Journal of Experimental Social Psychology 102 (2022) 104353

Contents lists available at ScienceDirect

Journal of Experimental Social Psychology

journal homepage: www.elsevier.com/locate/jesp

Building bonds: A pre-registered secondary data analysis examining linear and curvilinear relations between socio-economic status and communal attitudes☆

Mario Weick [a,*], Dominique-Laurent Couturier [b], Milica Vasiljevic [a], Paddy Ross [a], Cory J. Clark [a], Richard J. Crisp [a], Ana C. Leite [a], Andrew J. Marcinko [a], Thuy-vy T. Nguyen [a], Julie Van de Vyver [a]

[a] Department of Psychology, Durham University, UK
[b] Cancer Research UK, University of Cambridge, UK

ARTICLE INFO

Keywords:
Socio-economic status (SES)
Hierarchy
Communal orientation
Implicit attitudes
Explicit attitudes
Reward

ABSTRACT

A large body of research points to differences in the communal orientation of people from a lower and higher socio-economic status (SES) background. However, direct evidence for differences in communal attitudes remains scant. In this pre-registered report, we test the hypothesis that SES impacts the incentive value of cues associated with bonding and social relations, thereby fostering differences in implicit and explicit communal attitudes. We further speculate that for people at the low end of the SES spectrum, the prevalence of discrimination, exclusion, and conflict means that relationships may have less of an incentive value. Thus, we hypothesise that the association between SES and communal attitudes follows a curvilinear trajectory and peaks at medium levels of SES. Testing these predictions in a dataset derived from the Attitudes, Identities, and Individual Differences (AIID) Study (Hussey, Hughes, & Nosek, 2018), we found no evidence supporting a linear or a curvilinear association between SES and communal attitudes. Instead, implicit and explicit communal attitudes did not vary across the SES spectrum. We discuss the implications of these findings and avenues for future research.

When the going gets tough, people are motivated to bond with others. Evidence for this truism derives from the burgeoning literature on socio-economic status, which has documented numerous ways in which a lack of socio-economic resources fosters an increased other-orientation (*e.g.,* Hooker, Campos, Hoffman, Zoccola, & Dickerson, 2020; Kraus, Piff, Mendoza-Denton, Rheinschmidt, & Keltner, 2012; Piff & Robinson, 2017; Rucker, Galinsky, & Magee, 2018). Yet, a similarly sizable body of evidence suggests that, far from providing a source of support, for people at the bottom of the socio-economic ladder, the social environment is a place that is often marred by discrimination, exclusion, and conflict (*e.g.*, Fiske, 2010; Greitemeyer & Sagioglou, 2016; Lott, 2002). In the present article, we explore how these divergent phenomena may be reconciled and together shape the association between socio-economic status and communal attitudes.

Socio-economic status (SES) describes individuals' relative standing in terms of income, occupational prestige, and education (Adler, Epel, Castellazzo, & Ickovics, 2000). Subjectively, people with a lower SES background tend to feel less liked and respected than people with a higher SES background, thus giving rise to differences in perceived status (see Anderson, John, & Keltner, 2012). Growing up in a low SES environment has a profound and lasting impact on individuals' physical and psychological functioning: SES disparities can be observed in the development of the foetal brain (Lefmann & Combs-Orme, 2014), in the language and executive functioning of preschoolers (Noble, Norman, & Farah, 2005), in the epigenetic aging in adults (Steptoe & Zaninotto, 2020), and in rates of mortality (Stringhini et al., 2017).

Many of the detrimental effects of low SES can be attributed to a greater exposure to stressors. Manifestly, the lived experience of lower (*vs.* higher) SES individuals is one that is marked by uncertainty and reduced agency stemming from a greater exposure to external forces.

☆ This paper has been recommended for acceptance by Professor Michael Kraus.

* Corresponding author at: Department of Psychology, Durham University, South Rd, Durham DH1 3LE, UK.
E-mail address: mario.weick@durham.ac.uk (M. Weick).

https://doi.org/10.1016/j.jesp.2022.104353
Received 31 August 2019; Received in revised form 27 April 2022; Accepted 11 May 2022
Available online 26 May 2022

This affects the way in which lower (*vs.* higher) SES individuals interact with the social world. Relative to higher SES individuals, lower SES individuals are more oriented towards others (Kraus et al., 2012); compared to higher SES individuals, they spend more time observing other people (Dietze & Knowles, 2016), are more attentive to others in interactions (Kraus & Keltner, 2009), and look to others to inform their own choices (Stephens, Fryberg, & Markus, 2011).

Being attentive to others can be a strategy that enhances observers' predictability and control. Consistent with this perspective, studies show lower SES participants perform better than high SES participants in tasks requiring them to judge other people's emotions (Kraus, Côté, & Keltner, 2010). Empathic accuracy, and the allied tendency to attend to others, can also foster affiliation. From this (complementary) perspective, low SES may promote 'tending and befriending' tendencies to reduce the increased level of stress frequently experienced by lower SES individuals (Cohen & Wills, 1985; Taylor et al., 2000). Empirical studies support this contention showing that supportive family environments can help members of disadvantaged groups cope with stressors and reduce epigenetic aging (Brody, Miller, Yu, Beach, & Chen, 2016).

In keeping with the notion that social connections can counter the impact of adverse circumstances, lower (*vs.* higher) SES individuals are often perceived as being more communally oriented than higher SES individuals (Conway, Pizzamiglio, & Mount, 1996). Communal orientation refers to goals and behavioural inclinations that promote affiliation and cooperation (Abele & Wojciszke, 2007), and contribute to communally oriented individuals being perceived as warm and friendly (Fiske, Cuddy, Glick, & Xu, 2002).

Evidence that SES impacts communal orientation derives from studies showing that lower SES individuals are more generous and willing to share resources (*e.g.,* Piff, Kraus, Côté, Cheng, & Keltner, 2010); a tendency that emerges at a relatively early age when children with a lower SES background are often taught to 'blend in' (Guinote, Cotzia, Sandhu, & Siwa, 2015; Pearlin & Kohn, 1966). Similarly, studies show that lower SES individuals are more inclined to experience other-oriented emotions such as compassion and love (Piff & Moskowitz, 2018), and they respond more strongly to other people's pain and suffering (Stellar, Manzo, Kraus, & Keltner, 2012; Varnum, Blais, Hampton, & Brewer, 2015). In addition, while low SES appears to trigger behaviours aimed at establishing a rapport with others (Kraus & Keltner, 2009; Stephens, Markus, & Townsend, 2007), wealth-cues promote materialism and competition (Kasser, Ryan, Zax, & Sameroff, 1995; Kay, Wheeler, Bargh, & Ross, 2004).

In sum, multiple lines of inquiry suggest that the absence of social and economic resources boosts individuals' communal orientation, which provides a means of coping with external constraints (Kraus et al., 2012; Rucker et al., 2018), not least because it facilitates bonding with a social network that provides crucial resources (Carey & Markus, 2017). Interestingly, the benefits of social ties can extend beyond tight-knit networks. John-Henderson, Stellar, Mendoza-Denton, and Francis (2015) found that even the presence of a supportive stranger can help individuals with lower subjective childhood SES cope with stressors better, leading to a reduction in inflammation in the immune system, whereas no such protective effect was observed for individuals with higher subjective childhood SES.

1. Unanswered questions

Since social bonds appear to have particularly positive effects for people with a lower SES background, it stands to reason that cues associated with bonding and community should have gained incentive properties over the learning history (Robbins, Cador, Taylor, & Everitt, 1989). Consequently, encountering communal cues should trigger a desire and appetitive response. In other words, SES should impact the extent to which communal cues are perceived positively and trigger the human reward system (*e.g.,* McClure, York, & Montague, 2004). If communal cues trigger more positive affective reactions in low compared to high SES individuals, this should manifest in more positive implicit and explicit attitudes (*e.g.,* Wilkowski & Ferguson, 2014; Wojciszke, Abele, & Baryla, 2009).

Perhaps the most direct evidence for an association between SES and communal attitudes derives from Stephens et al. (2007) who found that lower (*vs.* higher) SES participants (as defined by parental education) showed a stronger preference for objects (*e.g.*, pens) when those objects were shared by others (*vs.* when those objects were more unique). Piff, Stancato, Martinez, Kraus, and Keltner (2012) observed a conceptually similar association between SES and measures of communal motivation, which only emerged, however, when participants were exposed to chaos and randomness. Taken together, direct evidence for an association between SES and communal attitudes remains scant, and there is a need for further studies probing the said association.

Engagement with others can be a source of comfort, but it can also expose individuals to sources of stress. Individuals from a disadvantaged background often find themselves at the receiving end of discrimination, triggering physiological wear-and-tear (Fuller-Rowell, Evans, & Ong, 2012). Instead of providing a sanctum, the social world is often a source of stigma and exclusion for those at the bottom of the socio-economic ladder (Lott, 2002). Not surprisingly, people respond negatively to the experience of being excluded (Twenge, Baumeister, Tice, & Stucke, 2001), in particular when there is little hope that the situation can be remedied (see Scott & Thau, 2013). In this view, for people at the bottom of the socio-economic ladder, social cues may also represent a potential source of threat and trigger negative affective reactions (Mickelson & Williams, 2008). This is consistent with recent work by Sainz, Martínez, Moya, Rodríguez-Bailón, and Vaes (2021), who showed that individuals from a disadvantaged background feel that they are perceived as being less human – a phenomenon coined *meta-dehumanisation*, which fosters social disconnection (Haslam, 2022) and is detrimental to individuals' well-being. Interestingly, the authors also report a carefully crafted experiment in which they manipulated different levels of SES, showing that relative to high levels of SES, only low, but not medium levels of SES, triggered perceptions of being perceived as less than human.

One could argue that, while those at the bottom of the SES hierarchy may face discrimination and exclusion, this may not extend to their close relationships. However, contrary to this supposition, studies show that poverty and economic hardship put strains on families (McLoyd, 1990). Similarly, in close relationships economic and social problems often cause conflicts and stifle the emotional support that couples gain from their close relationships (Conger et al., 1990; Trail & Karney, 2012). This suggests that for those at the bottom of the socio-economic ladder, even close relationships may not provide a reprieve from their adverse social environment.

Taken together, the benefits of social bonds may be most pronounced for those with at least some economic and material resources to spare who do not face the kind of discrimination, exclusion and conflict that often characterise the lives of those at the very bottom of the SES ladder. Put differently, the incentive value of social relations may differ across the SES trajectory in a nonlinear fashion, peaking not at low, but at medium levels of SES and then dropping off again at higher levels of SES.

Imhoff and Koch (2017) recently observed such a curvilinear association in people's impressions of social groups. They found that groups that are perceived as having the lowest status in society, such as drug addicts and the homeless, are also perceived as being less communal compared to medium status groups such as blue-collar workers. This pattern is in line with the conjectures put forth here. Imhoff and Koch examined people's impressions or stereotypes of social groups, and we do not know whether there is some kernel of truth to those stereotypes. However, the work does raise the intriguing prospect that the association between SES and communal orientation may follow a non-linear trajectory. To our knowledge, the only other piece of evidence that supports our contention derives from work on collectivism, which describes the extent to which societies are communally oriented (Triandis, 1995). It is well-established that national wealth accounts for a

significant proportion of the variance in collectivism (Hofstede, 1991), but more recently Tang and Koveos (2008) found that the association between wealth (operationalised as GDP *per capita*) and country-level collectivism also follows a curvilinear trajectory and peaks at low-to-medium levels of wealth.

2. The present research

Taken together, there is a need for studies to examine whether the association between individual-level SES and communal orientation follows a non-linear trajectory. If it is the case that communal orientation peaks at medium levels of SES, then people's attitudes towards communal cues should be more positive at medium levels of SES compared to low and high levels of SES. Establishing evidence for a non-linear relationship between SES and communal attitudes may contribute to shed further light onto the literature on SES and pro-social behaviour (*i.e.*, helping), which appears to be at loggerheads, with some studies reporting a negative (linear) association between SES and pro-social behaviour (*e.g.*, Callan, Kim, Gheorghiu, & Matthews, 2017; Côté, House, & Willer, 2015; Motsenok & Ritov, 2021; Piff et al., 2010), and other studies reporting no association, or a positive (linear) association between SES and pro-social behaviour (*e.g.*, Greitemeyer & Sagioglou, 2018; Korndörfer, Egloff, & Schmukle, 2015; Schmukle, Korndörfer, & Egloff, 2019; Stamos, Lange, Huang, & Dewitte, 2020).

In what follows we report a pre-registered, prospective secondary analysis of the Attitudes, Identities, and Individual Differences (AIID) Study (see Hussey, Hughes, & Nosek, 2018). The full AIID dataset contains data from *circa* 200,000 participants in all with diverse backgrounds who completed an Implicit Association Test (IAT) to measure implicit attitudes, along with auxiliary measures, including measures of explicit attitudes, covering a wide range of attitudinal domains.

Data derived from the Attitudes, Identities, and Individual Differences (AIID) Study is ideally suited to examine the present research hypotheses. First, the participant sample is demographically diverse and, as described in more detail below, includes a sizeable number of participants with a low and high SES background. Second, the final number of observations retained for the primary analysis ($n = 3698$) is sufficiently large to detect small effects with high statistical power, but at the same time small enough to ensure that negligible effects do not yield significant results. Finally, the pre-registered format is arguably ideal for the present investigation, which tests a research hypothesis that stipulates a more complex, non-linear relationship between study variables.

Based on the rationale outlined above, we hypothesised that SES – operationalised as objective education and income level – will explain differences in people's implicit and explicit attitudes towards communal cues. We hypothesised that the association between SES and attitudes will follow a non-linear trajectory; such that attitudes towards communal cues will be more positive at medium levels of SES and relatively more negative at low and high levels of SES.

3. Methods

3.1. Participants

The AIID dataset contained 8003 responses for one of seven target IAT and attitude measures selected for the primary analysis (based on criteria outlined below). Of these, 4119 responses were missing information on income, education level, or explicit attitudes and were therefore discarded. Of the remaining 3884 responses, 186 responses were duplicates stemming from repeated participation in the AIID study. To ensure observations are independent, we randomly selected one set of data from participants who took part more than once, leaving a final sample of 3698 participants. The final sample has the following demographic make-up: 64.2% female; 0.5% American Indian, 5.4% Asian, 5.3% Black, 5.1% Hispanic, 74.6% White, 1% Biracial (Black/White), 4.2% Multiracial, and 2.3% Other; with an average age of 32.64 years ($SD = 12.19$).

As detailed below, we carried out further sensitivity analysis on the entire AIID dataset. We identified 63,235 responses with data on education, income, and explicit and implicit attitudes. To ensure observations are independent, we randomly selected one response set from participants who took part more than once, discarding 19,433 responses. The final sample of 43,802 participants had the following demographic make-up: 60.3% female; 0.6% American Indian, 5.3% Asian, 5.5% Black, 5.7% Hispanic, 73.4% White, 0.9% Biracial (Black/White), 3.9% Multiracial, and 2.5% Other; with an average age of 32.21 years ($SD = 12.06$).

3.2. Measures

3.2.1. Implicit attitudes

The Implicit Association Test (IAT) was used to measure participants' implicit attitudes towards one of 95 attitudinal domains on a randomised basis (for a comprehensive description of the AIID Study see Hussey et al., 2018, and Nosek & Hansen, 2008, Study 7). For the purposes of our paper, we analysed the data of participants who completed one of the following IAT measures: *Corporations – Nonprofits, Money – Love, Punishment – Forgiveness, Receiving – Giving, Skeptical – Trusting, Solitude – Companionship, Team – Individual* (reverse coded). Table 1 provides an overview of the corresponding stimuli. Target domains were selected based on a survey carried out with 13 social psychology faculty members (11 staff members and 2 PhD students; 53.8% female; $M_{age} =$

Table 1
IAT categories and stimuli.

	IAT Category			
	Money	Love	Solitude	Companionship
IAT Stimuli	Affluence	Affection	Alone	Accompaniment
	Wealth	Heart	Unattached	Camaraderie
	Investments	Relationship	Independent	Company
	Cash	Romance	Solo	Fellowship
			Individual	Togetherness
			Autonomous	Relationship
	IAT Category			
	Punishment	Forgiveness	Receiving	Giving
	Penalty	Pardon	Accepting	Bestowing
	Retribution	Reprieve	Acquiring	Donating
	Discipline	Amnesty	Gaining	Endowing
	Punitive	Lenience	Obtaining	Awarding
	Sanction	Mercy	Procuring	Providing
	IAT Category			
	Corporations	Non-Profits	Team	Individual
		American		
	Walmart	Heart	Squad	Person
	Microsoft	Amnesty Int.	Players	Autonomous
	General Mills	Cancer Society	Group	Solo
	General			
	Motors	UNICEF	Bunch	One
	Starbucks	Red Cross		
	IBM	Greenpeace		
	IAT Category			
	Skeptical	Trusting		
	Questioning	Convinced		
	Hesitant	Confident		
	Wary	Accepting		
	Doubtful	Believing		

34.15). For 94 of the 95 IAT attitude domains,[1] faculty members indicated whether the domain measures communal attitudes on a scale ranging from 1 (*Definitely prefers* [item on the left]) to 5 (*Definitely prefers* [item on the right]). Based on these expert ratings, we selected six attitude domains with the highest average rating (*Ms* = 4.46 to 4.77) and one attitude domain with the lowest average rating (*M* = 1.54). We chose seven attitude domains in total because visual inspection of the data indicated that the seven domains formed a cluster that stood out from the remainder of the data. See Online Supplementary Material for a copy of the survey carried out with experts (Appendix SA), a breakdown of all attitude domain ratings (Table S1), and a figure visualising the distribution of the ratings (Fig. S1).

Data for the relevant attitudinal domains were already transformed in the AIID dataset according to established conventions to derive a *D* score (see Greenwald, Nosek, & Banaji, 2003; Nosek & Hansen, 2008, Study 7). We reversed implicit *D* scores related to the *Team - Individual* category so that higher scores denote more positive attitudes towards communal target concepts. All participants completed an evaluative IAT using either good/bad, positive/negative, or pleasant/unpleasant category labels.

3.2.2. Explicit attitudes

A single-item preference measure was used to assess participants' explicit attitudes. Responses ranged from 1 (*strongly prefer X to Y*) to 7 (*strongly prefer Y to X*). Scores related to the *Team - Individual* category were reverse coded.

3.2.3. Socio-economic status (SES)

Participants' education and household-level income served as measures of socio-economic status. Participants self-reported their education attainment using the following response options: 1 = *Not a high school graduate*, 2 = *High school graduate*, 3 = *Some college or associate's degree*, 4 = *Bachelor's degree*, 5 = *Graduate degree or graduate education.* Household-level income was reported on a scale ranging from 1 to 5: 1 = *<$25,000*; 2 = *$25,000 - $49,999*; 3 = *$50,000 - $74,999*; 4 = *$75,000 - $149,999;* 5 = *>$150,000*. Table 2 shows the distribution of participants across levels of income and education for the primary analysis.

3.3. Procedure

Data for the AIID Study was collected between 17 September 2004 and 17 October 2006 as part of *Project Implicit* (https://implicit.harvard.edu/implicit/). Study materials and further details on the Registered Reports project are available online (https://osf.io/pcjwf/); scripts and materials associated with the present project can be found at https://osf.io/pwt7b/. Data were released under a Creative Commons Zero (CC-0 1.0) license. Confirmatory data were made available *after* the successful completion of Stage 1 of the submission and review process for the preregistered report. A separate, exploratory dataset that contains *circa* 15% of the total data was made available for exploratory analyses to develop scripts and analyses plans. Information on demographic characteristics of the confirmatory sample were also available, thus enabling a precise sensitivity power analysis.

Participation in the AIID Study occurred online. Once participants were assigned a unique ID, they provided their demographic information, and were then randomly assigned to 1 out of 95 attitudinal domains (*i.e.,* concept category pairs, such as "Solitude" *vs.* "Companionship"). Participants completed an IAT for the assigned attitudinal domain. They also made various judgements regarding the attitudinal domain by responding to 27–29 items from a pool of 76 items, randomised with constraints. Completion of the implicit and explicit measure towards the randomised attitudinal domain was counterbalanced across participants. Finally, participants provided responses to 1 out of 20 individual differences measures. Individual difference measures are not relevant for the present report and will not be discussed further.

3.4. Sensitivity power calculation

As noted above, the AIID Registered Reports project involves a multi-stage process and at the first stage an exploratory dataset was made available to researchers for the purpose of creating scripts and conducting power analysis (see Hussey et al., 2018). Table S3 in Online Supplemental Materials shows the power (1- β) to detect parameter estimates derived from fitting the model described in Eq. (1) below to the exploratory AIID dataset (n = 876). Sensitivity to detect several theoretically relevant effects in the confirmatory AIID dataset (n = 3698) was expected to be high, 1-β > 0.99, applying a Šidák multiplicity correction and assuming we carry out two-tailed statistical tests of our directional hypotheses.

3.5. Variation

All data preparation and analyses were performed in line with the preregistration. There was some variation between the expected (Stage 1) and actual (Stage 2) sample size. This was due to respondents who participated in the AIID study more than once. To ensure all observations are independent, we selected one response from participants with multiple response sets at random. This only had a small impact on the sample size for the primary analysis (4.8% reduction). Retaining repeated responses did not alter the results.

4. Results

4.1. Exclusions

A small proportion of participants failed quality control checks (>10% of responses faster than 300 ms) and are not included in the AIID dataset. Trials with reaction times >10,000 ms were excluded prior to calculating *D* scores.

4.2. Data preparation

In keeping with preregistered protocols, implicit and explicit attitudes were screened for univariate outliers defined as scores above or below 2.5SD from the sample mean. Forty-nine outliers (1.3%) were identified. We thus report further sensitivity analyses using robust estimation models (see details below). Residuals were normally distributed and there was no evidence of heteroscedasticity.

Income was coded from −2 to +2, and education was also be coded from −2 to +2. In keeping with the reference literature, we created an index of objective SES by combining income and education using the arithmetic mean (we report the results of the primary analysis using income and education as separate predictors of communal attitudes in exploratory analyses). Thus, scores for objective SES (linear trend) ranged from −2 to +2, and medium levels of SES (zero) provide a reference point in subsequent regressions. Attitude domains were dummy coded (domain 1: $D_1 = 0, D_2 = 0, D_3 = 0, D_4 = 0, D_5 = 0, D_6 = 0$; domain 2: $D_1 = 1, D_2 = 0, D_3 = 0, D_4 = 0, D_5 = 0, D_6 = 0$; domain 3: $D_1 = 0, D_2 = 1, D_3 = 0, D_4 = 0, D_5 = 0, D_6 = 0$; domain 4: $D_1 = 0, D_2 = 0, D_3 = 1, D_4 = 0, D_5 = 0, D_6 = 0$; domain 5: $D_1 = 0, D_2 = 0, D_3 = 0, D_4 = 1, D_5 = 0, D_6 = 0$; domain 6: $D_1 = 0, D_2 = 0, D_3 = 0, D_4 = 0, D_5 = 1, D_6 = 0$; domain 7: $D_1 = 0, D_2 = 0, D_3 = 0, D_4 = 0, D_5 = 0, D_6 = 1$).

In keeping with the pre-registration, gender, age, and ethnicity served as control variables in further sensitivity analyses and missing cases (n = 68; 1.8% of the total sample) were deleted listwise. Age was centred, while gender and ethnicity were effect-coded (gender: female = −1; male = 1; ethnicity: white = −1; non-white = 1).

[1] Due to an omission, the IAT domain *Asians – Whites* was not included in the pre-test.

Table 2
Distribution of income and education (primary analysis; n = 3698).

	Income					
Education	<$25,000	£25,000–$49,999	$50,000–$74,999	$75,000–$149,999	>$150,000	Total
Not high school graduate	35	26	24	27	14	126
High school graduate	40	55	39	27	17	178
Some college or associate's degree	410	291	226	220	101	1248
Bachelor's degree	246	293	252	303	112	1206
Graduate degree or graduate education	101	195	169	294	181	940
Total	832	860	710	871	425	3698

4.3. Primary analysis

Our primary analysis focuses on variations in implicit (*D* scores) and explicit (preference ratings) attitudes. We regressed the attitude measures on the linear and quadratic effects of objective SES. We also added six dummy variables denoting different attitude domains (*i.e.*, number of domains minus one – see coding scheme above). Differences between attitude domains were modelled using fixed (*vs.* random) effects to minimise assumptions regarding the distribution of the data. The analysis can be more formally expressed as:

$$attitudes_i = b_0 + b_{1i}SES_i + b_{2i}SES_i^2 + b_{3i}domain\_dummy1_i + b_{4i}domain\_dummy2_i + b_{5i}domain\_dummy3_i + b_{6i}domain\_dummy4_i + b_{7i}domain\_dummy5_i + b_{8i}domain\_dummy6_i + \varepsilon_i \quad (1)$$

We carried out two OLS regressions, one for implicit attitudes, and one for explicit attitudes. For both analyses, the Šidák adjusted critical *p* value is 0.025 (two-tailed).

As shown in Table 3, neither the linear effect nor the quadratic effect of objective SES accounted for variation in implicit attitudes, *ps* = 0.161 and 0.134, respectively. A similar picture emerged for explicit attitudes: the regression yielded neither a significant linear effect nor a significant quadratic effect of objective SES, *ps* = 0.110 and 0.602, respectively. Follow-on Bayesian regressions provided strong evidence in favour of the null hypothesis, $BFs_{01} \geq 38.70$.

4.4. Sensitivity analysis

Bearing in mind the presence of outliers, we repeated the primary analysis using a more robust M-estimator. The analyses, which use a Šidák adjusted critical *p* value of 0.025 (two-tailed), yielded no significant linear or quadratic effects of objective SES, *ps* ≥ 0.047 (see Table S4).

As indicated above, we repeated our OLS regression analyses, this time adding the main effects of age, gender, and ethnicity to the model. The sample size for this analysis is *n* = 3630. As shown in Table S5 in Online Supplemental Materials, no evidence for a linear or quadratic effect of objective SES emerged, *ps* ≥ 0.216. Follow-on Bayesian regression analyses again supported the null hypothesis, $BFs_{01} \geq 64.21$.

Recall that 13 experts rated the extent to which 94 IAT attitude domains captured communal attitudes. To account for uncertainty in the expert ratings, and to make sure that the findings are conclusive and generalise beyond a unique sample of expert ratings, as a final step we performed a bootstrapping exercise. In this analysis using a High Throughout Computing (HTC) core, we resampled the 13 expert ratings of the IAT attitude domains as well as 43,802 study participants for whom data were available, *with replacement*, *R* = 10,000 times. See Table S2 in Online Supplementary Materials for the distribution of education and income in this sample.

For each expert and participant resampling, we selected the seven target domains according to two ways: (i) one time based on the arithmetic mean of the 13 resampled ratings, thus defining a set of domains rated most suitable by experts to provide an index of communal attitudes, (ii) 10,000 times randomly, *without replacement*. For each of the resulting 10,001 sets of seven attitude domains, we separately fitted the implicit and explicit attitude scores on the linear and quadratic SES scales by means of a linear regression (see Eq. (1)), and we then saved the *p*-values corresponding to these parameters. By fitting regressions to a set of domains chosen at random we can deduce a distribution of *p*-values under the null hypothesis. We can then compare the said distribution of *p*-values under the null hypothesis with the *p*-value corresponding to the set of domains rated most suitable by experts. By repeating this comparison 10,000 times, we obtain a new *p*-value corresponding to the likelihood of a random set of domains achieving a higher level of significance than the set of domains rated most suitable by experts. To interpret the data, we plotted the density of the resulting *p*-values derived from a total of 200,020,000 regressions (2 outcomes ×

Table 3
OLS regression predicting implicit and explicit attitudes (primary analysis; n = 3698).

	Attitudes (Implicit)				Attitudes (Explicit)			
x	B	SE	p	partial f^2	B	SE	p	partial f^2
Objective SES	0.012	0.009	0.161	0.001	−0.056	0.035	0.110	0.001
Objective SES^2	−0.011	0.008	0.134	0.001	0.016	0.030	0.602	<0.001
Domain_Dummy 1	0.471	0.026	<0.001	0.084	1.014	0.104	<0.001	0.025
Domain_Dummy 2	0.563	0.027	<0.001	0.105	0.458	0.109	<0.001	0.005
Domain_Dummy 3	−0.017	0.027	0.543	<0.001	0.014	0.111	0.896	<0.001
Domain_Dummy 4	0.641	0.027	<0.001	0.130	−0.307	0.111	0.005	0.002
Domain_Dummy 5	0.290	0.027	<0.001	0.031	−0.353	0.108	0.001	0.003
Domain_Dummy 6	−0.383	0.027	<0.001	0.053	−1.570	0.108	<0.001	0.054

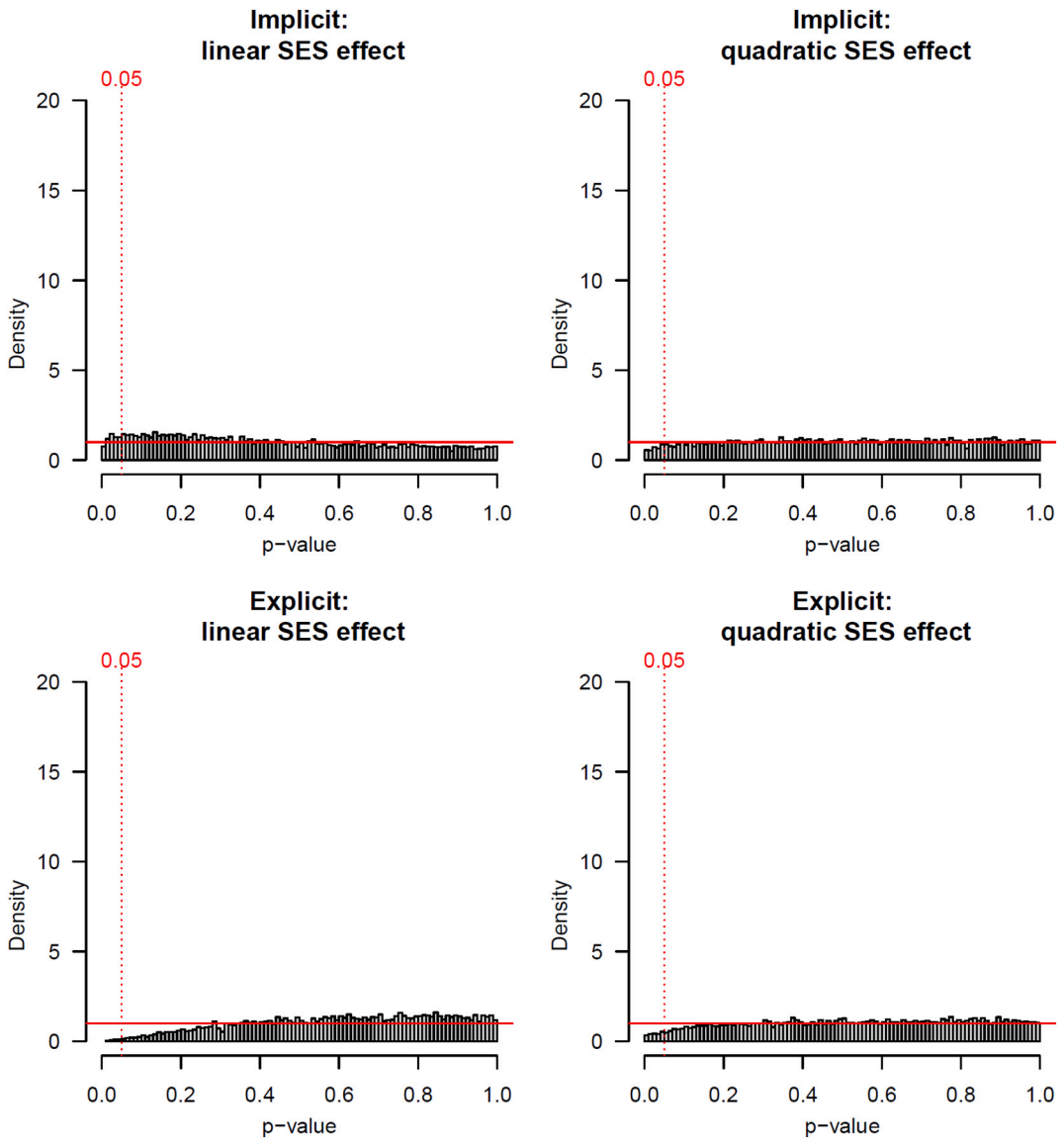

Fig. 1. Sensitivity analysis (bootstrapping). Density of *p*-values indicating the likelihood of a random set of domains achieving a higher level of significance than the set of domains rated most suitable by experts.

10,000 resampling × 10,001 sets).

Fig. 1 shows the histograms of (10,000) *p*-values resulting from this bootstrapping exercise for the linear (left) and quadratic (right) SES parameters when modelling the implicit (upper row) and explicit (lower row) attitude outcomes. The red horizontal line (shown in electronic materials) indicates the (uniform) distribution of *p*-values expected if there is no signal in the data. As can be seen, the distribution of *p*-values derived from the bootstrapping exercise follows closely the (uniform) distribution expected under the null hypothesis, with most *p*-values falling outside the $p < .05$ cut-off (shown as a red vertical line in electronic materials). Thus, the data do not support the hypothesis that regressions with seven domains chosen based on expert ratings are more likely to yield smaller *p*-values than regressions with seven domains chosen at random.

In sum, the confirmatory AIID dataset does not provide evidence for an association between the linear and quadratic trends of objective SES on the one hand, and implicit and explicit communal attitudes on the other hand. Instead, implicit and explicit communal attitudes appear to be equivalent across the SES spectrum.

4.5. Exploratory analysis

In further exploratory analysis, we examined education and income as separate predictors of implicit and explicit communal attitudes. Specifically, we carried out two OLS regressions with the linear and quadratic effect of education and income as predictors of implicit and explicit attitudes, respectively. As in our primary analysis, we added six dummy variables representing the seven attitude domains to the model. The Šidák adjusted critical *p*-value for these analyses is 0.013 (two-tailed). As shown in Table S6, none of the effects involving education and/or income were significant, $ps \geq 0.108$. Follow-on robust regressions using M-estimators corroborated the results obtained using OLS regressions, $ps \geq 0.160$ (see Table S7).

5. Discussion

A sizable body of research has linked a lack of socio-economic resources with an increased other-orientation (*e.g.,* Kraus et al., 2012; Piff & Robinson, 2017; Rucker et al., 2018), but only a few studies have tested the link between SES and communal attitudes (Piff et al., 2012; Stephens et al., 2007). In the present research, we sought to capitalise on

a pre-registered, prospective secondary analysis of the Attitudes, Identities, and Individual Differences (AIID) dataset (Hussey et al., 2018) to probe both linear and curvilinear relationships between SES – operationalised as income and education - and implicit and explicit communal attitudes. Given that for people at the bottom of the SES ladder the social environment is often a source of stigma, exclusion and conflict (*e.g.*, Lott, 2002; Sainz et al., 2021; Trail & Karney, 2012), we reasoned that the association between SES and communal attitudes may peak at medium rather than at low levels of SES, and consequently follow a non-linear trajectory. However, a thorough examination of the data revealed no linear or curvilinear (*i.e.*, quadratic) association between SES and communal attitudes, be it explicit or implicit. Rather, the data provided evidential value in support of the null hypothesis of invariance (Etz & Vandekerckhove, 2017). A large-scale bootstrapping exercise using a High Throughout Computing (HTC) core indicated that the failure to observe an association between SES and communal attitudes cannot be attributed to the selection of attitude domains that formed part of our main analysis. We also explored education and income as separate predictors of communal attitudes, again finding no evidence for any reliable relationships. All in all, there is strong evidence to conclude that SES – operationalised as education and income – does not relate to communal attitudes in the (confirmatory) Attitudes, Identities, and Individual Differences (AIID) dataset. Taken at face value, these findings point to a universal importance of communal relationships regardless of socioeconomic conditions (*e.g.*, Clark, Liu, Winegard, & Ditto, 2019).

5.1. Strengths and limitations

The AIID dataset enabled us to examine the association between SES and both implicit and explicit attitudes in a socio-economically diverse sample, which is a notable strength. The final sample size available for analysis was sufficiently large to detect even small effects with high statistical power, but small enough to ensure that negligible effects can be discarded. The inclusion of different attitude domains selected based on ratings of topic experts goes some way towards ensuring the findings generalise and are not confined to individual attitude domains (Wells & Windschitl, 1999). Relatedly, the bootstrapping exercise employed in the present study provides a template for how to deal with uncertainty inherent in subjective ratings of social stimuli. Finally, the pre-registered format boosts transparency and counters questionable research practices such as *p*-hacking (Nosek et al., 2019, but see Rubin, 2020, for an opposing view).

The present study is not without limitations. Although the data available for analysis covered a wide range of demographics and socio-economic circumstances, the sample may not have been representative for respondents at the tail ends of SES. Furthermore, respondents who took part in the AIID study may not have been fully representative of their socio-economic groups given the requirement for internet and computer access. Recruiting samples that are fully representative of a general population, including individuals that are hard-to-reach, is challenging, even for the most well-resourced polling agencies (Atkeson & Alvarez, 2018). Ultimately, a trade-off has to be made between scientific progress and methodological purity.

Related to the previous point, the participant sample was biased towards North America, and the link between SES and communal attitudes may vary between cultures. Indeed, Miyamoto et al. (2018) observed a greater other-orientation among respondents with *higher* (*vs.* lower) SES in South-East Asian Confucian cultures, and with *lower* (*vs.* higher) SES in the U.S. and Frontier cultures. It stands to reason that the more a culture promotes the discrimination and exclusion of disadvantaged individuals, the less the latter will be inclined to exhibit communal attitudes.

Household income is a widely used measure of objective SES, but there are caveats. Income ignores wealth, which is one of the more enduring facets of socio-economic status that underpins social inequality and social mobility (*e.g.*, Allin, Masseria, & Mossialos, 2009; Hällsten & Thaning, 2021; Poirier, Grépin, & Grignon, 2020). Similarly, compared to measures of total household income, measures such as net-adjusted disposable income would provide a better indication of individuals' economic standing (Marković, Zdravković, Mitrović, & Radojičić, 2016; OECD, 2020). It is worth noting that education continues to be strongly associated with class origins and destinations in Western countries, and as such provides a good indicator of individuals' socio-economic standing (*e.g.*, Breen & Karlson, 2014). Nevertheless, future work would benefit from incorporating a wider range of measures of SES, including occupational status and subjective social status.

5.2. Implications and future directions

The present work adds another piece to the puzzle linking socio-economic status with other-orientation more generally, and with communal attitudes more specifically. We have established with high confidence that there is neither a linear nor a curvilinear (*i.e.*, quadratic) association between SES and communal attitudes in the AIID dataset. Evidently, the absence of a signal in the AIID data does not rule out the absence of a relationship between these constructs. There is convincing evidence that the *perceived* communal orientation of low, medium, and high SES individuals follows a curvilinear trajectory (Imhoff & Koch, 2017). Further research is needed to determine whether these perceptions are mistaken or whether they contain a kernel of truth.

Recent experimental evidence suggests that the feeling of being viewed as less than human by others only emerges for those at the bottom of the social ladder, pointing to a non-linear association between SES and meta-dehumanisation (Sainz et al., 2021). This has implications for communal orientation as the feeling of being dehumanised fosters social disconnection (Haslam, 2022). The present study calls for future research that examines both linear and non-linear associations between SES and communal attitudes. Such research would benefit from aligning measures of communal attitudes more closely with studies on social perception/stereotyping, ideally measuring perceived and actual communal orientation concurrently in relation to both the self and others in a sample that is representative of the general population.

Whether or not SES is linked to communal orientation likely depends on individuals' present and past experiences in social settings. For example, Renger, Mommert, Renger, and Simon (2016) showed that overt unequal treatment in a group triggers feelings of being dehumanised among university students, leading to antisocial behaviour. In contrast, studies with children show that good relationships with peers and a positive family environment can counter the negative effects of low SES and foster prosocial behaviour (Yao & Enright, 2022). Future research should take note of individuals' circumstances and explore aspects of the social environment, such as frequency and quality of social interactions, as moderators of the link between low SES and communal attitudes.

Of course, it may be the case that communal attitudes do not vary as a function of SES as our results suggest. Recall that in Piff et al.' (2012) studies, the association between SES and measures of communal motivation only emerged in the presence of chaos and randomness. In a related vein, differences in the adherence to social norms could explain Stephens et al.' (2007) findings that lower (*vs.* higher) SES participants (as defined by parental education) showed a preference for objects (pens) when those objects were shared by others. Taken together, it would be fair to conclude that the current body of empirical evidence does not bode in favour of a link between SES and communal attitudes.

Communal orientation bears relevance for people's motives during social interactions. Thus, further research in this area is warranted, not least because such research can elucidate the relationship between SES and prosocial behaviour, which is yielding conflicting results that have yet to be reconciled (Callan et al., 2017; Côté et al., 2015; Greitemeyer & Sagioglou, 2018; Korndörfer et al., 2015; Motsenok & Ritov, 2021; Piff et al., 2010; Schmukle et al., 2019; Stamos et al., 2020).

To conclude, socioeconomic success and communal orientation are two fundamental dimensions of social perception (Koch, Imhoff, Dotsch, Unkelbach, & Alves, 2016). However, outside the realm of stereotypes the precise nature of the relationship between these two constructs remains elusive and an intriguing area of future research.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jesp.2022.104353.

References

Abele, A. E., & Wojciszke, B. (2007). Agency and communion from the perspective of self versus others. *Journal of Personality and Social Psychology, 93*, 751–763. https://doi.org/10.1037/0022-3514.93.5.751

Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy white women. *Health Psychology, 19*, 586–592. https://doi.org/10.1037/0278-6133.19.6.586

Allin, S., Masseria, C., & Mossialos, E. (2009). Measuring socioeconomic differences in use of health care services by wealth versus by income. *American Journal of Public Health, 99*, 1849–1855. https://doi.org/10.2105/AJPH.2008.141499

Anderson, C., John, O. P., & Keltner, D. (2012). The personal sense of power. *Journal of Personality, 80*, 313–344. https://doi.org/10.1111/j.1467-6494.2011.00734.x

Atkeson, L. R., & Alvarez, R. M. (2018). Introduction to polling and survey methods. In *The Oxford handbook of polling and survey methods* (pp. 1–11). Oxford University Press.

Breen, R., & Karlson, K. B. (2014). Education and social mobility: New analytical approaches. *European Sociological Review, 30*, 107–118. https://doi.org/10.1093/esr/jct025

Brody, G. H., Miller, G. E., Yu, T., Beach, S. R., & Chen, E. (2016). Supportive family environments ameliorate the link between racial discrimination and epigenetic aging: A replication across two longitudinal cohorts. *Psychological Science, 27*, 530–541. https://doi.org/10.1177/0956797615626703

Callan, M. J., Kim, H., Gheorghiu, A. I., & Matthews, W. J. (2017). The interrelations between social class, personal relative deprivation, and prosociality. *Social Psychological and Personality Science, 8*, 660–669. https://doi.org/10.1177/1948550616673877

Carey, R. M., & Markus, H. R. (2017). Social class shapes the form and function of relationships and selves. *Current Opinion in Psychology, 18*, 123–130. https://doi.org/10.1016/j.copsyc.2017.08.031

Clark, C. J., Liu, B. S., Winegard, B. M., & Ditto, P. H. (2019). Tribalism is human nature. *Current Directions in Psychological Science, 28*(6), 587–592. https://doi.org/10.1177/0963721419862289

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*, 310–357. https://doi.org/10.1037/0033-2909.98.2.310

Conger, R. D., Elder, G. H., Lorenz, F. O., Conger, K. J., Simons, R. L., Whitbeck, L. B., et al. (1990). Linking economic hardship to marital quality and instability. *Journal of Marriage and the Family, 52*, 643–656. https://doi.org/10.2307/352931

Conway, M., Pizzamiglio, M. T., & Mount, L. (1996). Status, communality, and agency: Implications for stereotypes of gender and other groups. *Journal of Personality and Social Psychology, 71*, 25–38. https://doi.org/10.1037/0022-3514.71.1.25

Côté, S., House, J., & Willer, R. (2015). High economic inequality leads higher-income individuals to be less generous. *Proceedings of the National Academy of Sciences, 112*, 15838–15843. https://doi.org/10.1073/pnas.1511536112

Dietze, P., & Knowles, E. D. (2016). Social class and the motivational relevance of other human beings: Evidence from visual attention. *Psychological Science, 27*, 1517–1527. https://doi.org/10.1177/0956797616667721

Etz, A., & Vandekerckhove, J. (2017). Introduction to Bayesian inference for psychology. *Psychonomic Bulletin & Review, 25*, 5–34. https://doi.org/10.3758/s13423-017-1262-3

Fiske, S. T. (2010). Envy up, scorn down: How comparison divides us. *American Psychologist, 65*, 698–706. https://doi.org/10.1037/0003-066X.65.8.698

Fiske, S. T., Cuddy, A. J. C., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology, 82*, 878–902. https://doi.org/10.1037//0022-3514.82.6.878

Fuller-Rowell, T. E., Evans, G. W., & Ong, A. D. (2012). Poverty and health: The mediating role of perceived discrimination. *Psychological Science, 23*, 734–739. https://doi.org/10.1177/0956797612439720

Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the implicit association test: I. an improved scoring algorithm. *Journal of Personality and Social Psychology, 85*, 197–216. https://doi.org/10.1037/0022-3514.85.2.197

Greitemeyer, T., & Sagioglou, C. (2016). Subjective socioeconomic status causes aggression: A test of the theory of social deprivation. *Journal of Personality and Social Psychology, 111*, 178–194. https://doi.org/10.1037/pspi0000058

Greitemeyer, T., & Sagioglou, C. (2018). Does low (vs. high) subjective socioeconomic status increase both prosociality and aggression? *Social Psychology, 49*, 76–87. https://doi.org/10.1027/1864-9335/a000331

Guinote, A., Cotzia, I., Sandhu, S., & Siwa, P. (2015). Social status modulates prosocial behavior and egalitarianism in preschool children and adults. *Proceedings of the National Academy of Sciences, 112*, 731–736. https://doi.org/10.1073/pnas.1414550112

Hällsten, M., & Thaning, M. (2021). Wealth as one of the "big four" SES dimensions in intergenerational transmissions. *Social Forces, 100*, 1533–1560. doi:0.1093/sf/soab080.

Haslam, N. (2022). Dehumanization and the lack of social connection. *Current Opinion in Psychology, 43*, 312–316. https://doi.org/10.1016/j.copsyc.2021.08.013

Hofstede, G. (1991). *Organizations and cultures: Software of the mind*. New York: McGraw Hill.

Hooker, E. D., Campos, B., Hoffman, L., Zoccola, P., & Dickerson, S. S. (2020). Is receiving social support costly for those higher in subjective socioeconomic status? *International Journal of Behavioral Medicine, 27*(3), 325–336. https://doi.org/10.1007/s12529-019-09836-w

Hussey, I., Hughes, S., & Nosek, B. A. (2018). The implicit and explicit attitudes, identities, and individual differences (AIID) dataset. URL https://osf.io/pnjwf/.

Imhoff, R., & Koch, A. (2017). How orthogonal are the big two of social perception? On the curvilinear relation between agency and communion. *Perspectives on Psychological Science, 12*, 122–137. https://doi.org/10.1177/1745691616657334

John-Henderson, N. A., Stellar, J. E., Mendoza-Denton, R., & Francis, D. D. (2015). Socioeconomic status and social support: Social support reduces inflammatory reactivity for individuals whose early-life socioeconomic status was low. *Psychological Science, 26*, 1620–1629. https://doi.org/10.1177/0956797615595962

Kasser, T., Ryan, R. M., Zax, M., & Sameroff, A. J. (1995). The relations of maternal and social environments to late adolescents' materialistic and prosocial values. *Developmental Psychology, 31*, 907–914. https://doi.org/10.1037/0012-1649.31.6.907

Kay, A. C., Wheeler, S. C., Bargh, J. A., & Ross, L. (2004). Material priming: The influence of mundane physical objects on situational construal and competitive behavioral choice. *Organizational Behavior and Human Decision Processes, 95*, 83–96. https://doi.org/10.1016/j.obhdp.2004.06.003

Koch, A., Imhoff, R., Dotsch, R., Unkelbach, C., & Alves, H. (2016). The ABC of stereotypes about groups: Agency/socioeconomic success, conservative–progressive beliefs, and communion. *Journal of Personality and Social Psychology, 110*, 675–709. https://doi.org/10.1037/pspa0000046

Korndörfer, M., Egloff, B., & Schmukle, S. C. (2015). A large scale test of the effect of social class on prosocial behavior. *PLoS One, 10*, Article e0133193. https://doi.org/10.1371/journal.pone.0133193

Kraus, M. W., Côté, S., & Keltner, D. (2010). Social class, contextualism, and empathic accuracy. *Psychological Science, 21*, 1716–1723. https://doi.org/10.1177/0956797610387613

Kraus, M. W., & Keltner, D. (2009). Signs of socioeconomic status: A thin-slicing approach. *Psychological Science, 20*, 99–106. https://doi.org/10.1111/j.1467-9280.2008.02251.x

Kraus, M. W., Piff, P. K., Mendoza-Denton, R., Rheinschmidt, M. L., & Keltner, D. (2012). Social class, solipsism, and contextualism: How the rich are different from the poor. *Psychological Review, 119*, 546–572. https://doi.org/10.1037/a0028756

Lefmann, T., & Combs-Orme, T. (2014). Prenatal stress, poverty, and child outcomes. *Child and Adolescent Social Work Journal, 31*, 577–590. https://doi.org/10.1007/s10560-014-0340-x

Lott, B. (2002). Cognitive and behavioral distancing from the poor. *American Psychologist, 57*, 100–110. https://doi.org/10.1037/0003-066X.57.2.100

Marković, M., Zdravković, S., Mitrović, M., & Radojičić, A. (2016). An iterative multivariate post hoc I-distance approach in evaluating OECD better life index. *Social Indicators Research, 126*, 1–19. https://doi.org/10.1007/s11205-015-0879-8

McClure, S. M., York, M. K., & Montague, P. R. (2004). The neural substrates of reward processing in humans: The modern role of FMRI. *The Neuroscientist, 10*, 260–268. https://doi.org/10.1177/1073858404263526

McLoyd, V. C. (1990). The impact of economic hardship on black families and children: Psychological distress, parenting, and socioemotional development. *Child Development, 61*, 311–346. https://doi.org/10.1111/j.1467-8624.1990.tb02781.x

Mickelson, K. D., & Williams, S. L. (2008). Perceived stigma of poverty and depression: Examination of interpersonal and intrapersonal mediators. *Journal of Social and Clinical Psychology, 27*, 903–930. https://doi.org/10.1521/jscp.2008.27.9.903

Miyamoto, Y., Yoo, J., Levine, C. S., Park, J., Boylan, J. M., Sims, T., … Ryff, C. D. (2018). Culture and social hierarchy: Self- and other-oriented correlates of socioeconomic status across cultures. *Journal of Personality and Social Psychology, 115*, 427–445. https://doi.org/10.1037/pspi0000133

Motsenok, M., & Ritov, I. (2021). The effect of perceived financial vulnerability on prosocial activity. *Journal of Behavioral Decision Making, 34*, 35–46. https://doi.org/10.1002/bdm.2198

Noble, K. G., Norman, M. F., & Farah, M. J. (2005). Neurocognitive correlates of socioeconomic status in kindergarten children. *Developmental Science, 8*, 74–87. https://doi.org/10.1111/j.1467-7687.2005.00394.x

Nosek, B. A., Beck, E. D., Campbell, L., Flake, J. K., Hardwicke, T. E., Mellor, D. T., & Vazire, S. (2019). Preregistration is hard, and worthwhile. *Trends in Cognitive Sciences, 23*, 815–818. https://doi.org/10.1016/j.tics.2019.07.009

Nosek, B. A., & Hansen, J. J. (2008). The associations in our heads belong to us: Searching for attitudes and knowledge in implicit evaluation. *Cognition & Emotion, 22*, 553–594. https://doi.org/10.1080/02699930701438186

OECD. (2020). *OECD better life index country reports: Income*. Paris: OECD Publishing. Available at: https://www.oecdbetterlifeindex.org/topics/income/.

Pearlin, L. I., & Kohn, M. L. (1966). Social class, occupation, and parental values: A cross-national study. *American Sociological Review, 31*, 466–479. https://doi.org/10.2307/2090770

Piff, P. K., Kraus, M. W., Côté, S., Cheng, B. H., & Keltner, D. (2010). Having less, giving more: The influence of social class on prosocial behavior. *Journal of Personality and Social Psychology, 99*, 771–784. https://doi.org/10.1037/a0020092

Piff, P. K., & Moskowitz, J. P. (2018). Wealth, poverty, and happiness: Social class is differentially associated with positive emotions. *Emotion, 18*, 902–905. https://doi.org/10.1037/emo0000387

Piff, P. K., & Robinson, A. R. (2017). Social class and prosocial behavior: Current evidence, caveats, and questions. *Current Opinion in Psychology, 18*, 6–10. https://doi.org/10.1016/j.copsyc.2017.06.003

Piff, P. K., Stancato, D. M., Martinez, A. G., Kraus, M. W., & Keltner, D. (2012). Class, chaos, and the construction of community. *Journal of Personality and Social Psychology, 103*, 949–962. https://doi.org/10.1037/a0029673

Poirier, M. J., Grépin, K. A., & Grignon, M. (2020). Approaches and alternatives to the wealth index to measure socioeconomic status using survey data: A critical interpretive synthesis. *Social Indicators Research, 148*, 1–46. https://doi.org/10.1007/s11205-019-02187-9

Renger, D., Mommert, A., Renger, S., & Simon, B. (2016). When less equal is less human: Intragroup (dis)respect and the experience of being human. *The Journal of Social Psychology, 156*, 553–563. https://doi.org/10.1080/00224545.2015.113586

Robbins, T. W., Cador, M., Taylor, J. R., & Everitt, B. J. (1989). Limbic-striatal interactions in reward-related processes. *Neuroscience & Biobehavioral Reviews, 13*, 155–162. https://doi.org/10.1016/S0149-7634(89)80025-9

Rubin, M. (2020). Does preregistration improve the credibility of research findings? *Quantitative Methods in Psychology, 16*, 376–390. https://doi.org/10.20982/tqmp.16.4.p376

Rucker, D. D., Galinsky, A. D., & Magee, J. C. (2018). The agentic–communal model of advantage and disadvantage: How inequality produces similarities in the psychology of power, social class, gender, and race. In , *Vol. 58. Advances in experimental social psychology* (pp. 71–125). Academic Press.

Sainz, M., Martínez, R., Moya, M., Rodríguez-Bailón, R., & Vaes, J. (2021). Lacking socio-economic status reduces subjective well-being through perceptions of meta-dehumanization. *British Journal of Social Psychology, 60*, 470–489. https://doi.org/10.1111/bjso.12412

Schmukle, S. C., Korndörfer, M., & Egloff, B. (2019). No evidence that economic inequality moderates the effect of income on generosity. *Proceedings of the National Academy of Sciences, 116*, 9790–9795. https://doi.org/10.1073/pnas.1807942116

Scott, K. L., & Thau, S. (2013). Theory and research on social exclusion in work groups. In C. N. DeWall (Ed.), *The Oxford handbook of social exclusion* (pp. 65–73). New York, NY: Oxford University Press.

Stamos, A., Lange, F., Huang, S. C., & Dewitte, S. (2020). Having less, giving more? Two preregistered replications of the relationship between social class and prosocial behavior. *Journal of Research in Personality, 84*, Article 103902. https://doi.org/10.1016/j.jrp.2019.103902

Stellar, J. E., Manzo, V. M., Kraus, M. W., & Keltner, D. (2012). Class and compassion: Socioeconomic factors predict responses to suffering. *Emotion, 12*, 449–459. https://doi.org/10.1037/a0026508

Stephens, N. M., Fryberg, S. A., & Markus, H. R. (2011). When choice does not equal freedom: A sociocultural analysis of agency in working-class American contexts. *Social Psychological and Personality Science, 2*, 33–41. https://doi.org/10.1177/1948550610378757

Stephens, N. M., Markus, H. R., & Townsend, S. S. M. (2007). Choice as an act of meaning: The case of social class. *Journal of Personality and Social Psychology, 93*, 814–830. https://doi.org/10.1037/0022-3514.93.5.814

Steptoe, A., & Zaninotto, P. (2020). Lower socioeconomic status and the acceleration of aging: An outcome-wide analysis. *Proceedings of the National Academy of Sciences, 117*, 14911–14917. https://doi.org/10.1073/pnas.1915741117

Stringhini, S., Carmeli, C., Jokela, M., Avendaño, M., Muennig, P., Guida, F., & Chadeau-Hyam, M. (2017). Socioeconomic status and the 25× 25 risk factors as determinants of premature mortality: A multicohort study and meta-analysis of 1· 7 million men and women. *The Lancet, 389*, 1229–1237. https://doi.org/10.1016/S0140-6736(16)32380-7

Tang, L., & Koveos, P. E. (2008). A framework to update Hofstede's cultural value indices: Economic dynamics and institutional stability. *Journal of International Business Studies, 39*, 1045–1063. doi:0.1057/palgrave.jibs.8400399.

Taylor, S. E., Klein, L. C., Lewis, B. P., Gruenewald, T. L., Gurung, R. A. R., & Updegraff, J. A. (2000). Biobehavioral responses to stress in females: Tend-and-befriend, not fight-or-flight. *Psychological Review, 107*, 411–429. https://doi.org/10.1037/0033-295X.107.3.411

Trail, T. E., & Karney, B. R. (2012). What's (not) wrong with low-income marriages. *Journal of Marriage and Family, 74*, 413–427. https://doi.org/10.1111/j.1741-3737.2012.00977.x

Triandis, H. C. (1995). *Individualism and collectivism*. Boulder, CO: Westview.

Twenge, J. M., Baumeister, R. F., Tice, D. M., & Stucke, T. S. (2001). If you can't join them, beat them: Effects of social exclusion on aggressive behavior. *Journal of Personality and Social Psychology, 81*, 1058–1069. https://doi.org/10.1037/0022-3514.81.6.1058

Varnum, M. E., Blais, C., Hampton, R. S., & Brewer, G. A. (2015). Social class affects neural empathic responses. *Culture and Brain, 3*, 122–130. https://doi.org/10.1007/s40167-015-0031-2

Wells, G. L., & Windschitl, P. D. (1999). Stimulus sampling and social psychological experimentation. *Personality and Social Psychology Bulletin, 25*, 1115–1125. https://doi.org/10.1177/01461672992512005

Wilkowski, B. M., & Ferguson, E. L. (2014). Just loving these people: Extraverts implicitly associate people with reward. *Journal of Research in Personality, 53*, 93–102. https://doi.org/10.1016/j.jrp.2014.08.006

Wojciszke, B., Abele, A. E., & Baryla, W. (2009). Two dimensions of interpersonal attitudes: Liking depends on communion, respect depends on agency. *European Journal of Social Psychology, 39*, 973–990. https://doi.org/10.1002/ejsp.595

Yao, Z. Y., & Enright, R. (2022). Social class and prosocial behavior in early adolescence: The moderating roles of family and school factors. *Journal of Moral Education*. https://doi.org/10.1080/03057240.2022.2031920