Altruism and Malevolence: Opposite Ends of a Single Dimension

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Abstract

Objective: Although the possibility sounds paradoxical, several studies have found that positive and negative regard for others' welfare are orthogonal and have unique personality correlates.

We tested whether this result is an artefact of treating the oft-used self-report altruism scale (SRA) as unidimensional.

Method: In a pilot study of students and community-dwelling adults ($N = 276$, 190 women; $\text{Mean}_{\text{age}} = 21.67$, $\text{SD}_{\text{age}} = 7.49$), we factor analyzed the SRA. We confirmed its factor structure in a study of Mechanical Turk workers ($N = 814$; 410 women; $\text{Mean}_{\text{age}} = 36.6$, $\text{SD}_{\text{age}} = 11.19$).

Using an S-1 bifactor model, we created a "gold standard" general altruism factor composed of idiographic, behavioral, and questionnaire measures. We used structural equation modeling to assess how the SRA and the gold standard measure relate to gender, sexual history, and malevolence.

Results: The SRA contained three factors across both studies. The factor that accounted for the most variance positively correlated with sadism and psychopathy, a history of uncommitted sex, and being male. The other two SRA factors and the gold standard measure generally evinced the opposite associations.

Conclusion: Regard for other's welfare is likely a single dimension of personality with a unified nomological network.

Keywords: Altruism, Psychopathy, Empathy, Antisocial Behavior, Prosocial Behavior

Introduction

Could a person be both particularly caring *and* particularly cruel? Several findings speak against this possibility. For instance, the absence of empathy—the presence of which plays a key role in altruism (i.e., a non-instrumental motivation to improve the welfare of needy others; Batson, 2011)—may be a core property of psychopathy (Jones & Figueredo, 2013; Verschuere et al., 2018). Moreover, altruism and malevolence have generally opposing nomological networks: Altruism is higher in women (Falk & Hermle, 2018) and is desirable in long-term partners (Moore, Wigby, English, Wong, Székely, & Harrison, 2013), whereas malevolence is higher in men and is associated with an uncommitted mating style (Jonason, Li, Webster, & Schmitt, 2009). It is reasonable, then, to posit that the same psychological mechanisms regulate both altruistic and malevolent sentiments, making them opposite ends of a single latent continuum.

However, a few studies have reported that altruism and malevolence are not opposites, but rather are independent traits that happen to share an opposite in common—indifference. For example, a large study of adult twins observed no relationship between altruism and antisocial behaviors (Krueger, Hicks, & McGue, 2001). The authors traced altruism to positive emotionality induced by nurturing home environments, and malevolence to genetic vulnerability towards negative emotionality and low constraint. Similarly, a study of incarcerated adults found no difference in altruism between psychopaths and non-psychopaths (Book & Quinsey, 2004). This null finding was corroborated by a study of college students that found no correlation between altruism and the so-called “Dark Triad”—i.e., the variance common to narcissism, Machiavellianism, and psychopathy (Jonason, Ti, & Teicher, 2010). Finally, a recent meta-analysis found only a modest negative relationship between empathy and aggression ($r = -.11$; Vachon, Lynam, & Johnson, 2014).

The validity of these counterintuitive findings depends on the validity of the measures used to measure altruism and malevolence. Vachon and Lynam (2016) proposed that the relationship between empathy and aggression has been underestimated because extant measures of empathy only capture the extent to which participants' feelings resonated with the feelings of others. The authors observed much stronger negative relationships between aggression and their new measure of empathy, which captured not only resonant feelings, but also feelings that are dissonant with others' feelings.

The finding that prosocial and antisocial behavior are unrelated may also be method-specific. For instance, Dark Triad traits have long been linked to low agreeableness (Muris, Merckelbach, Otgaar, & Meijer, 2017), and may be identical to low Honesty-Humility (Hodson, Book, Visser, Volk, Ashton, & Lee, 2018; Woodmass & O'Connor, 2018). In addition, the same cognitive and neural mechanisms that are blunted in callous individuals have heightened responsivity in caring individuals (for a review, see Marsh, 2018).

Here, we consider the possibility that measurement problems are responsible for the apparent non-relationship between altruism and antisocial tendencies. One reason to question the null results found by Krueger et al. (2001), Book and Quinsey (2004), and Jonason et al. (2010) is that they all used the self-report altruism scale (SRA; Rushton, Chrisjohn, & Fekken, 1981) to measure trait altruism. The SRA consists of twenty "act-frequency" items that query how many times participants have performed various acts that benefit other people. Consistent with the SRA's act-frequency format, Rushton et al. (1981) defined altruism in behavioral terms: "...there is a trait of altruism. That is, some people are consistently more generous, helping and kind than others" (p. 296). Defining altruism in this way is problematic because different participants may engage in the same helpful act for different reasons (Batson, 2011). For instance, one SRA item

asks participants how many times they have donated money to charity. It is not possible to know whether a person who reports that they donate to charity “very often” does so for selfish reasons (e.g., because she regularly acquiesces to solicitations at grocery stores to avoid negative social evaluation), altruistic reasons (e.g., because she cares about the charity’s beneficiaries), or moral motives (e.g., because she follows a principle that dictates donating a certain percentage of annual income).

Researchers typically score the SRA as if it were unidimensional. But because many motives can cause the same behavior, it is likely that many SRA items either tap multiple factors or do not conform to any clear factor structure. Although some researchers have pointed out that the SRA may reflect multiple helping motives (e.g., Wilhelm & Bekkers, 2010), to our knowledge researchers have yet to assess its dimensionality definitively. Landis et al. (2009) found that a principle components analysis (PCA) of the SRA yielded two components. However, this result is not conclusive because PCA is a data reduction technique, not a method for determining dimensionality (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Arnocky, Piché, Albert, Ouellette, and Barclay (2017) claimed that an exploratory factor analysis (EFA) of the SRA revealed just one factor. However, the authors based their conclusion on a qualitative examination of a scree plot, which is unreliable (Streiner, 1998).

If the SRA is multidimensional, then it could contain factors that have opposing relationships with malevolence. Although it is counterintuitive that prosocial behavior could positively correlate with antisocial tendencies, Jonason and Webster (2012) found that people high in Dark Triad traits help others to burnish their reputations and solicit favors. Thus, some people may engage in some of the acts described in the SRA to elicit reciprocity or approbation. Similarly, Patton, Smith, and Lilienfeld (2018) found that first responders score highly on facets

of psychopathy that reflect boldness and disinhibition. Some SRA items, such as giving a stranger a ride in one's car, are risky gestures that may reflect sensation seeking more than they reflect altruism.

Pilot Study

To ascertain the factor structure of the SRA, we reanalyzed previously published data from a study on the cross-situational consistency of prosocial behavior. 276 participants (190 women; Mean_{age} = 21.67, SD_{age} = 7.49) were recruited from the University of Miami ($n = 221$) and in several locations around Miami-Dade County ($n = 55$; for full details on the protocol, see McAuliffe, Forster, Pedersen, & McCullough, in press).

All analyses from the pilot study and main study had the following analysis features. We used R version 3.4.3 (R Core Team, 2014) and relied on functions in the *lavaan* (Rosseel, 2012) and *psych* (Revelle, 2017) packages to specify our models. We employed two-tailed tests and an alpha of .05 to determine statistical significance. We used full information maximum likelihood with robust standard errors to account for violations of normality and missing data. All latent variables were treated as continuous because they had at least five response categories (Rhemtulla, Brosseau-Liard, & Savalei, 2012). Data and syntax from both studies can be accessed at <https://osf.io/qjka4/files/>.

Pilot Study Results

Despite the fact that the SRA evinced high internal consistency ($\omega = .90$), a confirmatory factor analysis (CFA) in which all items loaded on one factor had poor fit ($\chi^2(170) = 490.94, p < .001$; SRMR = .076; RMSEA = .085, 90% CI [.076, .093]; TLI = .739). Consequently, we turned to exploratory techniques to determine how many substantive factors the SRA contains. To do so, we used Velicer's MAP test, which has an under-extraction bias,

and parallel analysis with 1,000 simulated datasets, which has an over-extraction bias (O'Connor, 2000). Velicer's MAP test yielded two factors, and parallel analysis yielded three factors.

To adjudicate between these conflicting findings, we conducted a series of minimal residual exploratory factor analyses (EFA) with an oblimin rotation (see Table 1 for the factor loadings of each EFA). The EFA with two factors achieved mediocre fit ($\chi^2(151) = 299.26, p < .001$; RSMR = .06; RMSEA = .066, 90% CI[.055, .074]; TLI = .857). The items that loaded highly and uniquely on Factor 1 described favors in response to the sudden need of others (e.g., "I have given money to a stranger who needed it (or asked me for it)"). The three items that loaded on Factor 2 were all related to charitable giving (e.g., "I have donated goods or clothes to a charity"). The two factors correlated at .44. The three-factor model had adequate fit ($\chi^2(133) = 143.70, p = .250$; RSMR = .040; RMSEA = .044, 90% CI[.029, .054]; TLI = .939) and split many of the items that loaded onto Factor 1 of the two-factor model onto Factor 1 and Factor 3. Several items loaded on multiple factors and the three factors were moderately correlated with each other ($r_{1,2} = .22$; $r_{1,3} = .49$; $r_{2,3} = .41$), as one would expect if different participants endorsed the same items for different reasons. Factors 1 and 3 each accounted for 15% of item variance, while Factor 2 accounted for 10%.

Rushton, Fulker, Neale, Nias, and Eysenck (1986) reported that women score higher on the SRA, in line with other measures of altruism (Falk & Hermle, 2018). To test whether this gender difference holds across all three SRA factors we uncovered, we conducted a multi-group CFA with gender as a group factor ($\chi^2(334) = 525.55, p < .001$; SRMR = .071; RMSEA = .066, 90% CI[.055, .077]; TLI = .851). We assigned items to the factor that they loaded highest on in the three-factor EFA. We then constrained factor loadings and item intercepts equal across

gender, which reduced model fit. After freeing two item intercepts that were noninvariant, we set the factor intercepts to zero for men. Examining the factor intercepts for women, we found that women scored similarly to men on Factor 1, $M_{\text{diff}} = .00$, $SE = .11$, $Z = 0.04$, $p = .971$, $d = .01$, higher on Factor 2, $M_{\text{diff}} = 0.53$, $SE = 0.11$, $Z = 4.89$, $p < .001$, $d = 1.00$, and higher on Factor 3, $M_{\text{diff}} = 0.17$, $SE = 0.09$, $Z = 2.03$, $p = .043$, $d = .32$.

Pilot Study Discussion

Our pilot study revealed that the SRA contains three factors, not just one. The factors were moderately correlated and there were several cross-loadings, suggesting that multiple motives explained endorsement of the same items. Factor 1 consisted of items that described favors (e.g., “I have given a stranger a lift in my car”). Women and men did not differ on Factor 1, which is anomalous because women tend to score higher on altruism measures.

Factors 2 and 3 described charitable acts (e.g., “I have done volunteer work for a charity”) and polite acts (“I have delayed an elevator and held the door open for a stranger”), respectively. Women scored higher on both factors. Overall, there is clear evidence that the SRA is multidimensional, leaving open the possibility that nil correlations between the SRA and antisocial behavior observed in previous studies was an artefact of aggregating SRA factors that measure opposing tendencies.

Present Study

The present investigation had three primary aims. First, we were interested in whether the SRA factor structure observed in the pilot study would replicate in a larger sample from a different population. Second, we sought to assess whether the SRA’s multidimensionality is responsible for its nil correlation with malevolence. Third, we attempted to create a “gold standard” measure of altruism that could (1) serve as a criterion from which to validate the SRA,

(2) clarify the relationship between altruism and malevolence, and (3) specify the nomological network of trait altruism.

Method

A power analysis using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) revealed that data from 779 participants yields 80% power to detect effects as small as $r = .1$. Consequently, we planned to recruit at least 800 participants from Amazon.com's Mechanical Turk (MTurk), an online crowdsourcing service. Participants were offered a \$1.00 base payment to complete the study, plus a bonus payment of up to \$2.00 for completing the study (depending on how much money they donated to charity at the end of the study—see the protocol below). 814 participants (410 women; $\text{Mean}_{\text{age}} = 36.6$, $\text{SD}_{\text{age}} = 11.19$) completed the study. The planned sample size, protocol, predictions, and analysis plan were preregistered on Open Science Framework, and can be viewed at <https://osf.io/86gwk/>.

Analyses involving the “gold standard” measure of altruism were not preregistered. We originally planned to compare the SRA to other questionnaire altruism measures by observing their relationships with each of the non-questionnaire measures of altruism. However, once we realized that we could use an S-1 bifactor model to partial out method variance (Eid, Geiser, Koch, & Heene, 2017), we decided that a single criterion composed of behavioral, idiographic, and questionnaires altruism measures was a more defensible gold standard. Also, we had preregistered we would run exploratory and confirmatory “classical” bifactor models on the SRA (Rodriguez, Reise, & Haviland, 2016). However, we abandoned this plan upon learning that these methods are only appropriate for data with a two-level sampling structure (Eid et al., 2017).

Measures

SRA. In addition to the original 20 SRA items ($\omega = .88$; $M = 2.64$, $SD = 0.58$), we also wrote nine (three more than the six that we originally planned and pre-registered) items that had the same act-frequency format as the SRA in case factor analysis of the 20-item SRA recovered a locally under-identified factor. However, all of the factors we identified had at least three items, so we do not analyze the extra nine items here.

Malevolence. To measure antisocial traits we administered the Short Dark Triad (Jones & Paulhus, 2014) and Assessment of Sadistic Personality (Plouffe, Saklofske, & Smith, 2017) scales. We used only the 9-item psychopathy sub-scale of the Short Dark Triad to shorten the protocol ($\omega = .82$; $M = 2.28$, $SD = .52$). We chose the psychopathy sub-scale because Machiavellianism and psychopathy may be indistinguishable, and all three sub-scales have considerable overlap (Miller, Hyatt, Maples-Keller, Carter, & Lynam, 2017; Persson, Kajonius, & Garcia, 2017). The Assessment of Sadistic Personality is a 9-item measure scored on a 5-point rating scale (1 = Strongly Disagree, 5 = Strongly Agree) that asks participants whether they agree with statements concerning the possession of desires to harm others (e.g., “Hurting people would be exciting”; $\omega = .90$; $M = 1.85$, $SD = .62$).

Sexual History. To clarify the nomological networks of altruism and malevolence, we also used two of Arnocky’s measures of mating success: Self-reported number of (consensual) life-time sex partners ($M = 10.78$, $SD = 15.68$), as well as self-reported number of (consensual) casual sex partners ($M = 7.99$, $SD = 15.90$). Arnocky et al. (2017) found both measures were positively associated with the SRA, particularly among men. Jonason et al. (2009) found that the Dark Triad predicted preference for a short-term mating strategy (i.e., preferring many casual sex partners to fewer, long-term partners), especially among men. We logit-transformed both measures to improve normality.

Confounders of gender differences. We also planned to assess whether women score higher on the SRA. We realized, however, that gender differences in the SRA could reflect artefacts of the specific acts described. For instance, many of the helping acts described on Factor 1, such as helping push a car, require physical strength and potentially leave less formidable helpers open to exploitation. Because men are on average more physically formidable than women (Lassek & Gaulin, 2009), they may score higher on Factor 1 even if they are not higher on the psychological construct that Factor 1 represents. Similarly, religious involvement facilitates charitable acts; women's higher involvement in religious events could thereby explain their higher score on Factor 2 (Einolf, 2011). To address whether content bias is responsible for gender differences on the SRA factors, we had participants use a sliding scale to respond to three items about how formidable they are relative to the rest of the U.S. population (e.g., "I would estimate that I am stronger than ____% of other people (including both men and women) in the U.S."; $\omega = .90$; $M = 39.67$, $SD = 22.75$). We also employed the 4-item interpersonal subscale of the Religious Commitment Inventory (RCI; Worthington et al., 2003; e.g., "I keep well informed about my local religious group and have some influence in its decisions"), which participants responded to on a 5-point rating scale (1 = "not at all true of me", 5 = "totally true of me"; $\omega = .94$; $M = 1.84$, $SD = 1.15$).

Alternative altruism measures. Although we were interested in how each factor of the SRA relates to malevolence, our broader goal was to determine whether altruism, independent of how it is measured, is negatively associated with malevolence. To this end, we measured trait altruism in several ways, each of which has unique strengths that distinguish them from each other and the SRA. Two of the additional altruism measures were also self-report questionnaires: The altruism facet scales from the NEO and HEXACO personality inventories. These measures

differ from the SRA in that they assess psychological dispositions rather than specific behaviors, but are similar to the SRA in that they lack contextual information. For example, the NEO altruism scale includes the item “I love to help others,” and the HEXACO altruism scale includes the item “People see me as a hard-hearted person” [reverse-coded]. The NEO Altruism Scale (Costa & McCrae, 1992) has participants indicate their level of agreement with ten statements on a 5-point rating scale (1 = strongly disagree, 5 = strongly agree; $\omega = .88$; $M = 3.98$, $SD = .63$). Participants respond to the HEXACO-Altruism scale (Lee & Ashton, 2018) by indicating their level of agreement with four statements on a 5-point rating scale (1 = strongly disagree, 5 = strongly agree; $\omega = .67$; $M = 3.99$, $SD = .70$).

Although researchers have thoroughly vetted both the NEO and HEXACO inventories, a weakness of questionnaire measures is that the transparency of their content evokes socially desirable responding (Paulhus & John, 1998). Based on evidence that asking participants to report their goals cues weaker concerns about appearing prosocial than do standard self-report questionnaires (Frimer, Schaefer, & Oakes, 2014), we sought to measure altruism by evaluating the content of people’s goals. We had participants complete ten sentences starting with “I typically try to . . .” with the goals that they are trying to achieve in their everyday lives (Emmons, 1999). Two independent raters who completed training in using the Values Embedded in Narrative (VEiN) coding procedure (Frimer, Walker, & Dunlop, 2009) coded each goal for evidence of benevolence (95% raw agreement; $\kappa = .80$) and/or universalism (99% raw agreement; $\kappa = .67$), values that underpin prosocial behavior cross-culturally (Schwartz, 2010). Benevolence was coded when a goal indicated “concern for the welfare of others in everyday interaction” (Frimer et al., 2009, p. 11), consistent with the definition of altruism employed in the present paper. Universalism was coded when a goal reflected “understanding, appreciation,

tolerance, and protection for the welfare of people beyond the primary reference group (e.g., all people, the community, disadvantaged people)” (Frimer et al., 2009, p. 10), which we regard as evidence of moral motivation rather than altruistic motivation per se (Batson, 2011).

Benevolence and universalism goals have been found to distinguish people who have been recognized for committing their lives to benefitting other people from matched controls (Frimer, Walker, Dunlop, Lee, & Riches, 2011). The first author resolved coding discrepancies in conversation with the raters. We summed benevolence goals to generate an idiographic measure of altruism ($M = 2.38$, $SD = 1.61$), and summed universalism goals to create an idiographic measure of moral motivation ($M = 0.23$, $SD = 0.56$).

Finally, voluminous evidence suggests that empathic concern in response to others’ distress generates altruistic motivation (Batson, 2011; McAuliffe, Forster, Philippe, & McCullough, 2018). Thus, we had participants watch a 90-second video by Oxfam about refugees of civil war. After finishing the video, participants indicated how strongly they were feeling 13 emotions on a 7-point rating scale (1 = not at all, 7 = extremely). Mixed among distractors were five adjectives that formed an index of empathic concern: sympathetic, compassionate, empathic, softhearted, and tender ($\omega = .94$; $M = 5.62$, $SD = 1.46$; Batson, 2011). Participants then learned that they had an opportunity to donate some or all of their bonus payment from the study to Oxfam America. Participants finished the study by indicating how much of their bonus payment (in \$0.05 increments) they would like to donate to charity ($M = \$0.55$, $SD = \$0.66$). We logit-transformed charitable giving amounts so that its metric would match more closely the other items on the S-1 bifactor model.

Protocol

All participants received the measures in the same order. After completing demographics, participants listed their goals. This task preceded the other measures so that participants would not infer that we were interested in whether they would report prosocial or antisocial goals. Participants then completed the SRA, the NEO and HEXACO altruism scales, the psychopathy and sadism scales, the sexual history items, the RCI, the physical formidability items, and finally the charitable giving task. No other measures were included in the protocol.

Results

Measurement Models

We moved to exploratory methods after a CFA in which all 20 SRA items loaded on one factor had inadequate fit ($\chi^2(170) = 989.78, p < .001$; SRMR = .057; RMSEA = .076, 90% CI[.071, .081]; TLI = .799). Velicer's MAP yielded 1 factor, while parallel analysis yielded 6 factors. To address these inconsistent results, we conducted a series of EFAs. Extracting two factors yielded mediocre fit, $\chi^2(151) = 609.57, p < .001$; RMSR = .040; RMSEA = .062, 90% CI[.056, .067]; TLI = .867. Extracting three factors yielded adequate fit, $\chi^2(133) = 343.66, p < .001$; RMSR = .030; RMSEA = .051, 90% CI[.045, .056]; TLI = .911. Loadings were similar to those of the pilot study, with some notable exceptions (see Table 2). Factor 1 accounted for more variance (19%) than Factor 2 (8%) and Factor 3 (9%). Four items that loaded strongest on Factor 3 in the pilot study loaded on Factor 1 in the present study. These differences in factor loadings across studies may reflect sampling variation or real differences in the motives that underlie helping behaviors in the Mechanical Turk and Miami populations.

To create the “gold standard” measure of altruism, we set out to specify a model in which a single factor would represent the shared variance across questionnaire, behavioral, and idiographic measures of altruism, purified of method variance shared by subsets of the

indicators. Thus, we created an S-1 bifactor model, which specifies a “general” factor that all items load on (the “gold standard”), and “specific” factors that represent the residual variance among subsets of items (see Figure 1). One subset of items does not load on a specific factor, and therefore its trait and method variance define the general factor (Eid et al., 2017). Each specific factor represents how much higher or lower a participant scores in a given content area trait given their position on the general factor. The general factor may not correlate with the specific factors, but the specific factors may correlate with each other.

We treated the benevolence strivings as the reference item for the general factor because it is a single indicator and possesses relatively little variance attributable to socially desirable responding (Frimer et al., 2014). Exploratory factor analyses revealed that both the NEO and Altruism questionnaires possess a content factor on which the negatively worded items loaded. These content factors likely represent a desire to deny callous tendencies (Paulhus & John, 1998). Consequently, we created a specific factor for the reverse-scored items on the HEXACO and NEO; the positively worded items loaded on only the general factor. We also created a specific factor for the donation decision and self-reported empathic concern, as these indicators likely possess variance specific to the charity video task. Note that we regard the general factor as a gold standard merely in the sense that it is composed of validated measures of altruism utilizing multiple measurement methods, all of which differ in certain ways from the SRA. We do not use the term “gold standard” to indicate that the general factor is the best imaginable measure of altruism.

Model fit of the S-1 bifactor model was adequate, $\chi^2(175) = 505.18, p < .001$; SRMR = .038; RMSEA = .048, 90% CI: [.044, .052]; TLI = .934. The only indicator with relatively low standardized loadings was the donation measure (.18 on the general factor; .16 on the charity

video factor), likely because it employed the most distinct measurement method. The charity video and reverse-scored factors were not significantly correlated ($r = .09, p = .162$).

We assessed the validity of the single-factor SRA by regressing the general factor of the S-1 bifactor model on it ($\chi^2(762) = 2115.82, p < .001$; SRMR = .059; RMSEA = .047, 90% CI: [.045, .049]; TLI = .874). The SRA strongly predicted the general factor ($b = 0.41, SE = 0.07, Z = 6.02, p < .001, r = .46$), confirming that it does possess considerable validity. To find out which factors of the SRA possesses the most validity, we regressed the general factor on each of its three factors simultaneously ($\chi^2(753) = 1813.44, p < .001$; SRMR = .047; RMSEA = .042, 90% CI: [.039, .044]; TLI = .900). Factor 1 had a nonsignificant *negative* correlation with the general factor ($b = -0.11, SE = 0.07, Z = -1.67, p = .095, r = -.13$). Factor 2 had a moderate, positive correlation with the general factor ($b = 0.19, SE = 0.07, Z = 2.69, p = .007, r = .24$), while Factor 3 had a strong, positive association ($b = 0.50, SE = 0.13, Z = 3.91, p < .001, r = .48$). To test whether Factors 2 and 3 might represent moral rather than altruistic motives, we added universalism as a covariate ($\chi^2(793) = 1908.69, p < .001$; SRMR = .049; RMSEA = .042, 90% CI: [.039, .044]; TLI = .897). Although universalism had a small, positive relationship with the general factor ($b = 0.10, SE = 0.03, Z = 3.63, p = .001, r = .11$), the associations between each of the SRA factors and general factor were virtually unchanged. Thus, the relationship between the SRA and the general factor is likely not accounted for by moral motives to help.

Gender Differences in Altruism and Malevolence

To test for gender differences in the SRA factors, we created a three-factor CFA with gender as the group factor, $\chi^2(334) = 802.96, p < .001$; SRMR = .055; RMSEA = .059, 90% CI [.054, .064]; TLI = .862. Constraining the factor loadings and item intercepts equal across gender degraded model fit. We achieved scalar invariance by freeing two factor loadings and five item

intercepts that modification indices indicated were noninvariant. Similar to the pilot study, women scored lower on Factor 1, $b = -0.15$, $SE = 0.05$, $Z = -3.01$, $p = .003$, $d = -0.25$, but higher on Factor 2, $b = 0.32$, $SE = 0.09$, $Z = 3.56$, $p < .001$, $d = 0.46$, and Factor 3, $b = 0.11$, $SE = 0.05$, $Z = 2.33$, $p = .020$, $d = 0.18$. Regressing the factors on the RCI and formidability index did not eliminate these gender differences, consistent with the thesis that these gender differences generalize beyond the acts described on the SRA.

We assessed gender differences in the S-1 bifactor model by entering gender as a group factor and constraining factor loadings and item intercepts equal across gender. Exact model fit decreased, but information criteria and approximate model fit showed improvements. Women scored higher than men in general altruism, $b = 0.27$, $SE = 0.05$, $Z = 5.19$, $p < .001$, $d = 0.49$. Interestingly, women also scored nonsignificantly higher on the negatively worded factor, $b = 0.05$, $SE = 0.04$, $Z = 1.32$, $p = .185$, $d = 0.10$, and significantly higher on charity video factor $b = 0.15$, $SE = 0.05$, $Z = 2.88$, $p = .004$, $d = 0.28$.

To confirm that malevolence is higher in men, we created a CFA of the sadism and psychopathy factors, with gender as a group factor, $\chi^2(268) = 655.38$, $p < .001$; SRMR = .053; RMSEA = .060, 90% CI: [.056, .065]; TLI = .883. The two factors were highly correlated in both women ($r = .89$) and men ($r = .93$). This suggests that sadism may simply represent an extreme version of psychopathy, rather than representing a different motivational system. Constraining factor loadings and item intercepts equal across gender reduced model fit. After freely estimating the four biased item intercepts, we found that women scored lower on psychopathy ($d = -.50$) and sadism ($d = -.56$).

Altruism and Malevolence

We created a series of structural equation models in which different altruism measures predicted psychopathy and sadism (see Table 3 for model fit and regression estimates). We first ran a model in which all twenty SRA items were treated as indicators of a single factor. Results indicated that the SRA does not significantly correlate with psychopathy ($p = .240$, $r = -.05$) or sadism ($p = .062$, $r = -.07$). Entering each of the three SRA factors as simultaneous predictors revealed that these null correlations are caused by positive and negative correlations between specific SRA factors and antisocial traits cancelling each other out. Specifically, Factor 1 positively predicted psychopathy ($p < .001$, $r = .56$) and sadism ($p < .001$, $r = .61$), while Factor 2 (psychopathy: $p = .001$, $r = -.31$; sadism: $p = .010$, $r = -.24$) and Factor 3 (psychopathy: $p < .001$, $r = -.49$; sadism: $p < .001$, $r = -.60$) evinced negative associations. Last, we ran a model in which the general factor of the S-1 bifactor model was the predictor. The general factor was also negatively associated with psychopathy ($p < .001$, $r = -.56$) and sadism ($p < .001$, $r = -.52$).

Altruism and Sexual History

We created a series of structural equation models in which different altruism measures predicted lifetime and casual sexual history (see Table 4) for model fit and regression estimates of the main effects models). Arnocky et al. (2017) found that the relationship between the SRA and sexual history was stronger for men, so we tested the interaction between altruism and gender in follow-up analyses. We created interaction terms using double-mean centering (Lin, Wen, Marsh, & Lin, 2010). We did not use robust standard errors in the interaction analyses because it prevented the software from computing simple slopes.

We first ran a model in which all twenty SRA items were treated as indicators of a single factor. Results indicate that the SRA significantly predicts number of lifetime ($p < .001$, $r = .17$) and casual ($p < .001$, $r = .22$) partners. Next, we added gender and the product of gender and the

SRA as an interaction term, $\chi^2(855) = 2506.48, p < .001$; SRMR = .055; RMSEA = .049, 90% CI [.047, .051]; TLI = .803. Women reported a significantly smaller history of lifetime ($b = -0.17, SE = 0.08, Z = -2.18, p = .029, d = -.17$) and casual sex ($b = -0.31, SE = 0.08, Z = -3.80, p < .001, d = -.31$). The interaction between gender and casual sex was significant ($p = .036$). Against Arnocky et al.'s (2017) finding that altruism has a stronger association with sexual history for men, the slope relating the SRA to casual sex partners was significant for *women* ($b = .20, SE = .04, \chi^2(1) = 4.65, p < .001$), but not men ($b = .08, SE = .06, \chi^2(1) = 1.40, p = .160$). The slope relating the SRA to lifetime sex partners was large for women ($b = .24, SE = .04, \chi^2(1) = 5.97, p < .001$), but still significant for men ($b = .15, SE = .06, \chi^2(1) = 2.66, p = .007$).

Entering each of the three SRA factor as simultaneous predictors showed that only Factor 1 has a positive relationship with lifetime ($p < .001, r = .33$) and casual ($p < .001, r = .37$) sex partners. Factor 2 had a negative relationship with sexual history (lifetime: $p = .091, r = -.16$; casual: $p = .007, r = -.23$), while Factor 3 had no relationship with sexual history (lifetime: $p = .874, r = .02$; casual: $p = .792, r = -.03$). In three separate models (to avoid multicollinearity) we added gender and the product of gender of a particular SRA factor as an interaction term. The model with the product of Factor 1 and gender ($\chi^2(615) = 1761.61, p < .001$; SRMR = .048; RMSEA = .048, 90% CI [.045, .051]; TLI = .858) yielded a significant interaction in predicting number of casual sex partners ($p = .019$) and lifetime sex partners ($p = .038$). Factor 1 scores positively predicted a history of casual sex for women ($b = .57, SE = .13, \chi^2(1) = 4.23, p < .001$) but not men ($b = .24, SE = .21, \chi^2(1) = 1.13, p = .257$). Similarly, Factor 1 scores predicted number of lifetime sex partners for women ($b = .50, SE = .13, \chi^2(1) = 4.03, p < .001$) but not men ($b = .23, SE = .19, \chi^2(1) = 1.18, p = .236$). There were no significant interactions between Factors 2 or 3 and gender in predicting the number of lifetime or casual sex partners.

Next, we ran a model in which the general factor of the S-1 bifactor model was the predictor of lifetime and casual sex history. The general factor was negatively associated with having had casual sex partners ($p = .016$, $r = -.09$) and nonsignificantly associated with number of lifetime sex partners ($p = .588$, $r = -.02$). However, the general factor did have a small positive relationship with number of lifetime sex partners after controlling for number of casual sex partners ($p = .005$, $r = .05$). Next, we added gender and the product of gender and the general factor as an interaction term, $\chi^2(924) = 3603.32$, $p < .001$; SRMR = .064; RMSEA = .060, 90% CI [.058, .061]; TLI = .792. Gender did not interact with the general factor to predict the number of lifetime sex partners ($b = 0.05$, $SE = 0.21$, $Z = 0.23$, $p = .821$, $r = .01$) or casual sex partners ($b = -0.15$, $SE = 0.23$, $Z = -0.62$, $p = .534$, $r = -.03$).

If malevolence and altruism are opposite sides of the same coin, then malevolence should be associated specifically with a casual sex history. In an exploratory test of this prediction, we first assessed whether psychopathy predicted number of lifetime and casual sex partners ($\chi^2(43) = 241.79$, $p < .001$; SRMR = .063; RMSEA = .075, 90% CI [.068, .084]; TLI = .878). Psychopathy significantly predicted number of casual sex partners ($b = 0.45$, $SE = 0.08$, $Z = 5.92$, $p < .001$, $r = .27$) and number of lifetime sex partners ($b = 0.30$, $SE = 0.07$, $Z = 4.16$, $p < .001$, $r = .19$). We then added casual sex partners as a covariate to the prediction of lifetime sex partners and vice versa. The partial correlation between psychopathy and casual sex partners was half the size but still significant ($b = 0.25$, $SE = 0.04$, $Z = 6.17$, $p < .001$, $r = .15$), while psychopathy's relationship with number of lifetime sex partners was a third of the size of the zero-order correlation but also still significant ($b = 0.09$, $SE = 0.04$, $Z = 2.21$, $p = .021$, $r = .06$). Sadism was more specifically related to casual sex ($\chi^2(43) = 121.15$, $p < .001$; SRMR = .030; RMSEA = .047, 90% CI [.040, .055]; TLI = .958). At the zero-order level, sadism significantly

predicted number of casual sex partners ($b = 0.34$, $SE = 0.07$, $Z = 5.02$, $p < .001$, $r = .21$), as well as number of lifetime sex partners ($b = 0.19$, $SE = 0.06$, $Z = 2.98$, $p = .003$, $r = .13$). Controlling for lifetime sex partners and casual sex partners, respectively, sadism still predicted a history of casual sex ($b = 0.22$, $SE = 0.04$, $Z = 5.39$, $p < .001$, $r = .14$) but not lifetime sexual history ($b = 0.01$, $SE = 0.04$, $Z = 0.33$, $p = .741$, $r = .01$). Overall, antisocial traits appear to have a stronger relationship with a history of casual sex partners rather than long-term partners.

Discussion

Are altruism and malevolence opposites of each other, or are they merely both opposites of indifference? Most literature supports the former possibility (Hodson et al., 2018; Marsh, 2018), while studies using the SRA as if it was unidimensional support the latter possibility (Book & Quinsey, 2004; Jonason et al., 2010; Krueger et al., 2001). We replicated previous findings that a one-factor SRA is uncorrelated with malevolence and is positively correlated with a history of casual sex. However, we also discovered that the SRA has three factors, one of which positively correlates with malevolence and two of which negatively correlate with it. Thus, collapsing across SRA factors explains why previous investigators observed null relationships between the SRA and various measures of antisocial traits. A “gold standard” measure of altruism further confirmed that altruism and malevolence are opposite ends of the same personality trait. Their opposing nature is further borne out by their relationships with gender and sexual history. Altruism is stronger in women and has a positive (but small) relationship with number of sex partners (after controlling for casual sex partners), consistent with recent findings that altruistic people have more children (Eriksson, Vartanova, Strimling, & Simpson, 2018). In contrast, malevolence is stronger in men and is most strongly related to a history of casual sex.

Why has the misuse of the SRA persisted for so long? One possibility is that, consistent with general trends in social and personality psychology (Flake, Pek, & Hehman, 2017) researchers took false comfort in high internal consistency coefficients (many researchers have reported coefficient alphas for the SRA between .80 and .90). Coefficient alpha assumes rather than tests unidimensionality and can yield spuriously high reliability estimates in the presence of multidimensionality (Cortina, 1993). A second possibility is that researchers often label prosocial and antisocial behaviors according to their outcome, rather than to their underlying motivational causes (Batson, 2011; Lilienfeld, 2018; Paulhus, Curtis, & Jones, 2018). Because SRA items describe behaviors that all have the same outcome—viz., the improved welfare of the beneficiary—researchers might have falsely assumed that the items share a common cause.

Whatever the cause of lax oversight on the SRA, our findings have practical implications for the measurement of altruism. First, researchers should stop using the SRA. Substituting the SRA for a multi-method approach is likely optimal, but the NEO altruism scale is reliable and could serve well as a convenience measure. Second, if positive and negative regard for others' welfare really are opposite poles of a single dimension, then researchers should use measures at both ends of the continuum with indifference at the mid-point. For instance, Vachon and Lynam's (2016) Affective and Cognitive Empathy scale measures both empathic concern and *schadenfreude*, thereby attenuating range restriction and differentiating people who are malevolent rather than merely indifferent towards others (Murphy, Costello, Watts, Cheong, Berg, & Lilienfeld, 2018).

The cross-sectional nature of our analyses prevents us from making claims about why altruism and malevolence form a single dimension of personality. One possibility is that the same processes regulate both malevolence and altruism. A similar possibility is that altruism and

malevolence rely on distinct sets of cognitive mechanisms, but the activation of one set inhibits the other. A third possibility is that altruism and malevolence have no common cause, but negatively correlate because they have antagonistic developmental pathways such that increases in one trait cause reductions in the other. Teasing apart these possibilities will require experiments that test whether enhancing altruism attenuates malevolence and vice versa (e.g., Brigham, Kelso, Jackson, & Smith, 1997), and longitudinal studies that model the interplay between malevolent and altruistic motives (e.g., Kievit et al., 2017).

To sum up, our results suggest that the terms “altruism” and “malevolence” can be substituted for a single construct: Regard for others’ welfare. This conceptual shift implies that altruism and malevolence have a unified nomological network. Whether regard for others’ welfare is relatively central to that network or a peripheral consequence of one of its correlates is an important question for future research. We also caution that researchers risk committing the jangle fallacy by making claims about just altruism or about just malevolence. Integrating the sometimes-isolated research literatures on prosocial behavior and antisocial behavior would speed up the consilience of researchers’ understanding of personality.

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Table 1. Factor loadings from exploratory factor analysis of pilot study

Numbers of factors extracted	1	2	3
Factor	1	1 2	1 2 3
1. I have helped a stranger whose car has broken down or pushed a stranger's car out of snow, mud, water, etc.	.52	.65 -.12	.65 .01 .01
2. I have given directions to a stranger.	.58	.40 .27	.01 .06 .61
3. I have made change for a stranger.	.58	.52 .11	.11 -.09 .62
4. I have given money to a charity.	.56	.11 .68	-.10 .49 .42
5. I have given money to a stranger who needed it.	.58	.56 .06	.18 -.10 .57
6. I have donated goods or clothes to a charity.	.51	.00 .76	.03 .74 .08
7. I have done volunteer work for a charity.	.42	-.07 .74	.06 .84 -.10
8. I have donated blood.	.35	.30 .12	.38 .22 -.08
9. I have helped carry a stranger's belongings.	.64	.60 .11	.41 .11 .29
10. I have delayed an elevator and held the door open for a stranger.	.43	.12 .44	-.20 .22 .52
11. I have allowed someone to go ahead of me in a lineup (e.g. in the supermarket)	.51	.42 .14	.07 -.03 .53
12. I have helped an acquaintance to move households.	.53	.62 -.07	.57 .04 .07
13. I have pointed out a clerk's error (e.g., in a bank, at the supermarket) in undercharging me for an item.	.49	.39 .16	.27 .14 .22
14. I have let a neighbor whom I didn't know too well borrow an item of some value to me.	.48	.56 -.07	.58 .07 -.02
15. I have bought 'charity' greeting cards deliberately because I knew it was a good cause.	.59	.43 .26	.40 .30 .11
16. I have helped a classmate who I did not know that well with a homework assignment when my knowledge was greater than his or hers.	.50	.24 .39	-.01 .26 .42
17. I have before being asked, voluntarily looked after a neighbor's pets or children without being paid for it.	.54	.52 .06	.37 .07 .23
18. I have offered to help a handicapped or elderly stranger across a street.	.63	.65 .03	.41 .00 .35
19. I have offered my seat on a bus or train to a stranger who was standing.	.63	.59 .10	.28 .00 .45
20. I have given a stranger a lift in my car.	.39	.59 -.23	.61 -.08 -.04

Table 2. Factor loadings from exploratory factor analysis of present study

Numbers of factors extracted	1	2	3
Factor	1	1 2	1 2 3
1. I have helped a stranger whose car has broken down or pushed a stranger's car out of snow, mud, water, etc.	.61	.63 .04	.63 -.02 .08
2. I have given directions to a stranger.	.55	.11 .56	.17 .08 .55
3. I have made change for a stranger.	.55	.50 .11	.53 -.07 .18
4. I have given money to a charity.	.48	.07 .52	-.05 .65 .11
5. I have given money to a stranger who needed it.	.58	.44 .21	.43 .14 .14
6. I have donated goods or clothes to a charity.	.51	.01 .63	-.04 .55 .27
7. I have done volunteer work for a charity.	.49	.30 .27	.20 .54 -.11
8. I have donated blood.	.37	.34 .07	.30 .17 -.04
9. I have helped carry a stranger's belongings.	.58	.49 .15	.55 -.12 .26
10. I have delayed an elevator and held the door open for a stranger.	.48	-.07 .69	.00 .12 .66
11. I have allowed someone to go ahead of me in a lineup (e.g. in the supermarket)	.53	.16 .48	.20 .13 .41
12. I have helped an acquaintance to move households.	.57	.50 .13	.49 .09 .09
13. I have pointed out a clerk's error (e.g., in a bank, at the supermarket) in undercharging me for an item.	.53	.41 .19	.38 .19 .07
14. I have let a neighbor whom I didn't know too well borrow an item of some value to me.	.55	.70 -.12	.66 .05 -.13
15. I have bought 'charity' greeting cards deliberately because I knew it was a good cause.	.52	.47 .10	.40 .33 -.13
16. I have helped a classmate who I did not know that well with a homework assignment when my knowledge was greater than his or hers.	.48	.30 .25	.31 .12 .18
17. I have before being asked, voluntarily looked after a neighbor's pets or children without being paid for it.	.51	.42 .14	.37 .31 -.07
18. I have offered to help a handicapped or elderly stranger across a street.	.64	.54 .17	.54 .08 .14
19. I have offered my seat on a bus or train to a stranger who was standing.	.57	.31 .35	.34 .07 .32
20. I have given a stranger a lift in my car.	.42	.67 -.23	.63 .05 -.16

Figure 1. “Gold Standard” bifactor S-1 model of altruism. “Benevolence” = number of benevolence strivings. “Donate” = amount of money donated to Oxfam. “Empathy” = self-reported empathic concern for refugee victims presented in Oxfam video. “HEXACO” = items from HEXACO altruism scale. “NEO” = items from the altruism scale of the NEO.

Table 3. Regressions of Malevolence on Altruism

	<i>b</i>	<i>SE</i>	<i>Z</i>	<i>p</i>	<i>r</i>
<i>Psychopathy</i>					
SRA	-.05	.04	-1.17	.240	-.05
<i>Sadism</i>					
SRA	-.07	.04	-1.87	.062	-.07
Model Fit: $\chi^2(662) = 2095.08$, $p < .001$; SRMR = .068; RMSEA = .052, 90% CI [.049, .054]; TLI = .840					
<i>Psychopathy</i>					
SRA1	.67	.12	5.82	<.001	.60
SRA2	-.33	.10	-3.25	.001	-.31
SRA3	-.66	.17	-3.89	<.001	-.49
<i>Sadism</i>					
SRA1	.71	.11	6.24	<.001	.61
SRA2	-.26	.10	-2.57	.010	-.24
SRA3	-.84	.18	-4.76	<.001	-.60
Model Fit: $\chi^2(655) = 1775.27$, $p < .001$; SRMR = .050; RMSEA = .046, 90% CI [.044, .048]; TLI = .874					
<i>Psychopathy</i>					
General	-.72	.10	-7.22	<.001	-.56
<i>Sadism</i>					
General	-.70	.10	-6.83	<.001	-.52
Model Fit: $\chi^2(685) = 1982.34$, $p < .001$; SRMR = .086; RMSEA = .048, 90% CI [.046, .050]; TLI = .882					

Note: SRA = one-factor self-report altruism scale. SRA1 = Factor 1 of three-factor self-report altruism scale. SRA2 = Factor 2 of three-factor self-report altruism scale. SRA3 = Factor 3 of three-factor self-report altruism scale. General = general factor of the S-1 bifactor model, the “gold standard” measure of altruism.

Table 4. Regressions of Number of Sex Partners on Altruism

	<i>b</i>	<i>SE</i>	<i>Z</i>	<i>p</i>	<i>r</i>
<i>Lifetime</i>					
SRA	.39	.07	5.35	<.001	.22
<i>Casual</i>					
SRA	.32	.08	4.02	<.001	.17
Model Fit: χ^2 (208) = 936.81, p < .001; SRMR = .057; RMSEA = .066, 90% CI [.062, .070]; TLI = .829					
<i>Lifetime</i>					
SRA1	.57	.13	4.47	<.001	.33
SRA2	-.26	.16	-1.69	.091	-.16
SRA3	.04	.22	.16	.874	.02
<i>Casual</i>					
SRA1	.69	.15	4.67	<.001	.37
SRA2	-.41	.15	-2.71	.007	-.23
SRA3	-.06	.23	-.26	.792	-.03
Model Fit: χ^2 (201) = 689.13, p < .001; SRMR = .050; RMSEA = .055, 90% CI [.050, .059]; TLI = .882					
<i>Lifetime</i>					
General	-.04	.08	-.54	.588	-.02
<i>Casual</i>					
General	-.20	.09	-2.14	.032	-.09
Model Fit: χ^2 (215) = 578.51, p < .001; SRMR = .039; RMSEA = .046, 90% CI [.042, .049]; TLI = .939					

Note: Note: SRA = one-factor self-report altruism scale. SRA1 = Factor 1 of three-factor self-report altruism scale. SRA2 = Factor 2 of three-factor self-report altruism scale. SRA3 = Factor 3 of three-factor self-report altruism scale. General = general factor of the S-1 bifactor model, the “gold standard” measure of altruism.