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Who supports redistribution? Replicating and refining effects of compassion, malicious envy, and self-interest

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Who Supports redistribution?

Replicating and refining effects of compassion, malicious envy, and self-interest.
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Editor *Evolution and Human Behavior*

Dear Professor Delton,

re: *"Who Supports redistribution? Replicating and refining effects of compassion, malicious envy, and self-interest"*.

Thank you accepting the paper in principle: we corrected the broken table link, opened the OSF data links, pre-reg files, and we hope that the manuscript is now acceptable for publication by Evolution and Human Behavior.

Sincerely,

Chien-An Lin & Timothy C. Bates

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comment: On page 5, there were two places where "error reference source not found" was displayed.

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Who Supports redistribution?

Replicating and refining effects of compassion, malicious envy, and self-interest.

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Abstract

Debate over wealth redistribution plays a prominent role in society, but the causes of differences in support for redistribution remain contested. A recent three-person two-situation model suggests these differences are shaped by evolved motivational systems of self-interest, compassion, and dispositional envy. We conducted a close replication testing this prediction, all subjects were British, recruited from an online subject pool. Study 1 (N = 206) confirmed the roles of self-interest ($\beta = 0.20$) and compassion for others ($\beta = 0.37$), as well as a predicted null effect of procedural fairness. Dispositional envy was non-significant ($\beta = 0.06$). In study 2 (N = 304), we tested whether it was better to conceptualize envy as being two separate emotions, benign envy and malicious envy. A significant effect of malicious envy was found ($\beta = 0.13$) and no significant effect of benign envy ($\beta = -0.06$). Study 3 (N = 501) closely replicated this improved model, confirming significant effects of compassion ($\beta = 0.40$), self-interest ($\beta = 0.21$), and malicious envy ($\beta = 0.15$), accounting for one third of variance in support for redistribution. These results support the role of evolved motivational systems to explain and improve important aspects of contemporary economic redistribution.

Keywords: redistribution, emotion, compassion, envy, self-interest

Support for redistribution of resources from the more well-off to the less well-off is a major focus of political disagreement. On average, people think some redistribution is warranted via mechanisms including taxation, welfare, housing and health provision and other entitlements (McCaffery & Baron, 2004). However large differences also exist in support for redistribution (Linos & West, 2003) and multiple psychological and sociological accounts have been generated to account for these differences. A common feature of such accounts is a focus on self-interest, the hypothesis being that those to whom wealth would be transferred should favour such transfers (Kangas, 1997). Self-interest alone, however, accounts for only a minority of variance in support for redistribution: Less well-off people do not necessarily support redistribution, and better-off people often support higher taxes and social welfare which would reduce their own income (Klor & Shayo, 2010; Weeden & Kurzban, 2016). Explanations for economic and political choices have thus expanded to include factors as diverse as personality and intelligence (Lewis & Bates, 2011, 2018), and goals such as using redistribution as an insurance policy to reduce uncertainty of resource acquisition (Kameda, Takezawa, Tindale, & Smith, 2002).

Here, we replicate and extend a recent study arguing that redistribution is shaped not only by mechanisms selected to pursue self-interest, but by additional systems for responding to others who are less well-off (experienced as compassion) and to those who are better-off than oneself, experienced as envy (Sznycer et al., 2017). Evidence for this three-player two-situation model has been found in different cultures, but not independently replicated. Importantly, while the effects of compassion and self-interest are robust, the effects of envy were less so. In this series of three studies, we focus on the functionalist account that the study results substantiate. We take the opportunity to focus on the psychological form of the adaptations sculpted by specific selection pressures, exploring alternative implementations of one of the motives: contrasting benign and malicious forms of envy to articulate and refine the motive activated in relations to better-off others. We begin by outlining the three-player two-situation model, before reporting three studies testing replication and refining this model.

Three motivational systems

Sznycer et al. (2017) proposed that support for redistribution is influenced by

emotional motivations of envy, compassion, and self-interest. The functionalist logic relating these three motivational systems to support for redistribution was developed by identifying three players and two situations present in the ancestral environment which could influence adaptations for redistribution, namely: 1: Others in the group who are less well-off than the self; 2: Others who are better-off than the self; and 3: The actor themselves. We next describe evidence for evolved motivations active in self-interest and situational relations to the better-off and the less well-off.

In developing a model of the adaptive response to those less well-off in the group, Sznycer et al. (2017) drew upon anthropological data showing that provision of aid to those in need is common (Kaplan et al., 1985). The evolutionary rationale for this adaptation derives from evidence our ancestors lived in a high-risk environment in which, consequently, the likelihood of needing help from others was high. In this environment an adaptation to mutualise risk can evolve, with reciprocal aid acting as a form of insurance policy (Aktipis et al., 2016; Cashdan, 1985; Kurzban, Burton-Chellew, & West, 2015). Sharing a resource with needy others often has low marginal cost (Jaeggi & Gurven, 2013; Kaplan, Gurven, Hill, & Hurtado, 2005), but may increase the concern of aid recipients for the helper's welfare, increasing the likelihood of support or help in the future (Tooby & Cosmides, 1996). The Sznycer et al. (2017) model proposes that this adaptation is experienced as compassion, with less well-off others eliciting compassion and more compassionate individuals showing support for redistribution.

The second situation modelled is that between the self and those who are better-off. Here Sznycer et al. (2017) highlight research on the role of positional goods such as status. Possession of positional resources places the better-off at an advantage in social competition and evidence suggests that less well-off individuals will work to reduce the position of better-off actors, even incurring costs to themselves if this results in a relative improvement (e.g. Pedersen, Kurzban, & McCullough, 2013; Zizzo & Oswald, 2001). Sznycer et al. (2017) proposed that the motivational system implementing this adaptation will be experienced as envy – an emotion characterised by hostility to those who are superior to the individual on some valued dimension (Smith & Kim, 2007; Smith et al., 1996) This leads to the prediction that relationships

to the better-off will in part be characterised by envy, and that those experiencing envy more readily will show greater support for redistribution, even when this will reduce the total wealth available for redistribution, because redistribution satisfies the envious motivation of reducing the competitive advantage of the better-off.

The third factor in the model is self-interest. This is viewed as a system for computing the benefit or cost of an action for the actor him or herself. Of the three systems in this theory, self-interest is perhaps the most straight-forward and features in almost all accounts of motivational systems (Halpern, 2001; Weeden & Kurzban, 2016). Self-interest, as a computational system, motivates accumulating and maintaining one's own resources, independent of relative wealth. Thus, self-interest is hypothesized to be associated with conditional support for redistribution: those less well-off will be motivated to support redistribution, while those who would be worse off after redistribution will be motivated to oppose it.

The role of fairness in redistribution

Importantly, Sznycer et al. (2017) examined an extra adaptation, that of fairness. While it is not an element of the three-person two-situation model, fairness is widely viewed as important in models of resource division (Brosnan & de Waal, 2014; Fehr & Schmidt, 1999). Fairness is an umbrella term covering concepts as varied as egalitarian outcome-equality (Starmans, Sheskin, & Bloom, 2017), impartial division of benefits and sharing costs (Baumard, André, & Sperber, 2013) and process fairness or equal treatment under relevant laws or conventions (Thibaut, Walker, LaTour, & Houlden, 1973). Sznycer et al. (2017) tested two fairness concepts commonly implicated in distribution experiments: windfall or distributional fairness assessed in scenario-based tests in which a windfall must be divided between oneself and others (Charness & Rabin, 2002; Engelmann & Strobel, 2004) and procedural fairness assessed psychometrically for example asking subjects if "*Every group should be judged with the same yardstick*" (Barrett-Howard & Tyler, 1986; Greenberg, 1987). We next detail the results of tests of these motivational systems.

Evidence for the motivations involved in support for redistribution

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Sznycer et al. (2017) applied their three-motivation model along with measures of fairness to measures of support for redistribution in four major studies with a total of over two thousand participants, and in four countries: The United States, India, the UK, and Israel. Following (Sznycer et al., 2017), because motivations are predicted to combine additively to produce a given individual's support for redistribution, each of the main analyses included all of the motives rather than testing these individually.

The details of their findings from these four major experiments testing the role of motivations in support for redistribution are shown in **Table 1**. In all four countries, reliable, highly significant, medium to large effects were found for both compassion (standardized effect sizes 0.25 to 0.40) and for self-interest (effects 0.18 to 0.30). For envy, effects were much smaller (βs 0.08 to 0.14) and failed to reach significance in one of their four studies. In terms of the three motivations implicated in the three-player two-situation model, then, these studies provided strong support for two of the motivations, and significant but perhaps less compelling support for envy.

Insert **Table 1** about here

Evidence for effects of the two forms of fairness tested was much weaker. Distributional fairness was assessed in a total of 9 studies with most of these failing to show a role for this form of fairness. Importantly, in no case did distributional fairness generate incremental prediction over and above measures of compassion, envy and self-interest measures. Windfall or distributional fairness, then, appears at best to function as a weak proxy for effects already captured by compassion, envy, and self-interest. Association of procedural fairness was tested in four studies, with only one significant relationship emerging, and estimates ranging from -0.08 to 0.22. This lack of effect of fairness as 'striking' (Sznycer et al., 2017), and we therefore wished to follow-up, with additional tests of the effect of procedural fairness.

In summary, Sznycer et al. (2017) found surprizing evidence that evolved mechanisms underpinning compassion, envy, and self-interest influence important socio-cultural phenomena in the form of support for redistribution. We note that the

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effect sizes for these motivations differed substantially, with envy showing a much smaller effect and compassion a very strong effect and procedural fairness no effect. An important first step to progressing this area, then, would be an independent confirmation of these important roles for self-interest, compassion, clarity over the role of dispositional envy, as well as additional evidence regarding the surprizing lack of effect of procedural fairness. In order to gain this information, we conducted a close replication of Sznycer et al. (2017) presented here as study 1.

Materials, data, and all analysis scripts for this and all other studies are provided openly at OSF (URL: https://osf.io/q786k)

Study 1

In study 1, we conducted a close replication of Sznycer et al. (2017) with the same measures and control variables including age, gender, SES and political orientation. We pre-registered 7 predictions for this replication using the exact same statistical procedures and scales used by Sznycer et al. (2017). We pre-registered 7 predictions as follows (url: https://aspredicted.org/dx8my.pdf):

    (1) Higher compassion will be associated with higher support for redistribution.

    (2) Higher envy will be associated with higher support for redistribution.

    (3) Higher self-interest will be associated with higher support for redistribution.

    (4) Preference for fairness will not be associated with support for redistribution.

    (5) Left-political support will be associated with higher support for redistribution.

    (6) Higher compassion will be associated with higher reported aid to the poor.

    (7) Envy will be associated with wealthy-harming tax choices.

As done by Sznycer et al. (2017), compassion, envy, self-interest and fairness were entered jointly in each analysis. Measurement of support for redistribution, compassion, envy, self-interest, aid to the poor and wealthy-harming tax choices were each as described in Sznycer et al. (2017). Likewise, socioeconomic status (SES) was controlled. Based on previous work showing that party affiliation was a strong influence self-reported preferences for redistribution (Sears, Lau, Tyler, & Allen, 1980), in their US study Sznycer et al. (2017) controlled for party affiliation. It is unclear whether political alignment should be a covariate or is itself a predictable outcome of evolved

motives and other beliefs impacting support for redistribution. For this reason, in our analyses, we assessed political alignment, but report analyses both with and without this covariate. Finally, to ensure our study was a close replication of the original study, preference for procedural fairness was administered after the participant had finished the other scales.

Methods

Participants

A total of 215 UK participants were recruited using Prolific Academic. We pre-registered a criterion that subjects who completed the questionnaire less than 15 minutes would be excluded. Nine subjects met this criterion, and we present the results excluding these subjects. Including them did not alter the results. Of the 206 UK subjects included in analyses 136 were female, 4 of unknown gender. Mean age was 34 years (SD = 13). The sample included participants identifying themselves as White (n = 186; 90.3%), Asian (n = 7; 3.4%), Mixed (n = 5; 2.4%), Black (n = 4; 1.9%) and other (n = 4; 1.9%). The study procedures were approved by the Psychology Research Ethics Committee at the School of Philosophy, Psychology & Language Sciences in the University of Edinburgh, and participants gave informed consent.

Measures

Attitudes toward redistribution were measured with the 11-item support for economic redistribution scale based on Petersen, Sznycer, Sell, Cosmides, and Tooby (2013) as modified by Sznycer et al. (2017), Example items include: "*The government should increase taxes to give more help to the poor*" and "*It is not fair that people have to pay taxes to fund welfare programs*" (reversed). Each item used a Likert response scale from 1 (strongly disagree) to 5 (strongly agree). The Cronbach Alpha of economic redistribution in our sample was 0.85.

Dispositional compassion was measured with the 10-item personality trait of dispositional compassion. Items in this scale were selected from Goldberg (1999) by Sznycer et al. (2017). Examples include "*I sympathize with the homeless*" and "*I try not to think about the needy*" (reversed). Each item used a Likert response scale from 1 (very inaccurate) to 5 (very accurate). The Cronbach Alpha of this scale was 0.79 in our

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sample.

Dispositional envy was measured with the 8-item Dispositional Envy scale (Smith, Parrott, Diener, Hoyle, & Kim, 1999). Example items include: "*Feelings of envy constantly torment me*" and "*No matter what I do, envy always plagues me*". The dispositional envy scale has no reverse-scored items, and responses were coded from 1 (strongly disagree) to 5 (strongly agree). Cronbach Alpha was 0.87 in our sample.

Self-interest was measured with one item: "*Imagine that a policy of higher taxes on the wealthy is implemented. What overall impact do you think the higher taxes on the wealthy would have on you*?", with responses on a 1 to 5 scale: My own economic situation would 1: significantly worsen; slightly worsen; stay the same; slightly improve; 5 significantly improve. Aid to the poor was also measured by one question: "*In the last 12 months, did you give money, food, or other material resources of your own to poor people (either directly to them or to charities)?*", coded on 1 (yes) and 0 (no).

Wealthy-harming preference was using an item asking subject to choose between two contrasting scenarios. Scenario one was "*The top 1% wealthiest individuals pay an extra 50% of their income in additional taxes, and as a consequence of that the poor get an additional £100 million per year (the extra 50% in taxes paid in former fiscal years leaving the wealthiest with relatively less taxable income)*". The second scenario was "*The top 1% wealthiest individuals pay an extra 10% of their income in additional taxes, and as a consequence of that the poor get an additional £200 million per year (the extra 10% in taxes paid in former fiscal years leaving the wealthiest with relatively more taxable income)*". Preference for scenario 1 (coded 1) reflects wealth-harming preference, increasing tax at even though this generates less money to redistribute. Scenario 2 showed a preference for helping the poor (coded on 0). To fit the local conditions, the currency in the two scenarios was changed from U.S. dollars ($) to Pound sterling (£).

Endorsement of procedural fairness was measured with 7 items developed by Sznycer et al. (2017), coded on 1 (strongly disagree) to 7 (strongly agree) scales.

Examples of items: "*Every group should be judged with the same yardstick*" and "*It would not bother me much if different groups of people were subject to different rules*" (reversed). Its Cronbach Alpha was 0.55 in our sample.

Socioeconomic status (SES) was measured with 7 items developed by Sznycer et al. (2017). Examples items include: "*I grew up in a relatively wealthy neighbourhood*" and "*I will probably be relatively poor later in life.*" (reversed). All items coded on 1 (strongly disagree) to 5 (strongly agree) and a sum score derived following Sznycer et al. (2017). Its Cronbach Alpha was 0.79 in our sample.

Party affiliation was measured with one item, participants were asked to choose which political party they support with 6 options: Conservative Party, Labour Party, Liberal Democrats, Scottish National Party, United Kingdom Independence Party and No party. Following Sznycer et al. (2017) we scored support for the main left party as 1, versus 0 for all other parties. In our study, the main left party referred to Labour, which was categorized as tending to support welfare state and economic planning (Neumayer, 2004).

Results

Descriptive statistics for the main variables are shown in Table 2. All predictions were tested using regression, with support for redistribution as the dependent variable, and compassion, envy, self-interest and fairness as independent variables, controlling for age, gender, socioeconomic status and party affiliation. The results are shown in Table 3.

Insert Table 2 and Table 3 about here

The prediction that compassion would be associated with increased support for redistribution (Hypothesis 1) was supported: Compassion showed a significant effect ($t(194)$ =5.64, p <.001) in the predicted direction ($\beta = 0.37$, CI95% [0.24, 0.50]). Support for hypothesis 2, that higher envy would be associated with support for redistribution was less clear. The effect size was in-line with previous reports of a (very)

small positive effect (β = 0.06 (CI95% [-0.08, .019])). This effect was not, however, significant($t(194) = 0.835$, $p =.405$).

Hypothesis 3, that self-interest would guide support for redistribution was also supported, with a significant ($t(194) =3.225$, $p = .001$) effect in the predicted direction (β = 0.20, CI95% [0.08, 0.33]). Hypothesis 4, that higher preference for fairness would not show significant association with higher support for redistribution, was tested in the same regression analysis reported above. As predicted, fairness failed to significantly predict support for redistribution ($t(194) = 0.031$, $p =.975$; β= 0.001 CI95% [-0.12, 0.13]). This result was again robust to different choices of covariates included in the regression model (as shown in Table 3, model 2).

We then tested the final three predictions regarding effects of covariate (political support) and the association of the compassion and envy variables with charitable giving and preference for wealth harming taxation. Hypothesis 5, that left-political support would be associated with higher support for redistribution was supported by the result of a regression test with support for age, gender and SES as covariates (as shown in Table 3, model 4). Party affiliation showed a significant small association (β=0.20, 95% CI [0.07, 0.32]), support for the Labour party was positively related with support for redistribution of wealth.

Hypothesis 6, that compassion would be positively associated with reported aid to the poor was tested using a binary logistic regression predicting giving to the poor with the three motivational measures entered as IVs along with support for redistribution and controlling for age, gender, and SES. Most (81%) participants reported giving material resources to poor people during the previous 12 months. Out of the three motivational systems, only compassion significantly predicted differences in self-reported charitable giving ($z = 3.691$, $p <.001$). A unit increase in compassion was associated with 17% increased odds of having given aid to the poor in the last year (odds ratio = 1.17, CI95% [1.08, 1.27]).

The hypothesis 7, that envy would be associated with wealthy-harming tax choices was also tested with binary logistic regression. While the association was in the

predicted direction and of the approximate (small) magnitude reported by Sznycer et al. (2017), the association of envy with self-reported desire to harm the wealthy was not significant (z = 0.029, *p* = .977), with an effect size of 0.1% increase in odds (odds ratio = 1.001, CI95% [0.91, 1.08]).

Discussion

Study 1 tested replication of the relationship of compassion, self-interest, and envy to support for redistribution. Two major sets of findings emerged. First, the predicted significant effects of compassion and self-interest were replicated. In addition, results compatible with a predicted null effect of preference for fairness on support for redistribution were found. Second, the predicted effect of dispositional envy on support for redistribution did not reach significance, nor was an association of dispositional envy and wealthy-harming preferences found, despite our replicating the relationship of compassion to self-reported charitable giving. The results, then, supported a role for motives elicited by the needy-other (compassion) and the actor's own self-interest in shaping support for redistribution but were ambiguous in support for a role of dispositional envy. Below, we discuss the result for envy, focussing on the small effect size and potential measurement issues with dispositional envy leading to a test of the specific effects of malicious envy.

One plausible reason for the lack of significance of dispositional envy in this study is the very small predicted effect of dispositional envy, based on Sznycer et al. (2017). As seen in Table 1, envy failed to reach significance in one of the 4 samples reported by Sznycer et al. (2017). Furthermore, in all countries, the standardized regression coefficients for envy were smaller than those for compassion and for self-interest, with standardized effect sizes of just 0.06 to 0.08 (Sznycer et al., 2017). Though we did not realise it at the time, we were not well powered to observe this effect. The R^2 of models including only envy as a predictor is expected to be very small – just 0.012 in their UK sample, implying sample sizes of at least 649 participants to reach 80% power to detect the effect of envy, or 1,072 participants for 95% power to replicate.

While the three motivations and control variables jointly accounted for 26% of the variance in support for redistribution, it is possible that the true effect of envy is,

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consistent with Sznycer et al. (2017), in the "very small" range. In this case not only will replicating the effect prove expensive, but such a small effect – invisible except in samples of many hundreds of subjects – may also cause doubt over the validity of the three-motives model: Why would one of just three relevant evolved motives have so little effect on the behaviour it is designed to control, especially in a world where inputs to this mechanism are presumably vastly larger than in ancestral times?

A second plausible explanation for a small effect of dispositional envy, which we explore next, is that a psychological mechanism processing relationships to the better-off indeed impacts support for redistribution and with a magnitude comparable to that of compassion and of self-interest, but that dispositional envy fails to measure the form of envy generated by this motive. To test this hypothesis, we conducted a second study, extending the three motivations model by including new measures of envy.

Study 2

In Study 2, we set out to select a superior measure of envy, and test if with this new measure, effects on support for redistribution could be found reliably and with magnitudes comparable to those of self-interest and compassion. Theoretically, the mechanism which dealing with better-off others is proposed to have selected for is driven by relative position, motivating the envier to harm the better-off thus increasing the envier's relative position. The dispositional envy scale, however, was not designed to specifically target negative feelings, and the authors of the scale note that none of items directly reflect ill-will (Smith et al., 1999). Current research on envy places ill-will at the heart of envy (Parrott & Smith, 1993; Smith & Kim, 2007; Smith et al., 1999). This insight has led to the distinguishing of two forms of envy: Benign, involving the aspirational motive to "*move ones-self upward*", and true envy, implementing the malicious motive to "*pull others down*" (Lange & Crusius, 2015). Benign envy is thus characterized by a desire to improving one's own position by achieve what others have demonstrated can be accomplished – at worst it motivates imitative rather than autonomous behaviour. In contrast, malicious envy is characterized by hostility and behaviours designed to harm and decrease the positional advantage of better-off others (Belk, 2011; Crusius & Lange, 2014; Lange & Crusius, 2015; Van de Ven, Zeelenberg, & Pieters, 2009, 2011).

To exploit this more sophisticated model of envy, in study 2, we added scales measuring benign and malicious envy. Based on the hypothesis that malicious envy would motivate subjects to attempt to harm or reduce the advantage of better-off others, we predicted that malicious envy would be associated with higher support for redistribution, with an effect comparable to that of self-interest or compassion.

We were less certain of the role of benign envy. On the one hand, it might be hypothesised that benign envy would motivate a desire to improve one's own position at the cost of the better-off, leading to a weak association with support for redistribution and wealth-destroying taxation if this was compatible with self-interest. On the other hand, an equally plausible inductive hypothesis might assert that benign envy should show no association with desire to transfer resources from the better-off to one's self, or even, given the benign-envier's aspiration to attain such resources themselves, an

aversion to policies that make this less possible. On balance, we pre-registered the hypothesis that benign envy would also be positively associated with support for redistribution. Regarding dispositional envy, we retained the prediction from Sznycer et al. (2017), that dispositional envy scores would be positively associated with higher support for redistribution. However, we predicted a higher effect size for malicious envy. Following the findings of Lange and Crusius (2015) we pre-registered predictions that dispositional envy would be significantly correlated with malicious envy, but not with benign envy. (pre-registration url https://aspredicted.org/bn2rw.pdf).

Methods

Participants

A total of 304 UK participants were recruited using Prolific Academic (206 females, 2 of unknown gender), including 104 who had participated in Study 1. The mean age of the participants was 34 years (SD = 12). The sample included participants identifying themselves as White (n = 228; 75%), Asian (n = 13; 4.3%), Mixed (n = 7; 2.3%), Black (n = 3; 1.0%) and other (n = 53; 17.4%). The study procedures were approved by the Psychology Research Ethics Committee at the School of Philosophy, Psychology & Language Sciences in the University of Edinburgh. All participants gave informed consent.

Measures

Attitudes toward redistribution were measured with the same 11-item support for economic redistribution scale used in Study 1 (Cronbach Alpha in our sample 0.89). Dispositional Envy (Smith et al., 1999) was measured using the 8-item Scale used in Study 1 (Cronbach Alpha 0.90).

Benign and malicious envy were measured with the 10-item Benign and Malicious Envy Scale (Lange & Crusius, 2015). An example benign envy item is "*Envying others motivates me to accomplish my goals*" and an example malicious item is "*I wish that superior people lose their advantage*". Items were scored from 1 (strongly disagree) to 6 (strongly agree), no items are reversed. Cronbach Alpha of the subscales in our sample was 0.91 for benign envy and 0.90 for malicious envy. The benign envy items were presented first, and the malicious envy scale appeared last in the questionnaire.

Results

We hypothesised that higher scores on each of the envy scales would be associated with higher support for redistribution, but that malicious envy should show the largest effect. Dispositional envy showed a standardized regression coefficient of just 0.02 (CI95% [-0.11, 0.11]) and was non-significant (t(303) = .33, p =.743). For benign envy the effect was small but negative (β = -0.05 CI95% [-0.17, 0.06]) and also non-significant (*t(303)* = -.89, p =.372). Crucially, malicious envy showed the predicted relatively strong positive effect (β = 0.14 CI95% [0.01, 0.27]), significantly predicting support for redistribution (*t(303)* = 2.14, p =.033). This result was robust to different choices of covariates included in the regression model or not (as shown in Table 4, model 2). Separate analyses of the participants from Study 1 and the participants newly recruited for study 2 was in line with prediction. In subjects who also participated in study 1, malicious envy showed a significant positive effect on support for redistribution (β = 0.25 CI95% [0.05, 0.46], *t(101)* = 2.50, p =.014). Among newly-recruited participants, malicious envy showed the same direction of effect (β = 0.06 CI95% [-0.12, 0.24]) but this did not reach significance (*t(200)* = 0.70, p =.483). Estimating modest effects with precision in small samples is unreliable, and in study 3, we tested replication of the effect in a large independent sample.

Insert Table 4 about here

Turning to the three envy measures themselves we found that dispositional envy was significantly associated with both malicious envy (*r* = 0.40, *t(302)* = 7.54, *p* <.001) and with benign envy (*r* = 0.15, *t(302)* = 2.68, *p* =0.007). The correlation matrix is shown in Table 5.

Insert Table 5 about here

Discussion

We found that malicious (but not dispositional or benign) envy was significantly and positively associated with support for redistribution. These findings support the

hypothesis that it is the specific motive to pull down the better-off that plays an active role in predicting support for redistribution and that the Lange and Crusius (2015) malicious envy scale is a suitable tool to capture this motivation.

While we had predicted that benign envy may also be associated with support for redistribution, this was not supported. It seems benign envy is rather unrelated to support for redistribution, consistent with the prediction that benign enviers admire and aspire to attain success and are therefore less likely to support policies which make success less likely. The results suggest that the absence of hostile content in the dispositional envy scale likely accounts for its lack of effect. By failing to target the malicious motivation that has proven key to comprehending envy (Smith & Kim, 2007), while also confounding aspects of benign envy, dispositional envy only weakly taps the dimension of malicious envy and is diluted by variance unrelated to malicious envy, thus failing to robustly predict support for redistribution. We interpret this as support both for the two-dimensional model of envy, and for the algorithm of the innate mechanism for reacting to those better-off involving elements of hostility and ill-will.

Study 2 accomplished its goal of refining the emotional motive of responses to the better-off other. A limitation was that we did not include measures of self-interest and compassion, and likely had less than a desirable sample size. Therefore, we conducted a third study, setting out to replicate the association of malicious envy in the presence of the other two motivational systems, including compassion, self-interest and adding the malicious and benign envy measures, and using an independent sample with good power for these effect sizes.

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Study 3

Sznycer et al. (2017) found weaker support for dispositional envy, as compared to the effects of compassion and self-interest. Our study 1 supported a very small, non-significant effect of dispositional envy, but our study 2 suggested that envy is a duplex system of largely independent malicious and benign components, and that a specific measure of malicious envy has a similar effect on support for redistribution as self-interest. This supports the three-motives model, refining the measurement underpinning it, but stands in need of empirical replication and theoretical consolidation, which we set out to accomplish in study 3.

We began from a close replication of Sznycer et al. (2017) in a well-powered sample, supplementing the data with measures of benign and malicious envy. Although benign envy had no impact on support for redistribution in our Study 2, we retained this measure both to test if benign envy may interact with self-interest to magnify support for redistribution when in one's self-interest, or if it is instead an entirely benign "re-writing" of the ancestral algorithm processing reaction to those who are better-off in ways which are not socially harmful.

We tested three main predictions, predicting that higher compassion, higher malicious envy and higher self-interest would be associated with higher support for redistribution (pre-registration https://aspredicted.org/55u2e.pdf). We also tested the interaction of benign envy and self-interest to rule out a logically possible (but implausible) association of benign envy with support for redistribution within the subset of those sufficiently less well-off to benefit from wealth transfer.

Methods

Participants

A total of 501 British participants were recruited using Prolific Academic, with 373 females and a mean age of 35 years (SD = 12). The sample included participants identifying themselves as White (n = 450; 89.8%), Asian (n = 17; 3.4%), Mixed (n = 15; 3.0%), Black (n = 6; 1.2%), Caribbean (n = 5; 1.0%) and other (n = 8; 1.6%), none of subjects previously completed the other studies. The study procedures were approved by the Psychology Research Ethics Committee at the School of Philosophy, Psychology

& Language Sciences in the University of Edinburgh. All participants gave informed consent.

Measures and Procedure

Scales used were the same as those introduced in studies 1 and 2. Support for economic redistribution had a Cronbach Alpha in this sample of 0.88. Dispositional compassion had a Cronbach Alpha of 0.77 and the 8-item Smith et al. (1999) Dispositional Envy Scale a Cronbach Alpha of 0.87. Self-interest was again measured using the single- item used in Study 1. Benign and malicious envy (Lange & Crusius, 2015) had Cronbach Alphas of 0.89 and 0.88 respectively. SES and party affiliation were also measured as in study 1. SES had a Cronbach Alpha of 0.80 in this sample.

Results

Hypotheses 1 to 3 were tested using regression, with support for redistribution as the dependent variable, and compassion, dispositional envy, malicious envy, benign envy, and self-interest as the independent variables, controlling for age, gender, socioeconomic status and party affiliation. The results are shown in Table 6.

Insert Table 6 about here

Compassion showed a significant effect ($t(501) =10.09$, $p <.001$) in the predicted direction ($\beta = 0.40$, CI95% [0.32, 0.48]). Self-interest was also significant ($t(501) =5.60$, $p <.001$) and had an effect in the predicted direction ($\beta = 0.21$, CI95% [0.13, 0.28]). Finally, for malicious envy, the standardized effect size was 0.15 (CI95% [0.06, 0.24]) and was significant ($t(501) = 3.32$, $p =.001$). As shown in Table 6, when only compassion and self-interest were controlled, dispositional envy had a significant but small relationship with support for redistribution ($\beta = 0.11$, CI95% [0.03, 0.18], $t(501) =2.8$, $p = .005$). However, this effect disappeared when controlling malicious envy.

Thus, the effects of compassion, malicious envy and self-interest were all supported: Jointly, these three motives accounted for a total of ~1/3rd of variance in support for redistribution (see Figure 1). Results were robust to changes in covariates, being largely unaltered after adding age, gender, socioeconomic status and party

affiliation as control variables (Table 6).

Insert Figure 1 about here

We also wished to rule-out any role of benign envy in support for redistribution through more complex interactions. To do this, we contrasted two multiple regression models, each included self-interest, benign envy and one included the interaction of these two terms. The variables were standardized and an interaction term between self-interest and benign envy was created. The interaction was non-significant (β = -0.01, CI95% [-0.09, 0.07], t(497) = -0.14, p = 0.888), and adding it to the model did not significantly increase the variance explained (F(1, 497) = 0.02, p= 0.89).

Discussion

Study 3 strongly supported the predicted effects of compassion, malicious envy and self-interest. Studies 1-3 supported replicable and robust effects of self-interest and compassion on support for redistribution, a lack of effect of procedural forms of fairness. Studies 2 and 3 supported an effect of malicious envy on par with that of self-interest in predicting support for redistribution.

The findings have both theoretical and practical implications, highlighting the multi-componential nature of support for redistribution with psychological motives distributed across multiple systems. In addition, the research highlights the importance of specifying the forms of cognitive mechanisms believed to have been sculpted by specific selection pressures. In this case, the much stronger link of malicious envy and near-zero effect of benign envy suggest that the motive towards the better-off which supports destructive redistribution is that specified in the Smith and Kim (2007) model of envy: an emotion processing relative position as inferiority and experienced as unpleasant, cycling, shame and anger/hostility. As redistribution motivated by malicious envy is destructive for both the better-off and the less well-off, research to identify causes of, and mitigate negative effects of this motive would appear to be valuable, helping people follow the admonition "*you shall not covet…anything that is your neighbor's*" (Exodus 20:17). Benign envy appears to form a basis for such a motive, replacing destructive redistribution with emulation.

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These studies suggest that deeper consideration of how evolutionary processes lead to the formation of specialized devices is a valuable approach with applications to pressing social problems. The three-player two-situation model emerges as a generative research framework, suggesting new directions for research, for instance testing if the tendency to help the less well-off is conditioned by perceptions of efforts for self-help among this group (Petersen, Sznycer, Cosmides, & Tooby, 2012). The possibility of explaining additional variance suggests this is a rich field for evolutionary study with, perhaps, additional adaptations relevant to solving this task. Testing additional concepts of fairness beyond procedural and windfall redistribution e.g. egalitarian (Starmans et al., 2017) or mutualistic (Baumard et al., 2013) fairness would be valuable. Including influences of general-purpose cognition (Lewis & Bates, 2018) may also increase variance accounted for. Controlling factors such as economic knowledge may also be useful (Sefton, 2005). Links to economic theory also appear to be attractive directions for future development, developing predictions for policies which might reduce harms driven by positional status motives of the envious, with their externalities of social costs in both total wealth and the well-being of others whether better-off or less well-off.

To conclude, the present studies support the application of evolutionary approaches to redistribution, and the specific model of support for redistribution as activating three mechanisms processing three group relations and their associated motives. The work refines the specific cognitive implementation of envy linked to redistribution, supporting role of malicious envy processing positional status and motivating harm of the better-off even at the cost of the less well-off or even the self. The work also supported a possible alternative evolved response to the better-off, one which is benign in nature, and leading to admiration or self-improvement, but which does not motivate malice to the better-off, even when this is in-line with self-interest.

Open Practices: Data and analysis scripts are available at https://osf.io/q786k/

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Table 1. Regression models predicting support for redistribution in Sznycer et al. (2017)

	Study 1a (US)	Study 1b (India)	Study 1c (UK)	Study 1d (Israel)
Compassion	.39 [.33 .44] ***	.25 [.16 .33] ***	.37 [.31 .44] ***	.29 [.19 .41] ***
Envy	.14 [.08 .19] ***	.08 [-.00 .16]	.10 [.03 .17]**	.12 [.01 .23] *
Self-interest	.30 [.24 .35] ***	.30 [.22 .37] ***	.21 [.14 .28] ***	.18 [.06 .28] *
R^2	.28	.15	.22	.13
N	1032	560	646	282

Note. Effects are standardized regression coefficients [followed by 95% CI].

*** = p < .001, ** = <.01, *= <.05

Table 2. *Descriptive statistics of main variables in present Study 1 (UK sample) with Sznycer (2017) US study values for comparison.*

Variable	Replication	Sznycer et al. (2017)
Redistribution	3.26 (0.69)	3.14 (0.83)
Compassion	3.70 (0.56)	3.42 (0.52)
Envy	2.44 (0.76)	2.30 (0.93)
Self-interest	3.05 (0.60)	3.22 (0.76)
SES	2.90 (0.74)	2.94 (0.74)
% Aid to the poor[α]	81.1%	74.4%
% Wealthy-harming preference[β]	12.5%	13.7%

Note. Displayed are means with standard deviations in parentheses, or percentages (two bottom rows). [α]Percentage of subjects who gave money, food, or other material resources of their own to poor people in the last 12 months. [β]Percentage of subjects preferring the "wealthiest pay more taxes and poor get relatively less money" scenario over the "wealthiest pay less taxes and poor get relatively more money" scenario.

Table 3. *Regression models predicting participants' support for redistribution*

Variable	Model 1	Model 2	Model 3	Model 4
Compassion	.40 [.28 .52] ***	.40 [.27 .52] ***	.41 [.28 .54] ***	.37 [.24 .50] ***
Envy	.08 [-.05 .20]	.08 [-.05 .20]	.04 [-.1 .18]	.06 [-.08 .19]
Self-interest	.22 [.10 .35] ***	.22 [.09 .34] ***	.20 [.07 .32] **	.20 [.08 .33] **
Fairness		.03 [-.10 .15]	-.002 [-.13 .13]	.001 [-.12 .13]
Age			-.13 [-.26 .01]	-.08 [-.22 .05]
Female			-.15 [-.28 -.02] *	-.17 [-.29 -.04] **
SES			-.07 [-.20 .07]	-.06 [-.19 .08]
Party				.20 [.07 .32] **
R^2	.219	.211	.230	.262
N	205	205	194	194

Note. Effects are standardized regression coefficients [followed by 95% CI]. SES: Socio-economic status. Party: 1 = participant most identified with Labour Party, 0 = participant most identified with other parties. *** = $p < .001$, ** = $< .01$, * = $< .05$.

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Table 4. *Regression models predicting participants' support for redistribution*

Variable	Participants from Study1	Newly recruited participants	Combined subjects Model 1	Combined subjects Model 2
Dispositional Envy	.06 [-.14 .26]	.05 [-.13 .23]	.02 [-.11 .11]	.02 [-.11, .11]
Benign	.03 [-.17 .24]	-.09 [-.25 .06]	-.05 [-.17 .06]	-.06 [-.18 .06]
Malicious	.25 [.05 .46] *	.06 [-.12 .24]	.14 [.01 .27] *	.13 [.00, .26] *
Age	-.14 [-.34 .06]	-.06 [-.21 .09]		-.08 [-.19 .04]
Female	-.09 [-.29 .10]	-.05 [-.19 .10]		-.06 [-.17 .05]
R^2	.063	-.008	.010	.012
N	101	200	304	301

Note. Effects are standardized regression coefficients [followed by 95% CI], Envy = Dispositional Envy, *** = $p < .001$, ** = <.01, *= <.05.

Table 5. *The correlation between dispositional envy, benign envy and malicious envy*

	Benign Envy	Malicious Envy
Dispositional Envy	.15 [.04 .26] **	.40 [.30 .49] ***
Benign Envy		.30 [.20 .40] ***

Note. Effects are correlation coefficients [followed by 95% CI].

*** = $p < .001$, ** = <.01, *= <.05.

Table 6. *Study 3 Regression models predicting support for redistribution*

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Compassion	.43 [.35 .50] ***	.47 [.39 .54] ***	.46 [.39 .54] ***	.48 [.40 .56] ***	.40 [.32 .48] ***
Dispositional Envy	.11 [.03 .18] **		.04 [-.05 .14]	.05 [-.05 .14]	-.01 [-.10 .09]
Self-interest	.24 [.16 .32] ***	.24 [.17 .32] ***	.23 [.16 .31] ***	.24 [.16 .31] ***	.21 [.13 .28] ***
Malicious Envy		.17 [.09 .25] ***	.16 [.07 .25] ***	.15 [.06 .24] **	.15 [.06 .24] ***
Benign Envy			-.07 [-.15 .01]	-.06 [-.15 .02]	-.04 [-.12 .04]
Age				-.01 [-.09 .07]	.00 [-.08 .08]
Female				-.10 [-.17 -.02] *	-.09 [-.16 -.02] *
SES					-.14 [-.21 -.06] ***
Party					.23 [.16 .31] ***
R^2	.280	.297	.297	.304	.368
N	501	501	501	501	501

Note. Effects are standardized regression coefficients [followed by 95% CI]. SES: Socio-economic status. Party: 1 = participant most identified with Labour Party, 0 = participant most identified with other parties. *** = $p < .001$, ** = <.01, *= <.05.
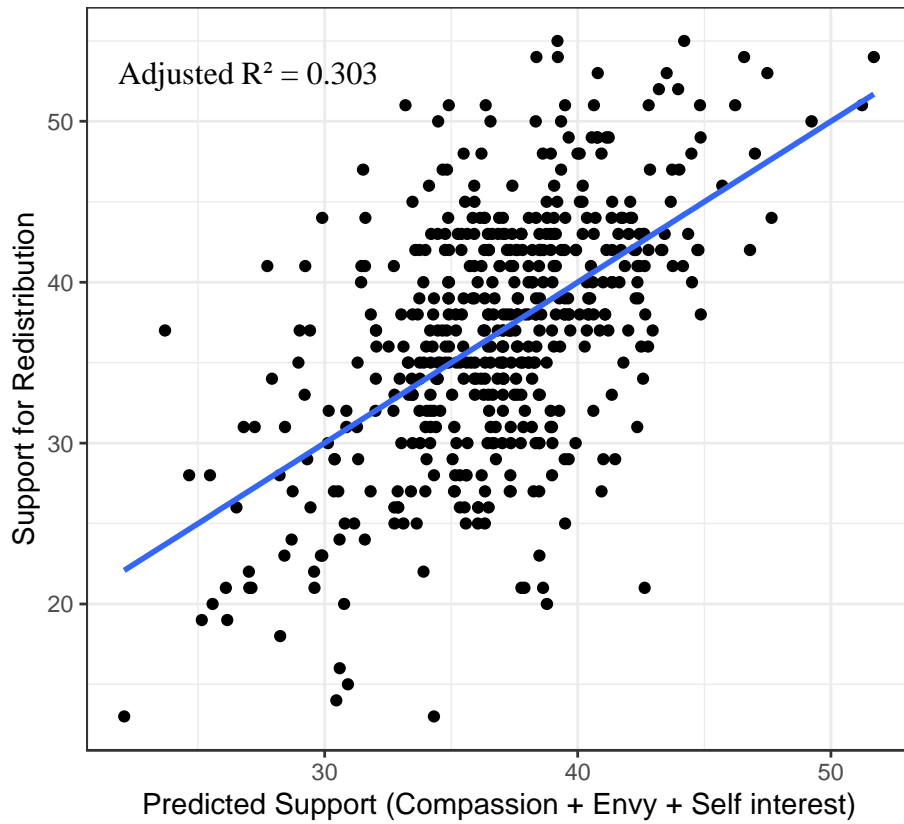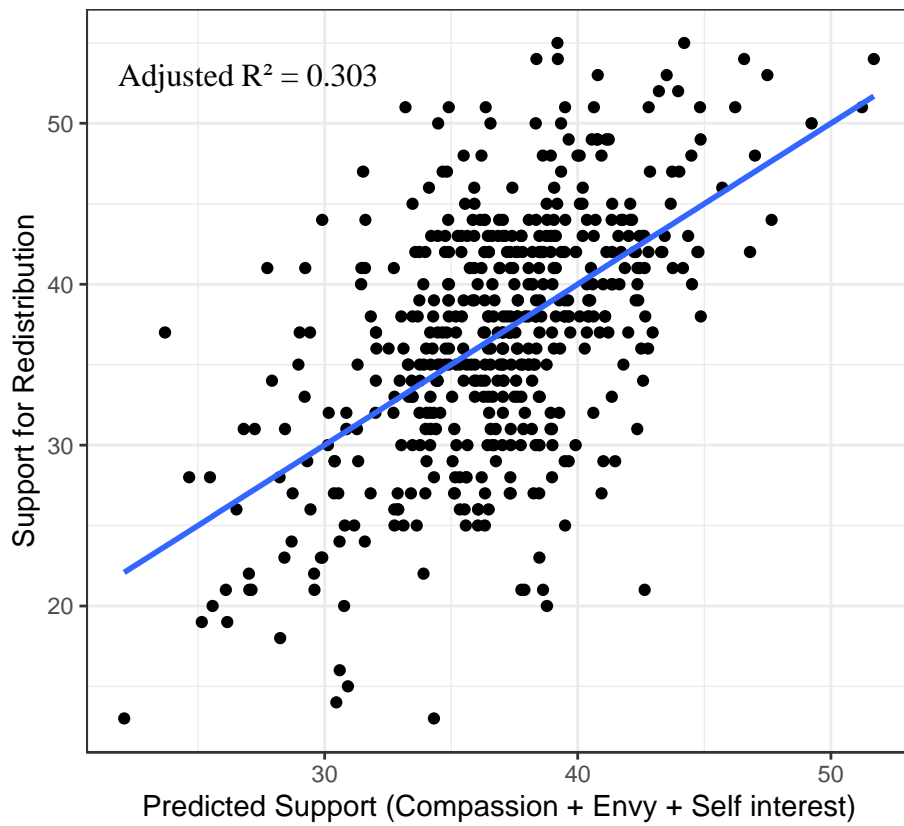
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Figures

Figure 1: Final model, study 3, showing predicted and actual support for redistribution based on adaptations for compassion, and self-interest, and malicious envy.

Figures

Figure 1: Final model, study 3, showing predicted and actual support for redistribution based on adaptations for compassion, and self-interest, and malicious envy.

Table

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