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# Disadvantageous inequalities, effort and money burning: are people willing to pay to reduce others' income when inequalities are based on individual performance or based on arbitrary decisions?

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## Abstract

Are people more or less willing to burn others' income if others deserve their advantage in the sense of having expended some efforts to get it? We investigated the impact of effort on burning decisions. To fulfil our research question, we conducted two experimental conditions: one in which participants received endowments randomly and another in which participants received endowments based on their performance in a real-effort task. Then participants could reduce others' income through incurring a cost. We found burning rates to be similar across conditions but participants cut a significantly larger fraction of others' income when endowments are attributed through effort rather than randomly.

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## 1. Introduction

Standard economic theory stresses that economic agents are self-interested and so behave to maximise their own welfare. Hence people would reject any opportunity to destroy others' income at a personal cost. However Zizzo and Oswald (2001) found, through a provocative laboratory experiment, that two third of the participants were willing to pay in order to reduce others' earnings. The authors showed that participants displayed (negative) interdependent preferences: namely, their utility depends not only on their own situation (or payoff) but also on others' situations (or payoffs). Interdependent preferences have since been incorporated to rational choice models to understand, explain and predict violations of rational behaviours such as the rejection of low proposals in the Ultimatum Game (Bolton & Ockenfels, 2000; Charness & Rabin, 2002; Fehr & Schmidt, 1999; Sobel, 2005; Zizzo, 2007) or costly punishment in public good games (Chaudhuri, 2011; Fehr et al., 2002).

In their seminal paper, Zizzo and Oswald (2001) first created a wealth distribution by giving an initial endowment to participants and by letting them bet their endowment on risky lotteries. Some participants received an arbitrary advantage by being initially better endowed. After betting their money on lotteries, participants were informed about their own payoff and about the payoffs of other participants within their experimental session. Participants were then anonymously allowed to burn/reduce others' payoffs at a personal cost. The burning cost varied to compute a price elasticity of burning or - as stated by the authors - a *degree of envy* (p. 43). The authors found that 62.5% of the participants chose to burn others' income and that the burning cost did not impact burning decisions (see also Abbink et al., 2000; Abbink & Herrmann, 2011; Abbink & Sadrieh, 2009). However, they found that there was a strong correlation between wealth and the amounts by which participants were burnt: wealthy participants were by far the largest victims of burning decisions. To explain their results, the authors proposed two factors to shape negative interdependent preferences: reciprocity (participants – and more precisely rich and favoured participants - burnt because they anticipated others to burn them) and desert (participants receiving an initial arbitrary advantage were most likely to be burnt because they were initially favoured).

In a later study, Zizzo (2003) examined the issue of reciprocity. In his experiment, only a few randomly chosen participants could burn others' payoffs without fearing to be victims of others' burning decisions thus eliminating the explanation that people burnt others because they anticipated others to burn them (and so removing concerns for reciprocity). Under such a setting, Zizzo (2003) found less burning: around half of the participants were willing to reduce others' income at a personal cost. Reciprocity was then partly responsible for leading such a large fraction of participants to burn others' income. In a subsequent paper, Zizzo (2004) examined the issue of desert. He conducted experimental sessions in which some participants were initially favoured by the experimenter (advantaged participants) whereas others were not (disadvantaged). Then participants, after learning others' income, could choose to burn, redistribute or to steal part of others' income. Zizzo (2004) found a larger proportion of negative interdependent preferences when advantages were induced unfairly (through initial experimental allocation) than when advantages were induced fairly (see also Rustichini and Vostroknutov, 2014). In light of all the results obtained, Zizzo (2004) concluded that desert mattered more than reciprocity in shaping negative interdependent preferences and resulting behaviours (stealing and burning): participants burnt richer ones because the latter were initially favoured by the experimenter and thus did not deserve their relative superiority.

Whereas the quoted studies highlighted the importance of desert in shaping burning decisions, they did not methodically investigate the impact of endowment provision on money burning decisions. Some limitations can be pointed out. First, Zizzo (2004) examined the role of

exogenous desert in money burning. Namely in his experiment, desert (and associated inequalities) was manipulated exogenously: advantages were given arbitrarily and participants were not responsible for the existing differences.[1] Second, Zizzo (2004) mixed different behaviours (burning, redistributing, stealing) and motivations (envy, guilt, resentment) that could weaken his conclusions on the importance of desert in shaping negative interdependent preferences. We aimed at expanding the objectives pursued by Zizzo (2004) to enhance our comprehension of money burning. More precisely, this paper proposes to examine this issue in a more focused and methodological way. Whereas Zizzo (2004) examined the impact of exogenous inequalities on money burning, we proposed in this paper to explore the impact of endogenous inequalities on money burning. Our paper addresses the following question: are people more or less willing to burn others' income if others deserve their advantage in the sense of having expended some efforts to get it? The novelty of our paper lies in exploring money burning decisions depending on how endowments are allocated. Contrary to previous papers (Fehr, 2018; Rustichini & Vostroknutov, 2014; Zizzo, 2004), we compared two allocation mechanisms (one based on chance and another based on individual performance) and study their impact on decision-making procedure. Note that Bosman et al. (2005) did investigate a related issue in the *power-to-take game* (aka PTG). Whereas the authors focused on emotions and their impact on destruction, they compared decisions from participants who received endowments from the experimenter with decisions from participants who earned their endowment through a real-effort task. They found more destruction when participants receive endowments like manna from heaven rather than when they earned it. Conversely to the money burning game (MBG), the PTG involves an interaction between two players: one can take part of the others' income who can retaliate by destroying part of his/her own income. The PTG examines the destructive behaviour resulting from an interaction (thus including reciprocal concerns). Based on a PTG, Bosman et al. (2005) could not disentangle the impact of effort from the impact of other players' decisions on emotions and individual behaviour. The MBG we consider in this paper does not consider a strategic setting but examines the internal motivations behind destruction. Our paper provides a setting to rigorously examine the impact of effort on money burning decisions and interdependent preferences.

In this paper, we used the MBG designed by Oswald and Zizzo (2000) and examined the role of effort in modulating burning decisions. We conducted two experimental conditions differing only in how participants obtained their endowment. In one condition (*Luck*) participants received endowments randomly whereas in another they received endowments according to their individual performance (*Effort*). As a preview of our results, we found that participants are not more willing to burn others' income when endowments are determined by individual performance however when they chose to do so they cut a significantly larger fraction of others' income. Our experimental design enables to differentiate participants' reactions toward inequalities generated randomly or through differences in effort.

Agents may experience negative interdependent preferences because of envy or feelings of unfairness (Beckman et al., 2002; Fehr & Schmidt, 2006). Since envy is thought to arise in situations of relative inferiority (Celse, 2017; Smith and Kim, 2007; Zizzo, 2007) and to provide

[1] Rustichini and Vostroknutov (2014) did examine participants' reactions to endogenous inequalities however in their experiment participants were also suffering from reciprocity concerns (strategic interactions) that prevents them from drawing robust conclusions about the impact of endogenous inequalities on destructive behaviour. Fehr (2018) did examine the relationship between inequality gaps and money burning. Participants had to perform a real-effort task, were paid according to their individual and relative performance and could cheat to increase their performance. After the real-effort task, participants could burn. He found more burning when participants inequalities were due to immoral behaviours. His design did not carefully disentangle reactions to inequalities generated by differences in effort from reactions to inequalities generated by differences in luck.

easily interpretable results, we opted to focus on the decisions resulting from participants placed in situations of relative inferiority namely exposed to better endowed others.

According to Equity Theory, the definition of fairness is closely related to the notion of effort (Buchanan, 1986; Schokkaert & Capeau, 1991). There is ample empirical evidence that people consider an unequal allocation to be fair if it results from differences in effort or performance (Bolton et al., 2005; Bosmans & Schokkaert, 2009; Dickinson & Tiefenthaler, 2002; Houser et al., 2012; Konow, 2001; List & Cherry, 2008; Ruffle, 1998). For instance, dictators give more to charities than to students because they perceive charities to be more deserving than students (Eckel & Grossman, 1996). Based on Equity Theory, inequalities originating from differences in performance are perceived to be fair, socially accepted and less likely to be contested. Hence if all participants have to make an effort to obtain an endowment, the resulting inequalities should be considered, from participants' perspectives, as fair. Conversely if participants receive endowments randomly, resulting inequalities should be considered as unfair and more contested. The experimental literature on destruction also tends to suggest that destruction is lower when people make efforts to get their situation (Bosman et al., 2005; Rustichini & Vostroknutov, 2014; Zizzo, 2004). Therefore we might expect that, if endowments were allocated according to individual performance, participants should not decide to burn others' higher endowments since they should consider such inequalities as fair and thus acceptable. We thus stated the following hypotheses: burning rates *(H1)* and burned amounts *(H2)* should be lower in *Effort* compared to *Luck*. Note that, if participants were purely self-interested, burning rates and thus amounts should be null in both conditions.

## 2. Experimental design

On aggregate, we conducted 22 experimental sessions (12 of *Luck* and 10 of *Effort*) and 368 participants participated to our study (218 in *Luck* and 150 in *Effort*). We designed two conditions and employed a *between-subjects* design. We restricted our analysis to participants whose endowment was strictly lower than the endowment of the participants they were paired with. The analysis below is thus based on the observations of 109 players A in *Luck* and 75 in *Effort*.

In both conditions, two roles were randomly attributed: player A and B. Pairs made of one player A and one player B were randomly formed at the beginning of the experiment. Participants were informed that only players A could make a decision (in order to remove reciprocity concerns in burning). The experiment was single shot (no reputation involved) and was identical in both conditions except that in *Effort* participants had to perform a real-effort task to determine their endowments (see below). First, players A were informed about their monetary endowment and about the endowment of the player B they were paired with. Then players A were informed about the opportunity to burn player B's endowment by incurring a personal cost. If players A decided to burn player B's endowment, they had to indicate by how much they wanted to burn player B's endowment by choosing an integer amount between 1 to 10 burning units. By burning to the maximal amount, the final payoff of the two players were equalised. For a lower amount, player B's payoff remained larger than player A's payoff. For comparison purposes, the burning cost had a similar relative weight in player A's initial endowment.[2] To reduce his opponent's endowment by one burning unit, each player A had to sacrifice 2.5% of his/her initial endowment. Participants could simulate the impact of their decision on the final payoffs of each member of the pair before confirming their decision.

[2] This proportional-cost scheme mirrors the case that efforts for destroying a car are smaller than those required for destroying a house. Foster (1972) provides anecdotal evidence about that proportional relationship.

The difference between the two treatments relies on how endowments are attributed to participants. In *Luck*, the computer randomly drew endowments and randomly attributed them to subjects whereas in *Effort* the endowment allocated to each player depended on their own performance in a real-effort task that consisted in clicking on a mouse under time pressure (1 minute): the more they clicked the higher their endowment. We chose a one minute real-effort task to ensure that the timing and the nature of the decisions were the same across conditions since it is acknowledged that the duration of real-effort tasks affect participants' behaviours (Charness et al., 2018).

As we focused on participants whose endowments are strictly lower than their opponent and to limit the number of useless observations (such as data originating from players A with strictly larger endowments than their opponents), we restricted the set of possible endowments to be allocated to participants. In both conditions, players A could receive either €4 or €16 and players B could receive either €8, €20 or €32. So, we focused on 5 sets of monetary endowments: (4; 8), (4; 20), (4; 32), (16; 20) and (16; 32). Whereas we controlled how endowments are allocated in *Luck*, the allocation of endowments was more problematic in *Effort* since endowments are allocated according to individual performance and thus uncontrollable prior to running the experiment. To be able to compare the two conditions, the allocated endowments needed to be similar across conditions. To fulfil that purpose, we conducted pilot sessions (not included in this paper nor in the analysis) in which participants were asked to perform only the real-effort task. From these pilot sessions, we derived a distribution of clicks and determined the performance levels required to equalise to the maximum extent the distribution of endowments across conditions. For instance, players A would get €4 if their performance was below 300 clicks otherwise, they would get €16. Required performance levels were kept constant across sessions of *Effort*. We conducted a Kruskal Wallis test to detect for differences in endowments attributed to participants between the two conditions. No significant differences in endowments were found between conditions for both players A (chi2=.661, p = .416, DOF = 1) and B (chi2= .062, p = .803, DOF =1).

## 3. Results:

On aggregate, one participant out of three burnt their opponent's endowment (see Table 1). More precisely, 35 participants out of 109 burnt others' payoffs in *Luck* and 29 out of 75 did the same in *Effort*. Although there are proportionally more burning decisions in *Effort* than in *Luck*, this difference does not reach significance (chi-square = 0.842, p = 0.358). Hence, the way endowments were attributed does not seem to exert more participants to burn others' income. A binary logit model showed that burning does not depend on the introduction of effort (p = 0.529). Although when endowments were attributed according to individual effort participants chose more often to burn their opponent's endowment, the introduction of effort plays no role in participants' decisions to subtract income. Our data did not corroborate *H1*. In *Luck*, whereas participants could invest up to 10 units and thus equalise endowments, they invested, on average, 3.34 units. Conversely, in *Effor*t, participants invested more, on average 6.41 units. The difference in the intensity of burning decisions between *Luck* and *Effort* is significant (p < .001, two sided Mann-Whitney). Again, our data did not validate *H2*.

**Table 1: Number (proportion) and average intensity of burning decisions across conditions.**

| Conditions | *Luck* | *Effort* | Overall |
|---|---|---|---|
| Number of independent observations (Players A) | 109 | 75 | 184 |
| Number of reduction decisions (proportions) | 35 (32.11%) | 29 (38.67%) | 64 (34.78%) |
| Average intensity of burning decisions | 3.34 | 6.41 | 4.73 |

To summarise, we found that the proportion of burning decisions is not significantly different between *Luck* and *Effort*. Nevertheless, participants cut a significantly higher fraction of their opponent's endowment when endowments are attributed through effort.

## 4. Conclusion

Zizzo and Oswald (2001) found that two-third of participants were willing to sacrifice their own resources to reduce others' earnings. They suggested two explanations: reciprocity and desert. Collected data suggested desert to be more important than reciprocity. We thus examined the impact of effort on burning decision. We conducted two conditions: one in which participants' endowments were attributed randomly and another in which endowments were given according to individual performance in a real-effort task. Participants were then exposed to unflattering social comparison and were proposed to burn their opponent's endowment. Although the introduction of effort did not exert more participants to burn their opponent's income, it pushed participants to cut a higher portion of their opponent's endowment.

To predict behaviour from our experiment, we referred to Equity Theory. It predicted that if endowments depend on individual effort then subjects would be less prone to reduce income. Our results did not validate this theory: we found more intense burning decisions when endowments were attributed through effort. Research on emotions may help understanding our results. According to Emotion Theory, effort is acknowledged to modulate the intensity of emotions (Ben-Ze'ev, 2000; Lazarus, 1991; Ortony et al., 1988). Emotions are experienced more intensely and have a higher action tendency when involving efforts: we regret more our failures when we make huge efforts to fulfil our objectives rather than when we are less involved (van Dijk et al., 1999). Negative emotions - such as envy or resentment - are particularly sensitive to effort and are ought to be more vivid and having a higher call for action when effort is invested in vain (Wyer & Srull, 1986). Hence if, as stated by previous studies (Beckman et al., 2002; Charness et al., 2014; Solnick & Hemenway, 1998; Rustichini & Vostroknutov, 2014; Zizzo, 2004; Zizzo & Oswald, 2001), negative emotions such as envy or resentment are responsible for burning others' income, participants should experience such emotions more vividly in *Effort* rather than in *Luck* and thus would be more likely to burn others' income when investing efforts in vain (i.e. in *Effort*) rather than when not investing efforts (i.e. in *Luck*). Although our experiment did not allow to measure rigourously the intensity of emotions and their impact on burning decisions, our results tend to corroborate predictions from emotion theory rather than for equity since and suggest the implications of emotions in burning decisions (see also Galeotti, 2015).

Still the issue of effort in modulating destructive decisions needs further investigation. One may conduct additional treatments to investigate agents' reactions when one made effort but got a smaller endowment than a participant who was arbitrarily favoured by the experimenter. Bardsley (2008) conducted a variant of a Dictator Game in which dictators could take money

from the receiver they were matched with. Bardsley (2008) found that by allowing dictators to take money from receivers, he could reverse dictators' generosity and suggested giving in the dictator game to be an artefact of experimentation (Cappelen et al., 2013; List, 2007). Future studies should also investigate whether the standard results observed in money burning games (such as those provided in the paper) are experimental artefacts. Do we observe similar burning rates when people burn by default?

## References


Abbink, K. & Herrmann, B. (2011). The moral costs of nastiness, *Economic Inquiry*, *49*(2), 631–633. https://doi.org/https://doi.org/10.1111/j.1465-7295.2010.00309.x

Abbink, K., Irlenbusch, B., & Renner, E. (2000). The moonlighting game: An experimental study on reciprocity and retribution. *Journal of Economic Behavior & Organization*, *42*(2), 265–277. http://www.sciencedirect.com/science/article/pii/S0167268100000895

Abbink, K., & Sadrieh, A. (2009). The pleasure of being nasty. *Economics Letters*, *105*(3), 306–308.

Bardsley, N. (2008). Dictator game giving: Altruism or artefact? *Experimental Economics*, *11*(2), 122–133. https://doi.org/10.1007/s10683-007-9172-2

Beckman, S. R., Formby, J. P., James Smith, W., & Zheng, B. (2002). Envy, malice and Pareto efficiency: An experimental examination. *Social Choice and Welfare*, *19*(2), 349–367.

Ben-Ze'ev, A. (2000). *The subtelty of emotions*. MA: MIT Press.

Bolton, G E, & Ockenfels, A. (2000). ERC: A Theory of Equity, Reciprocity, and Competition. *American Economic Review*, *90*(1), 166–193. http://www.jstor.org/stable/117286

Bolton, Gary E, Brandts, J., & Ockenfels, A. (2005). Fair procedures: Evidence from games involving lotteries. *Economic Journal*, *115*(506), 1054–1076. https://doi.org/10.1111/j.1468-0297.2005.01032.x

Bosman, R., Sutter, M., & van Winden, F. (2005). The impact of real effort and emotions in the power-to-take game. *Journal of Economic Psychology*, *26*(3 SPEC. ISS.), 407–429. https://doi.org/10.1016/j.joep.2004.12.005

Bosmans, K., & Schokkaert, E. (2009). Equality preference in the claims problem: A questionnaire study of cuts in earnings and pensions. *Social Choice and Welfare*, *33*(4), 533–557. https://doi.org/10.1007/s00355-009-0378-4

Buchanan, J. M. (1986). *Liberty, Market and State: Political Economy in the 1980s* (C. U. Press (ed.)).

Cappelen, A. W., Nielsen, U. H., Sørensen, E. Ø., Tungodden, B., & Tyran, J.-R. (2013). Give and take in dictator games. *Economics Letters*, *118*(2), 280–283. https://doi.org/https://doi.org/10.1016/j.econlet.2012.10.030

Celse, J. (2017). The behavioural economics of envy: what can we learn from it? In R H Smith, M. K. Duffy, & U. Merlone (Eds.), *Envy at Work and in Organizations* (Oxford Uni, pp. 321–346). Oxford University Press.

Charness, G, & Rabin, M. (2002). Understanding Social Preferences with Simple Tests*. *Quarterly Journal of Economics*, *117*(3), 817–869. https://doi.org/10.1162/003355302760193904

Charness, Gary, Gneezy, U., & Henderson, A. (2018). Experimental methods: Measuring effort in economics experiments. *Journal of Economic Behavior & Organization*, *149*, 74–87. https://doi.org/https://doi.org/10.1016/j.jebo.2018.02.024

Charness, Gary, Masclet, D., & Villeval, M. C. (2014). The Dark Side of Competition for Status. *Management Science*, *60*(1), 38–55. https://doi.org/10.1287/mnsc.2013.1747

Chaudhuri, A. (2011). Sustaining cooperation in laboratory public goods experiments: A selective survey of the literature. *Experimental Economics*, *14*(1), 47–83. https://doi.org/10.1007/s10683-010-9257-1

Dickinson, D. L., & Tiefenthaler, J. (2002). What Is Fair? Experimental Evidence. *Southern Economic Journal*, *69*(2), 414. https://doi.org/10.2307/1061680

Eckel, C. C., & Grossman, P. J. (1996). Altruism in Anonymous Dictator Games. *Games and Economic Behavior*, *16*(2), 181–191. https://doi.org/10.1006/game.1996.0081

Fehr, D. (2018). Is increasing inequality harmful? Experimental evidence. *Games and Economic Behavior*, *107*, 123–134. https://doi.org/https://doi.org/10.1016/j.geb.2017.11.001

Fehr, E., Fischbacher, U., & Gächter, S. (2002). Strong reciprocity, human cooperation, and the enforcement of social norms. *Human Nature*, *13*(1), 1–25. https://doi.org/10.1007/s12110-002-1012-7

Fehr, E., & Schmidt, K. M. (1999). A Theory of Fairness, Competition, and Cooperation. In *Quarterly Journal of Economics* (Vol. 114, Issue 3). https://doi.org/10.1162/003355399556151

Fehr, E., & Schmidt, K. M. (2006). Chapter 8 The Economics of Fairness, Reciprocity and Altruism - Experimental Evidence and New Theories. *Handbook of the Economics of Giving, Altruism and Reciprocity*, *1*(06), 615–691. https://doi.org/10.1016/S1574-0714(06)01008-6

Foster, G. M. (1972). The Anatomy of Envy: A Study in Symbolic Behavior. In *Current Anthropology* (Vol. 13, Issue 2, p. 165).

Galeotti, F. (2015). Do negative emotions explain punishment in power-to-take game experiments? *Journal of Economic Psychology*, *49*, 1–14. https://doi.org/https://doi.org/10.1016/j.joep.2015.03.005

Houser, D., Vetter, S., & Winter, J. (2012). Fairness and cheating. *Eur. Econ. Rev.*, *56*, 1645–1655. http://dx.doi.org/10.1016/j.euroecorev.2012.08.001

J. Solnick, S., & Hemenway, D. (1998). Is more always better?: A survey on positional concerns. *Journal of Economic Behavior & Organization*, *37*(3), 373–383. https://doi.org/10.1016/S0167-2681(98)00089-4

Konow, J. (2001). Fair and square: The four sides of distributive justice. *Journal of Economic Behavior and Organization*, *46*(2), 137–164. https://doi.org/10.1016/S0167-2681(01)00194-9

Lazarus, R. S. (1991). Cognition and motivation in emotion. *The American Psychologist*,

*46*(4), 352–367. https://doi.org/10.1037/0003-066X.46.4.352

List, J. A. (2007). On the Interpretation of Giving in Dictator Games. *Journal of Political Economy2*, *115*(3), 482–493. https://doi.org/10.1086/519249

List, J. a., & Cherry, T. L. (2008). Examining the role of fairness in high stakes allocation decisions. *Journal of Economic Behavior and Organization*, *65*(1), 1–8. https://doi.org/10.1016/j.jebo.2003.09.021

Ortony, A. A., Clore, G. L., & Collins, A. A. (1988). The cognitive structure of emotions. In *books.google.com*. Cambridge University Press. http://books.google.com/books?hl=en&lr=&id=dA3JEEAp6TsC&oi=fnd&pg=PA1&dq=Cognitive+Structure+of+Emotions&ots=HTOCXo7Ll7&sig=JWllOYZR7unNaZdMYnLlRy0J-N0

Ruffle, B. J. (1998). More Is Better, But Fair Is Fair: Tipping in Dictator and Ultimatum Games. *Games and Economic Behavior*, *23*(2), 247–265. https://doi.org/10.1006/game.1997.0630

Rustichini, A., & Vostroknutov, A. (2014). Merit and justice: An experimental analysis of attitude to inequality. *PLoS ONE*, *9*(12). https://doi.org/10.1371/journal.pone.0114512

Schokkaert, E., & Capeau, B. (1991). Interindividual Differences in Opinions about Distributive Justice. *Kyklos*, *44*(3), 325–345. https://doi.org/10.1111/j.1467-6435.1991.tb01758.x

Smith, Richard H, & Kim, S. H. (2007). Comprehending envy. *Psychological Bulletin*, *133*(1), 46–64. http://www.ncbi.nlm.nih.gov/pubmed/17201570

Sobel, J. (2005). Interdependent Preferences and Reciprocity. *Journal of Economic Literature*, *43*(2), 392–436. https://doi.org/10.1257/0022051054661530

van Dijk, W. W., van der Pligt, J., & Zeelenberg, M. (1999). Effort Invested in Vain: The Impact of Effort on the Intensity of Disappointment and Regret. *Motivation and Emotion*, *23*(3), 203–220. https://doi.org/10.1023/A:1021315314979

Wyer, R. S., & Srull, T. K. (1986). Human Cognition in Its Social Context. *Psychological Review*, *93*(3), 322–359. https://doi.org/10.1037/0033-295X.93.3.322

Zizzo, D. J. (2003). Money burning and rank egalitarianism with random dictators. *Economics Letters*, *81*(2), 117–120. https://doi.org/10.1016/S0165-1765(03)00190-3

Zizzo, D. J. (2004). Inequality and procedural fairness in a money burning and stealing experiment. *Research on Economic Inequality*, *11*(155). http://www.emeraldinsight.com/books.htm?chapterid=1759010&show=pdf

Zizzo, D. J. (2007). *The Cognitive and Behavioral Economics of Envy*.

Zizzo, & Oswald. (2001). Are People Willing to Pay to Reduce Others' Incomes? *Annales d'Économie et de Statistique*, *63/64*, 39–65. https://doi.org/10.2307/20076295