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Title:

How Do Basic Personality Traits Map Onto Moral Judgments of Fairness-Related Actions?

Date:

2022-04-01

Citation:

Andrejević, M., Smillie, L. D., Feuerriegel, D., Turner, W. F., Laham, S. M. & Bode, S. (2022). How Do Basic Personality Traits Map Onto Moral Judgments of Fairness-Related Actions?. *Social Psychological and Personality Science*, 13 (3), pp.710-721. <https://doi.org/10.1177/19485506211038295>.

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How Do Basic Personality Traits Map Onto Moral Judgments of Fairness-Related Actions?

Social Psychological and
Personality Science
1-12
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DOI: 10.1177/19485506211038295
journals.sagepub.com/home/spp



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Abstract

Reliance on fairness norms is a core feature of moral behavior and judgment, and is conceptually and empirically linked with basic personality dimensions. However, the specific nature of these links is poorly understood. In this study ($N = 313$, 68% female), we employed a novel third-party judgment paradigm, in which participants made moral judgments of various sharing actions of virtual others. This allowed us to capture individual variation in the relative importance of several fairness norms. We correlated these norm profiles with Big Five personality traits. We observed distinct associations between agreeableness, conscientiousness, openness, and extraversion and estimates of the importance of generosity, selfishness, relative generosity, and relative selfishness norms. Comparisons of these associations at the domain- versus facet-level of personality traits suggested these relations are specific to domain-level traits. These findings are an important step toward unraveling the complex links between fairness norms and basic personality traits.

Keywords

moral judgment, fairness norms, third party, Big Five, basic personality traits

Mounting evidence at the interface of moral psychology and personality science shows that individuals differ in the extent of their moral concern for harm, fairness, authority, loyalty, and purity and that these differences are related to basic personality traits (Hirsh et al., 2010; Lewis & Bates, 2011; Zeigler-Hill et al., 2015). Basic personality traits also relate to individual differences in moral virtues (Cawley et al., 2000), and they predict moral behaviors, judgments, and decisions (Bulmer et al., 2017; Kroneisen & Heck, 2020; Smillie et al., 2020; Tao et al., 2020; Zhou et al., 2019). Situations of moral choice, like a wide variety of social situations, can be conceptualized in terms of affordances, that is, opportunities for personality traits to be activated and expressed in behavior (Rusbult & Van Lange, 2003; Tett & Guterman, 2000; Thielmann et al., 2020). Studying links between moral choice and personality traits can improve our understanding of the psychological processes afforded by different moral decision-making situations and characterize heterogeneity in moral behaviors across individuals. In this article, we examine how personality traits may help to explain heterogeneity in the importance individuals assign to fairness norms in third-party moral judgments. We define fairness norms broadly, as any moral norms concerning division of stakes among two or more parties (e.g., equality, equity, reciprocity, generosity).

One means to describe the mapping between personality traits and moral decision making is through the use of

economic game paradigms. Economic games provide simplified models of behavior in interdependent situations where one or more parties make decisions affecting the economic outcomes for some or all parties (Camerer, 2003a; Pruitt & Kimmel, 1977). For example, in the Dictator Game (Forsythe et al., 1994), two participants are paired and one participant is randomly assigned to decide how much of a fixed stake to share with the other. The amount shared is indicative of the importance an individual places on fairness. Such games can vary greatly in structure and instructions and serve as models for a range of relevant social phenomena such as reciprocity, trust, altruism, punishment, and cooperation (Rilling & Sanfey, 2011). Another innovative use of these games is to study people's third-party judgments of others engaged in a game (Krupka & Weber, 2013). We argue below that such third-party judgments may better reflect the importance people assign to fairness norms compared to first-person behavior in

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these games. However, because individual differences in the importance people assign to fairness norms when making such judgments has not been well characterized, we focus our review on individual differences in the importance people assign to fairness norms in first-person behavior in economic games.

One of the most salient features of behavior observed within such games is the sizable individual differences: whereas some people maximize profit without concern for fairness, some adhere to equality norms, and some generously sacrifice their profit for others' benefit (Blount, 1995; Camerer, 2003b; Engel, 2011). These differences are relatively stable across games and over time (Peysakhovich et al., 2014; Reigstad et al., 2017; Yamagishi et al., 2013, 2014) and correlate with basic personality traits (Thielmann et al., 2020; Zhao & Smillie, 2015). Many studies have employed the comprehensive trait taxonomies provided by the Big Five (B5; John et al., 2008) and HEXACO (Ashton & Lee, 2007) frameworks. These reveal agreeableness as a prominent predictor of prosocial (i.e., other-benefiting) behavior across several kinds of games, whereas HEXACO honesty-humility specifically relates to prosocial games that afford an opportunity for exploitation of others (Hilbig et al., 2015; Thielmann et al., 2020). Similarly, neuroticism has been theorized to negatively relate to prosocial (i.e., partner-benefiting) behavior specifically in games that afford punishment of a partner's wrongdoing (Zhao & Smillie, 2015). These diverging patterns of trait correlations suggest that small changes in game structure and instructions (i.e., the context surrounding the social interaction) may have a strong impact on fairness-related behaviors and the personality traits that best account for them.

Although these studies have helped illuminate the links between personality traits and social preferences, most have used single-shot games, in which participants make only one decision in a given situation. This, however, comes with several limitations. First, single observations offer less reliable estimates of stable behavioral preferences as compared to multiple observations (Epstein, 1983). Second, observing only one decision allows for inferences regarding the importance of only one norm. For instance, if a participant gives half of the stake to their partner, we may deduce they are concerned with an equality norm. However, we cannot deduce anything about how this participant considers generosity (e.g., giving more than half) and whether they consider it less important than equality. Recent studies have demonstrated that it is important to disentangle such different motives in order to better understand the links between basic personality traits and fairness related behaviors (Hilbig et al., 2015; Mischkowski et al., 2019). Third, single-shot games do not reveal how people's choices may change upon learning contextual information regarding the social interaction (Camerer & Thaler, 1995). Contextual factors, such as existing relationships between actors (Simpson et al., 2016) or their deservingness of monetary compensation or reward (Feather, 1999), may promote reliance on different context-dependent norms, which although common in everyday life, are understudied in the economic games literature.

Finally, most previous studies have focused on costly sharing, which may reflect economic concerns in addition to moral concerns. Indeed, costless and costly sharing appear to have slightly different personality correlates (Ferguson et al., 2019). One way to surpass these limits of traditional economic games is to assess third-party moral judgments across a broad range of observed sharing behaviors occurring in variations of contextual conditions. Patterns of endorsement and condemnation can then be attributed to individual differences in concern for moral norms across contextual conditions, without the confound of concern for economic gain.

Estimating Fairness Norm Profiles Using a Novel Paradigm

We recently developed a paradigm to characterize individual differences in the importance assigned to different fairness norms, while overcoming the abovementioned limitations of traditional economic games (Andrejević et al., 2020). Here, participants made moral judgments regarding the sharing actions of virtual others engaged in a variant of the Dictator Game (see Figure 1). Participants first made an initial, "context-absent" judgment of a dictator's (hereafter, "decision maker's") offer to their partner (hereafter, "receiver"; ranging between 0 and 10 dollars). Subsequently, participants made a second judgment of the same offer after receiving contextual information regarding how much that partner had previously offered to another person ("context-present" judgment). Participants' judgments were coherent across trials, and the patterns of judgments across the range of offers (0–10) could be well captured by smooth spline functions. For example, judgments of some participants were strongly negative for low offers (\$0–3), relatively positive for midrange offers (\$4–6), and strongly positive for high offers (\$6–10), and this pattern was well captured by an s-shaped curve. Crucially, the shape of the curve varied markedly across individuals. Dominant modes of variation across individuals were identified using functional principal component analysis (fPCA; Ramsay et al., 2009; Ramsay & Silverman, 2005) and were interpretable in relation to various context-independent and context-dependent norms. Individuals' principal component (PC) scores were interpreted as estimates of the importance that each participant assigned to each norm. For example, scores on one PC captured how strongly a participant endorsed generous sharing (i.e., giving more than 50% of the stake to their partner).

Consistent with previous studies using traditional economic games, we found pronounced individual differences in the importance people assigned to several distinct fairness norms (Andrejević et al., 2020). In context-absent judgments, individuals differed in how strongly they endorsed high offers, how lenient they were in judging low offers, and how strongly they endorsed equal offers, reflecting differences in the importance placed on generosity, selfishness, and equality norms, respectively. Moreover, in context-present judgments, individuals differed in how strongly they endorsed *relatively* higher offers made by the decision maker compared to those previously

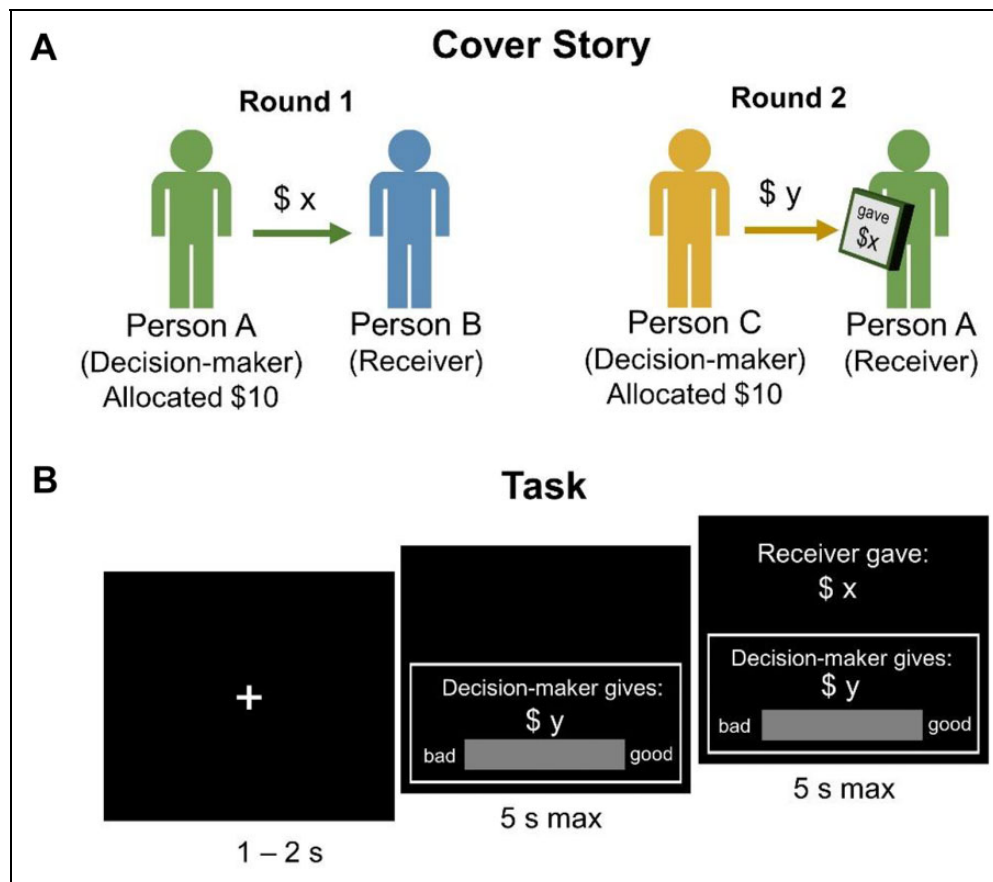


Figure 1. Moral judgment paradigm. (A) Illustration of the cover story presented to participants before the task about a fictitious experiment involving two rounds. In Round 1, pairs of individuals were randomly assigned the roles of a “decision maker” and a “receiver.” Person A (in the role of a decision maker) was allocated 10 dollars and decided how much to share with Person B (in the role of a receiver). In Round 2, Person A was assigned the role of a receiver and paired with a new decision-maker partner—Person C. Person C was allocated 10 dollars and decided how much to share with Person A. Importantly, Person C was shown the amount that Person A had shared in the previous round ($\$x$). Person C decided to share a $\$y$ amount, and this sharing behavior was judged in the real experiment. (B) Moral judgment task. Each trial of the task began with a fixation cross, after which participants were presented the amount that the decision maker (Person C) shared with the receiver (Person A) in Round 2 ($\$y$). However, at this point, participants were not informed of the amount receiver had shared with another person in Round 1 ($\$x$). Using their mouse, participants indicated their moral judgment of the decision maker on a gray bar scale ranging from “bad” to “good.” Subsequently, the contextual information regarding the deservingness of the Round 2 receiver was revealed (i.e., the amount $\$x$ that receiver had shared in the previous round). Participants then indicated their moral judgment of the decision maker once more.

made by the receiver, how leniently they judged *relatively* lower offers, and how strongly they endorsed similar offers, reflecting differences in the importance placed on relative generosity, relative selfishness, and indirect reciprocity norms. These components captured most of the variability in judgment patterns (93.8% for context-absent and 91.2% for context-present judgments), providing a rich and nuanced description of individual differences in preferences regarding distributive justice. What remains unknown is how these fairness norm profiles relate to basic personality traits.

The Present Study

In the present study, we reanalyzed data from our moral judgment paradigm to answer the following questions: First, what are the personality correlates of fairness norm profiles, and

do these match previous findings based on traditional economic games? Based on recent reviews of the literature (Thielmann et al., 2020; Zhao & Smillie, 2015), we expected personality correlates of fairness norm profiles to include B5 agreeableness and its facets. Second, are traits beyond agreeableness that have not been previously linked with behavior in one-shot games associated with fairness norm profiles? Third, which level of the personality trait hierarchy best captures individual differences in fairness concerns? Previous research has discussed relationships between fairness-related behaviors and personality at various levels (Hilbig et al., 2014; Thielmann et al., 2020; Zhao et al., 2017) but has not formally tested which level best captures these relationships. We will use the bifactorial approach (Holzinger & Swineford, 1937) to model these traits at various levels as orthogonal across levels, which can help us gauge whether relationships between personality and fairness

profiles are local to facets of personality or generalize to domains or supradomain factors. Fourth, are these relations consistent across context-independent and context-dependent norms? A clearer picture of these associations would improve our understanding of how robust the relationships between fairness norms and personality are across contexts. To address these questions, we examined how fairness norm profiles characterized in Andrejević et al. (2020) relate to personality at both the (broader) domain-level and the (narrower) facet-level dimensions of the B5, based on personality questionnaire data acquired from the same participants that were not reported in our previous publication.¹

Method

Participants

After exclusions (see Online Supplements 2), the sample comprised 313 participants (222 female, 91 male, $M_{\text{age}} = 20.66$, $SD = 2.51$, range: 18–36 years). The sample size was determined before we planned the current analyses, to suit the hypothesis-testing approach reported in Andrejević et al. (2020). Nevertheless, this sample size meets recommendations for latent variable analyses (e.g., MacCallum et al., 1999). Participants were drawn from an undergraduate psychology program at a large Australian university and received course credit in exchange for their time. The study was approved by the Human Research Ethics Committee of the Melbourne School of Psychological Sciences (Ethics ID 1750046).

Personality Measures

Personality traits were assessed using the Big Five Inventory 2 (BFI2; Soto & John, 2016), which comprises 60 items devised to measure 15 facet traits nested within five domains. The domains include agreeableness (subsuming compassion, respectfulness, and trust), conscientiousness (subsuming organization, productiveness, and responsibility), extraversion (subsuming assertiveness, energy, and sociability), negative emotionality (subsuming anxiety, depression, and volatility), and open-mindedness (subsuming aesthetic sensitivity, creative imagination, and intellectual curiosity). This inventory has good internal consistency (mean across domains, $\alpha = .87$, and facets, $\alpha = .76$) and test–retest stability within an 8 week period (mean across domains, $r = .8$, and facets, $r = .73$; Soto & John, 2016). Participants indicated their agreement on a 5-point scale with each point labeled: (1) “disagree strongly,” (2) “disagree a little,” (3) “neither agree nor disagree,” (4) “agree a little,” and (5) “agree strongly.” The order of items was randomized for each participant. (We also assessed agreeableness from the HEXACO framework [HEX-A] and present an analysis of that scale in Online Supplement 6. All other measures were unrelated to our study aims, see Online Supplements 4 for full details.) Within several questionnaires, we included attention-check items such as “This is an attention check, please indicate strong agreement.”

Experimental Paradigm

The experimental procedures are reported in detail in the original publication (Andrejević et al., 2020) and in Online Supplements 3. In short, participants made third-party moral judgments of sharing behaviors of fictional players engaged in a variant of the dictator game, where a “decision maker” was allocated 10 dollars and asked to choose how much to share with a “receiver” (see Figure 1). Participants first made an initial, “context-absent” judgment of the decision maker’s offer to the receiver. Subsequently, participants made a second judgment of the same offer after receiving contextual information regarding the receiver’s previous offer to another person (“context-present” judgment). Unlike in traditional economic games, there were no economic or other incentives for decisions in this task. This sequence was repeated for varying combinations of decision maker and receiver offers across 121 trials.

Fairness Norm Profiles

Fairness norm profiles were derived using methods described in detail in Andrejević et al. (2020), using fPCAs (Ramsay et al., 2009; Ramsay & Silverman, 2005). Online Supplements 1 briefly summarize these methods and reproduce the figure of the resulting components (depicted in figure 5 of Andrejević et al., 2020). The resulting PCs captured (a) how strongly each participant endorsed high offers (context-absent PC1, henceforth abbreviated as CA-PC1), that is, the importance of generosity norms for the individual; (b) how lenient they were in judging low offers (CA-PC2), reflecting the lack of importance of the selfishness norm; (c) how strongly they endorsed even offers (CA-PC3), reflecting the importance of equality norms; (d) how strongly they endorsed relatively higher offers (context-present PC 1 [CP-PC1]), reflecting the importance of relative generosity norms; (e) how lenient they were in judging relatively lower offers (CP-PC2), reflecting the lack of importance of relative selfishness norms; and finally (f) how strongly they endorsed similar offers (CP-PC1), reflecting importance of indirect reciprocity norms.

Data Analyses

B5 measurement models. We determined personality scores by calculating mean values across items for each facet and domain within the BFI-2, as described by Soto and John (2016). In order to separate common sources of measurement noise from variables of interest and improve measurement precision, we explored several approaches to modeling these traits as latent variables, using the *Lavaan* package v0.6-5 (Rosseel, 2012) and R v3.5.0. Our main approach was a *bifactorial* modeling approach, which we used to gauge whether relationships between fairness norms are local to facets of personality or generalize to domains or higher order factors (Holzinger & Swineford, 1937). We additionally used a factor modeling approach informed by previous research (Biderman et al., 2019), including variants of the model with latent factors for evaluativeness

Table 1. Descriptive Statistics and Intercorrelations of the Fairness Norm Profile Principal Components.

Fairness Norm	Descriptives		Intercorrelations				
	Median	SD	CA-PC1	CA-PC2	CA-PC3	CP-PC1	CP-PC2
Context-absent judgment of							
Generosity (CA-PC1)	23.00	75.04	—				
Selfishness (CA-PC2)	-23.50	70.50	-.66	—			
Equality (CA-PC3)	-6.71	34.59	.33	.02	—		
Context-present judgment of							
Relative generosity (CP-PC1)	111.35	219.36	.46	-.29	.07	—	
Relative selfishness (CP-PC2)	-21.95	77.99	-.42	.56	.11	-.62	—
Indirect reciprocity (CP-PC3)	-11.21	59.29	.10	.10	.47	-.01	.10

Note. For intercorrelations, cell color intensity scales with the strength of the association and ranges from red (negative correlation) and green (positive correlation), to white (zero correlation). The darkest color is anchored to the strongest correlation in the table. For principal component score means, it is important to note that, although higher numbers indicate stronger moral endorsement, with midpoint judgment (neither good or bad) referenced at 0, the range of these scores is somewhat broader than the response scale used by participants because of the mathematical transformations that occur within functional analyses. CA-PC = context-absent principal component; CP-PC = context-present principal component.

and acquiescence. The results generally approximated model fits reported in the previous literature (reported in Online Supplements 5).

Bifactorial modeling. Of the bifactorial models considered (refer to Online Supplements 5 for details), the best fitting model captured two meta-traits (stability and plasticity), subsuming the B5 domains, and each of their three facets (root mean square error of approximation = .047, 90% CI [.044, .051], comparative fit index = .837, standardized root mean square residual = .107, Bayesian information criterion = 51,094.192). Although it fell short of the standards of what is formally considered a good fit, this is not unusual for broad multiscale personality measures (Hopwood & Donnellan, 2010; Marsh et al., 2010). Factor scores were extracted at the level of facets, domains, and meta-traits.

Correlations between personality traits and fairness norm profiles. We correlated the PC scores (i.e., norm profiles) with each personality trait estimate for two measurement models (mean traits and bifactorial model scores) using nonparametric Spearman's rank-order correlation coefficients. These were preferable to Pearson correlations because PC scores were not normally distributed. Since we did not have strong theoretical predictions for these correlations, we did not interpret p-values, but rather focused on effect sizes (as recommended by Szucs & Ioannidis, 2017), only taking notice of effects larger than what is considered small in individual-differences research (correlation coefficient, $r > .10$, Gignac & Szodorai, 2016). Due to the number of correlations computed, some imprecision around the correlation estimates is likely, and we were careful not to overinterpret single values. Therefore, we focused on personality traits that correlated stronger than $r > .10$ with multiple PCs, which gave us confidence that these may be related to a significant degree with the interrelated pattern of fairness norms.

Results

Preliminary Statistics

Fairness norm profiles. Descriptive statistics and intercorrelations between different PC scores (as reported in Andrejević et al., 2020) are presented in Table 1. There were positive associations between pairs of components reflecting context-absent and context-present norm pairs such as generosity and relative generosity, selfishness and relative selfishness, and equality and indirect reciprocity. These results indicate coherence in judgment patterns across contexts (for further discussion, see Andrejević et al., 2020).

Basic personality traits. Descriptive statistics, scale intercorrelations, and reliability estimates (Cronbach's α) are presented in Table 2. These were broadly in line with expectations from previous research (Soto & John, 2016), though reliability for the compassion facet fell below acceptable standards; results based on this facet should be treated with caution.

Correlations Between Personality and Norm Profiles

Mean trait scores. Table 3 depicts correlations between personality trait scores and fairness norm profiles. Correlations were most pronounced for PCs capturing variability in judgments of low and relatively low offers. Specifically, these PCs were most strongly correlated with the domain-level agreeableness ($r_{CA-PC2} = -.22$ and $r_{CP-PC2} = -.17$), extraversion ($r_{CA-PC2} = -.16$ and $r_{CP-PC2} = -.19$), and conscientiousness ($r_{CA-PC2} = -.15$ and $r_{CP-PC2} = -.15$). PCs capturing variability in judgments of high offers correlated with these same domains, albeit more modestly (agreeableness, $r_{CA-PC1} = .10$ and $r_{CP-PC1} = .07$; extraversion, $r_{CA-PC1} = .14$ and $r_{CP-PC1} = .14$; conscientiousness, $r_{CA-PC1} = .11$ and $r_{CA-PC1} = .10$). Concerning the remaining traits: The openness domain correlated with judgments of *relatively* higher and lower offers ($r_{CP-PC1} = .11$ and $r_{CP-PC2} = -.14$) but not

Table 2. Descriptive Statistics and Intercorrelations of Personality Domains (Above the Diagonal) and Facets (Below the Diagonal).

	Descriptives		Intercorrelations																	
			Agreeableness				Conscientiousness				Extraversion				Negative Emotionality				Openness	
	Mean	SD	Chro.	α	Compassion	Respectfulness	Trust	Organization	Productiveness	Responsibility	Assertiveness	Energy	Sociability	Anxiety	Depression	Volatility	Aesthetic Sensitivity	Creative Imagination	Intellectual Curiosity	
Agreeableness	3.71	.55	.75		—	—	—	.35	—	—	—	.14	—	—	—	—	—	—	—	.13
Compassion	3.78	.72	.47		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Respectfulness	3.99	.66	.63		.40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Trust	3.37	.76	.68		.36	.40	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Conscientiousness	3.30	.68	.86		—	—	—	—	—	—	—	.28	—	—	—	—	—	—	—	.10
Organization	3.43	.94	.84		.13	.20	.15	—	—	—	—	—	—	—	—	—	—	—	—	—
Productiveness	3.05	.83	.74		.26	.16	.18	.59	—	—	—	—	—	—	—	—	—	—	—	—
Responsibility	3.41	.71	.63		.31	.43	.26	.43	—	—	—	—	—	—	—	—	—	—	—	—
Extraversion	3.24	.73	.88		.07	-.17	.01	.13	.34	.20	—	—	—	—	—	—	—	—	—	.33
Assertiveness	3.15	.85	.76		.26	.05	.31	.16	.36	.25	.45	—	—	—	—	—	—	—	—	—
Energy	3.51	.80	.74		.15	-.07	.16	.02	.19	.15	.55	.61	—	—	—	—	—	—	—	—
Sociability	3.07	.97	.85		-.04	-.10	-.27	-.06	-.17	-.19	-.17	-.25	-.25	—	—	—	—	—	—	-.04
Negative emotionality	3.41	.87	.74		-.09	-.12	-.28	-.13	-.28	-.26	-.23	-.44	-.32	-.25	-.25	-.25	-.25	-.25	-.25	-.25
Anxiety	2.68	.85	.71		-.01	-.20	-.26	-.16	-.19	-.25	.04	-.15	-.05	.60	.52	.57	.57	.57	.57	.57
Depression	2.94	.93	.82		.23	.06	.10	.06	.09	.07	.15	.17	.16	-.02	.03	.03	.03	.03	.03	.03
Volatility	3.80	.62	.83		.12	.00	.07	-.02	.18	.10	.28	.31	.20	-.15	-.11	-.11	-.11	-.11	-.11	-.11
Openness	3.76	.83	.74		.14	-.04	.01	-.01	.10	.08	.37	.25	.18	.04	.04	.04	.04	.04	.04	.04
Aesthetic sensitivity	3.66	.75	.71																	
Creative imagination	3.98	.69	.65																	
Intellectual curiosity																				

Note. Cell color intensity scales with the strength of the association and ranges from red (negative correlation) and green (positive correlation) to white (zero correlation). The darkest color is anchored to the strongest correlation in the table. Coefficients for relationships between facets subsumed within the same domain are bolded.

context-absent judgments of low and high offers ($r_{CA-PC2} = .03$ and $r_{CA-PC1} = .08$). The negative emotionality domain was only weakly correlated with fairness norm profiles ($|r| < .10$). Relationships between personality and fairness norms observed at the domain level were also notable for some of the facets contributing to each factor (e.g., compassion, responsibility and energy facets; see Table 3).

Bifactorial model. Many of the above presented correlations between mean trait scores and fairness profiles were equally strong for domain-level and facet-level estimates (e.g., in Table 3, extraversion vs. energy), making it difficult to assess at what level of the personality trait hierarchy (e.g., facets vs. domains vs. meta-traits), the observed relationships were best captured. Here, the *bifactorial model* is valuable as it provides estimates of domains that are orthogonal to facets, allowing us to compare the relative importance of facets and domains (see Table 3). Within this model, correlations between domain-level coefficients and fairness norm profiles differed very little from those of mean trait scores ($|\Delta r| < .03$). Crucially, in contrast to these stable domain-level correlation coefficients, facet-level coefficients dropped substantially—most of them to below $|r| < .10$ —indicating that in most cases, the relationships between personality and fairness norm profiles were best captured at the domain level. This was further reinforced by the relatively weak correlations between the two higher order meta-traits (stability and plasticity) and fairness norm measures ($|r| < .08$). These results indicate that correlations between personality and fairness norms were specific to the domains rather than meta-traits or facets.

Discussion

We investigated how basic dimensions of personality relate to individual differences in moral judgments. We examined correlations between personality traits measured using the BFI2 inventory and fairness norm profiles derived from a multitrail third-party moral judgment task. Trait scores for agreeableness, conscientiousness, openness, and extraversion correlated with individual fairness norm profiles across several offer ranges, which can be interpreted as positive relationships between these domains and the importance participants ascribed to generosity, selfishness, relative generosity, and relative selfishness norms in moral judgments. Within our bifactorial model, these correlations were strongest for the domain level of personality, suggesting that these relationships are best described in reference to personality domains rather than facets or meta-traits.

Positive correlations between B5 agreeableness and the importance of fairness norms are consistent with previous work that investigated personality correlates of prosocial behavior within traditional economic games (Thielmann et al., 2020; Zhao & Smillie, 2015). Whereas previous research has demonstrated this relationship in first-person choices, our findings show that it generalizes to moral judgments of impartial observers. We also found this pattern of associations for both context-independent and context-dependent selfishness and

generosity norms, suggesting that links between B5 agreeableness and fairness preferences may be reasonably robust across contexts with and without deservingness information. Note that this pattern of associations was not consistent for HEX-A, which only correlated with the importance participants ascribed to context-independent, but not context-dependent, norms (see Online Supplement 6 for details).

Our findings also provide new insights regarding the scope and specificity of relationships between personality and moral norms. Several other traits beyond agreeableness, including conscientiousness, openness, and extraversion, positively correlated with the importance placed on selfishness and generosity. Positive correlations between these traits and prosocial behaviors have been reported for several economic games and most often for game versions in which the instructions or the game-structure (i.e., the context surrounding the social interaction) have been altered in various ways (Brocklebank et al., 2011; Clark et al., 2014; Hirsh & Peterson, 2009; Lönnqvist et al., 2011; Zhao & Smillie, 2015); however, these relationships are not consistent across games (Thielmann et al., 2020). There are several possible accounts for our results. For instance, openness is related to sophistication and impartiality in moral reasoning (Cawley et al., 2000; De Raad & Van Oudenhoven, 2011), which may confer more confident understanding of moral norms and stronger judgments (resulting in higher PC scores). Committing to strong moral judgments may also require social confidence, as is characteristic of people who are assertive and bold, which is an aspect of extraversion. Alternatively, our extraversion results may also reflect the affiliative tendencies of extraversion. Affiliative tendencies are characterized by sensitivity to social reinforcement (DeYoung et al., 2013), which may play an important role in how moral norms are learned and increase aversion to norm violations because of potential social repercussions. A relationship between affiliation and importance assigned to fairness norms is not typically observed in economic games because other extraversion tendencies, especially agency, may positively facilitate the maximization of profit, masking a relationship between affiliation and concern for fairness norms (Zhao & Smillie, 2015). This relationship may be more readily expressed in tasks which do not provide opportunities for participants to maximize profit, such as our task. Committing to strong moral judgments may also rely on intuitions regarding the moral responsibilities of agents in economic games. Conscientious individuals tend to follow moral rules more strictly (C. M. Berry et al., 2007; Cohen et al., 2014; Marcus et al., 2007) and thus may also judge others more strictly. Alternatively, our conscientiousness findings may also reflect diligence in making judgments over many trials. Over repeated measures undiligent individuals may be more prone to making erroneous judgments (K. Berry et al., 2019), which may affect the median scores calculated across trials. Of course, these suggestions are somewhat speculative but provide potentially interesting hypotheses for future research.

We found that correlations between norm profiles and facet-level traits dropped substantially in the bifactorial model as

Table 3. Associations Between Personality Traits for Two Measurement Models (Mean Trait and Bifactorial Model Estimates) and Principal Component Scores for Context-Absent and Context-Present Judgments.

	Bifactorial Model Estimates of Personality																		
	Mean Personality Traits					Context-Absent Judgment of Relatively					Context-Present Judgment of Relatively								
	High Offers (CA-PC1)	Low Offers (CA-PC2)	Equal Offers (CA-PC3)	Higher Offers (CP-PC1)	Lower Offers (CP-PC2)	Similar Offers (CP-PC3)	High Offers (CA-PC1)	Low Offers (CA-PC2)	Equal Offers (CA-PC3)	Higher Offers (CP-PC1)	Lower Offers (CP-PC2)	Similar Offers (CP-PC3)	High Offers (CA-PC1)	Low Offers (CA-PC2)	Equal Offers (CA-PC3)	Higher Offers (CP-PC1)	Lower Offers (CP-PC2)	Similar Offers (CP-PC3)	
Agreeableness	.10 [-.01, .21]	.22 [-.32, .10]	-.01 [-.13, .11]	.07 [-.04, .18]	-.17 [-.27, .05]	-.05 [-.16, .06]	.12 [.00, .23]	.20 [-.31, .09]	-.01 [-.13, .11]	.07 [-.04, .19]	-.16 [-.27, .05]	-.03 [-.14, .08]	.12 [.00, .23]	.20 [-.31, .09]	-.01 [-.13, .11]	.07 [-.04, .19]	-.16 [-.27, .05]	-.03 [-.14, .08]	
Compassion	.14 [.02, .25]	-.20 [-.31, .09]	-.01 [-.13, .11]	.09 [-.02, .20]	-.19 [-.29, .08]	-.04 [-.15, .07]	.05 [-.06, .15]	-.07 [-.18, .04]	.00 [-.12, .10]	.05 [-.06, .16]	-.12 [-.23, .02]	-.06 [-.17, .06]	.05 [-.06, .15]	-.07 [-.18, .04]	.00 [-.12, .10]	.05 [-.06, .16]	-.12 [-.23, .02]	-.06 [-.17, .06]	
Respectfulness	.02 [-.09, .14]	-.11 [-.22, .01]	-.05 [-.17, .07]	.01 [-.11, .12]	-.09 [-.20, .03]	-.03 [-.15, .07]	.04 [-.08, .15]	-.01 [-.13, .10]	-.03 [-.15, .08]	.04 [-.09, .16]	-.04 [-.16, .08]	-.02 [-.14, .10]	.04 [-.09, .16]	-.01 [-.13, .10]	-.03 [-.15, .08]	.04 [-.09, .16]	-.04 [-.16, .08]	-.02 [-.14, .10]	
Trust	.05 [-.06, .16]	-.17 [-.27, .06]	.00 [-.11, .11]	.07 [-.03, .17]	-.10 [-.21, .01]	-.05 [-.16, .06]	-.01 [-.12, .09]	-.05 [-.16, .05]	.02 [-.08, .13]	.07 [-.04, .18]	-.03 [-.14, .08]	-.01 [-.13, .09]	.07 [-.04, .18]	-.05 [-.16, .05]	.02 [-.08, .13]	.07 [-.04, .18]	-.03 [-.14, .08]	-.01 [-.13, .09]	
Conscientiousness	.11 [.00, .22]	-.15 [-.26, .03]	.00 [-.10, .13]	.10 [-.01, .22]	-.15 [-.26, .04]	.06 [-.05, .17]	.11 [-.01, .21]	-.15 [-.26, .04]	.01 [-.11, .12]	.10 [-.01, .20]	-.16 [-.26, .05]	.06 [-.05, .17]	.11 [-.01, .21]	-.15 [-.26, .04]	.01 [-.11, .12]	.10 [-.01, .20]	-.16 [-.26, .05]	.06 [-.05, .17]	
Organization	.04 [-.07, .15]	-.06 [-.17, .05]	.02 [-.09, .14]	.07 [-.04, .18]	-.04 [-.15, .07]	.06 [-.06, .17]	.06 [-.17, .05]	.08 [-.03, .18]	.00 [-.11, .11]	.03 [-.08, .15]	-.04 [-.15, .08]	.04 [-.16, .08]	.03 [-.08, .15]	.00 [-.11, .12]	.00 [-.11, .13]	.00 [-.11, .12]	-.04 [-.15, .08]	.04 [-.16, .08]	
Productiveness	.09 [-.03, .20]	-.14 [-.25, .03]	.02 [-.13, .09]	.08 [-.04, .19]	-.16 [-.27, .05]	.05 [-.06, .15]	.04 [-.16, .08]	-.01 [-.13, .10]	.02 [-.10, .13]	.02 [-.10, .13]	-.04 [-.15, .08]	.04 [-.16, .08]	.02 [-.10, .13]	.02 [-.10, .13]	.02 [-.10, .13]	.02 [-.10, .13]	-.04 [-.15, .08]	.04 [-.16, .08]	
Responsibility	.17 [.06, .29]	-.19 [-.30, .08]	.01 [-.09, .12]	.11 [-.01, .22]	-.20 [-.30, .09]	.01 [-.10, .11]	.07 [-.04, .18]	-.08 [-.19, .02]	-.02 [-.14, .09]	.00 [-.11, .11]	-.19 [-.30, .08]	.01 [-.10, .11]	.00 [-.11, .11]	-.08 [-.19, .02]	-.02 [-.14, .09]	.00 [-.11, .11]	-.06 [-.16, .05]	.01 [-.10, .12]	.00 [-.11, .11]
Extraversion	.14 [.02, .26]	-.16 [-.27, .04]	-.01 [-.12, .11]	.14 [.02, .25]	-.19 [-.30, .08]	.01 [-.10, .11]	.13 [.01, .24]	-.16 [-.26, .04]	-.01 [-.12, .10]	.11 [.00, .21]	-.17 [-.27, .06]	.00 [-.11, .11]	.11 [.00, .21]	-.16 [-.26, .04]	-.01 [-.12, .10]	.11 [.00, .21]	-.17 [-.27, .06]	.02 [-.09, .12]	.00 [-.11, .11]
Assertiveness	.06 [-.06, .18]	-.06 [-.17, .05]	-.01 [-.13, .11]	.09 [-.03, .20]	-.09 [-.19, .02]	-.03 [-.13, .08]	-.02 [-.12, .09]	.02 [-.09, .12]	.00 [-.11, .11]	.04 [-.07, .15]	-.02 [-.13, .09]	.04 [-.07, .15]	.04 [-.07, .15]	.02 [-.09, .12]	.00 [-.11, .11]	.04 [-.07, .15]	-.02 [-.13, .09]	.02 [-.09, .12]	.08 [-.03, .19]
Energy	.14 [.02, .26]	-.17 [-.28, .06]	.01 [-.11, .12]	.17 [.06, .27]	-.19 [-.29, .08]	-.04 [-.15, .07]	.04 [-.07, .15]	-.05 [-.16, .05]	.06 [-.04, .17]	.08 [-.03, .19]	-.17 [-.28, .07]	.04 [-.07, .15]	.06 [-.04, .17]	.08 [-.03, .19]	.06 [-.04, .17]	.08 [-.03, .19]	-.06 [-.17, .04]	.08 [-.03, .19]	.10 [.00, .21]
Sociability	.11 [.00, .23]	-.14 [-.25, .03]	-.02 [-.13, .10]	.10 [-.01, .21]	-.17 [-.28, .07]	.00 [-.10, .11]	.04 [-.07, .15]	.05 [-.16, .05]	.08 [-.03, .19]	.04 [-.07, .15]	-.02 [-.13, .09]	.04 [-.07, .15]	.05 [-.16, .05]	.08 [-.03, .19]	.08 [-.03, .19]	.04 [-.07, .15]	-.06 [-.17, .04]	.08 [-.03, .19]	.10 [.00, .21]
Negative emotionality	-.09 [-.20, .02]	.09 [-.02, .20]	-.07 [-.17, .04]	-.03 [-.15, .08]	.06 [-.05, .17]	-.02 [-.13, .09]	.09 [-.21, .02]	.08 [-.04, .19]	-.07 [-.18, .03]	-.07 [-.18, .04]	.06 [-.05, .17]	.09 [-.21, .02]	.08 [-.04, .19]	-.07 [-.18, .03]	-.07 [-.18, .04]	-.04 [-.16, .07]	.07 [-.04, .18]	.04 [-.14, .07]	.10 [.00, .21]
Anxiety	-.10 [-.21, .01]	.08 [-.04, .19]	-.07 [-.17, .03]	-.07 [-.18, .03]	.04 [-.07, .15]	-.04 [-.15, .07]	-.07 [-.18, .04]	.02 [-.09, .13]	.00 [-.11, .11]	.02 [-.10, .13]	.04 [-.07, .15]	.00 [-.11, .11]	.02 [-.10, .13]	.00 [-.11, .11]	.02 [-.10, .13]	.02 [-.10, .13]	.03 [-.08, .14]	.00 [-.12, .11]	.00 [-.12, .11]
Depression	-.11 [-.23, .00]	.08 [-.03, .19]	-.07 [-.17, .03]	-.07 [-.18, .03]	.10 [-.01, .21]	-.03 [-.14, .08]	-.08 [-.19, .04]	.04 [-.07, .15]	.03 [-.08, .14]	.03 [-.08, .14]	.04 [-.07, .15]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .14]	.04 [-.07, .15]	.02 [-.12, .10]	.08 [-.03, .19]	.01 [-.11, .10]	.02 [-.08, .13]
Volatility	-.04 [-.16, .07]	.09 [-.02, .20]	-.01 [-.12, .10]	-.02 [-.13, .10]	.03 [-.07, .14]	.01 [-.10, .12]	.02 [-.10, .13]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .14]
Openness	.03 [-.09, .14]	-.08 [-.19, .03]	.05 [-.07, .16]	.11 [.00, .23]	-.14 [-.25, .02]	.02 [-.10, .13]	.03 [-.08, .14]	-.11 [-.22, .00]	.09 [-.02, .20]	.09 [-.02, .20]	-.14 [-.25, .02]	.02 [-.10, .13]	.09 [-.02, .20]	.09 [-.02, .20]	.09 [-.02, .20]	.12 [.00, .23]	-.15 [-.26, .04]	.04 [-.08, .15]	.04 [-.08, .15]
Aesthetic sensitivity	.00 [-.11, .11]	-.05 [-.16, .06]	.06 [-.05, .16]	.06 [-.05, .16]	-.09 [-.20, .01]	.00 [-.11, .11]	.02 [-.09, .13]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .14]	-.09 [-.20, .01]	.02 [-.09, .13]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .13]	.03 [-.08, .13]	.00 [-.10, .11]	.06 [-.06, .16]	.06 [-.06, .16]
Creative imagination	.02 [-.10, .13]	-.10 [-.20, .01]	.05 [-.06, .16]	.13 [.02, .25]	-.15 [-.26, .03]	.06 [-.06, .17]	.07 [-.18, .05]	-.04 [-.15, .07]	.07 [-.04, .18]	.07 [-.04, .18]	-.15 [-.26, .03]	.07 [-.18, .05]	.07 [-.04, .18]	.07 [-.04, .18]	.03 [-.08, .13]	.06 [-.06, .17]	-.03 [-.14, .08]	.03 [-.14, .08]	.03 [-.14, .08]
Intellectual curiosity	.07 [-.05, .19]	-.06 [-.17, .06]	.01 [-.10, .13]	.07 [-.05, .18]	-.10 [-.21, .02]	.01 [-.11, .12]	.17 [.06, .27]	-.07 [-.18, .05]	.07 [-.04, .18]	.07 [-.04, .18]	-.10 [-.21, .02]	.01 [-.11, .12]	.17 [.06, .27]	-.07 [-.18, .05]	.02 [-.10, .14]	.01 [-.11, .11]	.03 [-.08, .14]	.03 [-.08, .14]	.03 [-.08, .14]
Stability							.01 [-.11, .13]					.01 [-.11, .13]							
Plasticity							.02 [-.10, .14]					.02 [-.10, .14]							

Note. Spearman's rank order correlation coefficients (*r*) are shown along with 95% confidence intervals (in brackets). Cell color intensity scales with the strength of the association and ranges from red (negative correlation) and green (positive correlation), to white (zero correlation). The darkest color is anchored to the strongest correlation in the table. Coefficients with *p* < .05 (two-tailed) are bolded; however, note that no correction for multiple tests was performed. CA-PC = context-absent principal component; CP-PC = context-present principal component.

compared to traits estimated by computing means across items. Moreover, we found correlations between norm profiles and higher order meta-traits to be weak. These results suggest that heterogeneity in moral norms is best captured at the domain level. Although relationships between fairness-related behaviors and personality have been investigated at various levels (Hilbig et al., 2014; Thielmann et al., 2020; Zhao et al., 2017), our study is the first to use bifactorial models to formally test which of these levels best captures these relationships. Our findings suggest that facet-level traits do not add to our understanding of relationships between fairness preferences and personality (as compared to domain-level traits).

Finally, our findings also allow us to comment on whether relationships between personality and importance assigned to fairness norms are context-specific or generalize across contexts with and without additional deservingness information. Correlations between fairness profiles and B5 personality traits were strongest for generosity and selfishness norms and were consistent across scores for context-independent generosity and context-dependent relative generosity and across scores for context-independent selfishness and context-dependent relative selfishness (although see the previous paragraph where we discuss some subtle differences, and note that HEX-A showed a different results pattern as discussed in Online Supplements 6). This indicates that relations between B5 personality traits and norm profiles are robust across contexts with and without deservingness information. This is an important reassurance, given that subtle manipulations of contextual information in economic game tasks can substantially alter observed personality correlates of fairness-related behaviors (Zhao et al., 2017, 2018). There is even a concern that the classical Dictator Game may be so dependent on artificial contextual cues (e.g., random assignment of partners and unavailability of deservingness qualifiers) that it may not provide adequate insight into personality correlates of moral norms in naturalistic settings (Winking & Mizer, 2013). Our findings that personality correlates are consistent across judgments with and without contextual deservingness information alleviate this concern for our moral judgment task.

Strengths, Limitations, and Directions for Future Research

Our results highlight the strength of our novel methodological approach and demonstrate the benefits of using a multitrial judgment task and fPCA analyses. The congruence of our agreeableness findings with the previous literature confirms the validity of our paradigm. In fact, our correlations (.16 and .20) are larger than the meta-analytic correlations between sharing and agreeableness (ranging between .07 and .16), which may be because our estimates of importance assigned to fairness norms may be more accurate than estimates in single-shot decision paradigms. We also detected relations between several other traits and fairness profiles, when similar associations in previous work have been more fragmented (Zhao & Smillie, 2015). This could be because our estimates of importance

assigned to fairness norms may be more accurate than estimates in single-shot decision paradigms or because of any other differences that exist between unincentivized moral judgment tasks and incentivized single-shot decision paradigms. As we did not specifically predict each of these associations a priori and our methodological approach is novel, it would be valuable for future research to replicate our findings using alternative stimuli and measures. This would help confirm the reproducibility and generalizability of our findings and investigate whether these relationships are specific to fairness norms as observed in third-party moral judgments or more broadly applicable to fairness norms guiding prosocial and cooperative behaviors.

On the other hand, there are several limitations to our study that should be noted. First, our sample size was too small to draw confident conclusions about which of the presented measurement models (i.e., the bifactorial or the factor model) is the best basic personality model to be related to our data. We used these models only to improve measurement precision, relative to taking a mean across items for each trait. Moreover, because our findings were consistent across different measurement models, it seems unlikely that any of our findings are modeling artifacts. Second, the absence of correlations between equality-based norms and personality does not necessarily mean that there is no relationship between importance assigned to equality and personality. Participants exhibited much smaller individual differences in the importance they ascribed to equality and indirect reciprocity (only 9.5% and 5.6% of the variability across individuals) than for other norms. These subtle differences in judgment may require a much larger sample to be detected. Future studies could investigate these relationships in a more focused judgment task that presents examples of behaviors adhering to equality norms. Third, unlike in traditional economic games, our task was not incentivized. This could lead participants' judgments to become more susceptible to social desirability and experimenter demand effects. Variations on our models that included an evaluative factor to estimate the influence of social desirability led to poorer model fit, suggesting that social desirability did not uniformly affect all factor scores. Nevertheless, future studies should investigate more closely the effects of social desirability on third-party moral judgments such as ours. Fourth, this study used deception when presenting the cover story. Future work could consider studying judgments of hypothetical fairness actions instead, although it is to be determined whether this would produce the same patterns of moral judgments across conditions as when participants believed they were judging real actions. Future studies could also consider studying third-party judgments of real behaviors in an economic game without any deception.

Conclusion

To conclude, our novel paradigm provided precise and context-sensitive estimates of norm profiles underlying distributive justice judgments, and our findings highlight the rich

connections between personality and fairness norms. We found that B5 agreeableness, extraversion, conscientiousness, and openness related to context-independent and context-dependent norms and that these relationships were best captured at the domain level. Future studies may modify our paradigm to study individual differences in other aspects of morality (e.g., harm or authority) and engage participants from multiple perspectives (e.g., as first party or third party).

Acknowledgments

We thank Kun Zhao, Timothy Bainbridge, and Erin Lawn for their helpful discussions.

Author Note

Data and analyses scripts are available in the Open Science Framework repository, DOI: 10.17605/OSF.IO/27HUQ


Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was supported by an Australian Research Council grant (ARC DP160103353) to S.B.

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Supplemental Material

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

Note

1. Andrejević et al. (2020) investigated a different set of questions to the current study, which is why we chose to report the personality data separately.

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Handling Editor: Peter Rentfrow