The Influence of Emotion on Trust

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Abstract

Political scientists frequently wish to test hypotheses about the effects of specific emotions on political behavior. However, commonly used experimental manipulations tend to have collateral effects on emotions other than the targeted emotion, making it difficult to ascribe outcomes to any single emotion. In this letter, we propose to address this problem using causal mediation analysis. We illustrate this approach using an experiment examining the effect of emotion on dyadic trust, as measured by the trust game. Our findings suggest that negative emotions can decrease trust, but only if those negative emotions make people feel less certain about their current situation. Our results suggest that only anxiety, a low certainty emotion, has a negative impact on trust while anger and guilt, two emotions that differ in their control-appraisals but induce the same high level of certainty, appear to have no effect on trusting behavior. Importantly, we find that failing to use causal mediation analysis would ascribe a *positive* effect of anxiety on trust, demonstrating the value of this approach.

Key Words: trust, emotions, mediation analysis, emotional induction, investment game, trust game

Appendices for online presentation

A PANAS-X Details

The version of PANAS-X this study used consisted of 40 items. Subjects were asked to respond to the following prompt with respect to each item:

> This scale consists of a number of words that describe different feelings and emotions. Read each item and select the appropriate option next to that word. Indicate to what extent you feel this right now, (that is, at the present moment).
>
> Very slightly or not at all — A little — Moderately — Quite a bit — Extremely

Responses were coded from 1 (very slightly or not at all) to 5 (extremely). The responses were aggregated into the scales shown in Table 1. Items were displayed in a random order, to minimize possible order effects.

B Survey Instruments

The following survey items were used in this paper's analyses. The first is a standard seven-point measurement of ideology, the second a three-question battery measuring trust that comes from the GSS. Both were administered as part of the pre-survey completed when subjects signed up for the experiment (on average more than 24 hours prior to the experiment), and thus should neither contaminate nor be contaminated by the results of the experiment.

> **Ideology** We hear a lot of talk these days about liberals and conservatives. On a 7-point scale, where 1 is very liberal and 7 is very conservative, where would you place yourself on this scale, or haven't you thought much about this?
>
> Very Liberal — Liberal — Slightly Liberal — Moderate — Slightly Conservative — Conservative — Very Conservative— Haven't Thought Much About This
>
> **Generalized Trust**
>
> Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair?
>
> Would try to take advantage of you — Would try to be fair
>
> Would you say that most of the time people try to be helpful, or that they are mostly just looking out for themselves?
>
> Try to be helpful — Just look out for themselves

Generally speaking, would you say that most people can be trusted or that you cant be too careful in dealing with people?

Most people can be helpful — Can't be too careful

C Trust Game Experiment Instructions

To introduce the trust game, the following instructions were read aloud to all subjects:

> We will now pair subjects together and have you make decisions that determine how much money you will make from today's experiment. You will be paid privately at the end of the experiment.
>
> You will be randomly paired with one other person and what you earn depends only on your decision and the decision of the other person. One of you will be randomly placed in role 1 and the other in role 2. The person in role 1 is given $5 and they must decide how much, if any, of this to transfer to the person in role 2. The money you give to the other person will be then be tripled, so if the role 1 person gives $2 the role 2 person will receive $6. The person in role 2 then decides how much, if any, of the tripled money to return to the role 1 person and how much to keep for themselves. The person in role 1 earns whatever money is returned plus the share of the $5 they decided to keep.

After the instructions were read subjects were randomly assigned to role one or role two. Instructions specific to their roles appeared on their screens. For role one subjects, these read:

> You are given $5 and must decide how much, if any, of this to transfer to the person in role 2. The money you give to the other person will be then be tripled, so if the role 1 person gives $2 the role 2 person will receive $6. The person in role 2 then decides how much, if any, of the tripled money to return to you and how much to keep for themselves. You earn whatever money is returned plus the share of the $5 you decided to keep.

For role two players these read:

> The person you have been paired with has been given $5 and must decide how much, if any, of this to transfer to you. The money they give to you will then be tripled, so if they give you $2 this will be tripled to $6. You then decide how much, if any, of the tripled money to return and how much to keep for yourself.

D General Disposition Negative Mediation

Our theoretical framework suggests that the valence of a subject's emotional state will influence their willingness to trust, but only when they are experiencing either heightened uncertainty (according to the certainty appraisals hypothesis) or a sense that another person is in control of the situation (according to the control appraisals hypothesis). As section 3.1 shows, all three negative emotion manipulations succeeded in increasing their target emotion more than the other manipulations. In this auxiliary test we assume that subjects in the Anxiety condition had lowered certainty appraisals, that subjects in the anger condition had heightened other-control appraisals, and that the guilt manipulation did not affect subjects' certainty or control appraisals. If the certainty appraisals theory is correct, we would expect a negative effect of general negative disposition in the anxiety condition; if the control appraisals theory is correct we would expect a negative effect of general negative disposition in the anger condition. Finally, a negative effect in the guilt condition would suggest that neither of these theories accounts for the effect of emotion on trust. While this test relies on a strong assumption about the appraisal tendency of subjects, it has the advantage of taking into account the full degree of negative valence experienced by subjects, instead of just the degree of negative valence associated with the target emotion.

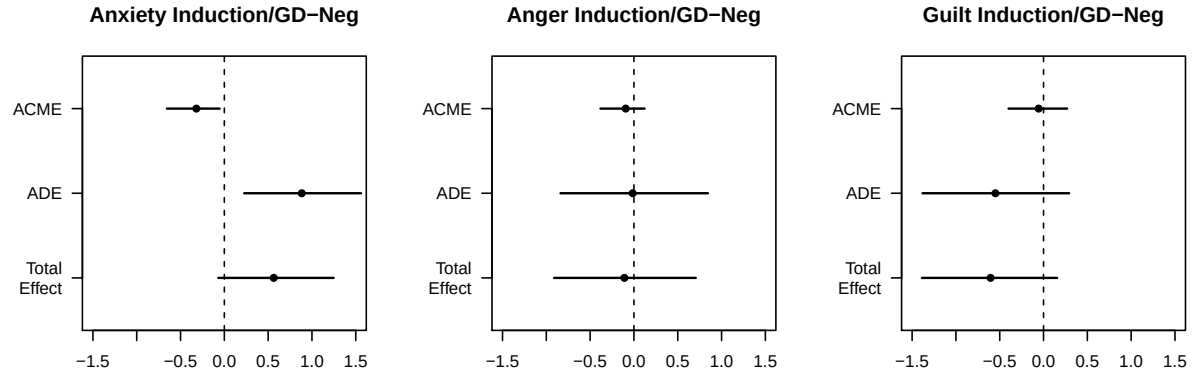

Figure 1: Effects of Emotion Manipulations using General Disposition-Negative mediator. Means with 95% confidence intervals.

Figure 1 presents the results for each of the three experimental manipulations. This figure uses the general disposition-negative scale from Figure 1 as the mediator. Figure 1 reports the average causal mediation effect (ACME), average direct effect (ADE), and total effects. The ACME is the quantity of primary interest, while the total effect shows the effect that would be inferred without the use of mediation analysis. Neither the anger or guilt conditions show an effect of the manipulation mediated

through general negative disposition. However, the anxiety condition shows a negative effect of the manipulation as mediated through negative disposition. These results thus replicate the results from the main text; indeed, they provide stronger support for the theory that negative emotions have a negative effect on trust, but only when subjects are experiencing more uncertainty. As in the main text, the null finding for the anger condition offers no support for the control-appraisals theory.

E Censored outcome model

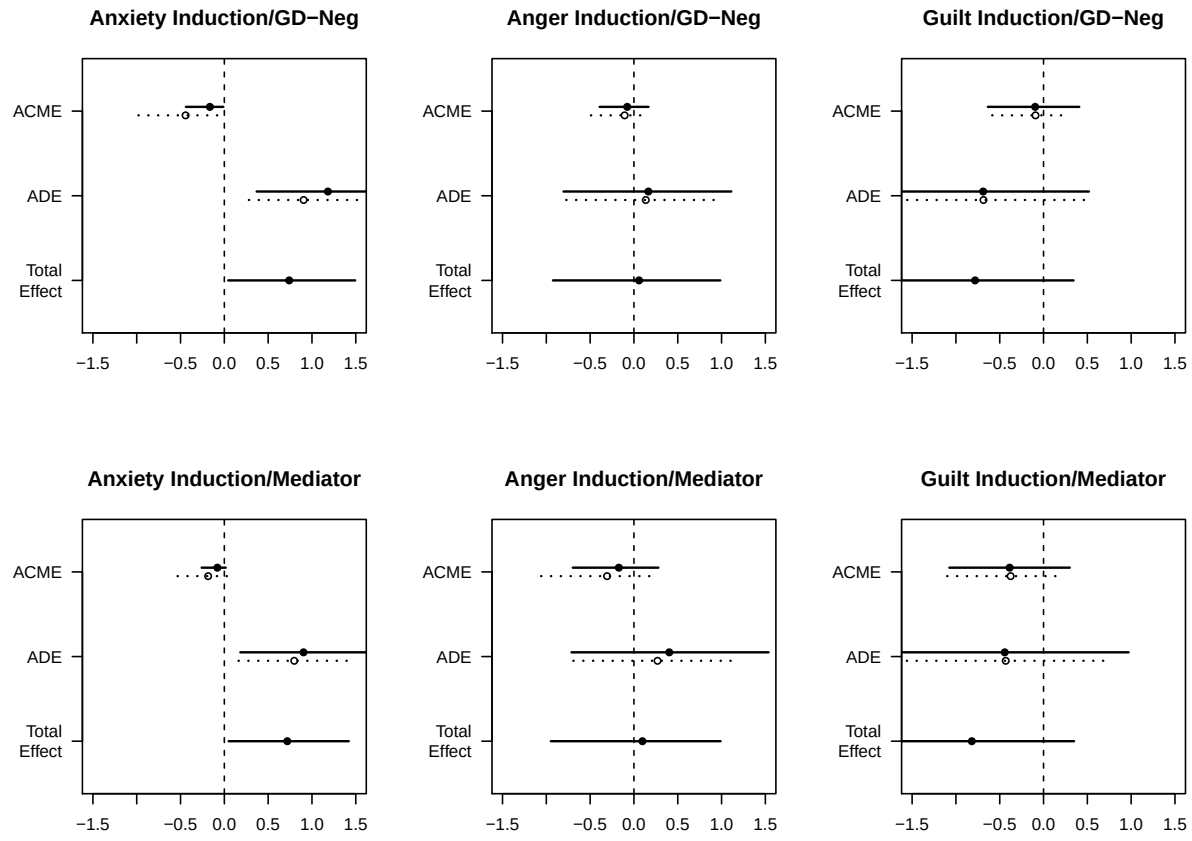

Figure 2: ACME, Direct, and Total Effects of anxiety, anger, and guilt manipulations for general disposition-negative mediator (top row) and targeted emotion (bottom row). Models use a tobit model for the outcome variable instead of linear regression as in the text. Point estimates with 90% confidence intervals. For the ACME and ADE, two effects are reported corresponding to the effects for the treatment (solid line) and control (dotted line) groups. The effects vary slightly due to the non-linear tobit function, rather than a modelled interaction between the treatment and mediator. See Imai *et al.* (2010) for additional details.

F Sensitivity Analysis

Given the strong nature of the sequential ignorability assumption and the fact that it cannot be directly tested, Imai *et al.* (2010) recommend conducting sensitivity analyses. Of course, the assumption is a priori plausible in that pre-treatment trust levels are used as a control, but there could always exist some omitted confounder.[1] Figure 3 presents two tests using the models that had the anxiety treatment and mediator. The first, displayed in the left column, plots the ACME as a function of the correlation in error terms between the mediator and outcome models (ρ). For the estimate of $\tilde{\delta}(t)$ to be positive this correlation must be approximately -0.2. An alternative representation is to plot the ACME in terms of the remaining variance of the mediator and outcome variables. The right column plots the ACME in a contour plot for various combinations of R^2 values. These results suggest that the negative mediation effect is relatively robust to an omitted confounding variable.

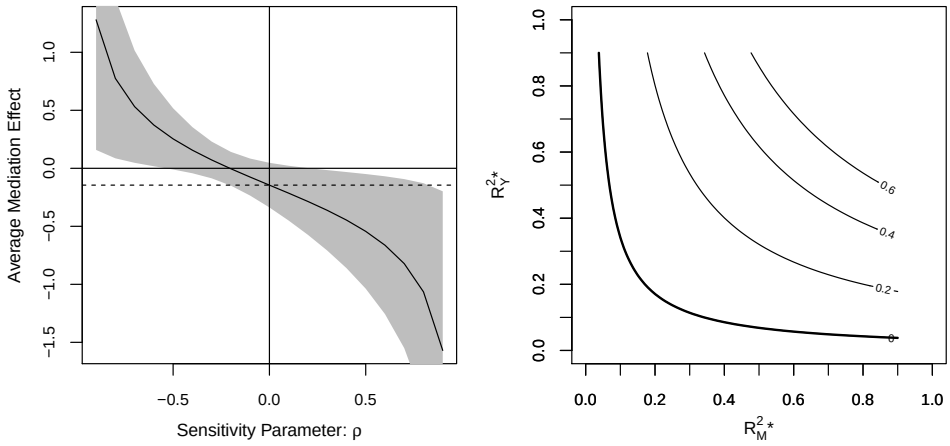

Figure 3: Sensitivity analysis for the anxiety treatment and anxiety mediator. Left column presents sensitivity analysis in terms of the ρ (correlation between model error terms) and the right column presents in terms of the proportion of residual variation in the mediator and outcome models. The mediation result is relatively robust. For example, for the sign on the ACME to become positive, an omitted confounder must explain 20% of the remaining variation in the mediator and 20% of the remaining variation in the outcome variable.

[1] As of now such sensitivity analyses are only available for a limited set of parametric models. In particular the necessary math has not yet been worked out for the case where the outcome variable is censored and so we rely here on models that use linear regressions for the mediator and outcome models. Not surprisingly ACME estimates using the linear outcome model tended to be slightly more extreme than those based on the tobit model.

G Quantile mediation effects

In this section we briefly apply quantile mediation analysis.

Formally, α-quantile causal mediation effects are defined as, $\tilde{\delta}_\alpha(t) \equiv q_{t1}(\alpha) - q_{t0}(\alpha)$, for $t = 0, 1$ and $0 < \alpha < 1$ where $q_{tt'}(\alpha) \equiv \inf\{y; F(Y_i(t, M_i(t')) \leq y) \geq \alpha\}$ is the quantile function for the distribution of $Y_i(t, M_i(t'))$. Similarly, we can define quantile direct and total effects as, $\tilde{\zeta}_\alpha(t) \equiv q_{1t}(\alpha) - q_{0t}(\alpha)$.

Here we suspect that the negative mediating effect should be strongest for those who sent smaller amounts of money to their partners. Individuals may form more negative expectations about the type of Role 2 player they face if they are negatively aroused emotionally. The transmission then of the arousal manipulation on amount sent should be strongest for individuals that subsequently choose to send less. In Figure 4 we plot the ACME and direct effect across the 35th through 65th quantiles of the amount sent for the anxiety treatment.

For the anxiety manipulation the ACME remains negative but is increasing over the amount sent. Interestingly, the anger and guilt conditions do not display this dynamic, instead staying relatively constant over the quantiles. Of course, the confidence intervals are much wider across much of the distribution of amount sent. This is common for semi-parametric models and not surprising given the amount sent distribution.

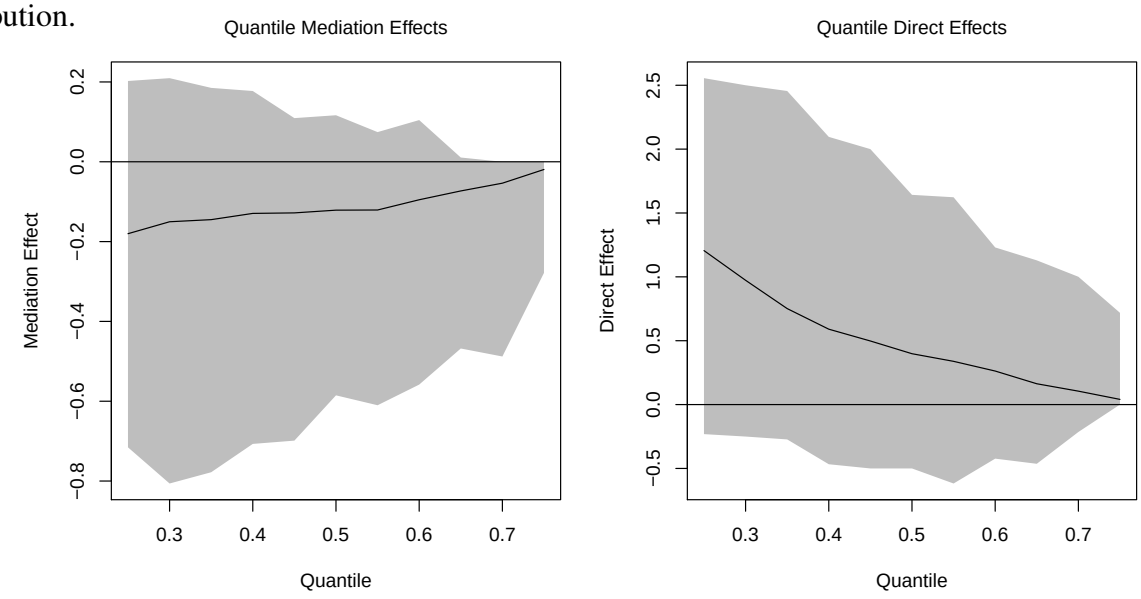

Figure 4: ACME and Direct Effects of anxiety manipulation on amount sent using Anxiety mediator across the 35th through 65th quantiles of the amount sent. Point estimates with 95% confidence intervals shaded. The negative mediating effect is strongest for lower levels of the amount sent.

Category	Citations
1	Smith *et al.* (2008); Klandermans *et al.* (2008); De Castella *et al.* (2009); Halperin *et al.* (2009); Lebel and Ronel (2009); Petersen (2010); Branton *et al.* (2011); Miller (2011); Ridout and Searles (2011); Norris *et al.* (2011); Marcus *et al.* (2011); Ladd and Lenz (2011); Hetherington and Suhay (2012); Stewart and Ford Dowe (2013); Rees *et al.* (2013); Hatemi *et al.* (2013); Milburn *et al.* (2014); Lyons and Sokhey (2014); Iyer *et al.* (2015); Mason (2015)
2	Gross (2008); Zebel *et al.* (2008); Brader *et al.* (2008); Civettini and Redlawsk (2009); Redlawsk *et al.* (2010); Aaroe (2011); Brooks (2011); Blanton *et al.* (2012); Petersen *et al.* (2012); Groenendyk and Banks (2014)
3	Wohl and Branscombe (2009); Gadarian (2010); Ryan (2012); Sullivan *et al.* (2013); Ben-Nun Bloom (2014); Renshon *et al.* (2015)
4	Small and Lerner (2008); Valentino *et al.* (2008, 2009, 2011); Banks and Valentino (2012); Zeitzoff (2014); Gadarian and Albertson (2014)

Table 1: Articles Included in Review

H Review of Studies On Emotion and Politics

A research assistant reviewed all articles published in the last eight years in five journals: *The American Political Science Review*, *The American Journal of Political Science*, *The Journal of Politics*, *Political Psychology*, and *Political Communication*. Articles were coded for the following four characteristics:

1. Is the article an empirical study of the effect of emotion on politics?
2. If "yes" to 1, does the article use an experiment to study the effect of emotion on politics?
3. If "yes" to 2, does the experiment include a manipulation that induces subjects to experience specific emotional state?
4. If "yes" to 3, does the experiment make use of the AEMT to manipulate subjects' emotional states?

Since the focus of the present article is the induction of specific positive and negative emotions we excluded studies that focused on general positive or negative affect instead discrete emotions like anger or anxiety. One of the authors (NAME) independently coded 10 percent of journal issues during this period (18 issues, 241 articles) and found only two disagreements (Krippendorf's $\alpha = .85$). Table H lists the articles coded in each category.

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