

**You can't handle the truth!**

**Errors in affective perspective-taking during disagreement**

Charles A. Dorison

Julia A. Minson

Harvard Kennedy School

Harvard University

Word count: 11,531

Declaration of Conflict of Interest: none

Data, analysis code, pre-registrations, and stimulus materials publicly available [here](#)

*Authors' note.* The authors appreciate helpful comments from the members of Minson Lab. Correspondence concerning this paper should be addressed to Charles A. Dorison, Harvard Kennedy School, Harvard University, 79 JFK Street, Cambridge, MA 02138. E-mail: [cdorison@g.harvard.edu](mailto:cdorison@g.harvard.edu).

*Funding.* The present work was supported by the authors' faculty research fund, Harvard's Foundations of Human Behavior Initiative, the Harvard Mind-Brain-Behavior Interfaculty Initiative, and the Harvard Program on Negotiation.

Abstract

Individuals in conflict often make decisions based on how they expect others to feel. Seven pre-registered studies (N=3,149) draw on theory and research on naïve realism (Pronin, Gilovich, & Ross, 2004; Robinson, Keltner, Ward & Ross, 1995) to identify errors in affective perspective taking during disagreement. We find that, in contrast to predictions based on cognitive dissonance theory, (1) the predominant affective reaction to disagreement is anger (not anxiety), and (2) individuals systematically over-estimate the anxiety (but not anger) felt by counterparts. Studies 1-2 document these effects. Studies 3-4 address alternative explanations for the over-estimation of anxiety experienced by conflict counterparts. Studies 5-6 identify a mediating mechanism (belief certainty) and moderator (argument strength) of this effect. Finally, Study 7 documents a behavioral consequence: overestimating others' anxiety in conflict leads to excessive confidence in one's persuasive abilities. Taken together, our work extends understanding of how affect drives decision making during conflict.

Keywords:

conflict, affect, naïve realism, confidence, open science

When asked how people feel when arguing with a disagreeing counterpart, two of our pilot study participants offered the following responses:

*Participant 191:* “I could see myself becoming angry, yelling at them, thinking they were an idiot, calling them out, and ridiculing them.”

*Participant 15:* “They - like almost everyone else – [would be] too afraid to admit that they are wrong.”

These two quotations illustrate a previously unexplored affective asymmetry during “attitude conflict” (Judd, 1978). Crucially, the first quotation was produced by a research participant forecasting how *they themselves* would feel, and focuses on anger, with no mention of anxiety. The second quotation comes from a research participant answering the same question with regard to *other people* and paints a very different affective picture. This difference is consequential because people frequently make decisions based on forecasts of their own (Wilson & Gilbert, 2003, 2005; Morewedge & Buechel, 2013; Wilson, Wheatley, Kurtz, Dunn, & Gilbert, 2004; Dorison, Minson, & Rogers, 2019) and others’ (Van Boven & Loewenstein, 2005; Van Boven, Loewenstein, Dunning, & Nordgren, 2013; Campbell, O’Brien, Van Boven, Schwarz, & Ubel, 2014; Klein, 2019) affective reactions. In the present research, we test the hypothesis that this pattern extends beyond the two individuals featured above, with important theoretical and practical consequences.

In seven pre-registered studies (collective N = 3,148) we draw on theory and research on naïve realism (Griffin & Ross, 1991; Robinson, Keltner, Ward, & Ross, 1995; Ross & Ward, 1995; Pronin, Gilovich, & Ross, 2004) to reveal that (1) although the predominant affective reaction to disagreement is anger rather than anxiety, (2) individuals systematically over-estimate the anxiety (but not anger) experienced by disagreeing counterparts. We use multiple measures

and financial incentives to provide evidence that this over-estimation cannot be explained by simple unwillingness to report anxiety. We also predict and find that over-estimation of anxiety is underpinned by the (unwarranted) certainty people feel in their views, and exacerbated by believing that others will fail to offer similarly compelling arguments. Finally, we document that this error in forecasting others' affect underpins excessive confidence in one's ability to persuade counterparts.

### **Affective consequences of disagreement**

Multiple long-standing research traditions in psychology, including cognitive dissonance theory (Festinger & Carlsmith, 1959; Frey, 1986; Harmon-Jones & Harmon-Jones, 2012; Harmon-Jones, Harmon-Jones, & Levy, 2015; Matz & Wood, 2005) and naïve realism (Griffin & Ross, 1991; Robinson, Keltner, Ward, & Ross, 1995; Ross & Ward, 1995, 1996; Pronin, Gilovich, & Ross, 2004), argue that attitude conflict on important, self-relevant issues triggers negative affect (Dorison, Minson, & Rogers, 2019; for review, see Hart et al., 2009). However, scant research – either within these two traditions or outside of them – has directly examined the specific emotional consequences of actively engaging with holders of opposing views.

This is an important gap. Despite the fact that different negative emotions (e.g., anger, anxiety, shame, sadness) are typically moderately correlated (e.g., Smith & Ellsworth, 1985; Cowen & Keltner, 2017), the weight of empirical evidence makes clear that different specific emotions, even of the same negative valence, can trigger opposite effects on judgment and decision making (for reviews reaching this conclusion, see Keltner & Lerner, 2010; Lerner, Li, Valdesolo, & Kassam, 2015; Dorison, Klusowski, Han, & Lerner, 2019; Zeelenberg, Nelissen, Breugelmans, & Pieters, 2008). For example, whereas anger increases risk-taking behavior, fear – an equally negative emotion – does the opposite (Lerner & Keltner, 2000, 2001). While anger

and disgust trigger heuristic thought because they carry concomitant appraisals of certainty, sadness and fear trigger systematic thought because they carry concomitant appraisals of uncertainty (Tiedens & Linton, 2001; Lerner & Tiedens, 2006).

Within the domain of interpersonal attitude conflict, both cognitive dissonance theory and research on naïve realism predict that disagreement elicits negative affect. However, while neither has empirically tested the specific emotional consequences of disagreement, they make diverging predictions. We review the relevant literatures below in order to form testable hypotheses.

### **The role of cognitive dissonance**

Traditionally, cognitive dissonance theory (Festinger, 1957, 1964) posits that when individuals hold two relevant yet inconsistent cognitions, they experience an aversive state of dissonance that in turn may motivate attitude or behavior change. A dieter may feel dissonance when consuming an unhealthy dessert; a smoker who knows that tobacco use causes cancer may feel dissonance when lighting up; a turtle-loving environmentalist may feel dissonance when using a plastic straw. In turn, this unpleasant state of dissonance may serve the function of motivating either belief change (“Turtles seem to be living long lives regardless”) or behavior change (“No straw, thank you”).

While dissonance research has traditionally focused on intrapersonal attitude conflict, both classic and modern research in this tradition have also argued that cognitive dissonance underpins the negative affective experience of interpersonal attitude conflict. For example, a recent influential review on the phenomenon of selective exposure noted that research on avoidance of interpersonal attitude conflict first attained prominence under the umbrella of dissonance theory (Hart et al., 2009). Indeed, as far back as the original articulation of the

dissonance phenomenon, Festinger argued that: “The open expression of disagreement in a group leads to the existence of cognitive dissonance in its members” (Festinger, 1957, pg. 261-262).

More recent research provides some empirical support for this hypothesis: Matz and Wood (2005) drew on dissonance theory to hypothesize and find that students assigned to disagree with group members predicted increased dissonance-related affective states (e.g., uneasy, uncomfortable), but did not predict increases in other negative affective states (e.g., disappointed, embarrassed).

The early research on cognitive dissonance did not concretely define or measure the dissonance experience, beyond labeling it “aversive.” However, as both emotion science and dissonance research have advanced, researchers have begun to more precisely zero in on an affective definition of dissonance. Over time, in both the intrapersonal and interpersonal dissonance literatures, research examining the affective consequences of dissonance has focused on anxiety-related states (e.g., Elliot & Devine, 1994; Russell & Jones, 1980; Harmon-Jones, 2000; Zanna & Cooper, 1974; Matz & Wood, 2005). In a recent review, Jonas and colleagues (2014, pg. 237) essentially equate measuring dissonance with measuring anxiety: “It was only when researchers began to zero in on [Behavioral Inhibition System]-specific anxious arousal...that the consciously reportable affective consequences [of dissonance] became clear.” Based on this theorizing, if cognitive dissonance underpins the negative affective consequences of disagreement, then disagreement should be characterized by anxiety-related states. This characterization of dissonance as heightened anxiety is also in line with the findings reported by Matz and Wood (2005). Importantly, however, the Matz & Wood paradigm pitted the lone participant against a unified majority of confederates and never included actual disagreement,

merely the anticipation of it. Thus, the extent to which dissonance actually arises in dyadic attitude conflict remains untested.

### **The role of naïve realism**

Work on the phenomenon of naïve realism (e.g., Griffin & Ross, 1991; Robinson, Keltner, Ward, & Ross, 1995; Ross & Ward, 1995, 1996; Pronin, Gilovich, & Ross, 2004) argues that individuals generally believe that their views rely on objective, moral, and intelligent considerations. Research within this tradition argues that when a counterpart sees the world differently, individuals attribute this divergence not to their own subjectivity, but rather to the fact that the counterpart's judgment has been contaminated by cognitive or motivational biases. Rather than feel uncertain, partisans attribute disagreement to bias, immorality, or ignorance on the part of the disagreeing counterpart (Pronin, Gilovich, & Ross, 2004). For example, in studies on the racially charged Howard Beach incident in the 1990s – in which a young Trinidadian immigrant was hit by a car after being chased by white youths – both liberals and conservatives believed that while their opinions were based on facts and logic, opponents' opinions were based on political ideology (Robinson, Keltner, Ward, & Ross, 1995). Similarly, both Liberman & Ross (2011) and Pronin, Gilovich & Ross (2004) report that disagreement heightened participants' negative attributions about the sources of others' beliefs, while also heightening their positive attributions about the sources of their own. Thus, in contrast to dissonance theory, research on naïve realism paints a picture of psychological certainty, rather than uncertainty, in the face of attitude conflict.

This difference in psychological certainty, in turn, has important consequences for the predictions one would make for the specific emotional consequences of interpersonal disagreement. According to naïve realism, given that individuals see their own views as being

driven by benevolent motives and sound logic, they are likely to feel angry and frustrated at the seemingly selfish and illogical views of others. Notably, this prediction also converges with predictions from cognitive appraisal theories of emotion (e.g., Smith & Ellsworth, 1985; Ellsworth & Smith, 1988), which argue that individuals will feel anger-related states (rather than anxiety-related states) when they appraise the environment as certain (rather than uncertain).

### **Summary**

Prior research makes clear that attitude conflict generates negative affect. However, an important gap remains regarding documentation of the specific emotional consequences of interpersonal disagreement. On the one hand, research on cognitive dissonance theory suggests that disagreement should generate anxiety-related states. On the other hand, research on naïve realism indicates that disagreement should generate anger-related states.

### **Affective perspective-taking during disagreement**

During attitude conflict, individuals often make decisions based on how they expect others to feel as a consequence of their choices. Thus, accurately forecasting a counterpart's affective reaction serves as a critical tool for productive discourse. Research on perspective-taking, in general, and affective perspective-taking, specifically, has demonstrated that individuals make systematic errors when predicting how others think and feel. In many cases, individuals may err by predicting others' feelings by using their own feelings as an anchor and then insufficiently adjusting for perceived differences (e.g., Epley, Keysar, Van Boven, & Gilovich, 2004; Epley, Morewedge, & Keysar, 2004; Epley, Caruso, & Bazerman, 2006). In other cases, in which individuals see themselves as inherently different than their counterpart, they may err by not realizing that their counterpart feels similarly to them. For example, O'Brien and Ellsworth (2012) find that individuals do not project their own visceral states (e.g., thirst)

onto political opponents, even in cases when they should. Further complicating this story is the fact that affective perspective taking may differ by emotional state.

Based on research on naïve realism, we predict that individuals will over-estimate the anxiety felt by disagreeing counterparts in the course of dialogue. Because individuals consider their beliefs about the world to be fundamentally accurate and unbiased, they will expect others to become persuaded by them. Thus, individuals should expect others to feel increasingly more uncertain in the course of conflictual dialogue (but not expect to experience such uncertainty themselves). As a result, to the extent that individuals are “naïve realists,” they should systematically over-estimate the level of anxiety felt by disagreeing others, because they also over-estimate the amount of uncertainty those others might feel (see also relevant work on cognitive appraisal theory of emotion: Smith & Ellsworth, 1985; Ellsworth & Smith, 1988; Lerner & Keltner, 2000, 2001).

The picture for anger is more complex. On the one hand, it could be the case that individuals *under-estimate* the level of anger felt by disagreeing others. Consistent with this idea, research on naïve realism might suggest that individuals will not appreciate how their own arguments appear illogical and biased to a counterpart. Thus, individuals should under-estimate the frustration and anger felt by their counterpart. On the other hand, a case could be made that individuals will *over-estimate* the level of anger felt by disagreeing others. Consistent with this idea, if individuals see counterparts as inherently unreasonable, biased, and immoral (Pronin, Gilovich, & Ross, 2004), then they may expect counterparts to demonstrate out-of-proportion emotional reactions.

Finally, an additional line of research suggests that individuals may accurately predict the level of anger felt by disagreeing others. Specifically, research on the anger superiority effect

(Hansen & Hansen, 1988; Horstmann & Bauland, 2006; Pinkham, Griffin, Baron, Sasson, & Gur, 2010; Ashwin, Wheelwright, & Baron-Cohen, 2006) finds that angry faces are detected far more efficiently than other emotional or expressionless faces, possibly due to the fact that efficiently identifying angry or threatening faces confers an evolutionary advantage. In the case of attitude conflict, it could be the case that individuals regularly recognize and remember anger expressions. If so, it becomes less likely that individuals will systematically over- or underestimate anger felt by disagreeing counterparts.

### **Summary**

Prior research makes clear that individuals make systematic errors in affective perspective taking. The evidence reviewed above suggests that while individuals are likely to over-estimate the anxiety felt by disagreeing others, they are much less likely to over- (or under-) estimate the corresponding level of anger.

### **Research overview**

In seven pre-registered studies (collective N = 3,148), we examine affective perspective taking during attitude conflict. We first report a pilot study in which we generate items for future studies from rich, first-person responses. In Studies 1-2, we report our two basic findings. First, that individuals report dramatically more anger than anxiety during conflictual dialogue. Second, that individuals consistently over-estimate the level of anxiety (but not anger) experienced by disagreeing others. Studies 3-7 focus on the over-estimation of anxiety (but not anger) in conflict counterparts. In Studies 3-4, we rule out alternative explanations of unwillingness to report anxiety, in general, or during disagreement, specifically. In Studies 5-6, we document a mechanism underpinning the over-estimation of anxiety — namely, the certainty people feel regarding their own beliefs. We also document a key moderator – expected opponent argument

quality. Finally, in Study 7, we document an interpersonal consequence of this faulty affective forecast: holding false beliefs about others' affective states unduly increases confidence in one's persuasion abilities. Taken together, the present studies document a novel barrier to conflict resolution and extend our understanding of how affect drives judgment and choice in the domain of attitude conflict.

In all studies, we report how we determined our sample size, all data exclusions, all manipulations, and all measures. In all studies, sample size was predetermined at 200 participants per cell based on effect size estimates from prior studies. We did not analyze the data before reaching our predetermined sample size. Data, code, preregistrations, and materials are available on the Open Science Framework [here](#).

### **Pilot Study**

We first conducted a pilot study to generate items for future experiments from open-ended first-person responses. We asked participants to consider and describe the affective consequences of conflictual dialogue in familiar situations. Given that our future studies examine affect for both self and others, we randomly assigned participants to write about either (a) themselves (i.e., the “Self” condition) or (b) a disagreeing counterpart (i.e., the “Other” condition) in a between-subjects design.

### **Method**

We recruited 200 Amazon Mechanical Turk (mTurk) workers (100 female, 98 male, 2 non-binary/other, mean age = 38, age range = 20 – 72). Participants were told to think of a topic on which they hold a strong opinion and imagine discussing this topic with someone who holds the opposite view. They were then asked to describe their own emotional reaction to this scenario (if they were assigned to the Self condition) or describe their counterpart's emotional reaction (if

they were assigned to the Other condition). Participants were told to be as vivid as they could and to write at least 4-5 sentences (minimum 200 characters). In addition to the written responses, we collected a variety of exploratory Likert and demographic responses. These data are available on the Open Science Framework (see link above).

## Results

Participants’ open-ended descriptions were illuminating in that they provided rich, first-person insight into the affective experience of disagreement. Responses varied in terms of length (Mean = 94 words, SD = 55 words) and content (covering political, lifestyle, and professional disagreement). Excerpts from two responses are reproduced at the beginning of this article. Table 1 provides selected examples of responses referencing anger and anxiety, by both self- and other-focused participants.

We used the responses from this pilot and related theorizing from work on dissonance theory and naïve realism to generate measures for the remaining studies. The measures broadly reflected the themes touched on in the open-ended responses, including anger/frustration at the lack of logical reasoning by disagreeing others and anxiety regarding being wrong. Based on these responses, we created four items measuring anger and four items measuring anxiety in conflictual dialogue, available in Table 2 and described in greater detail in later studies.

**Table 1.** Selected quotations from written responses (Pilot Study)

	Self	Other
Anger	<p>“I imagine the response would lack logic or mathematical sense which would be incredibly frustrating.”</p> <p>“I would have this conversation, but I would be slightly irritated because I work in this field and I have found people who are opposed to it don't really understand what they are talking about.”</p>	<p>“They would probably never change their mind...So doubtless what I say would not do anything to them. Except make them angry most likely.”</p> <p>“The person would be heated and mad because they think they are right and taking a moral high ground, but aren't willing to listen to facts and reason.”</p>
Anxiety	<p>“I think this would be a pretty fraught situation... I would not want to look dumb, so I would be nervous about that.”</p>	<p>“They - like almost everyone else - are too afraid to admit that they are wrong.”</p> <p>“I would expect the other person to have strong feelings of defensiveness... I would expect the other person to</p>

	<p>“I would try to change the person's mind about the issue, but I would avoid getting into an argument about it. I would feel confident but slightly anxious.”</p>	<p>experience a high degree of discomfort at confronting someone who does not share their perspective. There may be strong feelings of uncertainty regarding how [the] conversation would unfold.”</p>
--	---	--

**Table 2.** Full list of affect items used in studies (Studies 1-7)

	Self	Other
<p><b>Anger</b></p>	<p>“To what extent, if at all, were you angry that XXX was wasting your time?”</p> <p>“To what extent, if at all, were you irritated that XXX doesn’t change his mind in the face of good evidence?”</p> <p>“To what extent, if at all, were you frustrated that XXX wasn’t using better critical thinking?”</p> <p>“To what extent, if at all, were you mad that XXX might influence others who don’t know better?”</p>	<p>“To what extent, if at all, would they be angry that XXX is wasting their time?”</p> <p>“To what extent, if at all, would they be irritated that XXX doesn’t change his mind in the face of good evidence?”</p> <p>“To what extent, if at all, would they be frustrated that XXX isn’t using better critical thinking?”</p> <p>“To what extent, if at all, would be they mad that XXX might influence others who don’t know better?”</p>
<p><b>Anxiety</b></p>	<p>“To what extent, if at all, were you afraid of feeling uninformed?”</p> <p>“To what extent, if at all, were you scared that your opinions are not supported by facts?”</p> <p>“To what extent, if at all, were you worried that XXX might be right?”</p> <p>“To what extent, if at all, were you anxious about the idea that if you’re wrong about this, you might be wrong about other things as well?”</p>	<p>“To what extent, if at all, would they be afraid of feeling uninformed?”</p> <p>“To what extent, if at all, would they be scared that their own opinions are not supported by facts?”</p> <p>“To what extent, if at all, would they be worried that XXX might be right?”</p> <p>“To what extent, if at all, would they be anxious about the idea that if they’re wrong about this, they might be wrong about other things as well?”</p>

Note: XXX represents different targets used in different studies. Wording varied slightly across study contexts.

## Discussion

The pilot study allowed us to generate items for future experiments from open-ended, first-person responses following an exploratory process. Importantly, our resulting items are carefully worded to be identical in capturing own and others’ emotions. In the following studies we examine whether despite this identical wording, individuals actually expect themselves and other people to have different emotional experiences during conflict.

### Study 1

Study 1 was designed to test our two hypotheses: (H1) Participants would report higher levels of anger than anxiety when reflecting on their own affective reactions to disagreement,

and (H2) Participants would over-estimate the level of anxiety (but not anger) experienced by disagreeing others. We provided a first test of these hypotheses in the domain of affective reactions to speeches by professional politicians.

## **Method**

We recruited 400 mTurk workers (179 female, 219 male, 2 non-binary/other, mean age = 37, age range = 18 – 70) for a “survey about political opinions.” After an attention check, participants indicated their political ideology on a 7-point Likert scale from 1 (Very liberal) to 7 (Very conservative).

Participants were randomly assigned to one of two between-subjects conditions. In the “Self” condition, participants watched a video by a senator representing the opposing ideology and reported their affective reaction on eight Likert items (described below). In the “Other” condition, participants watched a video clip of a senator advocating for the participant’s own political ideology and forecasted how an mTurker who holds an opposing political ideology would feel while watching the clip. We used Senator Bernie Sanders and Senator Ted Cruz as our Liberal and Conservative target senators, respectively. Thus, participants either reported their affect after watching a video clip from a disagreeing senator (Self condition) or forecasted a disagreeing mTurker’s reaction to watching a video clip from an agreeing senator (Other condition). In both conditions, participants first watched a video clip. Video clips were the most recent speeches uploaded to the Youtube channels of the respective Senators.

The eight affect items were generated based on the open-ended responses from the pilot study. Four pertained to anxiety-related states associated with disagreement (e.g., “To what extent, if at all, would you be afraid of feeling uninformed?”) and four pertained to anger-related states associated with disagreement (e.g., “To what extent, if at all, would you be angry that they

are wasting your time?”). In the Other condition, the items were rephrased to refer to the feelings that participants expected the other, disagreeing mTurker to experience (e.g., “To what extent, if at all, would the other mTurker be afraid of feeling uninformed?”; “To what extent, if at all, would the other mTurker be angry that the Senator is wasting their time?”). Table 2 presents full text for all items in both conditions.

All eight items were presented in a randomized order and were answered on 9-point Likert scales from 0: “Not even the slightest bit” to 8: “More strongly than ever before.” The average levels of anxiety and anger served as our primary dependent variables. At the end of the study, all participants indicated their age and gender.

## Results

In line with our pre-registration, we excluded from analysis anyone who (a) failed the attention check or (b) reported being “middle of the road” in their political ideology. We also excluded one participant who had missing data on multiple affect items. These exclusion criteria left us with a total of 319 participants.

**Affect.** Both the anxiety ( $\alpha = .89$ ) and anger ( $\alpha = .86$ ) scales achieved high levels of reliability. Additionally, an exploratory factor analysis indicated a two-factor solution, with the four anxiety items loading onto the first factor and the four anger items loading onto the second factor. Thus, we averaged the four anxiety items to create an anxiety index and averaged the four anger items to create an anger index. From here on, the terms “anxiety” and “anger” are used to refer to these combined indices.

Our data strongly support our two hypotheses. First, in considering their emotions during disagreement, participants in the Self condition reported dramatically higher levels of anger than anxiety ( $M_{\text{anger}} = 4.65$  vs.  $M_{\text{anxiety}} = 2.27$ ,  $t(162) = 11.05$ ,  $p < .001$ , Cohen’s  $d = 0.87$ ). Indeed,

participants in the Self condition reported higher levels of anger than anxiety 74.2% of the time and the reverse just 21.4% of the time (the remaining 4.4% of participants reported equal levels of anger and anxiety). Comparison of anger vs. anxiety in the Self condition is reported in Figure 1 for this and all studies in which we collect the relevant measures.

Second, participants in the Other condition greatly over-estimated the levels of anxiety that participants in the Self condition reported ( $M_{\text{Other}} = 3.70$  vs  $M_{\text{Self}} = 2.27$ ,  $t(302) = 6.07$ ,  $p < .001$ , Cohen's  $d = 0.68$ ). Paralleling the analyses above, we ran a simulation in which we randomly drew 10,000 pairs of participants, one participant from each condition. Participants in the Other condition forecasted higher levels of anxiety than their randomly-selected match from the Self condition actually reported 65.8% of the time, and the reverse just 30.4% of the time (the remaining 3.8% of pairs indicated equal levels of anxiety).

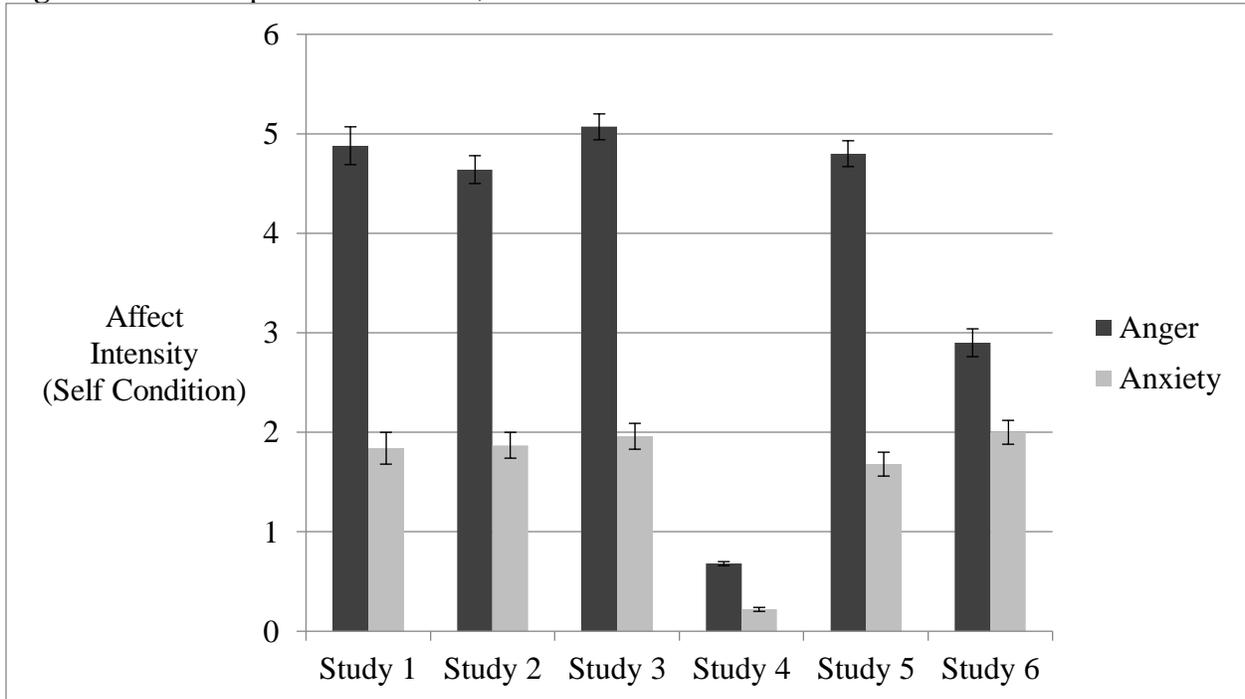
Participants in the Other condition tended to over-estimate the levels of anger that participants in the Self condition reported ( $M_{\text{Other}} = 5.37$  vs  $M_{\text{Self}} = 4.65$ ,  $t(300) = 3.36$ ,  $p < .001$ , Cohen's  $d = 0.37$ ). However, a 2 (within: anger, anxiety) x 2 (between: self, other) mixed ANOVA provided evidence for a significant interaction ( $F(1, 317) = 5.15$ ,  $p = .024$ ), demonstrating that the over-estimation for anxiety was significantly greater than the over-estimation of anger. Comparison of anxiety over-estimation vs. anger over-estimation is reported in Figure 2 for this and all studies in which we collect the relevant measures.

## **Discussion**

In sum, we find support for both hypotheses. Participants report that the experience of disagreement is primarily characterized by anger, while reporting that counterparts' experience of disagreement will be characterized by anxiety to a greater extent than is actually the case.

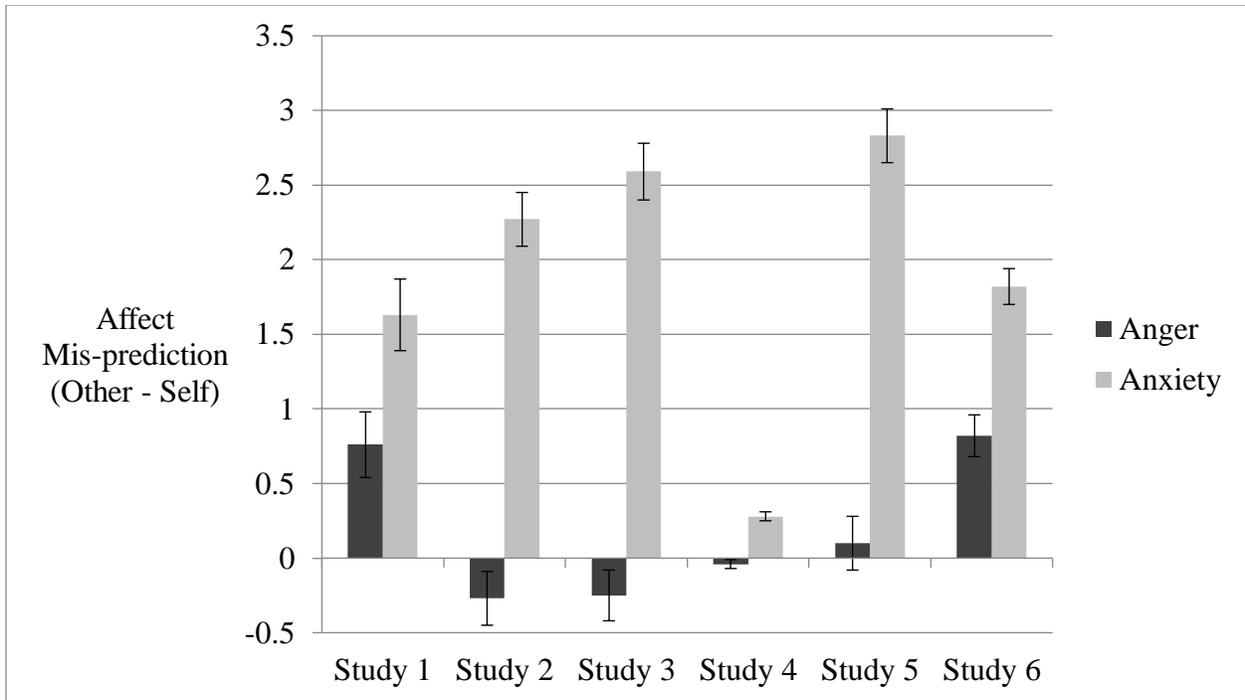
While we find a significant over-estimation of anger, it is significantly smaller than the over-estimation of anxiety.

**Figure 1.** Affect reported for the self, Studies 1-6.



Note: Error bars represent standard errors from the mean.

**Figure 2.** Affect mis-prediction (Other – Self), Studies 1-6.



Note: Error bars represent standard errors from the mean.

## Study 2

Study 1 examined affective perspective taking in the context of watching a well-known politician. However, it may be the case that individuals' affective reactions to political figures who deliver highly polished, professionally written content are not representative of their reactions in daily disagreement. Study 2 examines forecasts for a future argument with a peer. We also investigate whether an individual difference variable – receptiveness to opposing views (Minson, Chen, & Tinsley, 2019) – moderates our pattern of results.

## Method

We solicited participation by 400 mTurk workers (176 female, 223 male, 1 non-binary/other, mean age = 35, age range = 19 – 72) to participate in a 5-minute study. All participants first completed an attention check asking about the purpose of the study.

We prompted all participants to think of any topic, political or otherwise, that they held a very strong opinion about. After indicating the topic in a text box, participants were told to “Imagine a situation in which you are discussing this topic with someone who also has a very strong opinion but holds the opposite views from your own. Imagine that both you and this other person are making arguments for your points of view and trying to change each other’s mind. Please imagine this situation as vividly as possible.” These instructions ensured that the imagined scenario was perfectly symmetric for the participant and their imagined counterpart: both parties were engaged in persuasion regarding a topic on which they held strong attitudes.

As in Study 1, we then randomly assigned participants to either the Self condition or the Other condition. In the Self condition, participants answered eight items regarding the emotions they themselves would feel during this conversation. In the Other condition, participants answered the same eight items, but indicated how they expected *the other person* to feel. The eight items were nearly identical to those used in Study 1, with minor modifications to adjust for a social interaction rather than exposure to content from a professional politician. As in Study 1, all eight items were presented in a randomized order and were answered on 9-point Likert scales from 0: “Not even the slightest bit” to 8: “More strongly than ever before.” The average predicted levels of anxiety and anger served as our primary dependent variables.

After completing the eight emotion items, all participants completed the Receptiveness to Opposing Views Scale (Minson, Chen, & Tinsley, 2019), an 18-item self-report measure of one’s tendency to treat opposing political opinions in an impartial manner. The scale includes items such as “I am willing to have conversations with individuals who hold strong views opposite to my own” and “I find listening to opposing views informative.” All items were answered on 7-point Likert scales from 1: “Strong Disagree” to 7: “Strongly Agree.”

Finally, all participants filled out demographic measures, including age, gender, ethnicity, and political orientation.

## Results

In accordance with our pre-registration, we dropped 2 participants who failed the attention check at the beginning of the study, leaving us with a total of 398 participants.

**Affect.** Both the anger ( $\alpha = .77$ ) and anxiety ( $\alpha = .87$ ) scales achieved high levels of reliability. As in Study 1, we find support for our two main hypotheses. First, participants in the Self condition reported higher levels of anger than anxiety ( $M_{\text{anger}} = 4.64$  vs.  $M_{\text{anxiety}} = 1.87$ ,  $t(390) = 14.55$ ,  $p < .001$ , Cohen's  $d = 1.05$ ).

Second, participants in the Other condition imagined that their counterparts would experience higher levels of anxiety than participants in the Self condition actually reported ( $M_{\text{other}} = 4.14$  vs.  $M_{\text{self}} = 1.87$ ,  $t(390) = 12.37$ ,  $p < .001$ , Cohen's  $d = 1.25$ ). We find no evidence that participants in the Other condition over-estimate the level of anger felt by a disagreeing counterpart ( $M_{\text{other}} = 4.37$  vs.  $M_{\text{self}} = 4.64$ ,  $t(373) = 1.54$ ,  $p = .13$ , Cohen's  $d = 0.16$ ). If anything, participants tended to slightly under-estimate the anger predicted by counterparts. As a result, we again find evidence of a significant interaction using a 2 (within: anger, anxiety) x 2 (between: self, other) mixed ANOVA,  $F(1, 394) = 9.37$ ,  $p = .002$ , demonstrating that the over-estimation of anxiety was significantly greater than the over-estimation of anger.

**Receptiveness.** The receptiveness scale achieved a high level of reliability ( $\alpha = .89$ ). We found evidence that receptiveness to opposing views negatively correlated with both predicted anger for the self ( $r = -.57$ ,  $p < .001$ ) and predicted anger for others ( $r = -.17$ ,  $p = .016$ ). A Fisher  $r$ -to- $z$  transformation revealed that this relationship was stronger for the self than for others ( $z > 4.00$ ,  $p < .001$ ). However, receptiveness had no relationship with either the predicted

level of anxiety for the self ( $r = .02, p > .80$ ) or predicted anxiety for others ( $r = -.07, p > .30$ ).

Thus, while more receptive individuals predict reacting to disagreement with less anger than less receptive individuals, they demonstrate an equal (mis-) prediction of anxiety.

## **Discussion**

Study 2 replicates the two key results from Study 1, this time using forecasts regarding conversations with disagreeing peers. First, in considering their own reactions to disagreement, individuals again report an affective experience primarily characterized by anger rather than anxiety. Second, they imagine the affective experience of disagreeing counterparts to be characterized by anxiety to a greater extent than is actually the case, but do not exhibit this same mis-prediction for anger. Further, this over-estimation of anxiety persists for individuals who report being more receptive to opposing views.

## **Study 3**

Studies 1 and 2 suggest that individuals are not imagining themselves reacting to disagreement in a sanguine manner; rather, the affective experience they anticipate is both quantitatively and qualitatively different than the one they imagine counterparts having. Study 3 examines an alternative explanation for the over-estimation of anxiety: is forecasting higher levels of anxiety in the course of disagreement for others rather than the self merely due to a reluctance to admit anxiety in general?

## **Method**

We solicited participation by 400 Mturk workers for a 5-minute study of political opinions (female = 217, male = 193, mean age = 38, age range = 18 – 72). All participants first completed an attention check asking about the purpose of the study.

Study 3 had a similar design to Study 2 in that participants first indicated a topic they felt strongly about and then imagined a situation in which they were arguing with someone who also felt strongly but had the opposite position. In this study, however, we restricted participants to writing about political topics.

In addition to the battery of eight emotion items we used in Studies 1-2, we included four new items, which we theorized would lead to the opposite pattern of results with regard to self-other forecasts. Specifically, rather than asking participants about experiencing anxiety in the course of an argument with a disagreeing other, we asked about anxiety having to do with the *consequences* of implementing policies based on the disagreeing view. Thus, the four items asked the extent to which participants (or their counterparts, depending on condition) were (1) “afraid about what would happen to this country if policies their counterpart advocated became implemented,” (2) “scared that putting their counterpart’s views into place would negatively impact future generations,” (3) “worried that their counterpart’s views could have negative consequences for how the United States is viewed in the world,” and (4) “anxious about how implementing their counterpart’s views into law would impact the well-being of those they care about.”

This design allowed us to test two competing interpretations of Studies 1-2. Specifically, if the over-estimation of anxiety in Studies 1-2 was due to naïve realism, individuals should report being *more* afraid than their counterpart of the implementation of policies with which they disagree (because policies driven by ill-conceived and immoral motives *should* be a source of anxiety). However, if the over-estimation of anxiety in Studies 1-2 was due simply to participants’ reluctance to admit their own anxiety, individuals should report being *less* anxious than their counterpart, across both types of anxiety items.

In sum, participants answered twelve emotion items: eight concerning anxiety and anger related to the argument (identical to Studies 1-2), and four concerning anxiety related to the implementation of policies based on opposing views (i.e., consequence-based anxiety). All emotion items were again answered on a 9-point Likert scale from 0: “Not even the slightest bit” to 8: “More strongly than ever before.”

## Results

In accordance with our exclusion criteria from Study 2, we dropped 12 participants who failed the attention check at the beginning of the study, leaving us with a total of 388 participants.

**Affect.** Because all indices achieved high reliability (all alphas  $> .75$ ), we averaged each group of four emotion items to create indices of anger, persuasion-based anxiety, and consequence-based anxiety.

As in Studies 1-2, participants again expected themselves to feel much greater levels of anger than persuasion-based anxiety ( $M_{\text{anger}} = 5.07$  vs.  $M_{\text{anxiety}} = 1.96$ ,  $t(184) = 17.53$ ,  $p < .001$ , Cohen’s  $d = 1.29$ ), and over-estimated the level of persuasion-based anxiety forecasted by disagreeing others ( $M_{\text{self}} = 1.96$  vs.  $M_{\text{other}} = 4.55$ ,  $t(376) = 13.52$ ,  $p < .001$ , Cohen’s  $d = 1.39$ ). As in Study 2, we found no significant over-estimation of anger ( $M_{\text{self}} = 5.07$  vs.  $M_{\text{other}} = 4.82$ ,  $t(369) = 1.45$ ,  $p = .15$ , Cohen’s  $d = 0.15$ ), which again resulted in a significant interaction via a  $2 \times 2$  mixed ANOVA ( $p < .001$ )

However, the key question motivating Study 3 was whether participants are simply reluctant to admit anxiety in general. We do not find this to be the case. Instead, we find that participants predicted that they would be *more* afraid of having their opponents’ policies implemented than how afraid they think their opponents would be of having the participants’

policies implemented ( $M_{\text{self}} = 5.76$  vs.  $M_{\text{other}} = 4.87$ ,  $t(369) = 5.25$ ,  $p < .001$ , Cohen's  $d = 0.54$ ).

This is in line with our “naïve realism” interpretation of affect during disagreement: to the extent that people consider their own policy proposals to be well-reasoned and benign, and opponents’ proposals illogical and selfish, they should be more anxious at the prospect of having those nefarious policies implemented.

## **Discussion**

After replicating our two findings from Studies 1-2, Study 3 provided evidence that the over-estimation of anxiety is not due to simple reluctance on the part of participants to admit anxiety in general. Rather, we find that participants are specifically not worried about being proven wrong in policy arguments.

## **Study 4**

Study 4 examines a second alternative explanation for the over-estimation of counterparts’ anxiety: are participants reluctant to admit persuasion-based anxiety specifically? To test this hypothesis, we used Bayesian Truth Serum, a methodological procedure and scoring algorithm that incentivizes truthful reporting in situations where objective truth is unknowable (Prelec, 2004; see also John, Loewenstein, & Prelec, 2012). If the apparent over-estimation of others’ anxiety is driven by the fact that participants actually feel anxious but are hesitant to report it, then incentivizing truthful reporting should mitigate the gap in reported anxiety for the self and the estimated anxiety for others.

## **Method**

We recruited 400 mTurk workers and ended up with 399 for a 5-minute study of political opinions (female = 164, male = 233, non-binary/other = 2, mean age = 37, age range = 19-81). All participants first completed an attention check asking about the purpose of the study.

Our procedure closely mirrored that reported by John and colleagues (John, Loewenstein, & Prelec, 2012). Participants were told that they would read descriptions of different emotions that people may feel in the course of disagreement. We told participants that they would be asked whether they would feel each emotion, whether other mTurkers would feel each emotion, and whether other mTurkers would report feeling each emotion in our survey. We informed participants that this information would help us develop a more accurate estimate of each emotion by applying a formula called the Bayesian Truth Serum (BTS) (Prelec, 2004; see also John, Loewenstein, & Prelec, 2012). We also told participants that although they did not need to specifically understand how the formula worked, they did need to understand that the formula leads to a greater likelihood of receiving a bonus when answering truthfully.

After reading these instructions, participants answered a comprehension check to ensure that they understood that truthful answers would increase the probability of receiving a bonus. We did not use deception and participants were paid in accordance with the results of the scoring algorithm. Further details on this calculation are available on our Open Science Framework repository.

Following this introduction and comprehension check, participants were given identical instructions to Studies 2-3. First, participants were told to think of a particular topic that they held a very strong opinion about and to indicate that topic in a text box. Next, participants were told to imagine discussing this topic with someone who holds a strong opposite opinion and to imagine that both of them are trying to change each other's minds. Participants were then told that they would be asked about eight different emotions that a person might feel in this scenario.

Next, participants answered questions regarding the same eight affective states examined in prior studies. In the Self condition, participants indicated, on a binary response scale, whether

they would experience each of the affective states during the course of disagreement. In the Other condition, participants indicated whether their counterpart would experience each of the affective states during the course of disagreement. Following previous work on BTS, we call this variable an “admission.”

After each admission, we collected two further estimates for each affective state. These two estimates allowed us to calculate a BTS score for each participant. In the Self condition, we asked participants to estimate 1) the percent of mTurkers who would *feel* the affective state (i.e., a prevalence estimate), and 2) the percent of mTurkers who would *report* feeling the affective state (i.e., a reporting estimate). In the Other condition, participants were asked the same questions – both a prevalence estimate and a reporting estimate – but with regard to how other mTurkers would make predictions for their counterpart.

Participants followed this procedure – first giving an admission, then giving prevalence and reporting estimates – for each of the eight affective states (four for anxiety, four for anger) in a randomized order. We calculated separate BTS scores for each affective state and summed across the eight to create a composite BTS score for each participant. Participants in the top 25% of BTS scores in each condition received a bonus.

## **Results**

In accordance with our pre-registration, we dropped 19 participants who failed an attention or comprehension check, leaving us with a total of 380 participants. Bonuses were paid in accordance with BTS scores, as detailed above.

**Affect.** We created indices of anger and anxiety using admission rates, as described above. We averaged each group of four items. This procedure was identical to that employed in prior studies, except that responses were given on a binary scale in this study as opposed to a 9-

point Likert scale in previous studies. Thus, indices range from 0 (would not feel any of the four associated states) to 1 (would feel all of the four associated states), with intermittent values of 0.25, 0.50, and 0.75.

In the presence of incentives for truth-telling, we find support for our two hypotheses. Participants in the Self condition forecasted higher levels of anger than anxiety ( $M_{\text{anger}} = .68$  vs.  $M_{\text{anxiety}} = .22$ ,  $t(194) = 16.12$ ,  $p < .001$ , Cohen's  $d = 1.15$ ). Further, participants in the Self condition still reported significantly less anxiety than participants in the Other condition predicted ( $M_{\text{self}} = .22$  vs.  $M_{\text{other}} = .50$ ,  $t(360) = 8.32$ ,  $p < .001$ , Cohen's  $d = 0.86$ ). Notably, as depicted in Figures 1 and 2, the effect size remains approximately equal to prior studies in the presence of truth-telling incentives. As in Studies 2-3, we again find evidence for a slight, yet not statistically significant, under-estimation of anger ( $M_{\text{self}} = .68$  vs.  $M_{\text{other}} = .64$ ,  $t(377) = 1.61$ ,  $p = .11$ , Cohen's  $d = 0.16$ ), which again yielded a significant interaction in a 2 x 2 mixed ANOVA ( $p < .001$ ).

## **Discussion**

Study 4 adds to the weight of evidence suggesting that individuals are actually over-estimating the anxiety felt by conflict counterparts and are not simply failing to report their own anxiety. Using a well-validated incentive structure for truthful reporting, we again find that participants report minimal anxiety at the prospect of interacting with a disagreeing other, yet expect their counterpart to have a different affective experience. In Study 5 we turn to exploring the psychological mechanism underpinning this effect.

### **Study 5**

In Study 5, we test the mechanism behind participants' over-estimation of others' anxiety in the course of disagreement: namely, individuals' confidence in the fact that their own views

are fundamentally reasonable and supported by sound evidence. In addition, Study 5 tests a moderator of the misperception of counterparts' anxiety: participants' beliefs about the quality of the arguments available to both sides.

## **Method**

We solicited participation by 400 Mturk workers for a 5-minute study of political opinions (208 female, 192 male, mean age = 38, age range = 18 – 76).

Study 5 had an identical design to Study 2, with two additions. First, after the eight affect items, participants answered three new questions used to measure their beliefs regarding the soundness of their own versus their counterpart's views. These items were answered on 9-point Likert scales. Participants in the Self condition answered (1) how certain they were that they were correct, (2) the extent to which they believed they had evidence to support their view, and (3) how much they believed that thoughtful, objective people should agree with them. Participants in the Other condition answered the same three questions on the same scale, but with regard to how they expected their counterpart would feel. To the extent that people are “naïve realists,” confident in the veracity and objectivity of their own views, participants should report higher values on these items for themselves versus for disagreeing others. We predicted that this difference in certainty would mediate the difference in forecasted anxiety for the self versus one's counterpart.

At the end of the study, we asked participants to evaluate the arguments that they and their counterpart made in the debate they had imagined. Participants answered using a binary response option characterizing their own and their counterpart's arguments as “strong” or “weak.” We predicted that participants who imagined their own argument as weak or their counterpart's argument as strong would predict more anxiety for themselves and less anxiety for

their counterpart, relative to participants who imagined their own argument as strong or their counterpart's argument as weak.

## Results

We dropped data from 12 participants who failed the attention check, leaving us with a total of 388 participants.

**Affect.** As in Studies 1-4, both the anxiety ( $\alpha = .91$ ) and anger ( $\alpha = .81$ ) scales achieved high reliability. Thus, we averaged the four items measuring anxiety items and the four items measuring anger.

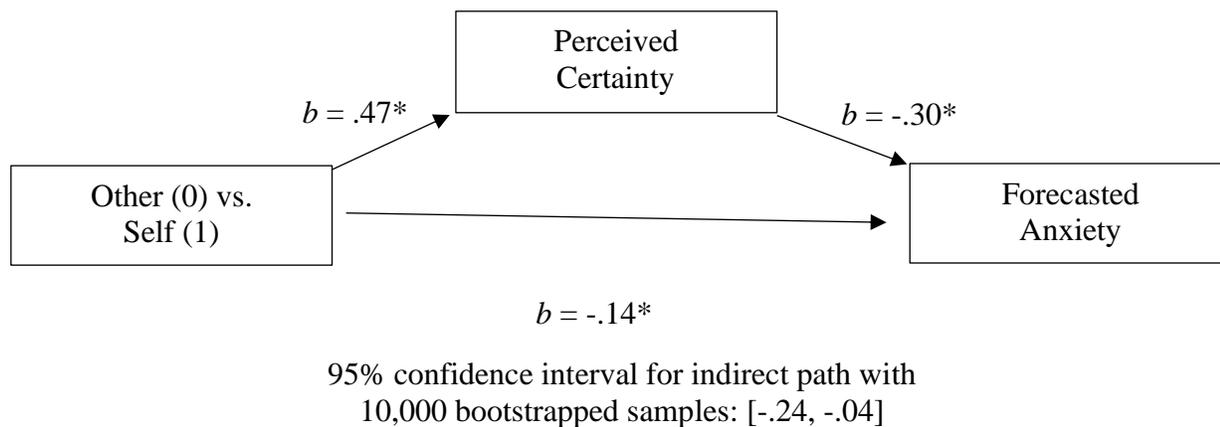
Replicating our prior studies, participants in the Self condition reported dramatically higher levels of anger than anxiety ( $M_{\text{anger}} = 4.80$  vs.  $M_{\text{anxiety}} = 1.68$ ,  $t(193) = 18.46$ ,  $p < .001$ , Cohen's  $d = 1.33$ ). Again, participants in the Other condition predicted significantly higher levels of anxiety than participants in the Self condition actually reported ( $M_{\text{other}} = 4.51$  vs.  $M_{\text{self}} = 1.68$ ,  $t(377) = 15.31$ ,  $p < .001$ , Cohen's  $d = 1.56$ ). Finally, we find no evidence of an over-estimation of anger ( $M_{\text{self}} = 4.80$  vs.  $M_{\text{other}} = 4.90$ ,  $t(375) = 0.53$ ,  $p = .60$ , Cohen's  $d = 0.05$ ), resulting in a significant interaction in a  $2 \times 2$  mixed ANOVA ( $p < .001$ ).

**Perceived certainty.** Based on previous work on naïve realism, we predicted that individuals would consider their own views to be sounder and better supported by evidence than the views of disagreeing others. This was indeed the case: participants in the Self condition reported being more certain in their views than did participants in the Other condition ( $M_{\text{self}} = 6.60$  vs.  $M_{\text{other}} = 6.35$ ); considered their own views to be backed by more evidence ( $M_{\text{self}} = 6.54$  vs.  $M_{\text{other}} = 5.72$ ); and believed that their views would enjoy greater support among objective others ( $M_{\text{self}} = 6.15$  vs.  $M_{\text{other}} = 5.83$ ). We averaged these three items into a single measure,

which achieved a high level of reliability ( $\alpha = .76$ ) and differed between conditions ( $M_{\text{self}} = 6.43$  vs.  $M_{\text{other}} = 5.97$ ,  $t(374) = 3.33$ ,  $p < .001$ , Cohen's  $d = 0.34$ ).

**Mediation.** We designed Study 5 to address whether the difference in perceived certainty we report above – a consequence of naïve realism – was a driver of the over-estimation of anxiety in conflict counterparts. To address this question, we conducted a between-subjects mediation analysis with the Lavaan package in R (Rosseel, 2011) with 10,000 bootstrapped samples. Consistent with predictions, and as depicted in Figure 3, certainty in beliefs mediated the self-other difference in predictions of anxiety during conflict,  $b = -0.14$ ,  $z = -2.72$ ,  $p = .006$ , 95% Confidence Interval =  $[-0.24, -.04]$ .

**Figure 3.** The effect of condition on forecasted anxiety as mediated by perceived certainty (Study 6).



**Argument quality.** At the end of the study all participants classified their own and their disagreeing counterpart's expected arguments as either strong or weak. Strikingly, we found almost no variance in participants' evaluations of their own argument quality: 98% of participants classified their own arguments as strong. However, we found ample variation in classification of counterparts' argument quality: 55% of participants classified their counterpart's expected argument as strong, with the remaining 45% classifying their counterpart's expected

argument as weak. We thus tested whether individuals who expected their counterparts to make strong arguments would make different forecasts than individuals who expected their counterparts to make weak arguments.

Participants who imagined their counterpart making weak arguments demonstrated a clear self-other difference in forecasted anxiety ( $M_{\text{self}} = 1.57$  vs.  $M_{\text{other}} = 4.88$ ,  $t(164) = -12.49$ ,  $p < .001$ , Cohen's  $d = 1.90$ ). This difference was smaller, but still substantial, for participants who imagined their counterpart making strong arguments ( $M_{\text{self}} = 1.78$  vs.  $M_{\text{other}} = 4.23$ ,  $t(208) = -9.62$ ,  $p < .001$ , Cohen's  $d = 1.33$ ). Importantly, the interaction between condition (self, other) and argument classification (strong, weak) was significant: participants who imagined their counterparts making weak arguments demonstrated a greater self-other anxiety difference than participants who imagined their counterpart's arguments as being strong,  $b = 0.87$ ,  $se = 0.37$ ,  $t = 2.35$ ,  $p = .019$ .

An analysis of the simple effects demonstrated that this interaction was driven by changes in predictions for the disagreeing counterpart. Predictions of anxiety for disagreeing others varied based on perceived argument strength of the counterpart ( $M_{\text{weak}} = 4.23$  vs.  $M_{\text{strong}} = 4.88$ ,  $t(176) = -2.40$ ,  $p = .02$ ). However, predictions of anxiety for the self did not vary based on perceived argument strength of the disagreeing counterpart ( $M_{\text{weak}} = 1.57$  vs.  $M_{\text{strong}} = 1.78$ ,  $t(195) = 0.86$ ,  $p = .39$ ).

## **Discussion**

Study 5 demonstrated that the mis-prediction of anxiety is driven by participants' belief in the relatively greater validity and defensibility of their own views. This study provides evidence for our theorizing that that the affective experience during conflict and one's forecasts regarding counterparts' affective experiences are importantly affected by naïve realism.

One might make an argument that individuals are justified, even Bayesian, in believing that they have strong arguments and sound evidence for their views. After all, if they did not believe this to be the case, why would they hold the views that they hold? The logical fallacy, of course, lies in the fact that both sides cannot simultaneously have better arguments than their opponent. When both parties in a debate make such a claim, one has to be in error. Study 5 advances prior research by providing evidence that suggests that this greater than warranted certainty in one's beliefs also influences the affective experience of conflict.

### **Study 6**

Our studies up to this point have featured participants imagining the affective reactions of a hypothetical conflict counterpart. In Study 6, participants make predictions regarding the reactions of a specific disagreeing party to a specific argument that they have just generated. We then test the accuracy of those predictions by actually presenting the participants' arguments to someone holding an opposing point of view.

In Study 5 participants expected that argument strength would moderate experienced anxiety in conflict. In Study 6 we follow-up on this finding by randomly assigning writers to making predictions about a counterpart who is more or less knowledgeable on the topic of debate.

### **Method**

Study 6 employed two waves of participants on mTurk: a first wave of writers (N = 350) and a second wave of readers (N = 400). In Wave 1, writers generated arguments for their point of view and forecasted the affective reaction of disagreeing readers. In Wave 2, readers read arguments written by disagreeing writers and reported their affective reactions.

Participants in the study considered one of two controversial policy proposals. This allowed us to randomly assign writer-reader pairs to one of two between-subjects conditions. In the Low Knowledge condition, readers read arguments on the topic they reported knowing less about. In the High Knowledge condition, readers read arguments on the topic they reported knowing more about. In order to optimize the quality of the written responses, all writers produced arguments on the topic that they reported knowing more about.

*Wave 1: Writers*

We first recruited 350 writers (154 female, 194 male, 2 non-binary/other, mean age = 37, age range = 20 – 73). Writers completed an attention check and were told to continue only if they were willing to write at least five sentences on a political topic.

Next, writers indicated, on a 7-point Likert scale, the extent to which they agreed/disagreed with two controversial policy statements: “The death penalty should be abolished in all US states” and “When a sexual assault accusation is made on a college campus, the alleged perpetrator should be immediately removed from campus to protect the victim’s well-being.” Immediately after giving their opinions on these two issues, writers indicated on which of the two issues they could make a stronger argument. In pilot tests, we found that mTurk participants were approximately evenly split both on their opinions on these two issues and on which of the two issues they felt they could make stronger arguments.

In order to optimize the quality of the written arguments, all writers were assigned to produce arguments on the topic on which they claimed to be more knowledgeable. Writers were instructed to write at least 5 sentences. The survey did not allow them to advance without writing at least 400 characters.

After completing the writing task, writers were asked to forecast the affective reaction of another mTurker who would read their argument. All participants were told that the mTurker disagreed with them on the issue to which they were assigned. In the Low Knowledge condition, writers were told that their counterpart had been assigned to a topic they know relatively less about. In the High Knowledge condition, writers were told that their counterpart had been assigned to a topic that they know relatively more about. Writers forecasted the affective reaction of their counterpart using the same eight questions regarding anxiety and anger used in prior studies.

Finally, writers answered demographic questions including age, gender, ethnicity, and political orientation.

#### *Wave 2: Readers*

Wave 2 included 400 readers (183 female, 217 male, mean age = 38, age range = 18 – 73). The beginning of Wave 2 unfolded identically to the beginning of Wave 1. Readers first indicated the extent to which they agreed/disagreed with the two political statements and identified which statement they knew more about.

Readers were then randomly assigned to one of two between-subjects experimental conditions. In the High Knowledge condition, readers were assigned to read a disagreeing argument from Wave 1 about the topic they knew more about. In the Low Knowledge condition, readers were assigned to read a disagreeing argument from Wave 1 about the topic they knew less about.

After reading the disagreeing argument, readers reported their affective reaction using the same eight items, four regarding anger and four regarding anxiety. Finally, readers answered the same demographic questions regarding age, gender, ethnicity, and general political orientation.

*Exclusion Criteria and Matching Procedure*

We pre-registered our criteria for excluding participants and creating pairs. First, we excluded any writers who failed the attention check or said they had no opinion on the topic to which they were assigned. Then, a research assistant, blind to hypotheses, read all arguments and coded whether the writer (1) had clearly argued for a point of view, (2) had argued for a point of view which was in line with their stated opinion on the issue, and (3) had followed directions. We excluded any writers who failed any one of these criteria. Arguments by excluded writers were not shown to readers.

Readers were then randomly paired with writers based on having an opposing opinion and random assignment to condition. We excluded any reader who failed an attention check or said they had no opinion on the topic to which they were assigned. Then, we kept the data for only the first reader to be matched with each writer in order of enrollment into the study.

After implementing these exclusion criteria, we retained 228 usable pairs of writers and readers.

**Results**

Both the anxiety and anger scales achieved high levels of reliability for both readers and writers (all alphas > .85). Thus, as in prior studies, we averaged the four anxiety items and four anger items into combined indices.

**Main effect hypotheses.** We again find support for our two main hypotheses from prior studies. First, in reading actual arguments composed by disagreeing peers, readers reported higher levels of anger than anxiety ( $M_{\text{anger}} = 2.90$  vs.  $M_{\text{anxiety}} = 2.00$ ,  $t(227) = 5.93$ ,  $p < .001$ , Cohen's  $d = 0.39$ ). Even when contemplating specific arguments that they had just written, writers over-estimated the amount of anxiety that would be felt by the readers ( $M_{\text{writer}} = 3.68$  vs.

Running head: Affect and Disagreement

$M_{\text{reader}} = 2.00$ ,  $t(452) = 9.98$ ,  $p < .001$ , Cohen's  $d = 0.94$ ). In this study, we also find evidence that writers over-estimated the amount of anger that would be felt by readers of their arguments ( $M_{\text{writer}} = 4.06$  vs.  $M_{\text{reader}} = 2.90$ ,  $t(446) = 6.30$ ,  $p < .001$ , Cohen's  $d = 0.59$ ); however, the average anxiety over-estimation for each pair was significantly larger than the average anger over-estimation for each pair, as evidenced by a paired  $t$ -test ( $M_{\text{anxiety}} = 1.68$  vs.  $M_{\text{anger}} = 1.16$ ,  $t(227) = 2.65$ ,  $p = .009$ , Cohen's  $d = 0.17$ ).

**High vs. low knowledge.** We next tested the effect of reader knowledge on both writers' affective forecasts and the experienced affect reported by readers. We find evidence that whereas writers forecasted higher levels of anxiety for low knowledge rather than high knowledge readers ( $M_{\text{low}} = 3.99$  vs.  $M_{\text{high}} = 3.43$ ,  $t(223) = 2.49$ ,  $p = .013$ , Cohen's  $d = 0.33$ ), low and high knowledge readers reported statistically indistinguishable levels of anxiety ( $M_{\text{low}} = 2.17$  vs.  $M_{\text{high}} = 1.86$ ,  $t(200) = 1.24$ ,  $p = 0.22$ , Cohen's  $d = 0.17$ ). However, our sample was not sufficiently large to detect a statistically significant interaction ( $b = -0.25$ ,  $p = .46$ ).

## Discussion

Study 6 replicated the two main effect hypotheses using real arguments exchanged among study participants. Study 6 also provided evidence that whereas differences in knowledge influence forecasts for disagreeing others, it does not influence reported affect. Even on issues where individuals reported feeling relatively less knowledgeable, they did not report feeling anxious about being proven wrong.

### Study 7

In Study 7, we turn to examining a behavioral consequence of our phenomenon. Specifically, we were interested in whether erroneous beliefs about how anxious one's counterparts in conflict are might lead individuals to engage in fruitless debates, believing that

they have a real chance at persuading their counterpart. The weight of empirical evidence makes clear that individuals over-estimate their abilities across a wide variety of domains (for review, see Moore & Healy, 2008). Could it be the case that over-estimation of the anxiety experienced by conflict counterparts leads individuals to harbor excessive confidence in their persuasion abilities?

## **Method**

We solicited participation by 400 mTurk workers (160 female, 240 male, mean age = 36, age range = 19 – 71) for a 5-minute study of political opinions. All participants first completed an attention check asking about the purpose of the study.

After reporting their general political orientation on a 7-point Likert scale from 1 (very liberal) to 7 (very conservative), participants indicated their agreement with statements concerning five political topics: the death penalty, recreational marijuana, President Trump's job performance, illegal immigration, and gun control. Agreement was scored on a 7-point Likert scale from -3 (Strongly Disagree) to +3 (Strongly Agree). Participants also ranked the five issues in terms of how strongly they felt about them. After providing their views, participants were told that we would attempt to match them with another participant for a debate on the issue that they felt most strongly about.

While the participant ostensibly waited for the experimental software to match them with a debate partner, they were asked to answer several questions. First, participants forecasted their emotional reaction during the upcoming debate by answering the four anxiety questions used in prior studies. Second, participants were told that they would be given the opportunity to bet up to \$.50 on whether they would be able to persuade their counterpart. They were told that if they

won their bet (i.e., by persuading their counterpart), any money they bet would be doubled. If they lost their bet (i.e., did not persuade their counterpart), any money they bet would be lost.

Participants were then randomly assigned to one of two between-subjects conditions, which varied in the information they received about their debate partner. Participants were told that their partner answered the same emotion questions that they themselves had just answered. In the Realistic condition, we presented participants with a counterpart who had purportedly indicated the *typical* levels of anxiety reported by participants in the Self conditions from previous studies. In the Imagined condition, we presented participants with a counterpart who had purportedly indicated the levels of anxiety *forecasted* by participants in the Other conditions from previous studies. Thus, the Realistic condition represented an aggregated version of actual participant responses, while the Imagined condition represented an aggregated version of the over-estimation of anxiety forecasted by prior participants. To control for political ideology, participants were told that counterparts were moderately conservative (if the participant was liberal) or moderately liberal (if the participant was conservative).

After seeing the counterpart's (fictional) responses on the affect items, participants were reminded of the betting procedure and chose how much they would like to wager, if at all. This choice served as our pre-registered dependent variable.

Finally, participants were thanked for their time and told that we could not match them with a partner. We paid all participants the amount they would have earned if they had won the debate. At the end of the survey, participants filled our demographic measures, including age, gender, and ethnicity.

## **Results**

On average, participants bet 41% of their bonus on their ability to persuade their counterpart. 23% of participants bet their entire bonus, 18% of participants bet some of their bonus, and 59% of participants bet none of their bonus. Thus, rather than a normal distribution, our distribution depicted an inverted U shape, with modal responses at 0% and 100%.

The percentage of the bonus money that participants chose to bet on their ability to persuade their counterpart served as our primary dependent variable. Participants in the Realistic condition bet 34% of their bonus, whereas participants in the Imagined condition bet 44% of their bonus. A t-test confirmed that this difference was statistically significant ( $t(317) = 2.26, p = .021$ , Cohen's  $d = 0.26$ ).

We pre-registered to analyze this variable using a t-test. However, the descriptive statistics above make clear that the distribution is not normal; rather, the modal responses are 0 and 100%. Thus, for robustness, we tested the effect of condition on betting using a beta regression, which does not make assumptions regarding the normality of the distribution of the dependent variable. The effect of condition on willingness to bet was robust to this new analysis:  $b = .30, se = .15, z = 1.98, p = .047$ .<sup>1</sup> In sum, participants were more likely to bet real bonus money when facing a counterpart who reported an unrealistically elevated level of anxiety regarding possibly being proven wrong.

### General Discussion

Conflict about attitudes – ranging from political beliefs, to family norms, to professional convictions – pervades daily life. Successfully navigating such conflict serves as a foundation for

<sup>1</sup> It could be the case that perceived anxiety increases the likelihood that someone bets at all. If so, then the percentage of individuals who bet any amount of money should be higher in the Imagined condition than in the Realistic condition. We find partial support for this hypothesis: Participants in the Realistic condition bet 54% of the time, whereas participants in the Imagined condition bet 65% of the time. A logistic regression showed that this difference was marginally significant ( $z = 1.88, p = .061$ ).

well-functioning relationships, organizations, and democracies. To do so, individuals must accurately predict how their actions will impact others.

Across seven studies, we found that (1) individuals report higher levels of anger than anxiety during disagreement, but (2) systematically over-estimate the level of anxiety – but not anger – felt by disagreeing counterparts. Studies 1-2 documented these primary effects in response to both professional politicians and imagined peers. Studies 3-4 ruled out the alternative explanation of unwillingness to report anxiety and also documented the effects with financial incentives. In Study 5, we identified a key psychological mechanism supporting these effects: perceived certainty regarding one's views. In Study 6, we demonstrated that the effects persist with real arguments and that perceived argument strength influences forecasted anxiety, but not experienced anxiety. Finally, Study 7 revealed a behavioral consequence: confidence in one's persuasion abilities. Taken together, the present research sheds new light on the role of affect in decision making during attitude conflict. This work has particular application for optimizing organizational performance because doing so requires individuals to successfully navigate disagreement on a daily basis. Successfully forecasting how one's actions will influence a counterpart serves as a foundation for such navigation.

Our work stands in contrast to a long-standing explanation of affective reactions to disagreement being rooted in cognitive dissonance, which recent research has described as being primarily characterized by anxiety-like states. In contrast, we find that disagreement is characterized by anger and related states such as irritation and frustration. Although cognitive dissonance explains an impressively wide swath of human behavior, our studies suggest that it poorly predicts the specific affective consequences of dyadic disagreement.

Instead, our work provides evidence for predictions based on naïve realism (Griffin & Ross, 1991; Robinson, Keltner, Ward, & Ross, 1995; Ross & Ward, 1995; Pronin, Gilovich, & Ross, 2004). First, research on the phenomenon of naïve realism suggests that disagreement should elicit anger and frustration rather than fear and anxiety. We find this to be the case. Second, according to naïve realism, individuals in conflict should systematically over-estimate the level of anxiety felt by disagreeing others because they also over-estimate the corresponding level of uncertainty surrounding opponents' beliefs. We also find evidence for this latter point: not only did individuals over-estimate anxiety felt by disagreeing counterparts, but differences in perceived psychological certainty mediated this mis-prediction. Further, perceived argument strength moderated the predictions regarding others' anxiety.

Importantly, our work also documents a barrier to successful conflict resolution that is exacerbated by the mis-prediction of counterparts' anxiety: excessive confidence in one's ability to persuade others. Although in our research we offered participants a single chance to bet on their success to measure such overconfidence, we suspect that in the world outside of the research laboratory several related phenomena would also emerge. For example, individuals might be more willing to enter an argument rather than walk away, or may persevere in an argument longer than might be wise. If people continue to believe in the correctness of their views, and mistakenly infer anxiety in their counterpart, they may dismiss any attempts to counter argue as “defensiveness,” and further evidence of impending success.

Outside of the domain of attitude conflict, prior research on affective forecasting has made clear that individuals mis-predict their own affective reactions across a wide variety of events, and that these faulty affective forecasts can drive sub-optimal decisions (e.g., Wilson & Gilbert, 2003, 2005; Morewedge & Buechel, 2013; Wilson, Wheatley, Kurtz, Dunn, & Gilbert,

2004; Dorison, Minson, & Rogers, 2019). Our work adds not only to this literature, but also to a growing body of research examining emotional perspective taking (Van Boven & Loewenstein, 2005; Campbell, O'Brien, & Van Boven, 2014; Van Boven, Loewenstein, Dunning, & Nordgren, 2013), in which individuals systematically mis-predict the affective reactions of others. We extend this growing research area in at least two important ways. First, we extend this body of work to conflict, an area rife not only with high-intensity affective reactions, but also with failures of perspective-taking. Second, to our knowledge, no prior work on affective perspective-taking has examined differences between specific affective states. In our work, we find consistent evidence of over-estimation of anxiety, but not of anger. We expect our approach to generate new hypotheses of potential emotion-specific errors in affective perspective-taking outside the domain of conflict.

Finally, our work yields other interesting avenues for future research. First, open questions remain regarding boundary conditions for over-estimation of anxiety in counterparts. While the present investigation found that both dispositionally receptive and non-receptive individuals equally over-estimated a counterpart's anxiety, other moderators are likely. For example, it could be the case that individuals in close relationships are more accurate when forecasting their counterpart's affective reaction. This error may be less pronounced among individuals who come from cultural contexts in which attention to the psychological states of others is of greater social import (Markus & Kitayama, 1991) .

Second, open questions remain regarding different types of conflict. While the present investigation examined both political and non-political attitude conflict and found concordance, future research could examine how our findings may vary by domain. Finally, the present studies focused on two emotions of interest to theory and research on dissonance and naïve realism:

anxiety and anger. Future research could examine affective reactions and perspective taking for a host of negative (and positive affective states), including but not limited to sadness, guilt, and shame.

Social psychology has furnished the world with many examples of human inferential shortcomings. Yet none of us can claim lack of experience when it comes to conflict. We observe our counterparts' emotions through their words, their body language, their tone, and sometimes the objects they throw at us. Indeed, organizational success requires successful conflict resolution on a daily basis. Yet, it seems that even in this familiar context and even with incentives for accuracy, people systematically misjudge their counterparts' affect. When both people think that they are more accurate than the other side, one of them has to be wrong. In this case of predicting others' affect, our data suggest that they both are.

References

- Ashwin, C., Wheelwright, S., & Baron-Cohen, S. (2006). Finding a face in the crowd: Testing the anger superiority effect in Asperger Syndrome. *Brain and Cognition, 61*(1), 78-95.
- Campbell, T., O'Brien, E., Van Boven, L., Schwarz, N., & Ubel, P. (2014). Too much experience: A desensitization bias in emotional perspective taking. *Journal of Personality and Social Psychology, 106*(2), 272.
- Cowen, A. S., & Keltner, D. (2017). Self-report captures 27 distinct categories of emotion bridged by continuous gradients. *Proceedings of the National Academy of Sciences, 114*(38), E7900-E7909.
- Dorison, C. A., Klusowski, J., Han, S., & Lerner, J. S. (2019). Emotion in organizational judgment and decision making. *Organizational Dynamics*.
- Dorison, C. A., Minson, J. A., & Rogers, T. (2019). Selective exposure partly relies on faulty affective forecasts. *Cognition, 188*, 98-107
- Elliot, A. J., & Devine, P. G. (1994). On the motivational nature of cognitive dissonance: Dissonance as psychological discomfort. *Journal of personality and social psychology, 67*(3), 382.
- Ellsworth, P. C., & Smith, C. A. (1988). Shades of joy: Patterns of appraisal differentiating pleasant emotions. *Cognition & Emotion, 2*(4), 301-331.
- Epley, N., Caruso, E. M., & Bazerman, M. H. (2006). When perspective taking increases taking: reactive egoism in social interaction. *Journal of personality and social psychology, 91*(5), 872.
- Epley, N., Keysar, B., Van Boven, L., & Gilovich, T. (2004). Perspective taking as egocentric anchoring and adjustment. *Journal of personality and social psychology, 87*(3), 327.

Epley, N., Morewedge, C. K., & Keysar, B. (2004). Perspective taking in children and adults:

Equivalent egocentrism but differential correction. *Journal of Experimental Social Psychology, 40*(6), 760-768.

Festinger, L. (1957). *A theory of cognitive dissonance*. Evanston, Ill.: Row, Peterson.

Festinger, L. (1964). *Conflict, decision, and dissonance* (Stanford studies in psychology; 3). Stanford, Calif.: Stanford University Press.

Festinger, L., & Carlsmith, J. M. (1959). Cognitive consequences of forced compliance. *The journal of abnormal and social psychology, 58*(2), 203.

Frey, D. (1986). Recent research on selective exposure to information. In *Advances in experimental social psychology* (Vol. 19, pp. 41-80). Academic Press.

Griffin, D. W., & Ross, L. (1991). Subjective construal, social inference, and human misunderstanding. *Advances in experimental social psychology, 24*, 319.

Hansen, C. H., & Hansen, R. D. (1988). Finding the face in the crowd: an anger superiority effect. *Journal of personality and social psychology, 54*(6), 917.

Harmon-Jones, E. (2000). Cognitive dissonance and experienced negative affect: Evidence that dissonance increases experienced negative affect even in the absence of aversive consequences. *Personality and Social Psychology Bulletin, 26*(12), 1490-1501.

Harmon-Jones, E., & Harmon-Jones, C. (2012). Cognitive dissonance theory. *Handbook of motivation science, 71-83*.

Harmon-Jones, E., Harmon-Jones, C., & Levy, N. (2015). An action-based model of cognitive-dissonance processes. *Current Directions in Psychological Science, 24*(3), 184-189.

Hart, W., Albarracín, D., Eagly, A. H., Brechan, I., Lindberg, M. J., & Merrill, L. (2009). Feeling validated versus being correct: a meta-analysis of selective exposure to information.

- Psychological bulletin*, 135(4), 555.
- Horstmann, G., & Bauland, A. (2006). Search asymmetries with real faces: Testing the anger-superiority effect. *Emotion*, 6(2), 193.
- John, L. K., Loewenstein, G., & Prelec, D. (2012). Measuring the prevalence of questionable research practices with incentives for truth telling. *Psychological science*, 23(5), 524-532.
- Jonas, E., McGregor, I., Klackl, J., Agroskin, D., Fritsche, I., Holbrook, C., ... & Quirin, M. (2014). Threat and defense: From anxiety to approach. In *Advances in experimental social psychology* (Vol. 49, pp. 219-286). Academic Press.
- Judd, C. M. (1978). Cognitive effects of attitude conflict resolution. *Journal of Conflict Resolution*, 22(3), 483-498.
- Keltner, D., & Lerner, J. S. (2010). Emotion. *Handbook of social psychology*.
- Klein, N. (2019). Better to overestimate than to underestimate others' feelings: Asymmetric cost of errors in affective perspective-taking. *Organizational Behavior and Human Decision Processes*, 151, 1-15.
- Lerner, J. S., & Keltner, D. (2000). Beyond valence: Toward a model of emotion-specific influences on judgement and choice. *Cognition & emotion*, 14(4), 473-493.
- Lerner, J. S., & Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology*, 81(1), 146.
- Lerner, J. S., Li, Y., Valdesolo, P., & Kassam, K. S. (2015). Emotion and decision making. *Annual review of psychology*, 66, 799-823.
- Lerner, J. S., & Tiedens, L. Z. (2006). Portrait of the angry decision maker: How appraisal tendencies shape anger's influence on cognition. *Journal of behavioral decision making*, 19(2), 115-137.

- Matz, D. C., & Wood, W. (2005). Cognitive dissonance in groups: the consequences of disagreement. *Journal of personality and social psychology*, 88(1), 22.
- Minson, J. A., Chen, F. S., & Tinsley, C. H. (2019). Why won't you listen to me? Measuring receptiveness to opposing views. *Management Science*, in press.
- Minson, J. A., Liberman, V., & Ross, L. (2011). Two to tango: Effects of collaboration and disagreement on dyadic judgment. *Personality and Social Psychology Bulletin*, 37(10), 1325-1338.
- Moore, D. A., & Healy, P. J. (2008). The trouble with overconfidence. *Psychological review*, 115(2), 502.
- Morewedge, C. K., & Buechel, E. C. (2013). Motivated underpinnings of the impact bias in affective forecasts. *Emotion*, 13(6), 1023.
- O'Brien, E., & Ellsworth, P. C. (2012). More than skin deep: Visceral states are not projected onto dissimilar others. *Psychological Science*, 23(4), 391-396.
- Pinkham, A. E., Griffin, M., Baron, R., Sasson, N. J., & Gur, R. C. (2010). The face in the crowd effect: anger superiority when using real faces and multiple identities. *Emotion*, 10(1), 141.
- Prelec, D. (2004). A Bayesian truth serum for subjective data. *science*, 306(5695), 462-466.
- Pronin, E., Gilovich, T., & Ross, L. (2004). Objectivity in the eye of the beholder: divergent perceptions of bias in self versus others. *Psychological review*, 111(3), 781.
- Robinson, R. J., Keltner, D., Ward, A., & Ross, L. (1995). Actual versus assumed differences in construal: "Naive realism" in intergroup perception and conflict. *Journal of Personality and Social Psychology*, 68(3), 404.
- Ross, L., & Ward, A. (1995). Psychological barriers to dispute resolution. *Advances in*

- experimental social psychology*, 27, 255-304.
- Ross, L., & Ward, A. (1996). Naive realism in everyday life: Implications for social conflict and misunderstanding. In E. S. Reed, E. Turiel, & T. Brown (Eds.), *Values and knowledge*. (pp. 103–135). Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc.
- Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling and more. Version 0.5–12 (BETA). *Journal of statistical software*, 48(2), 1-36.
- Russell, D., & Jones, W. H. (1980). When superstition fails: Reactions to disconfirmation of paranormal beliefs. *Personality and Social Psychology Bulletin*, 6(1), 83-88.
- Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, 48(4), 813.
- Tiedens, L. Z., & Linton, S. (2001). Judgment under emotional certainty and uncertainty: the effects of specific emotions on information processing. *Journal of Personality and Social Psychology*, 81(6), 973.
- Van Boven, L., & Loewenstein, G. (2005). Empathy gaps in emotional perspective taking. *Other minds: How humans bridge the divide between self and others*, 284-297.
- Van Boven, L., Loewenstein, G., Dunning, D., & Nordgren, L. F. (2013). Changing places: A dual judgment model of empathy gaps in emotional perspective taking. In *Advances in experimental social psychology* (Vol. 48, pp. 117-171). Academic Press.
- Wilson, T. D., & Gilbert, D. T. (2003). Affective forecasting. *Advances in Experimental Social Psychology*, 35, 345-411.
- Wilson, T. D., & Gilbert, D. T. (2005). Affective forecasting: Knowing what to want. *Current Directions in Psychological Science*, 14(3), 131-134.

Wilson, T. D., Wheatley, T. P., Kurtz, J. L., Dunn, E. W., & Gilbert, D. T. (2004). When to fire:

Anticipatory versus postevent reconstrual of uncontrollable events. *Personality and Social Psychology Bulletin*, 30(3), 340-351.

Zanna, M. P., & Cooper, J. (1974). Dissonance and the pill: an attribution approach to studying the arousal properties of dissonance. *Journal of personality and social psychology*, 29(5), 703.

Zeelenberg, M., Nelissen, R. M., Breugelmans, S. M., & Pieters, R. (2008). On emotion specificity in decision making: Why feeling is for doing. *Judgment and Decision making*, 3(1), 18.