

Successful replication is a necessary but not sufficient condition for establishing the robustness of a scientific finding. Highly robust findings should also demonstrate generalizability: Results obtained when sampling from a particular population, employing a particular procedure or measure, and analyzed using a particular statistical method, should also be found using other populations, operationalizations, and analytic approaches (Cronbach et al., 1972; Shavelson et al., 1989).

For example, many of the classic personality–outcome studies reviewed by Ozer and Benet-Martinez (2006) and replicated by Soto (2019) were conducted using student or young adult samples, but others used more age-representative samples. Some studies recruited predominantly or exclusively male samples, some used female samples, and some used gender-balanced samples. Many used predominantly non-Hispanic White samples, but some were more ethno-culturally diverse. Some employed statistical analyses that controlled for demographic characteristics and overlap between personality traits, but many simply examined zero-order correlations between traits and outcomes. Therefore, the present research aimed to further evaluate the robustness of personality–outcome links by systematically testing whether trait–outcome associations generalize across gender, age, ethnicity, and analytic approaches.

What should we expect to find? If links between personality traits and life outcomes are perfectly robust, then associations obtained in one kind of sample using one analytic approach should also be found in other samples using other approaches. However, there are both substantive and statistical reasons to suspect that trait–outcome associations may not be fully generalizable. Substantively, the specific traits and processes that link personality with a particular life outcome may differ across populations. For example, the personality determinants of relationship quality and social support may differ across gender, age, or ethnicity due to differences in socialization experiences or other biosocial factors (Campos et al., 2014; Watson et al., 2000). Statistically, sets of personality and demographic predictors may provide overlapping information. For example, Agreeableness tends to intercorrelate positively with Conscientiousness and negatively with Negative Emotionality, reflecting the shared self-regulatory aspects of these three traits (DeYoung, 2006). Moreover, Agreeableness levels tend to be somewhat higher among women and older adults than among men and younger adults, and higher in some cultures than others (Roberts et al., 2006; Schmitt et al., 2007; Soto et al., 2011). Due to such shared information, controlling for demographic characteristics and other personality traits may affect the relations of Agreeableness—or any other trait—with life outcomes.

### Overview of the Present Research

In sum, this study was conducted to systematically test whether the Big Five personality traits' associations with consequential life outcomes generalize across gender, age, ethnicity, and analytic approaches. Specifically, I conducted secondary analyses of data from the LOOPR Project (Soto, 2019) to test whether trait–outcome associations differ meaningfully between (a) men and women, (b) young adult and age-representative samples, (c) majority and minority racial and ethnic groups, and (d) analytic approaches that include versus exclude demographic and personality covariates. I then used the results of these tests to identify specific trait–outcome associations that proved highly robust. I generally hypothesized that some, but not all, trait–outcome associations would generalize across gender, age, ethnicity, and analytic approaches and that trait–outcome associations would tend to be weaker when controlling for other personality traits than when personality covariates were excluded from analysis.

## Method

### Preregistration and Supporting Materials

The original preregistration protocol, data, analysis code, and other supporting materials for the LOOPR Project are available at https://osf.io/d3xb7. The corresponding materials for the present study are available at https://osf.io/7w9fu. The present preregistration was submitted before conducting any analyses of generalizability across gender, age, ethnicity, or analytic approaches.

### Participants and Procedure

Data came from 6,126 participants in the LOOPR Project. As described by Soto (2019; for additional details, see https://osf.io/6w8qt), these participants were recruited in four samples using the Qualtrics Online Sample service. This included two age-representative adult samples ($N$s = 1,559 and 1,512) and two young adult samples ($N$s = 1,550 and 1,505). Quota sampling was used to ensure that each adult sample would closely represent the U.S. population in terms of age (11% ages 18–24, 18% ages 25–34, 17% ages 35–44, 19% ages 45–54, 17% ages 55–64, and 18%

ages 65 and older), gender (52% female, 48% male), and race/ethnicity (74% non-Hispanic White/Caucasian, 11% Black/African American, 10% Hispanic/Latino, 3% Asian/Asian American, and 2% American Indian/Native American), as well as educational attainment and household income, and that each young adult sample would be similarly representative in terms of gender and race/ethnicity. A sample size of 1,500 participants per sample provides power of 97.3% to detect a small true effect ($\rho = .10$), and greater than 99.9% power to detect a medium-sized ($\rho = .30$) or large ($\rho = .50$) effect, using two-tailed hypothesis tests at the $\alpha = .05$ significance level.

All participants completed demographic questions, the Big Five Inventory-2 (BFI-2), and a subset of life outcome measures using the Qualtrics online survey platform (August 2017 version). Median completion time was 23 min, and participants were compensated at the standard Qualtrics online sample rate of approximately US$3. During data collection, participants were excluded and replaced if they answered fewer than 90% of the survey items, had a within-person standard deviation of less than 0.50 across the 60 BFI-2 items, completed the survey in less than one third of the median completion time, or gave conflicting responses to demographic questions during the survey.

## Measures

*The BFI-2.* The Big Five personality traits were assessed using the BFI-2 (Soto & John, 2017). The 60 BFI-2 items are short, easy-to-understand phrases that respondents rate on a 5-point scale ranging from 1 = *disagree strongly* to 5 = *agree strongly*. In the combined LOOPR sample, $\alpha$ reliabilities were .83 for Extraversion, .79 for Agreeableness, .86 for Conscientiousness, .89 for Negative Emotionality, and .81 for Open-Mindedness.

*Life outcome measures.* Life outcomes were assessed using a battery of measures developed for the LOOPR Project. Based on Ozer and Benet-Martinez's (2006) review of the personality–outcome literature, Soto (2019) selected a broad set of 48 individual, interpersonal, and social institutional life outcomes that have been linked with the Big Five traits. After identifying and coding one previous study or meta-analysis supporting each trait–outcome association, Soto (2019) developed a set of survey measures designed to closely follow these original empirical articles. To prevent participant fatigue, the LOOPR measures were limited to a maximum of approximately 6 items per outcome, and the full outcome battery was divided into two subsets (which can be viewed at https://osf.io/9nzxa and https://osf.io/vdb6w). Thus, each participant completed approximately half of the outcome measures.

This study retained the LOOPR outcome measures from Soto (2019), with two modifications intended to maximize the size and breadth of the present outcome set. First, several of the LOOPR outcomes included multiple suboutcomes. In this study, each LOOPR suboutcome was treated as a separate outcome variable. Second, the LOOPR surveys included seven outcome measures that were not included in Ozer and Benet-Martinez's (2006) summary of trait–outcome associations and were therefore omitted from Soto's (2019) replicability analyses. These outcomes were included in this study.

These modifications resulted in a total of 83 outcome variables examined in the present study. Basic information about each outcome measure is presented in Table 1, and additional details are available in Supplemental Table S1.

## Data Analysis

Several sets of preregistered analyses were conducted to systematically test the generalizability of trait–outcome associations. To test generalizability across gender, age, and ethnicity, I computed each correlation between a Big Five trait and an outcome variable separately for men and women, for the young adult and age-representative LOOPR samples, and for participants who identified as White and non-Hispanic versus Hispanic or non-White. To test generalizability across analytic approaches, for each trait–outcome association, I computed (a) the zero-order correlation; (b) the partial correlation controlling for gender, age, and ethnicity; (c) the partial correlation controlling for the other four Big Five traits; and (d) the partial correlation controlling for gender, age, ethnicity, and the other traits. I then conducted three paired-samples *t* tests and three Wilcoxon signed-rank tests to compare the *z*-transformed zero-order correlations (oriented so that all correlations were positive) from (a) with the *z*-transformed partial correlations from (b), (c), or (d). Finally, I conducted three McNemar tests to compare the proportion of statistically significant correlations from (a) with the proportion of significant partial correlations from (b), (c), or (d).

As an additional, exploratory check on the robustness of the results, I then repeated all of the generalizability analyses using a regression approach. For analyses of generalizability across gender, age, and ethnicity, I conducted moderated regression analyses in which a standardized outcome variable was regressed on a standardized trait variable, a moderator variable (either gender coded −1 = *male*, 1 = *female*; sample age coded −1 = *young adult*, 1 = *age-representative*; or ethnicity coded −1 = *non-Hispanic white*, 1 = *another ethnicity*), and a Trait × Moderator interaction term. For analyses of generalizability across the inclusion of covariates, I compared the standardized trait–outcome regression coefficient while including versus excluding the relevant control variables.

All analyses were conducted as two-tailed tests using the $\alpha = .05$ significance level. Due to the large number of bivariate associations and high statistical power, interpretation of results focuses on meaningful differences in trait–outcome associations. Meaningful differences were defined as cases where (a) the test for the difference between correlations (or regression coefficients) was statistically significant, (b) the effect size for this difference was nontrivial (i.e., absolute Cohen's $q \geq .10$), and (c) the absolute trait–outcome correlation (or simple regression slope) was at least .10, and statistically significant, for one or both groups.

**Table 1.** List of Life Outcomes and Measures.

| Outcome | Measure Name | Number of Items | α Reliability | Sample Size |
|---|---|---|---|---|
| Individual outcomes | | | | |
| Subjective well-being | | | | |
| Life satisfaction[s] | LSI-A | 6 | .54 | 3,109 |
| Positive affect[s] | ABS | 5 | .68 | 3,108 |
| Negative affect[s] | ABS | 5 | .69 | 3,107 |
| Happiness[s] | DTS | 1 | — | 3,108 |
| Religion and spirituality | | | | |
| Cognitive orientation toward spirituality[s] | ESS | 6 | .81 | 3,109 |
| Religiousness[s] | ESS | 6 | .87 | 3,109 |
| Existential-phenomenological dimension[s] | ESS | 6 | .67 | 3,109 |
| Paranormal beliefs[s] | ESS | 6 | .73 | 3,109 |
| Existential well-being | ESS | 6 | .77 | 3,109 |
| Gratitude | GQ-6 | 6 | .80 | 3,107 |
| Forgiveness | HFS | 6 | .61 | 3,109 |
| Inspiration | Inspiration Scale | 8 | .93 | 3,028 |
| Humor | Ad hoc item | 1 | — | 3,109 |
| Identity status | | | | |
| Identity achievement | EOM-EIS | 8 | .65 | 3,109 |
| Identity diffusion[n] | EOM-EIS | 8 | .65 | 3,109 |
| Identity foreclosure | EOM-EIS | 8 | .87 | 3,109 |
| Identity moratorium[n] | EOM-EIS | 8 | .76 | 3,109 |
| Identity integration/consolidation | Q-EIS | 6 | .66 | 3,109 |
| Ethnic culture identification (for minorities) | SL-ASIA | 2 | .68 | 391 |
| Majority culture identification (for minorities) | SL-ASIA | 2 | .62 | 391 |
| Coping | | | | |
| Active coping[s] | WOC-R | 5 | .82 | 3,017 |
| Avoidant coping[s] | WOC-R | 6 | .82 | 3,017 |
| Seeking support[n] | WOC-R | 5 | .82 | 3,017 |
| Resilience | CRI | 6 | .85 | 3,016 |
| Risky behavior | | | | |
| Activity[s] | GLTEQ | 3 | .60 | 2,528 |
| Unhealthy eating[s] | MIRW | 1 | — | 2,796 |
| Excessive alcohol use[s] | Ad hoc item | 1 | — | 2,944 |
| Drug use[s] | Ad hoc item | 1 | — | 2,944 |
| Tobacco use[s] | Ad hoc item | 1 | — | 2,944 |
| Risky sex[s] | Ad hoc composite | 3 | .51 | 1,881 |
| Risky driving[s] | Ad hoc scale | 3 | .77 | 3,007 |
| Violence[s] | Ad hoc scale | 5 | .90 | 2,991 |
| Suicide[s] | Ad hoc item | 1 | — | 3,011 |
| Heart disease | LSH-CPQ | 1 | — | 3,014 |
| Substance abuse | Ad hoc item | 1 | — | 3,017 |
| Anxiety | Ad hoc item | 1 | — | 3,015 |
| Depression | Ad hoc item | 1 | — | 3,014 |
| Personality disorders | | | | |
| Mistrust[s] | SNAP-2 | 4 | .41 | 3,017 |
| Manipulativeness[s] | SNAP-2 | 4 | .47 | 3,017 |
| Aggression[s] | SNAP-2 | 4 | .46 | 3,017 |
| Self-harm[s] | SNAP-2 | 4 | .70 | 3,017 |
| Eccentric perceptions[n] | SNAP-2 | 4 | .36 | 3,017 |
| Dependency[s] | SNAP-2 | 4 | .41 | 3,017 |
| Exhibitionism[s] | SNAP-2 | 4 | .44 | 3,017 |
| Entitlement[s] | SNAP-2 | 4 | .49 | 3,017 |
| Detachment[s] | SNAP-2 | 4 | .43 | 3,017 |
| Impulsivity[s] | SNAP-2 | 4 | .48 | 3,017 |
| Propriety[s] | SNAP-2 | 4 | .49 | 3,017 |
| Workaholism[s] | SNAP-2 | 4 | .16 | 3,017 |

*(continued)*

**Table 1.** (continued)

| Outcome | Measure Name | Number of Items | α Reliability | Sample Size |
|---|---|---|---|---|
| Interpersonal outcomes | | | | |
| Family satisfaction | | | | |
| Mother affectional[s] | Ad hoc scale | 3 | .77 | 2,425 |
| Father affectional[n] | Ad hoc scale | 3 | .72 | 2,237 |
| Mother functional—associational[s] | Ad hoc scale | 3 | .69 | 2,425 |
| Father functional—associational[s] | Ad hoc scale | 3 | .77 | 2,237 |
| Peers' acceptance and friendship[s] | BRF | 1 | — | 3,108 |
| Peer status | Ad hoc item | 1 | — | 3,109 |
| Attractiveness | BRF | 1 | — | 3,109 |
| Dating variety | BRF | 1 | — | 2,034 |
| Romantic satisfaction | SMU-RQ | 6 | .67 | 2,158 |
| Romantic conflict | Ad hoc scale | 6 | .83 | 2,393 |
| Romantic abuse | Ad hoc scale | 6 | .81 | 2,394 |
| Romantic dissolution | Ad hoc item | 1 | — | 1,359 |
| Social institutional outcomes | | | | |
| Occupational interests | | | | |
| Realistic[n] | VPI | 6 | .79 | 3,017 |
| Investigative | VPI | 6 | .76 | 3,017 |
| Artistic | VPI | 6 | .79 | 3,017 |
| Social | VPI | 6 | .72 | 3,015 |
| Enterprising | VPI | 6 | .75 | 3,016 |
| Conventional[n] | VPI | 6 | .74 | 3,017 |
| Occupational performance | | | | |
| Turnover[s] | Ad hoc item | 1 | — | 1,757 |
| Status change[s] | Ad hoc item | 1 | — | 1,758 |
| Salary[s] | Ad hoc item | 1 | — | 1,610 |
| Occupational satisfaction | MSQ-SF | 6 | .80 | 1,476 |
| Occupational commitment | TCM-ECS-R | 6 | .78 | 1,477 |
| Occupational involvement | Ad hoc scale | 6 | .75 | 1,872 |
| Extrinsic success | HISP, Ad hoc item | 2 | .54 | 1,350 |
| Intrinsic success | Ad hoc scale | 6 | .81 | 1,477 |
| Job attainment | HISP, DOT, and Ad hoc items | 5 | .71 | 1,647 |
| Financial security | Ad hoc scale | 3 | .80 | 1,871 |
| Leadership | MLQ | 8 | .83 | 1,476 |
| Volunteerism | Ad hoc items | 4 | .60 | 3,013 |
| Conservatism | C-Scale | 7 | .47 | 3,109 |
| Right-wing authoritarianism | RWA | 6 | .75 | 3,107 |
| Antisocial behavior | Ad hoc composite | 6 | .58 | 3,109 |
| Criminal behavior | Ad hoc items | 6 | .86 | 3,109 |

*Note.* [s] = Measure was treated as a suboutcome in the LOOPR replicability analyses (Soto, 2019). [n] = Measure was not previously included in the LOOPR replicability analyses. ABS = Affect Balance Scale (Bradburn, 1969); BRF = Behavior Report Form (Paunonen, 2003); C-Scale = Conservatism Scale (Wilson & Patterson, 1968); CRI = Coping Responses Inventory (Moos, 1988); DIS-III-R = Diagnostic Interview Schedule–Version III-R (Robins et al., 1989); DOT = Dictionary of Occupational Titles total complexity score (United States Department of Labor, 1991); DTS = Delighted-Terrible Scale (Andrews & Withey, 1965); EI-OPC = Elley-Irving Socio-Economic Index (Elley & Irving, 1985); ESS = Expressions of Spirituality Scale (MacDonald, 2000); EOM-EIS = Extended Objective Measure of Ego Identity Status (Bennion & Adams, 1986); GLTEQ = Godin Leisure-Time Exercise Questionnaire (Godin & Shephard, 1985); GQ-6 = Gratitude Questionnaire-6 (McCullough et al. 2002); HFS = Heartland Forgiveness Scale (Thompson et al., 2005); HISP = Hollingshead Index of Social Position (Hollingshead, 1975); LSH-CPQ = London School of Hygiene Chest Pain Questionnaire (Rose et al., 1977); LSI-A = Life Satisfaction Index A (Neugarten et al., 1961); MAT = Marital Adjustment Test (Locke & Wallace, 1959); MIRW = Metropolitan Insurance Reference Weights (Russell et al., 1984); MLQ = Multifactor Leadership Questionnaire–Form 5× (Avolio et al., 1995); MSQ-SF = Minnesota Satisfaction Questionnaire–Short Form (Weiss et al., 1967); Q-EIS = Q Ego Identity Status templates (Mallory, 1988); QMI = Quality of Marriage Index (Norton, 1983); RWA = Right-Wing Authoritarianism (Altemeyer, 1998); SL-ASIA = Suinn-Lew Asian Self Identity Acculturation scale (Suinn et al., 1992); SMU-RQ = SMU Relationship Questionnaire (Assenheimer & Watson, 1991); SNAP-2 = Schedule for Nonadaptive and Adaptive Personality-2 (Clark et al., 2014); TCM-ECS-R = TCM Employee Commitment Survey–Revised (Meyer et al., 1993); VPI = Vocational Preference Inventory (Holland, 1985); WOC-R = Ways of Coping–Revised (Folkman & Lazarus, 1980).

## Results

### *Generalizability Across Gender*

Do links between the Big Five traits and consequential life outcomes generalize across gender? The complete correlation matrices for men and women are presented in Supplemental Table S2. Of the 415 possible trait–outcome associations (5 traits × 83 outcome variables), 293 were nontrivial in strength (i.e., absolute $r \geq .10$) and statistically significant for men, women, or both. Of these 293 associations, only 33 (11%)

showed a meaningful difference between men and women (i.e., absolute $q \geq .10$, $p < .05$). Twenty-one of these differences (7%) reflected cases where both men and women showed a nontrivial trait–outcome association in the same direction, but the strength of this association differed by gender. The remaining 12 differences (4%) reflected cases where only men or only women showed a nontrivial association. There were no cases in which men and women showed a nontrivial association in opposite directions.

Repeating these analyses using regression models yielded very similar results. As shown in Supplemental Table S3, 297 of the 415 possible trait–outcome associations were nontrivial in strength (i.e., $b \geq .10$) for men, women, or both. Of these nontrivial associations, only 35 (12%) showed a meaningful difference between men and women.

As summarized in Figure 1, this first set of results indicates that the vast majority of trait–outcome associations generalize across gender. Almost 90% of these associations were in the same direction, with similar strength, for men and women. Moreover, most exceptions to this overall trend reflected differences in the relative strength of an association rather than in the presence or direction of the association.

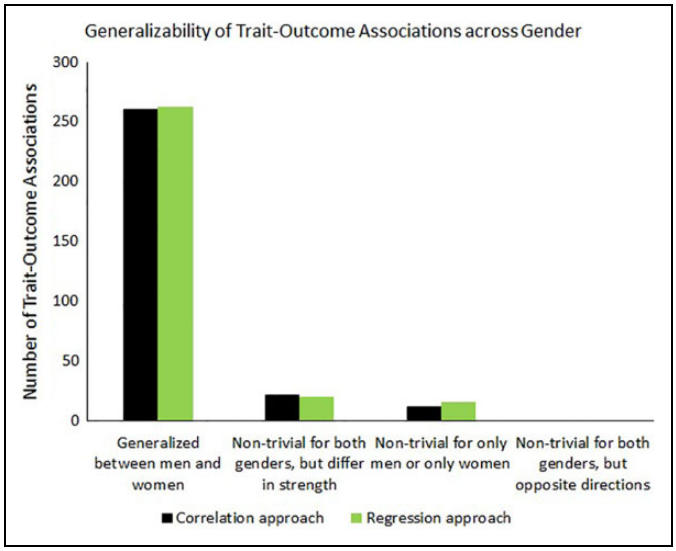


**Figure 1.** Number of trait–outcome associations that generalized versus meaningfully differed between men and women. Nontrivial associations are defined as absolute correlations or regression coefficients $\geq .10$, $p < .05$. Meaningful differences are defined as absolute differences $\geq .10$, $p < .05$.

## *Generalizability Across Age*

Do trait–outcome associations generalize between young adult and age-representative samples? Supplemental Table S4 presents the complete correlation matrix for each sample type. Of the 415 possible trait–outcome associations, 293 indicated a nontrivial association for the age-representative sample, the young adult sample, or both. Of these, 66 (23%) showed a meaningful difference between the two samples. These differences were about equally split between 35 cases (12%) where both samples showed a nontrivial association, but this association differed in strength, and 31 cases (11%) where only one sample showed a nontrivial association. As with gender, there were no cases in which the young adult and age-representative samples showed a nontrivial association in opposite directions.

Repeating these analyses using regression models also yielded similar results. Supplemental Table S5 shows that 296 of the 415 possible trait–outcome associations were nontrivial in strength for one or both samples. Of these, 59 (20%) showed a meaningful difference between the young adult and age-representative samples.[1]

As summarized in Figure 2, this second set of results indicates that most trait–outcome associations generalize between young adult and age-representative samples. However, the results also suggest that some associations differ meaningfully by age. In fact, about 10% of the nontrivial associations observed in one sample were not also observed in the other. That said, these results do not provide any examples of cases where a particular trait had an opposite relation with a particular outcome in young adult versus age-representative samples.

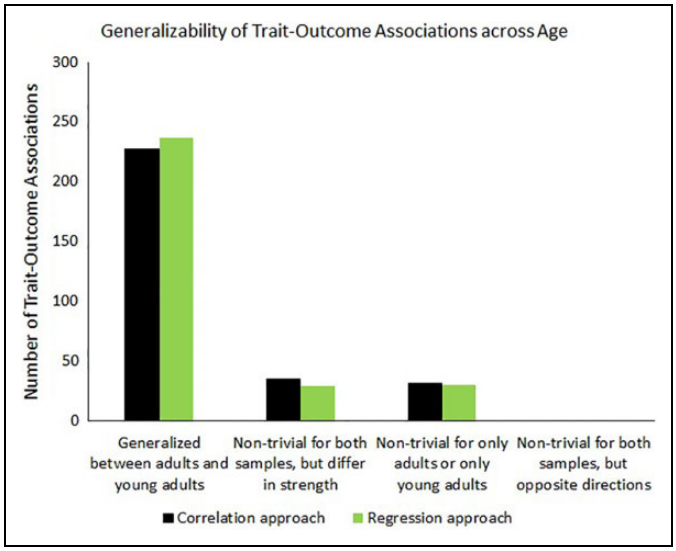


**Figure 2.** Number of trait–outcome associations that generalized versus meaningfully differed between young adult and age-representative samples. Nontrivial associations are defined as absolute correlations or regression coefficients $\geq .10$, $p < .05$. Meaningful differences are defined as absolute differences $\geq .10$, $p < .05$.

## *Generalizability Across Ethnicity*

Do trait–outcome associations generalize between majority and minority ethno-cultural groups? Supplemental Table S7 presents the complete correlation matrix for participants who identified as non-Hispanic White versus another race or ethnicity. Of the 415 possible trait–outcome associations, 299 indicated a nontrivial association for the majority group, minority group, or both. Of these, 46 associations (15%) showed a meaningful

difference between the two groups. This included 24 cases (8%) where both groups showed a nontrivial association that differed in strength, and 22 cases (7%) where only one group showed a nontrivial association. There were no cases in which the majority and minority groups showed a nontrivial association in opposite directions.

Repeating these analyses using regression models again yielded similar results. Supplemental Table S8 shows that 299 of the 415 possible trait–outcome associations were nontrivial in strength for one or both groups. Of these, 43 associations (14%) showed a meaningful difference between the majority and minority groups.[2]

As summarized in Figure 3, this third set of results indicates that most trait–outcome associations generalize between majority and minority racial and ethnic groups. However, they also suggest that some associations differ meaningfully between these groups, with 7% of the nontrivial associations observed in one group not also observed in the other.

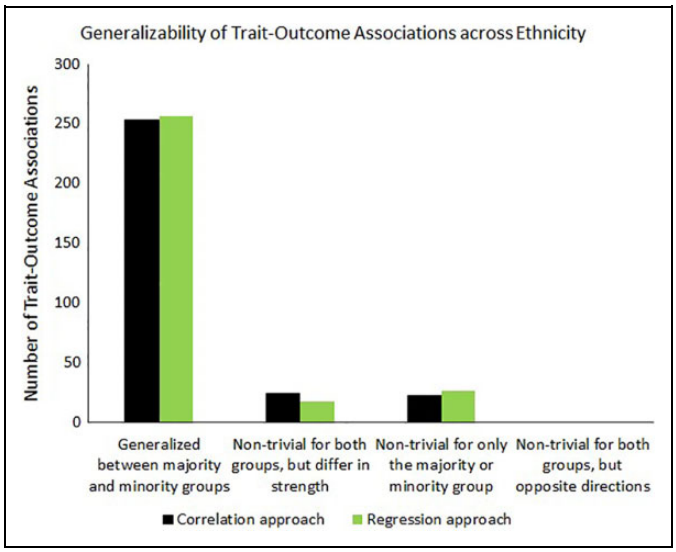


**Figure 3.** Number of trait–outcome associations that generalized versus meaningfully differed between majority and minority racial and ethnic groups. Nontrivial associations are defined as absolute correlations or regression coefficients $\geq$.10, $p < .05$. Meaningful differences are defined as absolute differences $\geq$.10, $p < .05$.

## *Generalizability Across Analytic Approaches*

Do trait–outcome associations generalize across analytic approaches that include versus exclude demographic and personality covariates? Supplemental Table S10 and Figure 4 show that controlling for gender, age, and ethnicity meaningfully affected only 2 of the 277 nontrivial trait–outcome associations (1%). In contrast, including the other four Big Five traits as covariates had more widespread effects, with 181 of the 283 associations (64%) meaningfully affected. Specifically, 67 associations (24%) remained nontrivial but changed meaningfully in strength, 105 (37%) changed from nontrivial to trivial in strength, and 9 (3%) changed from trivial to nontrivial. However, no associations changed from nontrivially positive to nontrivially negative, or vice versa.

Controlling for the full set of demographic and personality covariates had the most dramatic effects, with 192 of the 277 associations (69%) meaningfully affected. This included 70 associations (25%) that remained nontrivial but changed meaningfully in strength, 117 (42%) that changed from nontrivial to trivial, 4 (1%) that changed from trivial to nontrivial, and 1 (<1%) that changed from nontrivially negative to nontrivially positive. As shown in Supplemental Table S11, repeating these analyses using regression models yielded similar results.

These results suggest that controlling for demographic and (especially) personality covariates tends to weaken many trait–outcome associations. Analyses testing the overall pattern of associations further supported this finding. As shown in Figure 5, compared with the zero-order correlations, controlling for gender, age, and ethnicity modestly but significantly reduced the mean $z$-transformed correlation from .175 to .164 ($t(414) = -6.91$, $p < .001$), and the median correlation from .152 to .139 (Wilcoxon's $z = -6.00$, $p < .001$), although it did not affect the proportion of significant correlations (81% versus 82%; McNemar's $\chi^2(1) = 0.09$, $p = .76$).[3] Including only personality covariates substantially reduced the mean correlation to .076 ($t(414) = -21.48$, $p < .001$), the median correlation

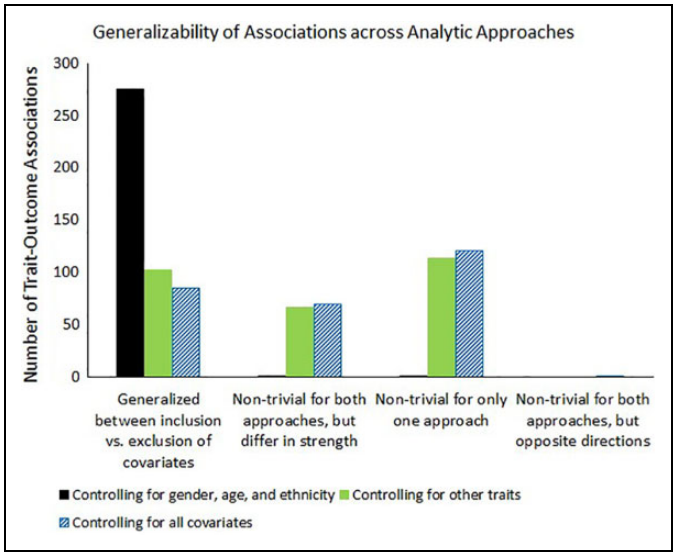


**Figure 4.** Number of trait–outcome associations that generalized versus meaningfully differed between analytic approaches that included or excluded demographic and personality covariates. Nontrivial associations are defined as absolute correlations or regression coefficients $\geq$.10, $p < .05$. Meaningful differences are defined as absolute differences $\geq$.10, $p < .05$.

to .063 (Wilcoxon's $z = -15.52$, $p < .001$), and the proportion of significant correlations to 71% (McNemar's $\chi^2(1) = 14.01$, $p < .001$). Finally, controlling for the full covariate set reduced the mean correlation to .070 ($t(414) = -22.58$, $p < .001$), the median correlation to .054 (Wilcoxon's $z = -15.90$, $p < .001$), and the proportion of significant correlations to 67% (McNemar's $\chi^2(1) = 26.58$, $p < .001$). Repeating these tests

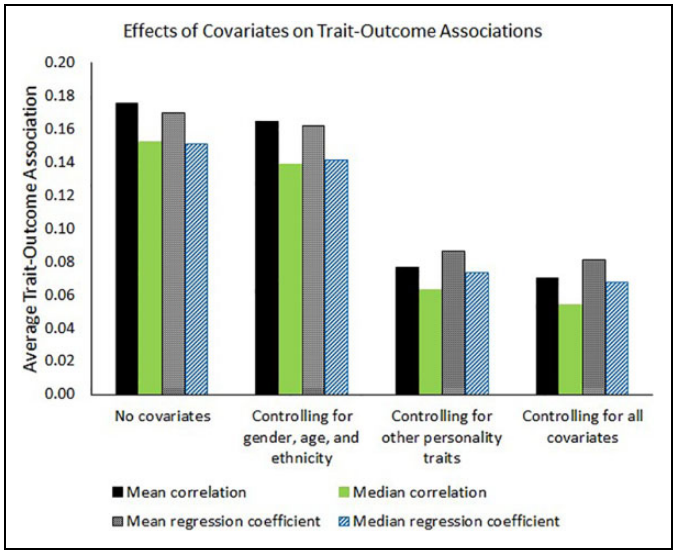


**Figure 5.** Effects of including demographic and personality covariates on the mean and median trait–outcome association. Correlations are z-transformed.

using regression coefficients yielded similar results when controlling for only demographic covariates ($t(414) = -5.29$, $p < .001$; Wilcoxon's $z = -4.68$, $p < .001$; McNemar's $\chi^2(1) = 0.21$, $p = .64$), only personality covariates ($t(414) = -17.84$, $p < .001$; Wilcoxon's $z = -14.08$, $p < .001$; McNemar's $\chi^2(1) = 12.54$, $p < .001$), or the full covariate set ($t(414) = -19.25$, $p < .001$; Wilcoxon's $z = -14.71$, $p < .001$; McNemar's $\chi^2(1) = 27.65$, $p < .001$).

Taken together, these results support the hypothesis that controlling for other personality traits substantially weakens many trait–outcome associations. In fact, including personality covariates meaningfully affected about two thirds of the individual associations and reduced the strength of the average association by approximately half. In contrast, controlling for gender, age, and ethnicity only modestly affected the average trait–outcome association and rarely had a meaningful impact on individual associations.

### *Highly Generalizable Trait–Outcome Associations*

The preceding analyses tested the generalizability of 415 possible trait–outcome associations across a range of conditions: among men versus women, in young adult versus age-representative samples, among majority versus minority ethno-cultural groups, with versus without controlling for demographic and personality covariates, and in analyses of correlations versus regression coefficients. Which trait–outcome associations proved most generalizable across these conditions? Table 2 lists 95 specific associations that were nontrivial in strength and statistically significant in all 20 conditions. This includes 24 associations involving Extraversion (largely focused on social connection and well-being), 24 involving Agreeableness or Conscientiousness (focused on prosocial and rule following vs. antisocial behavior), 29 involving Negative Emotionality (focused on ill-being and psychopathology), and 18 involving Open-Mindedness (focused on attitudes and identity).

Of these 95 highly generalizable associations, 56 were included in Ozer and Benet-Martinez's (2006) landmark summary of the personality–outcome literature and Soto's (2019) list of successful replications. The remaining 39 associations were not included in these previous summaries. They therefore represent possible additions to the canon of established links between personality traits and consequential life outcomes.

## Discussion

How generalizable are links between personality traits and life outcomes? Taken together, the present findings support two key conclusions. First, most trait–outcome associations generalize across gender, age, and ethnicity. In this study, approximately 95% of the nontrivial associations obtained among men were also obtained among women, 90% of those obtained among young adults were also obtained in age-representative samples, and 93% of those obtained among non-Hispanic Whites were also obtained among members of racial and ethnic minorities. Moreover, controlling for gender, age, and ethnicity had only modest overall effects on trait–outcome associations, and virtually all meaningful differences concerned the strength, rather than direction, of these associations. These findings suggest, for example, that a researcher who observes a substantial trait–outcome association in a predominantly female sample of young adults (i.e., the kind of sample most often used in psychological research) can be fairly confident that this association would generalize to a more representative population, unless there is good reason to suspect otherwise. However, "fairly confident" is not the same as "completely confident," and researchers should directly test the generalizability of obtained trait–outcome associations whenever possible.

The second key conclusion is that controlling for overlap between personality traits substantially reduces the strength of many trait–outcome associations. In this study, including other Big Five traits as covariates meaningfully weakened most trait–outcome associations and cut the average association in half. This finding suggests that, in general, researchers should (a) measure personality traits using a multidimensional framework, such as the Big Five or HEXACO models (Ashton & Lee, 2007; John et al., 2008), rather than measuring individual traits in isolation, and (b) use the resulting data to directly test whether the obtained trait–outcome associations remain robust when controlling for personality covariates. Following this suggestion will help mitigate the risk of false-positive results in personality–outcome research by identifying cases where a particular outcome's apparent associations with multiple traits actually reflect overlap between the traits themselves.

Why did personality–outcome associations generalize more robustly across gender, age, and ethnicity than across analytic approaches that include personality covariates? Most gender and ethno-cultural differences in personality are modest in size, and most adult age trends are gradual rather than dramatic

**Table 2.** Trait–Outcome Associations That Generalized Across Gender, Age, Ethnicity, and Analytic Approaches.

| Outcome | E | A | C | N | O |
|---|---|---|---|---|---|
| Individual outcomes | | | | | |
| Subjective well-being | | | | | |
| Life satisfaction | **.37/.17** | | | **−.43/−.26** | |
| Positive affect | **.37/.19** | | | **−.34/−.19** | |
| Negative affect | | | | **.59/.44*** | |
| Happiness | **.37/.14** | | | **−.57/−.42** | |
| Religion and spirituality | | | | | |
| Cognitive orientation toward spirituality | | **.23/.11** | | | |
| Religiousness | | **.24/.13** | | | |
| Existential—phenomenological dimension | .17/.11 | | | | **.24/.19** |
| Existential well-being | | | .45/.11* | **−.66/−.52*** | |
| Gratitude | **.37/.12** | **.54/.32** | | | .39/.19* |
| Forgiveness | | **.51/.28** | | −.59/−.39 | .27/.11* |
| Inspiration | **.43/.22** | | | | **.40/.24** |
| Humor | .30/.18 | | | | .26/.16 |
| Identity status | | | | | |
| Identity achievement | | | | | .20/.11 |
| Identity diffusion | | | | | −.24/−.15* |
| Identity foreclosure | | | | | **−.28/−.30** |
| Identity integration/consolidation | | | .52/.23 | **−.53/−.31** | **.30/.17*** |
| Majority culture identification (for minorities) | | | | −.31/−.15 | |
| Coping | | | | | |
| Active coping | **.29/.17** | | | | .28/.16 |
| Avoidant coping | | | | **.35/.25*** | |
| Seeking support | .21/.21 | | | | |
| Resilience | | | | | .33/.26 |
| Risky behavior | | | | | |
| Activity | .19/.10 | | | | |
| Suicide | | | | .28/.19 | |
| Heart disease | | | | .14/.11 | |
| Anxiety | | | | **.35/.27** | |
| Depression | | | | **.34/.24** | |
| Personality disorders | | | | | |
| Mistrust | | −.30/−.13* | | **.38/.26*** | |
| Manipulativeness | | **−.46/−.29** | **−.40/−.19** | | |
| Aggression | | **−.52/−.39** | | **.30/.17*** | |
| Self-harm | | | −.42/−.14 | **.51/.31** | |
| Eccentric perceptions | | | | .18/.11* | |
| Dependency | | | **−.36/−.15** | **.32/.14** | −.22/−.15 |
| Exhibitionism | **.40/.37** | | | −.22/−.12 | |
| Entitlement | **.38/.21** | | | −.29/−.12 | .28/.18 |
| Detachment | **−.44/−.32*** | **−.37/−.25** | | .37/.11* | |
| Impulsivity | | | **−.40/−.28** | .26/.15* | |
| Propriety | | .28/.11 | **.36/.24** | | |
| Workaholism | | | **.16/.22** | | |
| Interpersonal outcomes | | | | | |
| Family satisfaction | | | | | |
| Mother affectional | | | | **−.19/−.10** | |
| Father affectional | | | | −.19/−.11 | |
| Peers' acceptance and friendship | **.38/.24** | | | −.32/−.11 | |
| Peer status | **.40/.25** | | | **−.31/−.14** | |
| Attractiveness | **.34/.18** | | | −.28/−.13 | |
| Romantic satisfaction | | | | | .18/.11 |
| Romantic abuse | | −.22/−.11 | | | |

*(continued)*

**Table 2.** (continued)

| Outcome | E | A | C | N | O |
|---|---|---|---|---|---|
| Social institutional outcomes | | | | | |
| Occupational interests | | | | | |
| Investigative | | | | | **.21/.21*** |
| Artistic | | | | | **.42/.45*** |
| Social | **.17/.14** | | | | |
| Enterprising | **.22/.17** | | | | |
| Occupational performance | | | | | |
| Status change | .17/.15 | | | | |
| Occupational commitment | **.26/.14*** | .26/.11 | | | |
| Occupational involvement | .15/.11 | | | | |
| Intrinsic success | .33/.18 | | | **−.31/−.10** | |
| Financial security | | | | **−.31/−.21** | |
| Leadership | **.42/.26** | | | | .34/.18 |
| Volunteerism | **.20/.13** | | | | |
| Right-wing authoritarianism | | | .16/.10 | | **−.27/−.32** |
| Antisocial behavior | | −.39/−.23 | **−.31/−.14*** | | |
| Criminal behavior | | **−.25/−.13** | **−.25/−.15** | | |

*Note.* Values left of the forward slash are zero-order correlations. Values right of the slash are partial correlations controlling for gender, age, ethnicity, and the other four Big Five traits. Boldface indicates trait–outcome associations included in Ozer and Benet-Martinez's (2006) summary of the personality–outcome literature. Asterisks indicate associations that differed meaningfully in strength across gender, age, or ethnicity in both correlation and regression analyses. E = Extraversion; A = Agreeableness; C = Conscientiousness; N = Negative Emotionality; O = Open-Mindedness.

(Roberts et al., 2006; Schmitt et al., 2007; Soto et al., 2011). The same is likely true for many life outcomes. Thus, controlling for demographic characteristics will only meaningfully affect trait–outcome associations in the relatively few cases where there are substantial group differences in both the personality trait and the life outcome.

In contrast, personality traits often intercorrelate with one another as the result of both conceptual overlap and evaluative bias (Anusic et al., 2009; DeYoung, 2006; Paulhus & John, 1998). Such intercorrelations tend to be stronger in more representative samples (Denissen et al., 2019; Rammstedt & Farmer, 2013) and when personality is measured using a single data source (e.g., only self-reports or only informant reports; Anusic et al., 2009; DeYoung, 2006). Moreover, collinearity can compound across multiple intercorrelated traits. Thus, including a broad set of other traits as covariates—and thereby controlling for all overlap between them—can substantially affect many trait–outcome associations.

The present findings also have important implications for updating the canon of established links between personality traits and life outcomes. Most of the generalizable associations obtained in this study were previously included in Ozer and Benet-Martinez's (2006) landmark review of personality–outcome research, but a substantial minority were not. Some of these discrepancies may reflect idiosyncrasies of this study. However, some likely reflect the fact that much classic personality–outcome research predates the paradigm shift to the Big Five model (John et al., 2008) and therefore did not assess all five traits. For example, several of the generalizable associations listed in Table 2 involve Agreeableness and Open-Mindedness, which were rarely measured in pre-Big Five research. Such findings hold promise as possible additions to the personality–outcome canon, pending future research to further test their robustness.

### *Limitations and Future Directions*

This study had a number of important strengths, including its representative samples, high statistical power, preregistered design and analyses, consensus measure of the Big Five traits, and broad range of life outcomes. However, it also had some noteworthy limitations. For example, it relied on self-reported, cross-sectional data. Additional research is therefore needed to examine longitudinal trait–outcome associations, as well as alternative data sources (e.g., informant reports, objective records). A second limitation is that the present research is only a single study; additional studies are therefore needed to replicate its findings regarding generalizability across gender, age, ethnicity, and analytic approach. Future research can also extend these findings to additional facets of generalizability, such as generalizability across personality measures, outcome measures, and cultural contexts beyond the United States.

## Conclusion

In sum, the present findings indicate that most links between personality traits and life outcomes generalize across gender, age, and ethnicity, but that controlling for overlap between personality traits substantially reduces the strength of many trait–outcome associations. These findings have important implications for evaluating the robustness of the personality–outcome literature, updating the canon of established trait–outcome associations, and conducting future research.

## Acknowledgment

The author thanks Alison Russell and Samantha Rizzo for their assistance with this research.

## Declaration of Conflicting Interests

The author(s) declared following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Christopher J. Soto is a copyright holder for the Big Five Inventory–2 (BFI-2), which was used in the present research. The BFI-2 is freely available for research use at http://www.colby.edu/psych/personality-lab.

## Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The Life Outcomes of Personality Replication Project was supported by a faculty research grant from Colby College to Christopher J. Soto.

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## Supplemental Material

The supplemental material is available in the online version of the article.

## Notes

1. The analyses presented in Supplemental Tables S4 and S5 were specified to approximate situations in which a researcher or practitioner wonders whether findings obtained among young adults would generalize to an age-representative population (or vice versa). To further check the robustness of these results, I also analyzed Trait × Continuous Age interactions in the full LOOPR sample, with age linearly transformed so that −1.00 = age 22 (i.e., the mean age of adults 25 or younger in the full sample) and 1.00 = age 50 (i.e., the mean age of adults older than 25 in the full sample). These analyses also yielded similar results, with 56 of the 294 nontrivial associations (19%) showing a meaningful difference at younger versus older ages. Supplemental Table S6 presents the complete results of these analyses.
2. To parallel the analyses of gender and age and to maximize statistical power, the analyses reported in Supplemental Tables S7 and S8 combined all racial and ethnic groups other than non-Hispanic Whites into a single category. However, this approach may obscure differences between more specific groups. I therefore also conducted an additional set of regression analyses to compare the three largest subgroups: White/Caucasian, Black/African American, and Hispanic/Latino. As shown in Supplemental Table S9, these analyses also produced similar results: 52 of the 314 nontrivial trait–outcome associations (17%) differed meaningfully between Black and non-Black participants, and 51 of the 312 associations (16%) differed between Hispanic and non-Hispanic participants.
3. Because some trait–outcome associations were dependent rather than independent, due to shared trait, outcome, or demographic variables, the *p* values for these aggregate tests should be considered approximate rather than exact.

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