



The Selfishness Questionnaire: Egocentric, Adaptive, and Pathological Forms of Selfishness

Adrian Raine & Stepheni Uh

To cite this article: Adrian Raine & Stepheni Uh (2019) The Selfishness Questionnaire: Egocentric, Adaptive, and Pathological Forms of Selfishness, Journal of Personality Assessment, 101:5, 503-514, DOI: [10.1080/00223891.2018.1455692](https://doi.org/10.1080/00223891.2018.1455692)

To link to this article: <https://doi.org/10.1080/00223891.2018.1455692>



Published online: 19 Apr 2018.



Submit your article to this journal [↗](#)



Article views: 1328



View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 4 View citing articles [↗](#)



The Selfishness Questionnaire: Egocentric, Adaptive, and Pathological Forms of Selfishness

Adrian Raine,¹ and Stepheni Uh²

¹Departments of Criminology, Psychiatry, and Psychology, University of Pennsylvania; ²Center for Neuroscience and Society, University of Pennsylvania

ABSTRACT

Despite its importance in society, there is virtually no standardized research on the personality trait of selfishness, in part due to the absence of an assessment instrument. The central aim of this study was to develop a brief (2–3 min) self-report personality measure of selfishness with three main subtypes: egocentric, adaptive, and pathological. Questionnaires were administered to an undergraduate sample, with replicability and generalizability tested on a community population. A confirmatory factor analysis supported the existence of the three hypothesized forms of selfishness. Good internal reliability, test–retest reliability, convergent validity, discriminant validity, factorial validity, incremental validity, and criterion validity were documented. Selfishness was associated with reduced levels of mindfulness and more utilitarian decision making, whereas Tibetan Buddhist monks were less selfish than controls. Findings from the student sample were replicated in the community sample. To our knowledge, this is the first systematic examination of the personality construct of selfishness and the first instrument to assess selfishness and its variants.

ARTICLE HISTORY

Received 1 September 2017
Revised 9 February 2018

Selfishness is widely regarded as an inordinate focus on one's own welfare, regardless of the well-being of others. Commonly, selfishness has been invoked in evolutionary theories of cooperation (Fehr & Gächter, 2002) and measured behaviorally in economic games (Bardsley, 2008). To date, however, there is no standardized instrument for the assessment of a selfish personality and no prior examination of different variants of selfishness. As such, despite being a well-used descriptor of one antisocial feature of human nature, a direct assessment of selfishness as a personality construct is lacking. Having an instrument that specifically assesses this trait would fill this gap in the personality literature and allow for the future development of a nomological network of relationships for this construct that would aid theory development. Because selfishness is a trait common to a number of personality disorders, research specifically on selfishness would facilitate a symptom-based approach to research the etiology of these clinical disorders (Cuthbert, 2014). This article therefore seeks to develop a brief self-report instrument for assessing degrees of selfishness in the general population. Specifically, based on principles from evolutionary psychology, psychopathology, and developmental psychology, we hypothesize the presence of a spectrum of selfishness consisting of three basic forms (adaptive, pathological, and egocentric) to provide a preliminary framework for future research.

One variant, adaptive selfishness, is defined as a “softer” form of selfish behavior with an eye to others, and is hypothesized to be the least pathological variant, with a basis in evolutionary theory and social psychology. Unlike

other forms, those displaying this variant care not just for themselves, but also for their family, and at times their friends. Some selfish behaviors could be justified on the grounds that others benefit from such selfishness, even to the extent that giving oneself priority in life can benefit others. Particularly at an evolutionary level, ensuring one's well-being and survival can be driven by the overriding need to look after one's family and promote genetic fitness (Dawkins, 2006). For example, if it came down to taking the last place in a lifeboat in preference to a child, or killing another person to avoid being killed, adaptively selfish people would act affirmatively to ensure that their own family would not suffer from their absence. Kin selection theory emphasizes the importance of the individual looking after the interests of family members who are closely genetically related (Hamilton, 1964). From a reciprocal altruism perspective (Dawkins, 2006), helping and caring for friends who can in turn help one in the future can be taken as a form of positive selfishness rather than giving selflessness. At a social level, telling white lies is arguably selfish as it benefits the teller by smoothing out social encounters at the cost of dishonestly (but beneficially) sparing the listener's feelings (Ariely, 2012). As this adaptive form of selfishness could be theorized as promoting “survival” both in the extreme and in less harmful social settings, it might be expected to be more prevalent than other forms of selfishness. Furthermore, because this form of selfishness is somewhat more socially positive (i.e., at times including benefits to others), we anticipate that it would be relatively more adaptive and functional. As such, adaptive selfishness was

expected to be less associated with antisocial, narcissistic, and histrionic personality disorders, psychopathy, and Machiavellianism than other forms of selfishness.

A second variant, egocentric selfishness, is defined as selfishness with a single-minded attentional focus on the self. This form is hypothesized as a simpler form of selfishness in which behaviors are neither ostensibly advantageous nor disadvantageous to others. It is neither antisocial nor prosocial in that other individuals are rarely factored into one's need calculus. Such individuals are not concerned about the needs of either individuals or society, but are single-mindedly centered on themselves. From a sociobiological perspective, egoistic incentive theory argues that human nature is fundamentally selfish (Caporael, Dawes, Orbell, & Van de Kragt, 1989). From a developmental psychology perspective, egocentrism as a theoretical concept was most strongly propagated by Piagetian theory, which drew attention to egocentrism in childhood with a fundamental focus on the self and a failure to take into account others' perspectives (Piaget, 1951). In the context of adult personality development, this lack of others' perspective taking would be particularly expected to be associated with low levels of empathy. Lack of perspective taking would be expected in turn to be associated with an uncaring, glacial, self-centered form of selfishness without reference to others. Based broadly on egoistic incentive theory, we hypothesized that this basic form of selfishness would be characterized by a lack of empathy, low altruism, low warmth, and unwillingness to share resources with others.

A third variant, pathological selfishness, is defined as a form of "hard" selfishness in which others are harmed for self-advancement. It is predicated on theory and research in psychopathology and is viewed as relatively more antisocial in nature. Antisocial behavior, for instance, is frequently self-serving (Koolen, Poorthuis, & van Aken, 2012; van Leeuwen, Rodgers, Gibbs, & Chabrol, 2014), whether it is used to acquire resources or as a way to subjugate others. Psychopathy is a reward-seeking condition that has been theorized by multiple researchers to have selfishness at its core, combined with a reckless disregard for the well-being of other people (Patrick, 2006). Narcissistic personality disorder is characterized by egotistical grandiosity, with one diagnostic feature consisting of taking advantage of other people for one's own ends (American Psychiatric Association, 2013). Histrionic personality disorder includes self-centered features, including drawing attention to oneself and craving to be the center of attention (American Psychiatric Association, 2013). Machiavellianism is a personality construct involving the manipulation of others for one's own gain (Wilson, Near, & Miller, 1996). Pathological selfishness is conceptualized as incorporating some features of these externalizing psychopathological conditions, including manipulation, exploitation of others, and reward-seeking behavior. Consequently, we anticipate that these disorders, although associated with all forms of selfishness, should particularly correlate positively with pathological selfishness, where selfish actions noticeably harm others. In contrast, anxiety and depression, disorders that do not contain elements of selfishness as defined by the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed. [DSM-5]; American Psychiatric Association,

2013), are expected from a discriminant validity standpoint to be less associated with selfishness.

From a construct validity standpoint, we aimed to test several other provisional hypotheses. One concerns utilitarianism, which historically has its roots in the work of Malthus (1798), who argued that an increasing population exponentially burdens society's limited resources. Bentham (1789) similarly advocated decisions that benefit the greater good of the greater number at the cost of a small minority. Utilitarian moral decision making has been associated with acting selfishly as manifested in variations of the trolley dilemma and the dictator game (Tinghog et al., 2016) as well as with psychopathy (Gao & Tang, 2013) and lack of empathy (Gleichgerrcht & Young, 2013), two traits provisionally thought to characterize selfish individuals. We consequently hypothesized that selfishness in general would be associated with utilitarian moral decision making.

An important conceptual question consists of whether selfishness in general is simply the opposite of altruism. Past research suggests that altruism and selfishness are related but different concepts, as altruistic acts are not always selfless. For example, although individuals might engage in reciprocal altruism, this social reciprocity ultimately maximizes the genetic fitness of the giver and as such can be viewed as selfish (Dawkins, 2006). Altruistic acts can also be used to build an individual's reputation in his or her social community, an ultimately selfish strategy that has been noted in classic studies of psychopaths (Cleckley, 1976). Furthermore, even in the absence of an audience, giving to others has been argued to be motivated by a "warm glow" reward, a positive feeling associated with activation of the ventral striatum, a brain area associated with reward (Harbaugh, Mayr, & Burghart, 2007). These perspectives suggest that selfishness and altruism are not polar opposites. Although we expect a negative association between selfishness and altruism, we also anticipate that selfishness will relate to other measures characterized by low altruism (e.g., Machiavellianism, psychopathy) independent of its association with altruism, a test of incremental validity.

Finally, we anticipated that higher levels of mindfulness would be associated with lower levels of selfishness. Mindfulness involves approaching one's experiences and one's self with an attitude of openness and acceptance, and is associated with increased empathy and compassion (Birnie, Speca, & Carlson, 2010). As such, we anticipated a relationship between a mindful personality and reduced selfishness. In the context of criterion validity, Buddhist meditation has been associated with a "quiet ego" (Wayment, Wiist, Sullivan, & Warren, 2011) and the practice of "mental cultivation" to establish a mindful and compassionate awareness of the self (XIV Bstan-'dzin-rgya, 2012). Compassion and genuine concern for the welfare of others are key foci of the daily practices and studies of Tibetan Buddhist monks who incorporate mindfulness practices in their daily lives (XIV Bstan-'dzin-rgya, 2012). In collaboration with the XIV Dalai Lama and Emory University's Emory-Tibet Science Initiative (ETSI), we therefore administered our measure to a sample of Tibetan Buddhist monks, hypothesizing that they would show reduced selfishness compared to a control group.

The overarching aim of this study is to develop a brief self-report measure of selfishness using samples drawn from both

university and community populations to test generalizability of findings across populations. Psychometric goals were to keep the questionnaire relatively simple and brief, establish adequate internal reliability and test–retest reliability, provide initial construct validity by documenting convergent, discriminant, criterion, incremental, and factorial validity, and to replicate findings. A further main goal was to develop items for the three hypothesized subtypes of selfishness, test this a priori model of selfishness using confirmatory factor analysis (CFA), and investigate differential correlates of these factors. Importantly from a methodological standpoint, we aimed to test replicability and generalizability of initial findings from a student sample to a community sample given that it has been argued that the majority of findings in psychology do not replicate (Aarts et al., 2015).

Method

Participants

Student sample

A total of 453 undergraduate students from the University of Pennsylvania participated in this study in two phases. The first group was used for initial test construction (64.3% female), with a mean age of 19.93 years ($SD = 2.63$). Ethnicity was as follows: White (50.3%), Latino or Hispanic (9.3%), African American or Black (8.1%), Asian American (25.3%), and other (7.0%). Due to questionable data (see later), 14 participants were dropped from the original sample of 357, leaving a final sample of 343.

An additional sample of 117 undergraduates (59.1% female) was similarly recruited at a later phase to increase sample size. These participants had a mean age of 20.04 years ($SD = 1.51$), with ethnicity as follows: White (44.5%), East Asian (19.1%), Indian (6.4%), African American or Black (11.8%), Hispanic (10.0%), and other (8.2%). Seven participants were dropped due to questionable data (see later), leaving a final sample of 110. All students were given course credit for their participation and human subjects' approval was obtained from the University of Pennsylvania.

Community sample

Community participants ($N = 402$, 51.7% female) were recruited through Amazon's Mechanical Turk (MTurk) and provided a replication sample for the CFA. Participants had a mean age of 39.39 years ($SD = 12.53$), with ethnicity as follows: White (56.8%), East Asian (2.1%), Indian (30.3%), African American or Black (6.6%), Hispanic (2.4%), and other (1.8%). Participants were compensated \$1.50 for their participation. Due to questionable data (see later), 66 participants were dropped, leaving a final sample of 336.

An additional 338 MTurk participants were recruited (45.9% female) to provide data specifically on the dictator game as well as moral decision making and mindfulness. Participants had a mean age of 36.81 years ($SD = 10.46$), with ethnicity as follows: White (77.2%), East Asian (7.5%), Indian (2.6%), African American or Black (7.5%), Hispanic (3.6%), and other (1.6%). Some participants ($n = 31$) were dropped due to questionable data (see later), leaving a final sample of 307.

Tibetan buddhist monks

Tibetan Buddhist monks ($N = 81$) were recruited at the Drepung Loseling Monastery in Mundgod, India, for the purpose of criterion validity in collaboration with the ETSI members. Participants were either in their first or second year of a 6-year science curriculum established by the XIV Dalai Lama and Emory University. The Selfishness Questionnaire (SQ) was completed in a classroom at the monastery in two group sessions for first and second years separately. Items were translated and reviewed by ETSI translators and instructions on the SQ completion were provided orally. Mean age was 33.35 years ($SD = 4.66$), with ethnicity as follows: East Asian (81.5%) and Indian (18.5%).

Selfishness questionnaire

Questionnaire construction began with the generation of 61 items measuring selfish behaviors and attitudes. Because the three-factor model was hypothesized a priori, approximately equal representation was given to items for the three hypothesized factors (egocentric, adaptive, pathological). Initial analyses of these items from the student sample were then conducted to select eight items to represent each of the three factors (see later). Item reduction was based on retention of less skewed items, items with better item–total correlations, and sampling validity (i.e., obtaining a relatively broad coverage of social situations and contexts). These 24 items were then subjected to CFA in both test (student) and replication (MTurk) samples. Example items from the final questionnaire are as follows: “I care for myself much more than I care for others” (egocentric); “At the end of the day, I care mostly for myself, my family, and friends who can help me” (adaptive); and “If I’m honest, there are times when I put myself first, even if it’s someone else’s loss” (pathological). To facilitate the availability of this instrument for future research, the questionnaire together with administration and scoring instructions are given in the Appendix.

Convergent validity measures

Antisocial, histrionic, and narcissistic personality

The Personality Diagnostic Questionnaire–4+ (PDQ–4+) is one of the most commonly used self-report measures of personality disorder symptoms in both clinical and community samples, with acceptable reliability, construct validity, and cross-cultural validity (Abidin et al., 2011; Bouvard, Vuachet, & Marchand, 2011). In this study, antisocial (manipulation, exploitation, and disregard for the rights of others), histrionic (excessive attention-seeking behavior, an overly dramatic self-presentation, and discomfort when not the center of attention), and narcissistic (heightened grandiosity and an excessive need for admiration) personality disorders were assessed, as they are clinical disorders that embody facets of pathological selfishness. Acceptable levels of reliability, construct validity, and cross-cultural validity have been reported for these measures (Fossati, Porro, Maffei, & Borroni, 2012; Hopwood et al., 2013; Hyler, 1994; Kounou et al., 2015; Wang et al., 2013). In this study, internal reliability was acceptable for the community sample:

antisocial (coefficient $\alpha = .82$), histrionic (coefficient $\alpha = .78$), and narcissistic (coefficient $\alpha = .84$).

Machiavellianism

Machiavellianism reflects duplicitous, scheming, and dishonest behavior often in a way to better serve the interests of the individual. In this study, the Machiavellianism-egocentricity facet of the Psychopathic Personality Inventory–Short Form (PPI–SF), a brief version of the original PPI (Lilienfeld & Hess, 2001), was administered. Scores from the short version correlate well with those from the original PPI scales (Tonnaer, Cima, Sijtsma, Uzieblo, & Lilienfeld, 2013). The community sample showed good internal reliability in this study (coefficient $\alpha = .89$).

Psychopathy

Psychopathy was assessed using the Triarchic Personality Measure (TriPM), which consists of three phenotypic components: boldness, meanness, and disinhibition (Patrick, 2010). This brief self-report measure has demonstrated strong evidence of construct validity (Hall et al., 2014; Sellbom & Phillips, 2013). Good internal reliability was obtained in this study for the TriPM (coefficient $\alpha = .84$).

Warmth and altruism

Warmth and altruism were hypothesized to show relationships with reduced selfishness. Affection and genuine like of others as well as active concern for others were assessed using the warmth facet and altruism facet scales, respectively, of the Revised NEO Personality Inventory (NEO PI–R; Costa & McCrae, 1992). NEO PI–R facet scales have established reliability and validity in both normal and clinical populations, together with established cross-cultural validity (Trull, Ueda, Costa, & McCrae, 1995; Yang et al., 1999). Acceptable internal reliability for both the warmth (coefficient $\alpha = .87$) and altruism (coefficient $\alpha = .79$) facet scales was obtained in this study.

Affective empathy

The capacity to experience the emotions of how others feel was assessed using the 10-item negative affect emotional empathy subscale of the Cognitive, Affective, and Somatic Empathy Scale (CASES; Raine & Chen, 2018). Good internal reliability (coefficient $\alpha = .82$) was obtained in this study. Each item (e.g., “Seeing people sad at a funeral would make me feel sad too”) is answered on a 3-point (*rarely, sometimes, often*) scale.

Discriminant validity measures

Anxiety, depression, and social desirability

Both personalities were assessed using the anxiety and depression facet scales of the NEO PI–R (Costa & McCrae, 1992). High scorers on the anxiety subscale tend to be more apprehensive, fearful, and nervous (Costa & McCrae, 1992). The depression scale assesses the tendency to experience depressive affect (e.g., guilt, sadness) in normal individuals (Costa & McCrae, 1992). Social desirability (i.e., people’s desire to make a good impression) was assessed using the Too Good scale of the PDQ–4+ (Hyler, 1994). An example of a true–false item is “Sometimes I get upset,” with an affirmative answer reflecting

lower social desirability. Internal reliability was good in this study for anxiety (coefficient $\alpha = .86$) and depression (coefficient $\alpha = .88$), but relatively low for social desirability (coefficient $\alpha = .41$).

Criterion validity

Dictator game

The dictator game is an experimental economic task gauging altruistic social preference. The participant (dictator) decides how much money to give to a recipient anonymously, without any negative consequences (Bardsley, 2008). Similar to one version of the dictator game (Eckel & Grossman, 1996), the recipient for this study was a charity foundation (Save the Children). Participants in the second community sample were informed that they would be given an additional \$0.70 and were asked how much they would be willing to donate to Save the Children (participants viewed an online YouTube video from the foundation), with assurance that all donations would be sent to the charity at the conclusion of the study.

Additional measures for construct validity (second community sample only)

Moral decision making

Utilitarian moral decision making was assessed in the second community sample using three condensed versions (Glenn, Raine, & Schug, 2009) of high-conflict personal dilemmas: “Crying Baby,” “Footbridge,” and “Sacrifice” (Greene, Morelli, Lowenberg, Nystrom, & Cohen, 2008; Greene, Sommerville, Nystrom, Darley, & Cohen, 2001). Participants were asked to rate how morally appropriate or inappropriate they found utilitarian actions (ones that are harmful but benefit the greater good) on a 7-point Likert scale (Knutson et al., 2010) ranging from 1 (*extremely inappropriate*) to 7 (*extremely appropriate*; see Supplementary Table S.1).

Cognitive and affective mindfulness scale–revised

The Cognitive and Affective Mindfulness Scale–Revised (CAMS–R; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007) is a short 12-item questionnaire assessing mindfulness (e.g., “I am able to pay close attention to one thing for a long period of time”). The CAMS–R is divided into four factors with three items in each: (a) attention, (b) present focus, (c) awareness, and (d) acceptance (Feldman et al., 2007). Reliability and validity with constructs including mindfulness, distress, and emotion regulation have been documented (Feldman et al., 2007). Good internal reliability was obtained in this study (coefficient $\alpha = .87$).

Data accuracy checks

To maximize fidelity of the data, the three validity check items from the NEO PI–R (Costa & McCrae, 1992) were administered at the end of the study. Participants were asked to indicate “Yes” or “No” to questions assessing honesty and carelessness (e.g., “Have you answered all the items?”). Participants were excluded if they did not mark “Yes” to all three questions.

Statistical methods

Confirmatory factor analysis

The 24 selfishness items (8 egocentric, 8 adaptive, 8 pathological) were subjected to CFA conducted on the covariance matrix using EQS 6 (Bentler, 2000). Due to significant kurtosis for many of the items (Mardia's normalized estimate for multivariate kurtosis was greater than 11 in both samples), the elliptical estimation method was used to estimate the distribution of covariances in the evaluation of all models (Bentler, 1995; Bentler, Berkane, & Kano, 1991). Two models were evaluated: a one-factor model (general selfishness) and a three-factor model (egocentric, adaptive, and pathological). In the one-factor model, all 24 items were loaded on one latent factor of general selfishness. In the three-factor model, the egocentric, adaptive, and pathological selfishness items were loaded onto their respective latent factors. Error terms were set to be uncorrelated in all the models.

Three goodness-of-fit indexes were reported to assess the fit of the models: chi-square, the root mean square error of approximation (RMSEA) index (McDonald, 1989), and the comparative fit index (CFI; Bentler, 1990). High values for CFI and RMSEA are indicative of a good-fitting model (Hu & Bentler, 1999). Direct comparisons were made between the one-factor and three-factor models using the chi-square difference ($\Delta\chi^2$) test (Loehlin, 1992).

Differential associations with factors

All tests of significance were two-tailed. In addition to testing the significance of associations between selfishness and the convergent validity measures (e.g., antisocial personality disorder) and discriminant validity measures (e.g., anxiety), the significance of the difference between these correlations was calculated using the procedure outlined by Lee and Preacher (2013) in which each r was converted into a z score using Fisher's r -to- z transformation, with Steiger's Equations 3 and 10 used to compute the asymptotic covariance of the estimates (Steiger, 1980).

Incremental validity: Altruism and social desirability

To assess the extent to which selfishness scales related in the predicted manner with convergent validity scales over and above altruism and social desirability, partial correlations were run holding the control variable (e.g., altruism) constant for the total selfish and convergent validity scale (e.g., antisocial personality) relationships, thus comparing the unique variance of selfishness with the unique variance of antisocial personality free of any shared association with altruism.

Results

Internal reliability and means

From the original pool of 61 items that had been clustered into three groups on the basis of face validity, item-total correlations were computed for each of the three putative subscales using the first student subject pool ($N = 343$). The eight items with the highest item-total correlations on their subscale were retained. Internal reliability (coefficient α) for the scales together with range of item-total correlations were as follows:

total ($\alpha = .87$, range = .33–.52), egocentric ($\alpha = .76$, range = .39–.49), adaptive ($\alpha = .71$, range = .28–.51), pathological ($\alpha = .75$, range = .32–.53). Female students scored significantly lower on all SQ scores (total, $M = 16.98$, $SD = 8.28$, $d = .76$, $p < .001$; egocentric, $M = 3.67$, $SD = 2.65$, $d = .71$, $p < .001$; adaptive, $M = 8.21$, $SD = 3.36$, $d = .44$, $p = .027$; pathological, $M = 4.80$, $SD = 3.84$, $d = .82$, $p < .001$) than male students (total, $M = 23.38$, $SD = 8.60$; egocentric, $M = 5.89$, $SD = 3.77$; adaptive, $M = 9.70$, $SD = 3.49$; pathological, $M = 7.80$, $SD = 3.38$).

The same items comprising scales developed on the student sample were applied to the MTurk sample to assess independent replicability. Internal reliabilities were well-replicated, with coefficient alpha and range of item-total correlations as follows: total scale ($\alpha = .93$, range = .28–.70), egocentric ($\alpha = .83$, range = .41–.65), adaptive ($\alpha = .79$, range = .45–.62), pathological ($\alpha = .85$, range = .34–.69). As with the student sample, female community participants also responded significantly less selfishly (total, $M = 15.87$, $SD = 10.94$, $d = .41$, $p < .001$; egocentric, $M = 4.62$, $SD = 3.91$, $d = .37$, $p < .001$; adaptive, $M = 6.70$, $SD = 4.22$, $d = .33$, $p = .003$; pathological, $M = 4.56$, $SD = 4.10$, $d = .42$, $p < .001$) than male community participants on the SQ (total, $M = 20.57$, $SD = 11.76$; egocentric, $M = 6.16$, $SD = 4.43$; adaptive, $M = 8.07$, $SD = 4.11$; pathological, $M = 6.33$, $SD = 4.36$).

Test-retest reliability

Two samples of community participants were randomly selected to complete the SQ again to assess test-retest reliability at two different time points: 4 weeks and 10 weeks after initial administration. Four-week test-retest data were obtained from 75 community participants. Test-retest reliabilities were as follows: total selfishness, $r = .84$, $p < .0001$; egocentric, $r = .84$, $p < .0001$; adaptive, $r = .71$, $p < .0001$; and pathological, $r = .79$, $p < .0001$. Ten-week test-retest data were also obtained for a different set of 57 community participants. Test-retest reliabilities were as follows: total selfishness, $r = .85$, $p < .0001$; egocentric, $r = .79$, $p < .0001$; adaptive, $r = .77$, $p < .0001$; and pathological, $r = .78$, $p < .0001$.

We tested for any 4- to 10-week differences in the sizes of test-retest correlations. No differences were significant (all p values $> .41$), indicating no significant change in test-retest reliability over time. We further tested for within-group changes in mean levels of selfishness scores from the first to the second administration for each group (4 weeks and 10 weeks) separately using paired t tests. All comparisons were nonsignificant for both the 4-week group ($p > .14$) and the 10-week group ($p > .32$). Taken together from the three vantage points of test-retest reliability coefficients, change in test-retest reliability over time, and change in mean scores over time, all SQ measures show a good level of trait stability.

Confirmatory factor analysis

The three-factor model of selfishness was initially tested on the student sample using CFA (see Supplementary Table S.2). Fit indexes were as follows: $\chi^2(249) = 626.49$, $p < .0001$; CFI = .93; RMSEA = .065, indicating a good-fitting model. The three-

factor model was a significantly better fit than a one-factor model, $\Delta\chi^2(2) = 75.89, p < .0001$ (see Supplemental Table S.3 for factor loadings and fit indexes for a one-factor model). All fit indexes were without exception superior for the three-factor model than the one-factor model. All factor loadings were acceptable for egocentric (.42–.56), adaptive (.36–.62), and pathological selfishness (.37–.60). Factor intercorrelations were as follows: egocentric with adaptive, $r = .52, p < .0001$; egocentric with pathological, $r = .66, p < .001$; adaptive with pathological, $r = .61, p < .001$.

The preceding three-factor solution was well-replicated in the community sample. Fit indexes were as follows: $\chi^2(249) = 665.82, p < .0001$; CFI = .97; RMSEA = .065, indicating a good-fitting model. The three-factor model was a significantly better fit than a one-factor model, $\Delta\chi^2(2) = 36.55, p < .0001$. All fit indexes were without exception superior for the three-factor model than the one-factor model. All factor loadings were acceptable for egocentric (.39–.71), adaptive (.29–.69), and pathological selfishness (.41–.75). Factor intercorrelations were as follows: egocentric with adaptive, $r = .71, p < .0001$; egocentric with pathological, $r = .75, p < .001$; and adaptive with pathological, $r = .76, p < .001$.

Convergent validity

The SQ should relate to other constructs associated with selfishness if it does indeed measure selfishness. This component of construct validity was tested by associating total selfishness scores with antisocial personality disorder, narcissistic personality disorder, histrionic personality disorder, Machiavellianism, psychopathy, affective empathy, and warmth. Correlations for the student ($N = 343$) and community samples ($N = 643$) are shown in Table 1 and Table 2, respectively. All correlations were significant and in the predicted direction, indicating that the SQ converges with other constructs thought to be associated with selfishness.

Factorial validity

We sought to examine the extent to which the three factors derived from the factor analysis had factorial validity in that they differed from one another by virtue of showing differential relations to external variables. We assessed this by testing the significance of the difference between respective correlations

Table 1. Selfishness Questionnaire convergent validity results for the student sample.

Constructs	Total selfishness	Egocentric	Adaptive	Pathological
Antisocial	.423	.375 ^{b,c}	.295 ^b	.408 ^c
Narcissistic	.486	.427 ^a	.332 ^b	.456 ^a
Histrionic	.307	.226 ^a	.209 ^a	.340 ^c
Machiavellianism	.658	.497 ^a	.563 ^{a,c}	.622 ^c
Psychopathy	.506	.451 ^a	.323 ^b	.539 ^c
Altruism	–.539	–.576 ^a	–.324 ^b	–.472 ^c
Affective empathy	–.355	–.397 ^a	–.193 ^b	–.313 ^c
Warmth	–.285	–.352 ^a	–.122 ^b	–.227 ^c

Note. $N = 357$. All correlations are statistically significant ($p < .03$). For the three factors only, a significant difference ($p < .05$) in the size of correlation coefficients (across rows) is indicated by different superscript (e.g., ^{a, b, c}). Coefficients with the same superscript do not differ significantly.

Table 2. Selfishness Questionnaire convergent validity results for the community sample.

Constructs	Total selfishness	Egocentric	Adaptive	Pathological
Antisocial	.556	.498 ^a	.459 ^a	.557 ^c
Histrionic	.466	.363 ^a	.375 ^a	.538 ^c
Machiavellianism	.767	.641 ^a	.716 ^b	.737 ^b
Psychopathy	.570	.505 ^a	.477 ^a	.601 ^c
Altruism	–.579	–.613 ^a	–.463 ^b	–.524 ^c
Affective empathy	–.428	–.472 ^a	–.281 ^b	–.386 ^c
Warmth	–.365	–.426 ^a	–.307 ^b	–.285 ^b

Note. $N = 336$. All correlations are statistically significant ($p < .001$). For the three factors only, a significant difference ($p < .05$) in the size of correlation coefficients (across rows) is indicated by different superscript (e.g., ^{a, b, c}). Coefficients with the same superscript do not differ significantly.

across factors, anticipating that all three variants should correlate significantly at some level with construct validity measures.

Results of these findings are shown in Table 1 where significant differences ($p < .05$) between correlations are flagged by superscripts that differ. Significant differences were found for all external variables. In most cases, all three selfishness factors differed from each other in the extent to which they were associated with these variables. Pathological selfishness was more strongly related than the other two scales to psychopathy, antisocial personality, histrionic personality, and Machiavellianism. Egocentric selfishness was most strongly associated with low altruism, low warmth, and low emotional empathy. In contrast, adaptive selfishness had the weakest association with these traits.

The factorial validity findings from the student sample were broadly replicated in the community sample (see Table 2). Pathological selfishness showed significantly stronger correlations with psychopathy, narcissism, histrionic personality, and Machiavellianism. Egocentric selfishness again showed significantly stronger correlations with low altruism, low warmth, and low affective empathy. Prior findings of lower association between adaptive selfishness and convergent validity measures were confirmed for most traits, except for significantly higher scores on Machiavellianism compared to egocentric selfishness.

Summarizing these differential relationships, pathological selfishness was most associated with pathological personality traits. Egocentric selfishness was most associated with emotional coldness. Adaptive selfishness was least associated with all these traits in the student sample and to a lesser extent in the community sample. Although all three factors are to some extent associated with external traits that they should be associated with if they do indeed measure selfishness, there are also between-factor differences in the extent of these associations, documenting some degree of factorial validity.

Discriminant validity

We tested whether anxiety and depression would correlate with selfishness at a significantly lower level than convergent validity scales to test discriminant validity. Associations between these traits for the student sample are given in Table 3. Anxiety was unassociated with selfishness. Depression was associated with higher selfishness at a low level ($r = .155$). This association was significantly weaker than the associations between selfishness and all other convergent validity scales (antisocial personality

Table 3. Selfishness Questionnaire discriminant validity results for students and community samples.

Constructs	Total selfishness	Egocentric	Adaptive	Pathological
Students (<i>N</i> = 357)				
Anxiety	.005	-.020	.035	.015
Depression	.155**	.113*	.130*	.153**
Community (<i>N</i> = 336)				
Anxiety	.185**	.196**	.145**	.164**
Depression	.331**	.279**	.321**	.324**

Note. Significant weak associations ($p < .05$) are seen between depression and the total and three varieties of selfishness for the student sample. In the community sample, significant weak associations are seen between both anxiety and depression and the total and three variances of selfishness.

* $p < .05$.

** $p < .01$.

disorder, narcissistic personality disorder, histrionic personality disorder, Machiavellianism, psychopathy, affective empathy, and altruism; all $p < .02$), with the exception of a trend for warmth ($p = .052$, two-tailed).

This pattern of discriminant validity was broadly replicated in the community replication sample (see Table 3). Higher anxiety was associated with higher selfishness at a low level ($r = .185$). This association was significantly weaker than the associations between selfishness and all other convergent validity measures without exception ($p < .002$). Although higher depression was associated with higher selfishness ($r = .331$), this association was nevertheless significantly weaker than the associations between selfishness and all other convergent validity measures ($p < .02$), except for warmth ($p = .49$) and affective empathy ($p = .12$).

Incremental validity

In addition to its association with altruism (see earlier), high selfishness was generally associated with low social desirability, with modest correlations for student and community samples, respectively, as follows: total selfishness, $r = .09$, $p < .10$; $r = .14$, $p < .02$; egocentric, $r = .04$, $p = .32$; $r = .09$, $p = .02$; adaptive, $r = .10$, $p = .07$; $r = .17$, $p = .002$; pathological, $r = .09$, $p = .09$; $r = .12$, $p = .04$. In examining incremental validity, we assessed the extent to which selfishness provided increased knowledge on other constructs over and above knowledge provided by a related construct (low altruism) or an associated response style (low social desirability). This issue also addresses the conceptual issue of whether selfishness is merely the opposite of altruism. We addressed these two separate questions by

Table 4. Incremental validation of Selfishness Questionnaire controlling for altruism and social desirability.

Constructs	Controlling for altruism		Controlling for social desirability	
	Students	Community	Student	Community
Antisocial	.32***	.37***	.43***	.47***
Narcissistic	.42***	.48***	.47***	.53***
Histrionic	.29***	.41***	.31***	.38***
Machiavellianism	.57***	.66***	.65***	.74***
Psychopathy	.41***	.43***	.55***	.53***
Altruism	—	—	-.53***	-.60***
Affective empathy	-.16**	-.22***	-.36***	-.47***
Warmth	.08	.05	-.24***	-.43***

Note. Relationships between total selfishness scores and convergent validity variables after controlling for altruism and social desirability in the student and community sample.

* $p < .05$, two-tailed.

** $p < .005$, two-tailed.

*** $p < .0001$, two-tailed.

reexamining the relationship between selfishness scales and convergent validity scales after controlling for each of these two variables, namely altruism and social desirability.

Partial correlations between total selfishness scales and convergent validity scales are provided in Table 4 for both student and community replication samples. After controlling for altruism, selfishness was still associated with all convergent validity scales, with replication across samples. The one exception was that after controlling for altruism, selfishness was not associated with warmth in the student sample, although robust associations were obtained for this scale in the community sample.

Criterion validity

Tibetan monks

The two MTurk samples were used to form a control group for comparison with Tibetan monks as they approximate a normal population more closely than university undergraduates (Berinsky, Huber, & Lenz, 2012). Nevertheless, groups differed on gender, ethnicity, and age, with monks being male, younger, and more likely to be Asian. To obtain a more balanced sample, the MTurk control group ($N = 108$) was restricted to only those who were male and Asian, and within the same age range as monks (23–45 years). Age was additionally used as a covariate in analyses.

Means and standard deviations for the two groups, together with results on analyses of variance and effect sizes, are given in Table 5. Monks scored significantly lower than matched

Table 5. Comparisons on selfishness scales between monks and controls.

SQ factors	Monks ^a		Controls ^b		<i>df</i>	<i>F</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
SQ total	20.68	6.38	25.94	9.63	1,187	18.13	.001	.63
Egocentric	6.94	2.91	8.18	3.61	3,185	6.40	.012	.37
Adaptive	7.91	2.61	9.19	3.49	3,185	7.58	.006	.41
Pathological	5.83	2.91	8.57	3.82	3,185	29.08	.001	.79

Note. SQ = Selfishness Questionnaire.

^a*N* = 81.

^b*N* = 108.

controls on all scales, with effect sizes ranging from .37 to .79. The effect of age was nonsignificant ($p = .57$).

Dictator game

The second community sample was used to validate selfishness scores against a known behavioral standard of selfishness: not sharing money with others without consequences. Higher total selfishness scores were associated with increased hoarding of financial resources in the dictator game ($r = -.27, p < .0001$). Nonsharing was also associated with egocentric ($r = -.32, p < .0001$), adaptive ($r = -.18, p < .003$), and pathological selfishness ($r = -.22, p < .001$). Egocentric selfishness was more strongly associated with hoarding than adaptive ($p = .002$) and pathological selfishness ($p = .018$), with no significant difference between the latter two ($p = .28$). Consequently, the SQ (especially egocentric selfishness) met the behavioral criterion of enhancing self-interest by not sharing resources with others.

Construct validity

Moral decision making

Selfish individuals are more likely to make utilitarian moral decisions. High scores favoring utilitarian decision making were associated with total ($r = .35, d = .75, p < .0001$), egocentric ($r = .35, d = .74, p < .0001$), adaptive ($r = .29, d = .60, p < .0001$), and pathological ($r = .32, d = .68, p < .0001$) selfishness. The three forms of selfishness did not differ significantly ($p > .42$) in the strength of these relationships.

Mindfulness

More selfish individuals are less mindful. Low scores on the CAMS-R were associated with high total selfishness ($r = -.30, N = 319, p < .001$), egocentric selfishness ($r = -.23, p < .001$), adaptive selfishness ($r = -.24, p < .001$), and pathological selfishness ($r = -.31, p < .001$). The association of mindfulness with pathological selfishness was significantly higher than its association with egocentric selfishness ($p < .05$), and marginally higher than the association with adaptive selfishness ($p < .08$, two-tailed).

Discussion

The central aim of this study was to develop the first self-report measure of selfishness. A CFA supported the existence of egocentric, adaptive, and pathological forms of selfishness. The SQ was characterized by good internal reliability, test-retest reliability, convergent validity, discriminant validity, face validity, factorial validity, incremental validity, and criterion validity. Pathological selfishness was more strongly associated with antisocial, narcissistic, and histrionic personality disorders, psychopathy, and Machiavellianism. Egocentric selfishness, in contrast, was more strongly associated with a lack of warmth, low altruism, low emotional empathy, and less giving in the dictator game. Adaptive selfishness was less associated with these traits and was more likely to be endorsed. Selfishness was associated with reduced levels of mindfulness and also increased utilitarian moral decision making. Criterion validity was established by reduced selfishness in Tibetan monks, and less giving in the dictator game. Selfishness predicted to

outcomes over and above altruism, establishing selfishness as having incremental utility as an independent personality construct in understanding other psychological phenomena. Findings from students were cross-validated in a community sample, documenting replicability of findings and evidence of generalizability to a different population. To our knowledge, this constitutes the first report of a reliable and valid self-report measure of selfishness, and provides instrumentation for the development of future research on this construct in both clinical and community populations.

Generalizability and social desirability

Results from the student sample, with some exceptions, were well-replicated in the MTurk community sample. Replication was particularly robust for the CFA, internal reliability, test-retest reliability, and convergent validity. The issue of replication is of significance because the capacity of findings from psychological research to replicate has been questioned (Aarts et al., 2015). Replication in our study also speaks to the issue of the generalizability of findings, as our student sample is a highly select sample even among undergraduate populations, whereas the MTurk sample is more representative of the general population. Specifically, although MTurk samples are somewhat less representative of national probability samples, they correspond more similarly to the general U.S. population than in-person convenience samples (Berinsky et al., 2012), and have a more superior diversity distribution compared to many in-person samples (Casler, Bickel, & Hackett, 2013). The associations of selfishness with other constructs did not vary greatly across different samples, attesting to the generalizability and replicability of this study's main findings on the reliability and validity of this instrument.

Although selfishness was associated with antisociality, high selfishness scorers were found to be relatively honest in their self-appraisal, as indicated by reduced social desirability in relation to higher and total selfishness. Although high scores on social desirability scales assess "faking good" and dissimulation, they also assess a stable personality trait, with lower scores reflecting social nonconformity and artfulness (Eysenck & Eysenck, 1991). It appears that selfish individuals, far from making an attempt to hide this socially undesirable characteristic, might not be personally concerned about how negatively they appear to others in society. Furthermore, selfishness was associated with other scales over and above its association with social desirability, documenting that it is not simply a by-product of the personality trait of social undesirability.

Optimal selfishness and mindfulness

Selfishness was predominantly associated with negative and malicious outcomes, including psychopathy and Machiavellianism. Selfishness in society is not entirely unexpected from an evolutionary standpoint as self-benefits enhance inclusive fitness (Hamilton, 1964), although we acknowledge that we cannot definitively document from our study that adaptive selfishness is advantageous from an evolutionary perspective, or is in any way optimal. The term *adaptive* is used in a relative sense to convey a softer form that is somewhat more nuanced

than the other two forms, which either callously make use of others (pathological) or have a single-minded focus on the self (egocentric). Adaptive selfishness could ultimately prove to be a maladaptive trait, albeit at a lower level than other forms of selfishness. Furthermore, we should clarify that the term *pathological selfishness* is a shorthand label for a form of selfishness that harms others and is more related to psychopathology. It has been suggested that if one had only 2 seconds to explain human nature, one might say “self-interest” (Haidt, 2007). Clearly, at some level, looking after oneself is an essential component of life, and this raises the question of whether extremely low levels of selfishness could be maladaptive. Future research could examine to what extent, and in which outcome areas, an “optimum” level of selfishness might exist.

An important question at a clinical level concerns how excessive selfishness that harms others can be attenuated. Findings of this study provide initial suggestions. Criterion validity for the scale was documented by showing that Tibetan monks who endorse compassion and practice mindfulness were less selfish than controls. Relatedly, selfishness was also associated with reduced compassion and increased mindfulness, particularly with respect to pathological selfishness. There is evidence that a mindful self-compassion intervention experimentally increases compassion (Neff & Germer, 2013), and that even kindergarten children can become less selfish compared to controls following mindfulness-based kindness training (Flook, Goldberg, Pinger, & Davidson, 2015). Mindfulness training has also been reported to reduce antisocial behaviors (Shonin, Van Gordon, Slade, & Griffiths, 2013; Wupperman et al., 2012), behaviors that we find to be associated with selfishness. Future intervention studies could therefore address whether selfishness could be attenuated by loving-kindness meditation programs, particularly for pathological selfishness, which was more associated with reduced mindfulness compared to other variants (Logie & Frewen, 2015).

Limitations

Several limitations of this study need to be recognized. First and foremost, the samples used to develop the scale consisted of undergraduates and online (MTurk) samples that do not include children, adolescents, and the elderly. Second, this study only provides a very beginning investigation of the nomological network of relationships that encapsulate the selfishness construct, a network that needs to be extended to solidify its construct validity (Cronbach & Meehl, 1955). Third, although we a priori conceptualized a three-factor structure to selfishness that was confirmed and replicated, other conceptualizations of selfishness could be evaluated in future research using a different instrument. Fourth, the wording of some items could be improved, as, for example, for adaptive selfishness, which contained two items on nonhurtful lying (e.g., “white lies”), yielding an overlap between this construct and telling lies that can benefit others as well as oneself. Fifth, although discriminant validity was documented for both student and community samples, correlations were somewhat larger for the community sample (see Table 3). Sixth, Tibetan monks differ from controls in ways other than mindfulness that we were not fully able to control. Seventh, selfishness scores were not

centered at the midpoint of the 0, 1, 2 response scale, and such uncentered responses in questionnaire data can result in Type II error inflation (Holtzman & Donnellan, 2017).

Future directions

There are several directions in which future research on selfishness could usefully contribute incremental knowledge. From a developmental perspective, one issue concerns whether prospective longitudinal research, by teasing out the temporal ordering of variables, can help establish whether selfishness predisposes individuals to some clinical disorders, or alternatively whether the development of psychopathological conditions results in increased selfishness. From a psychopathology perspective, it would be of value to explore links between selfishness and other disorders, including borderline personality disorder. At a psychometric level, this study at least provides a basis for building alternative selfishness questionnaires with a different conceptualization, item wording, and factor structure. At a sampling level, we anticipate that the scale could have utility in researching individual differences in the general population, as well as pathological selfishness in clinical samples.

At a mechanistic level, an unresolved issue concerns the genetic, neural, cognitive, social, and macrosocial processes that give rise to selfishness. This study was not designed to speak to the important issue of causal processes, but inclusion of the SQ in future brain imaging, molecular genetic, social, clinical, and cognitive studies could begin to address this question. For example, is the reward circuit consisting of the ventral striatum, orbitofrontal cortex, and anterior cingulate, together with the dorsolateral prefrontal cortex, amygdala, hippocampus, and thalamus that regulate this system (Haber & Knutson, 2010) more easily activated in excessively selfish individuals?

Conclusions

Selfishness as a concept has been frequently invoked in the study of human behavior, particularly in the area of clinical psychology where selfishness is a trait purported to be present in several clinical conditions. In the context of personality assessment, the lack of any instrument to specifically quantify selfishness and its variants is unexpected. The SQ represents an initial instrument for the assessment of three forms of selfishness—egocentric, adaptive, and pathological—that might have utility in further investigating a construct that is well-known to everyone, but is virtually unresearched in a standardized manner. The future promise of such research, at least at the clinical level, lies in the potential to parse more finely a trait that is believed to characterize narcissism, psychopathy, Machiavellianism, and histrionic personality, and yet is not specified as such in their formal *DSM* definitions. Whether selfishness should be included as one of the defining traits in these clinical disorders in future *DSM* revisions remains to be seen.

Acknowledgments

We thank Emory-Tibet Science Initiative and Drepung Loseling Monastery for assistance in the criterion validity component of this study, and

also Sonam Choepel and Tsondue Samphel for translation and administration of the Selfishness Questionnaire from English into Tibetan for data collection.

Funding

This work was supported by the GVR Khodadad Family Foundation, grant no. 001.

References

- Aarts, A. A., Anderson, J. E., Anderson, C. J., Attridge, P. R., Attwood, A., Axt, J., ... Penuliar, M. (2015). Estimating the reproducibility of psychological science. *Science*, 349, aac4716. doi:10.1126/science.aac4716
- Abdin, E., Koh, K. G. W. W., Subramaniam, M., Guo, M. E., Leo, T., Teo, C., ... Chong, S. A. (2011). Validity of the Personality Diagnostic Questionnaire-4 (PDQ-4) among mentally ill prison inmates in Singapore. *Journal of Personality Disorders*, 25, 834–841. doi:10.1521/pedi.2011.25.6.834
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Ariely, D. (2012). *The honest truth about dishonesty: How we lie to everyone, especially ourselves*. New York, NY: HarperCollins.
- Bardsley, N. (2008). Dictator game giving: Altruism or artefact? *Experimental Economics*, 11, 122–133. doi:10.1007/s10683-007-9172-2
- Bentham, J. (1789). *An introduction to the principles of morals and legislation*. Oxford, UK: Clarendon.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238–246. doi:10.1037/0033-2909.107.2.238
- Bentler, P. M. (1995). *EQS Structural Equations program manual*. Encino, CA: Multivariate Software.
- Bentler, P. M. (2000). *EQS 6 Structural Equation program manual*. Encino, CA: Multivariate Software.
- Bentler, P. M., Berkane, M., & Kano, Y. (1991). Covariance structure analysis under a simple kurtosis model. In E. M. Keramidas (Ed.), *Computing science and statistics* (pp. 463–465). Fairfax Station, VA: Interface Foundation of North America.
- Berinsky, A. J., Huber, G. A., & Lenz, G. S. (2012). Evaluating online labor markets for experimental research: Amazon.com's Mechanical Turk. *Political Analysis*, 20, 351–368. doi:10.1093/pan/mpr057
- Birnie, K., Specia, M., & Carlson, L. E. (2010). Exploring self-compassion and empathy in the context of mindfulness-based stress reduction (MBSR). *Stress and Health*, 26, 359–371. doi:10.1002/smi.1305
- Bouvard, M., Vuachet, M., & Marchand, C. (2011). Examination of the screening properties of the Personality Diagnostic Questionnaire-4+ (PDQ-4+) in a non-clinical sample. *Clinical Neuropsychiatry*, 8, 151–158.
- Caporael, L. R., Dawes, R. M., Orbell, J. M., & Van de Kragt, A. J. (1989). Selfishness examined: Cooperation in the absence of egoistic incentives. *Behavioral and Brain Sciences*, 12, 683–699. doi:10.1017/S0140525X00025292
- Casler, K., Bickel, L., & Hackett, E. (2013). Separate but equal? A comparison of participants and data gathered via Amazon's MTurk, social media, and face-to-face behavioral testing. *Computers in Human Behavior*, 29, 2156–2160. doi:10.1016/j.chb.2013.05.009
- Cleckley, H. (1976). *The mask of sanity* (5th ed.). St. Louis, MO: Mosby.
- Costa, P. T., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI) professional manual*. Odessa, FL: Psychological Assessment Resources.
- Cronbach, L., & Meehl, P. (1955). Construct validity in psychological tests. *Psychological Bulletin*, 52, 281–302. doi:10.1037/h0040957
- Cuthbert, B. N. (2014). The RDoC framework: Facilitating transition from ICD/DSM to dimensional approaches that integrate neuroscience and psychopathology. *World Psychiatry*, 13, 28–35. doi:10.1002/wps.20087
- Dawkins, R. (2006). *The selfish gene* (30th anniversary ed.). Oxford, UK: Oxford University Press.
- Eckel, C. C., & Grossman, P. J. (1996). Altruism in anonymous dictator games. *Games and Economic Behavior*, 16, 181–191. doi:10.1006/game.1996.0081
- Eysenck, H. J., & Eysenck, S. (1991). *Eysenck personality scales*. London, UK: Hodder & Stoughton.
- Fehr, E., & Gächter, S. (2002). Altruistic punishment in humans. *Nature*, 415, 137–140. doi:10.1038/415137a
- Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment*, 29, 177–190. doi:10.1007/s10862-006-9035-8
- Flook, L., Goldberg, S. B., Pinger, L., & Davidson, R. J. (2015). Promoting prosocial behavior and self-regulatory skills in preschool children through a mindfulness-based kindness curriculum. *Developmental Psychology*, 51, 44–51. doi:10.1037/a0038256
- Fossati, A., Porro, F. V., Maffei, C., & Borroni, S. (2012). Are the DSM-IV personality disorders related to mindfulness? An Italian study on clinical participants. *Journal of Clinical Psychology*, 68, 672–683. doi:10.1002/jclp.21848
- Gao, Y., & Tang, S. (2013). Psychopathic personality and utilitarian moral judgment in college students. *Journal of Criminal Justice*, 41, 342–349. doi:10.1016/j.jcrimjus.2013.06.012
- Gleichgerricht, E., & Young, L. (2013). Low levels of empathic concern predict utilitarian moral judgment. *PLoS ONE*, 8, e60418. doi: 10.1371/journal.pone.0060418
- Glenn, A. L., Rainé, A., & Schug, R. A. (2009). The neural correlates of moral decision-making in psychopathy. *Molecular Psychiatry*, 14, 5–6. doi:10.1038/mp.2008.104
- Greene, J. D., Morelli, S. A., Lowenberg, K., Nystrom, L. E., & Cohen, J. D. (2008). Cognitive load selectively interferes with utilitarian moral judgement. *Cognition*, 107, 1144–1154. doi:10.1016/j.cognition.2007.11.004
- Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science*, 293, 2105–2108. doi:10.1126/science.1062872
- Haber, S. N., & Knutson, B. (2010). The reward circuit: Linking primate anatomy and human imaging. *Neuropsychopharmacology*, 35, 4–26. doi:10.1038/npp.2009.129
- Haidt, J. (2007). The new synthesis in moral psychology. *Science*, 316, 998–1002. doi:10.1126/science.1137651
- Hall, J. R., Drislane, L. E., Patrick, C. J., Morano, M., Lilienfeld, S. O., & Poythress, N. G. (2014). Development and validation of triarchic construct scales from the Psychopathic Personality Inventory. *Psychological Assessment*, 26, 447–461. doi:10.1037/a0035665
- Hamilton, W. D. (1964). The genetical evolution of social behaviour: I. *Journal of Theoretical Biology*, 7, 1–16. doi:10.1016/0022-5193(64)90038-4
- Harbaugh, W. T., Mayr, U., & Burghart, D. R. (2007). Neural responses to taxation and voluntary giving reveal motives for charitable donations. *Science*, 316, 1622–1625. doi:10.1126/science.1140738
- Holtzman, N. S., & Donnellan, M. B. (2017). A simulator of the degree to which random responding leads to biases in the correlations between two individual differences. *Personality and Individual Differences*, 114, 187–192. doi:10.1016/j.paid.2017.04.013
- Hopwood, C. J., Donnellan, M. B., Ackerman, R. A., Thomas, K. M., Morey, L. C., & Skodol, A. E. (2013). The validity of the Personality Diagnostic Questionnaire-4 narcissistic personality disorder scale for assessing pathological grandiosity. *Journal of Personality Assessment*, 95, 274–283. doi:10.1080/00223891.2012.732637
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1–55. doi:10.1080/10705519909540118
- Hyler, S. E. (1994). *PDQ-4 and PDQ-4+ instructions for use*. New York, NY: New York State Psychiatric Institute.
- Knutson, K. M., Krueger, F., Koenigs, M., Hawley, A., Escobedo, J. R., & Vasudeva, V., ... Grafman, J. (2010). Behavioral norms for condensed moral vignettes. *Social Cognitive and Affective Neuroscience*, 5, 378–384. doi:10.1093/scan/nsq005
- Koolen, S., Poorthuis, A., & van Aken, M. A. G. (2012). Cognitive distortions and self-regulatory personality traits associated with proactive and reactive aggression in early adolescence. *Cognitive Therapy and Research*, 36, 776–787. doi:10.1007/s10608-011-9407-6

- Kounou, K. B., Foli, A. A. D., Djassoa, G., Ametepe, L. K., Rieu, J., & Mathur, A., ... Schmitt, L. (2015). Childhood maltreatment and personality disorders in patients with a major depressive disorder: A comparative study between France and Togo. *Transcultural Psychiatry*, 52, 681–699. doi:10.1177/1363461515572001
- Lee, I. A., & Preacher, K. J. (2013). Calculation for the test of the difference between two dependent correlations with one variable in common [Computer software].
- Lilienfeld, S. O., & Hess, T. H. (2001). Psychopathic personality traits and somatization: Sex differences and the mediating role of negative emotionality. *Journal of Psychopathology and Behavioral Assessment*, 23, 11–24. doi:10.1023/A:1011035306061
- Loehlin, J. C. (1992). *Latent variable models: An introduction to factor, path, and structural analysis*. Hillsdale, NJ: Erlbaum.
- Logie, K., & Frewen, P. (2015). Self/other referential processing following mindfulness and loving-kindness meditation. *Mindfulness*, 6, 778–787. doi:10.1007/s12671-014-0317-z
- Malthus, T. R. (1798). *An essay on the principle of population*. London, UK: J. Johnson in St Paul's Church-Yard.
- McDonald, R. P. (1989). An index of goodness-of-fit based on non-centrality. *Journal of Classification*, 6, 97–103. doi:10.1007/BF01908590
- Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology*, 69, 28–44. doi:10.1002/jclp.21923
- Patrick, C. J. (2006). *Handbook of psychopathy*. New York, NY: Guilford.
- Patrick, C. J. (2010). *Operationalizing the triarchic conceptualization of psychopathy: Preliminary description of brief scales for assessment of boldness, meanness, and disinhibition*. Tallahassee, FL: Florida State University.
- Piaget, J. (1951). *The child's conception of the world* (Vol. 213). Lanham, MD: Rowman & Littlefield.
- Raine, A., & Chen, F. R. (2018). Cognitive, Affective, and Somatic Empathy Scale (CASES) for children. *Journal of Clinical Child and Adolescent Psychology*, 47, 24–37. doi:10.1080/15374416.2017.1295383
- Sellbom, M., & Phillips, T. T. (2013). An examination of the triarchic conceptualization of psychopathy in incarcerated and nonincarcerated samples. *Journal of Abnormal Psychology*, 122, 208–214. doi:10.1037/a0029306
- Shonin, E., Van Gordon, W., Slade, K., & Griffiths, M. D. (2013). Mindfulness and other Buddhist-derived interventions in correctional settings: A systematic review. *Aggression and Violent Behavior*, 18, 365–372. doi:10.1016/j.avb.2013.01.002
- Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin*, 87, 245–251. doi:10.1037/0033-2909.87.2.245
- Tinghög, G., Andersson, D., Bonn, C., Johannesson, M., Kirchler, M., Koppel, L., & Västfjäll, D. (2016). Intuition and moral decision-making—The effect of time pressure and cognitive load on moral judgment and altruistic behavior. *PLoS ONE*, 11, e0164012. doi: 10.1371/journal.pone.0164012
- Tonnaer, F., Cima, M., Sijtsma, K., Uzieblo, K., & Lilienfeld, S. O. (2013). Screening for psychopathy: Validation of the Psychopathic Personality Inventory-Short Form with reference scores. *Journal of Psychopathology and Behavioral Assessment*, 35, 153–161. doi:10.1007/s10862-012-9333-2
- Trull, T. J., Ueda, J. D., Costa, P. T., & McCrae, R. R. (1995). Comparison of the MMPI-2 Personality Psychopathology Five (PSY-5), the NEO-PI, and the NEO PI-R. *Psychological Assessment*, 7, 508–516. doi:10.1037/1040-3590.7.4.508
- van Leeuwen, N., Rodgers, R. F., Gibbs, J. C., & Chabrol, H. (2014). Callous-unemotional traits and antisocial behavior among adolescents: The role of self-serving cognitions. *Journal of Abnormal Child Psychology*, 42, 229–237. doi:10.1007/s10802-013-9779-z
- Wang, Y. P., Zhu, X. Z., Cai, L., Wang, Q., Wang, M. C., Yi, J. Y., & Yao, S. (2013). Screening cluster A and cluster B personality disorders in Chinese high school students. *BMC Psychiatry*, 13, 116. doi: 10.1186/1471-244X-13-116
- Wayment, H. A., Wiist, B., Sullivan, B. M., & Warren, M. A. (2011). Doing and being: Mindfulness, health, and quiet ego characteristics among Buddhist practitioners. *Journal of Happiness Studies*, 12, 575–589. doi:10.1007/s10902-010-9218-6
- Wilson, D. S., Near, D., & Miller, R. R. (1996). Machiavellianism: A synthesis of the evolutionary and psychological literatures. *Psychological Bulletin*, 119, 285–299. doi:10.1037/0033-2909.119.2.285
- Wupperman, P., Marlatt, G. A., Cunningham, A., Bowen, S., Berking, M., Mulvihill-Rivera, N., & Easton, C. (2012). Mindfulness and modification therapy for behavioral dysregulation: Results from a pilot study targeting alcohol use and aggression in women. *Journal of Clinical Psychology*, 68, 50–66. doi:10.1002/jclp.20830
- XIV Bstan-'dzin-rgya, D. L. (2012). *Beyond religion: Ethics for a whole world*. New York, NY: Random House.
- Yang, J., McCrae, R. R., Costa, P. T., Dai, X. Y., Yao, S. Q., Cai, T. S., & Gao, B. (1999). Cross-cultural personality assessment in psychiatric populations: The NEO-PI-R in the People's Republic of China. *Psychological Assessment*, 11, 359–368. doi:10.1037/1040-3590.11.3.359

Appendix

The Selfishness Questionnaire (SQ)

Instructions to participant

We can't always be charitable to others, and there are times when you have to look after your own self-interests. Answer the following questions as honestly as you can by indicating whether you: **Disagree (0)**, **Neither Agree nor Disagree (1)**, or **Agree (2)** with each statement.

1. I have no problem telling “white lies” if it will help me achieve my goals.
2. I'm not too concerned about what is best for society in general.
3. Now and again I've manipulated my friends to gain an advantage.
4. At the end of the day I care mostly for myself, my family, and friends who can help me.
5. I've occasionally put others down to achieve my goals.
6. I don't give to charities.
7. Even if it meant giving my kids an unfair advantage over others, I'd do it for them.
8. Sometimes you need to take advantage of other people before they take advantage of you.
9. I'm not always honest because honesty can end up harming myself and others.
10. When it comes to helping myself or helping others, I tend to help myself.
11. It's not nice to exploit others, but there are times when you simply need to.
12. If there was only one space left on a lifeboat that a child needed, I'd honestly have to take it for myself and my family.
13. Quite often in life, it is more important to receive than to give.
14. I know I love rewards in life, even if there is a cost to others.
15. It's better to save for a rainy day than to give to charities where money can be misspent.
16. If I'm honest, there are times when I put myself first, even if it's someone else's loss.

17. If the choice was between killing someone or being killed, I'd kill.
18. I care for myself much more than I care for others.
19. I have sometimes dumped friends that I don't need anymore.
20. I sometimes lie to others for my own good, and theirs too.
21. Even when I see people in need, I don't feel the urge to help them.
22. I go out of the way to exploit situations for my own advantage.
23. At the end of the day, I have to admit that I'm quite a selfish person.

24. I mostly help those around me who will help me later.

Scoring instructions

Each item has a score ranging from 0 to 2. Add scores as follows:

Egocentric Selfishness: Questions 2, 6, 10, 13, 15, 18, 21, 23.

Adaptive Selfishness: Questions 1, 4, 7, 9, 12, 17, 20, 24.

Pathological Selfishness: Questions 3, 5, 8, 11, 14, 16, 19, 22.

Total Selfishness: add **Egocentric** + **Adaptive** + **Pathological** Selfishness scores