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ORIGINAL PAPER

Rose-colored glasses gone too far? Mania symptoms predict biased emotion experience and perception in couples

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Abstract The present study investigated how symptoms of mania—associated with heightened and persistent positive emotion—influence emotion experience and perception during distressing social interactions, whereby the experience of heightened positive emotion may not be socially adaptive. Specifically, mania symptoms were assessed via a validated self-report measure, and used to predict emotion experience and perception during a naturalistic conversation between romantic couples about a time of distress and suffering ($N = 68$ dyads). Results indicated that mania symptoms were associated with increased positive and decreased negative emotion experience and perception between couples, as well as decreased empathic accuracy for partners' negative but not positive emotions. These findings suggest that mania symptoms may be associated with "rose-colored" glasses characterized by a positively biased emotional experience and outward perception even during perhaps the most intimate and distressing social situations.

Keywords Mania · Emotion · Perception · Empathy · Relationships

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Introduction

Recent work suggests that positive emotion may not always be adaptive for social exchanges and, in fact, there may be possible boundary conditions whereby heightened positive emotion could portend social difficulties (e.g., Gruber et al. 2011). However, no work to our knowledge has examined how heightened positive emotion directly impacts the experience and perception of emotions of others during in vivo social exchanges. This is particularly relevant in distressing social contexts where the expression of positive emotions can be much less appropriate than the expression of negative emotions, such as when one's partner is discussing a time of personal tragedy, suffering, or loss. In such distressing social interactions, experiencing heightened positive emotion may be particularly problematic for understanding and connecting to another's distress. The present study aims thus to examine how a measure of heightened positive emotionality actually shapes the experience and perception of emotion during a conversation on a distressing topic between couples.

Mania and heightened positive emotionality

Although positive emotion is associated with numerous social benefits, it seems that in some contexts, too much positive emotion may actually be associated with social impairments (e.g., Gruber et al. 2011). Yet, there is a dearth

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of work systematically employing a measure of heightened positive emotion to see if it adversely shapes emotion experience and perception during an ecologically rich social interaction. One validated measure of heightened positive emotion associated with adverse social consequences is the Altman Self-Rating Mania Index (ASRM; Altman et al. 1997). The ASRM measures self-reported clinical symptoms of mania, centrally characterized by abnormally and persistently elevated or euphoric mood (American Psychiatric Association 2000). Indeed, experimental research confirms that increased symptoms of mania, and risk for development of mania, are associated with heightened and persistent positive emotionality across even negative contexts (Gruber 2011; Gruber et al. 2008; Gruber et al. 2011).

Mania symptoms are associated with social impairment, including reduced quality and quantity of social relationships (Dilsaver 2011; Romans and McPherson 2002). Moreover, mania symptoms (and risk for developing future mania) appear to influence emotion perception in response to socially-relevant cues. For example, one study found that individuals at increased risk for mania showed a bias towards detecting subtle facial expressions of positive, but not negative, emotions in pictures of other people (Trevisani et al. 2008). In addition, currently manic patients (i.e., diagnosed with bipolar disorder) reported a bias towards perceiving positive emotion even when presented with standardized images of negative facial expressions (Lembke and Ketter 2002). Individuals with a clinical history of mania also demonstrate decreased neural activation in regions associated with accurate interpretation of others' emotions (i.e., mirror neuron system) during a virtual social cognition task (Kim et al. 2009) as well as reduced activation in regions relating to mental state reasoning (i.e., insula, temporal cortex) during a theory-of-mind task (Malhi et al. 2008), compared with healthy controls. Taken together, these findings suggest that mania may be associated with impaired perception of emotion in others that may be driven by an inaccurate and overly positive bias towards perceiving positive emotions in others. However, previous studies have not examined emotion experience and perception in more naturalistic social interactions, thereby limiting their ecological validity (Fischer and van Kleef 2010). Moreover, it is unclear whether such apparent biases in positive emotionality may persist in the context of a familiar and intimate social partner (such as one's romantic partner) and when the social context itself is palpably distressing (and negative emotion responses would potentially be more context-appropriate).

The present research

The current study aims to systematically address these issues using an ecologically-valid, dyadic interaction between couples sharing a time of personal suffering while simultaneously assessing emotion experience and perception. As such, it is the first study to directly examine whether heightened positive emotionality—as measured through the lens of mania symptoms—influences emotion perception and experience during an ecologically rich social interaction. Specifically, we tested the role of continuous mania symptoms during a naturalistic interaction between two romantic partners as predictors of emotional experience and perception (i.e., empathic accuracy). As noted above, we focused on an interpersonal context in which experiencing positive emotions would be typically deemed as contextually-inappropriate and maladaptive. Importantly, we examined emotion experience, as well as accuracy and bias in perceptions of emotions perceived in the partner, for both positive and negative emotions. Doing so allowed us to examine whether effects on emotion perception generalize to both positive and negative emotion perception, or whether they are valence-specific.

Truth and bias model: Window into examining emotion in dyadic interactions

In order to examine the associations between mania symptoms and both emotion experience and perception among romantic partners, we applied a recently developed analytical model for conceptualizing and testing accuracy and bias in perceptions in dyadic relationships, known as the Truth and Bias Model (West and Kenny 2011). The Truth and Bias Model identifies three independent effects which are simultaneously measured in one analytical model: directional bias, truth force, and bias force. We define each of these three components in turn. First, *directional bias* reflects the degree to which perceivers systematically over- or under-estimate a truth benchmark, such as judging a partner's negative emotion experience as more positive or negative than the partner's actual emotion experience. Directional bias is typically measured as the mean difference between the judgment and the truth benchmark (Fletcher and Kerr 2010; West and Kenny 2011). When perceivers systematically overestimate their partners' negative emotions during a conversation, for example (i.e., believe they experience relatively more negative emotion than those partners actually feel), then there is a positive directional bias. When they underestimate their partners' negative emotions, there is a negative directional bias. Second, the *truth force* indexes the degree to which people accurately detect changes in the truth benchmark, such as tracking a partner's negative emotions over the course of an interaction. The truth force is typically measured as the effect of the truth benchmark on the judgment and is measured as a regression coefficient. For example, individuals who are able to identify how the

specific behaviors expressed by their partners map onto their partners' negative emotions show a positive truth force (see Fletcher and Kerr 2010, who refer to this effect as "tracking accuracy"). Third, the *bias force* indexes the degree to which people assume that their partners are feeling the same as themselves. The bias force is typically measured as the effect of the perceiver's actual emotion experience on their judgment and is measured as a regression coefficient, representing assumed similarity. Importantly, perceivers can be accurate "indirectly" if they assume that their partners feel similarly to themselves, and they are indeed similar (West and Kenny 2011). By including assumed similarity in our models, we obtained a measure of direct accuracy—accuracy left over once assumed similarity is adjusted for.

In the present research, we were primarily interested in how mania symptoms influence directional bias and the truth force. In addition to mania symptoms shaping the internal emotional experience of an individual in a naturalistic social context for the first time, we also wanted to directly examine how they shape the social perception of positive and negative emotions in others. That is, do individuals relatively higher on mania symptoms demonstrate poorer empathic accuracy for both positive *and* negative emotions, as indicated by a weaker truth force, than those lower on mania symptoms? Do such individuals also overestimate (i.e., show a positive directional bias) their partners' positive emotions and underestimate (i.e., show a negative directional bias) their partners' negative emotions? To answer these questions, mania symptoms were treated as a moderator of directional bias and the truth force. Because we also included the bias force in the model to assess assumed similarity, we also treated mania symptoms as a moderator of the bias force. This data analytic strategy—combined with an ecologically rich experimental design—enabled us to test the following hypotheses:

Hypothesis 1 Mania and emotion experience

Our first hypothesis was that mania symptoms would significantly predict participants' positive and negative emotional experience while sharing a time of personal suffering with their partner. For positive emotion experience, we predicted that increased mania symptoms would be associated with increased positive emotion experience during a distressing social conversation between couples (Hypothesis 1a). This was based upon findings showing that individuals at risk for, and with a clinical history of, mania exhibit heightened and persistent reports of positive emotion experience during negative contexts in individual laboratory settings (e.g., Gruber 2011; Gruber et al. 2008). For negative emotion experience, we predicted that increased mania symptoms would be associated with decreased negative emotion experience during a distressing social conversation (Hypothesis 1b). This was based upon prior research suggesting an absence of context-appropriate increases in negative emotion in response to stressors and negative stimuli among individuals diagnosed with, or at risk for mania in individual laboratory settings (e.g., Johnson et al. 2007).

Hypothesis 2 Mania symptoms and emotion perception

Our second hypothesis was that mania symptoms would also significantly predict participants' perception of positive and negative emotion in their partners during a distressing conversation. For positive emotion perception, we predicted that increased mania symptoms would be associated with increased perceived positive emotion in response to a distressing social conversation (Hypothesis 2a). This was based upon research demonstrating increased recognition of positive emotion in photos of human faces among individuals at risk for mania (Trevisani et al. 2008) as well as an overly positive bias towards perceiving positive emotions in negative facial expressions in individuals with a clinical history of mania (Lembke and Ketter 2002). For negative emotion perception, we predicted that increased mania symptoms would be associated with decreased perceived negative emotion in response to a distressing social conversation (Hypothesis 2b). This was based upon related work demonstrated impaired recognition of negative emotions (e.g., fear) in individuals with a history of mania (Lembke and Ketter 2002).

Hypothesis 3 Mania symptoms and empathic accuracy

Our third set of hypotheses built from Hypotheses 2a and 2b above insofar as we sought to examine the accuracy of these positive and negative emotional perceptions of one's partner. Specifically, we hypothesized that mania symptoms would also significantly predict poorer empathic accuracy, as indicated by a weaker truth force, as well as a directional bias in their perceptions of their partners' positive and negative emotions during a distressing conversation. More specifically, for positive emotion, we predicted that symptoms of mania would be associated with decreased empathic accuracy for perceptions of their partner's positive emotions as indicated by a weaker truth force, and also, that participants would overestimate their partner's positive emotions as indicated by a positive directional bias for perceptions of positive emotion (Hypothesis 3a). For negative emotion, we predicted that symptoms of mania would be associated with decreased empathic accuracy as indicated by a weaker truth force, and also, that participants would underestimate their partner's negative emotions as indicated by a negative directional bias for perceptions of negative emotion (Hypothesis 3b). Both hypotheses are based on work in patients with a history of clinical mania who exhibit deficits in

empathic accuracy generally (Kim et al. 2009; Malhi et al. 2008) as well as specific tendencies to overestimate positive, and underestimate negative, emotion in photos of human faces (e.g., Lembke and Ketter 2002).

Method

Participants

Sixty-eight romantic couples were recruited through paper flyers as well as online advertisements. Of these, 63 couples were heterosexual, four were lesbian, and there was one gay couple in the sample. Demographics were representative of the ethnically diverse San Francisco Bay Area (52 % European/European-American, 18 % Asian/Asian-American, 10 % African/African-American, 5 % were Latino, and 15 % other). Relationship length ranged from 6 months to 30 years ($M = 2$ years, 8 months, $SD = 3$ years, 11 months). Each participant received $20.

Procedure

Both partners provided informed consent to participate in a larger study of romantic couples (Impett et al. 2010). Couples were seated in two chairs angled towards each other in a private room and communicated via intercom with the experimenter. Before coming into the lab, participants completed several questionnaires, including mania symptoms using the ASRM scale. During the laboratory visit, couples engaged in a verbal interaction task during which each partner was asked to share "a time in your life when you felt a lot of suffering or sadness" with their partner. Importantly, the directions stated that topics of discussion should be "a time that you have each gone through personally—not something in your relationship—that has caused you a lot of sadness or suffering." In this way, effects of conflict-related topics were ruled out. Each partner was instructed to specify the exact sequence of events and their feelings at the time. After each partner related a story, both the speaker and listener self-reported their own emotion experience and perception of their partner's emotions. Thus, each individual completed a total of four emotion ratings (i.e., emotion experience as the listener, emotion experience as the sharer, emotion perception as the listener, emotion perception as the sharer). Conversations between partners lasted approximately 3–4 minutes.

Materials

Mania symptoms

Symptoms of mania were assessed using the Altman Self-Rating Mania Index (ASRM; Altman et al. 1997; Altman et al. 2001), a five-item self-report inventory with scores ranging from 0 to 20 ($M = 5.68$ $SD = 4.00$), with higher scores indicating greater mania severity over the past week. Items include heightened cheerfulness ("I feel happier or more cheerful than usual all of the time"), inflated self-confidence ("I feel more self-confident than usual all of the time"), reduced need for sleep ("I can go all day or night without any sleep and still not feel tired"), talkativeness ("I talk constantly and cannot be interrupted"), and activity level ("I am constantly active or on the go all the time"). Scores ≥ 14 represent clinically significant symptoms. Internal consistency was acceptable in the present study ($\alpha = 0.76$). In our sample, a box plot of ASRM scores revealed one outlier score (=20), and we note that findings remained consistent when the outlier score was removed from the analysis.

Emotion experience and perception

After each conversation, participants indicated the extent to which they experienced six positive emotions (*happy/pleased/joyful*, *affectionate/loving/caring*, *proud/good about self*; *compassionate/sympathetic*; *grateful/appreciative*; *cared about/loved/connected*) and six negative emotions (*anxious/nervous*; *lonely/isolated*; *angry/irritated/hostile*; *contempt/disgust with partner*; *disappointed/let down*; and *put down/rejected*), as well as separately rating the extent to which they perceived these same positive and negative emotion items in their partners (Impett et al. 2010). All items were rated on a scale from 1 (*not at all*) to 7 (*a lot*). Positive and negative emotion items were separately averaged to form composite scores for positive and negative emotion experience and perception. Internal consistency across both partners was high for positive emotion experience ($\alpha = 0.90$), negative emotion experience ($\alpha = 0.79$), positive emotion perception ($\alpha = 0.91$), and negative emotion perception ($\alpha = 0.86$).[1]

Data analytic model

In the Truth and Bias Model, the perception of the partner's emotion is treated as the outcome variable. The predictors include the partner's self-reported emotion (the truth benchmark) and the perceiver's own emotion. The intercept in the model measures directional bias (centered on the mean of the truth); the effect (slope) of the partner's own emotion on the perceiver's judgment of that partner's emotion measures the truth force, and the effect (slope) of

[1] Because individual emotion findings were generally consistent with the results from the composites, and internal consistency was high within the scale, we used composites rather than individual emotion items for statistical parsimony.

the perceiver's own emotion on the perceiver's judgment of his or her partner's emotion is the bias force (which measures assumed similarity). Note that because the model includes the perceiver's own emotion (i.e., includes a measure of the bias force), the truth force is a measure of *direct accuracy* (i.e., accuracy once assumed similarity is adjusted for; West and Kenny 2011).

In the Truth and Bias model, the main effect of perceiver ASRM measures its effect on directional bias. The interactions between perceiver ASRM with the truth variable (i.e., partners' actual emotions) and the bias variable (i.e., perceivers' actual emotions), measures the extent to which the strength of the truth force and bias force, respectively, differed as a function of perceiver ASRM (see equation 3 in West and Kenny 2011 for a similar example).

Lastly, in addition to including perceiver ASRM as a moderator of directional bias, the truth force, and the bias force to test our central hypotheses, in supplemental analyses, we also analyzed models for positive and negative emotion that included gender and the partner's ASRM scores as moderators (see Footnotes 3 and 4 for results for positive and negative emotions, respectively). Gender was included as a moderator because the literature on empathic accuracy has shown that women tend to demonstrate greater accuracy than men in judging the emotions of their interaction partners (e.g., Hall and Schmid Mast 2008; also, Ickes et al. 2005). Partner ASRM was included as a moderator because characteristics of the partner being perceived have been found to predict perceivers' empathic accuracy (Zaki et al. 2008). As discussed in Footnotes 3 and 4, the results for these models are entirely consistent with those reported in the main results.

Results

The current analysis assessed the role of mania symptoms in predicting emotion experience and perception in romantic couples. We tested our hypotheses using Linear Mixed Modeling (i.e., the MIXED procedure in SPSS Statistics v19), which adjusts for non-independence in dyad members' responses (Kenny et al. 2006). After standardizing all variables, analyses were conducted to examine the effects of mania symptoms on (1) self-reported positive and negative emotion experience of oneself (to test hypothesis 1) and (2) self-reported perceptions of positive and negative emotions in one's romantic partner (to test hypothesis 2); and (3) the Truth and Bias model was used to test hypothesis 3.

Hypothesis 1 Mania symptoms and emotion experience

Consistent with our first hypothesis, we found that perceiver ASRM scores (i.e., mania symptoms) were a significant predictor of positive and negative emotional experience during a distressing conversation between partners. For positive emotion, increased ASRM scores were associated with increased positive emotion experience ($b = 0.06$, $t(249) = 3.08$, $p < .01$; $M = 4.62$; $SD = 1.33$) and decreased negative emotion experience ($b = -0.03$, $t(254) = -2.61$, $p < .05$; $M = 1.53$; $SD = 0.73$). These effects held consistent across both speaker roles (i.e., person sharing experience of suffering with partner) and listener roles (i.e., person listening to experience of suffering with partner).[2] In sum, increased mania symptoms predicted a more positive, and less negative, emotional experience during a conversation about suffering.

Hypothesis 2 Mania symptoms and emotion perception

Consistent with our second set of hypotheses, perceiver ASRM scores (i.e., mania symptoms) were a significant predictor of participants' perceptions of their partners' emotional experience during a distressing conversation between partners. For positive emotion perception, participants with increased symptoms of mania perceived their partners as experiencing significantly more positive emotion than participants with fewer mania symptoms ($b = 0.07$, $t(240) = 3.57$, $p < .001$). For negative emotion perception, participants with increased symptoms of mania rated their partners as experiencing significantly less negative emotion than participants with decreased mania symptoms ($b = -0.04$, $t(240) = -3.31$, $p < .01$). In other words, participants with increased symptoms of mania perceived their partners as also experiencing more positive, and less negative, emotion during a conversation about suffering. In our next set of analyses, we examined the accuracy of these emotional perceptions of one's partner.

Hypothesis 3 Mania symptoms and empathic accuracy

Our third hypothesis was that perceivers' mania symptoms would be associated with less accurate perceptions of their partners' positive and negative emotions. Specifically, we hypothesized that mania symptoms would predict poorer empathic accuracy, as indicated by a weaker truth force, and a positive directional bias (i.e., overestimation) in their perceptions of their partners' positive emotions, and a negative directional bias (i.e. underestimation) in their perceptions of their partners negative emotions.

[2] Follow-up analyses including role (speaker vs. listener) in the models revealed that role did not moderate effects of mania symptoms (ASRM scores) on positive or negative emotion experience or perception ($ps > .60$). For the empathic accuracy analyses, role also did not moderate the directional bias of ASRM ($ps > .40$) or the Truth Force ($ps > .20$), and the three-way interaction between ASRM scores, truth force, and role was not significant ($ps > .30$) for positive or negative emotion experience or perception composites.

For empathic accuracy for positive emotion,[3] participants systematically underestimated their partner's positive emotion, as indicated by a negative directional bias = ($b = -0.13$, $t(109.96) = -3.15$, $p < .01$). The truth force was positive and significant ($b = 0.12$, $t(248.11) = 2.69$, $p < .01$), indicating that perceivers were accurate. We note that perceivers also assumed similarity, as indicated by a significant bias force ($b = 0.84$, $t(248.81) = 24.18$, $p < .001$). Contrary to our predictions, ASRM of the perceiver did not moderate directional bias nor the truth force; it also did not moderate the bias force (assumed similarity) ($ps > .30$). These findings demonstrate that mania symptoms do not influence the truth force or directional bias for perceptions of positive emotions.

For empathic accuracy of negative emotion,[4] a significant and positive directional bias was found ($b = 0.15$, $t(123.52) = 3.86$, $p < .001$) indicating that participants systematically overestimated their partners' negative emotions. Consistent with the results for positive emotion, the truth force was also positive, ($b = 0.38$, $t(253.00) = 7.69$, $p < .001$), indicating that perceivers were accurate. Perceivers also assumed similarity, as indicated by a significant bias force ($b = 0.48$, $t(253.02) = 9.71$, $p < .01$). Consistent with our predictions, perceivers' ASRM scores moderated directional bias such that perceivers with higher ASRM scores overestimated their partners' negative emotion less than those with lower ASRM scores ($b = -0.02$, $t(243.73) = -2.16$, $p < .05$). ASRM scores also moderated the truth force, ($b = -0.02$, $t(243.18) = -2.14$, $p < .05$), such that, consistent with our hypotheses, perceivers with higher ASRM scores were less accurate in their perceptions of their partners' negative emotions than those with lower ASRM scores. ASRM scores also moderated the bias force, such that individuals with higher ASRM scores assumed similarity to a weaker extent than did those with lower ASRM scores ($b = -0.04$, $t(241.66) = -3.30$, $p < .01$).

Discussion

The current research investigated how heightened positive emotionality—measured via continuous self-reported symptoms of mania—influences emotion experience and perception during social interactions between intimate partners sharing times of personal suffering with one another. We were specifically interested in examining social interactions where the experience of positive emotion may not be socially appropriate, such as sharing a time of extreme suffering or distress. Guided by recent discoveries in affective science and the study of mania (e.g., Gruber 2011), we expected that extreme levels of positive emotion may lead to biases in experience and interpretation of social interactions. Moreover, we tested this idea in an ecologically rich dyadic interaction typically imbued with negative emotionality to investigate whether mania symptoms would bias partners toward positive emotional experiences and perceptions even in such a context where positive emotionality (both its experience and perception) may be less socially appropriate.

Mania symptoms influence emotion experience and perception in social interactions

Our first hypothesis centered on the role of mania symptoms in shaping emotion experience during a distressing social exchange, thereby extending previous studies that had been largely based in individual experimental contexts (e.g., Gruber 2011; Johnson et al. 2007). We found supportive evidence for our prediction that mania symptoms significantly shape emotion experience when people share a time of personal suffering with their romantic partner, but do so in distinct ways for positive and negative emotions. Specifically, mania symptoms were associated with increased positive emotion experience, and decreased negative emotion experience, during the distressing conversation task. With respect to positive emotion experience, this work provides supportive evidence for an

[3] For positive emotion, gender did not moderate the directional bias or truth force ($ps > .80$), but did moderate the bias force ($b = -0.09$, $t(186.00) = -2.49$, $p < .05$), such that men demonstrated a weaker bias force compared to women; that is, women assumed more similarity than did men. In the same model, partner ASRM scores did not moderate the directional bias, truth force, or bias force ($ps > .10$). Consistent with what is reported in the main text, in this model, directional bias was negative and significant, ($b = -0.13$, $t(99.82) = -2.89$, $p < .01$), the truth force was positive and significant ($b = 0.14$, $t(239.54) = 2.96$, $p < .01$), and the bias force was positive and significant ($b = 0.81$, $t(239.43) = 22.12$, $p < .001$). Perceiver ASRM of the perceiver did not moderate directional bias, the truth force, or the bias force ($ps > .20$).

[4] For negative emotion, gender did not moderate the directional bias ($p > .10$) but did moderate the truth force ($b = -0.12$, $t(208.91) = -2.31$, $p < .05$), such that men were less accurate at perceiving negative emotion in their partners overall. Gender did not moderate the bias force ($p > .90$), but partner ASRM scores did moderate the directional bias ($b = 0.03$, $t(250.39) = 3.17$, $p < .01$), such that individuals whose partners scored higher in ASRM were more likely to overestimate their partners' negative emotions. Partner ASRM scores did not moderate the truth force or bias force ($ps > .10$). In this model, consistent with what is reported in the main text, directional bias was positive and significant, ($b = 0.16$, $t(124.08) = 4.12$, $p < .001$), the truth force was positive and significant ($b = 0.42$, $t(247.85) = 8.41$, $p < .001$), and the bias force was positive and significant ($b = 0.44$, $t(240) = 8.83$, $p < .01$). Perceivers with higher ASRM scores overestimated their partners' negative emotion less than those with lower ASRM scores ($b = -0.03$, $t(251.11) = -3.07$, $p < .01$). Perceivers with higher ASRM scores were less accurate in their perceptions of their partners' negative emotions than those with lower scores ($b = -0.03$, $t(250.58) = -2.89$, $p < .01$), and individuals with higher ASRM scores assumed similarity to a weaker extent than did those with lower ASRM scores ($b = -0.03$, $t(250.43) = -3.00$, $p < .01$).

emerging model of positive emotion disturbance in mania (i.e., bipolar disorder), referred to as the positive emotion persistence model (PEP; Gruber 2011). The PEP model has suggested that mania symptoms and history are associated with elevated positive emotion across contexts. Importantly, previous studies had primarily focused on emotional responses in individual contexts such as viewing films or photos, and as such were relatively devoid of social context. Data from the present study thus suggest that amplified positive feelings may extend across socially relevant negative contexts as well, even with a social partner whose welfare is of importance to the individual (i.e., romantic partner).

With respect to negative emotion experience, this work is important in that it identifies for the first time the ways in which mania symptoms can directly influence measurable reductions in negative emotions, and in contexts where the normative response would be to experience distress. Prior research on negative emotion experience in individual contexts has failed to yield significant associations between mania risk, or a clinical history of mania, with negative emotion experience (e.g., Gruber et al. 2008; Johnson et al. 2007). Importantly, however, these previous studies typically utilized emotional stimuli of mild to moderate intensity and in relatively asocial individual experimental contexts (i.e., sitting alone watching a film or picture on a computer screen). The present study suggests that important effects on negative emotion reduction may be revealed in more ecologically valid social settings.

Our second hypothesis centered on the role of mania symptoms in shaping emotion *perception* during the same in vivo negative social exchanges between romantic partners. In a context in which an intimate partner is signaling distress when sharing a time of personal suffering, it may be especially critical to accurately perceive and interpret a partner's emotional state. We found supportive evidence for our prediction that mania symptoms significantly shape emotion perception, but once again do so in divergent ways for positive and negative emotion perception. Specifically, mania symptoms were associated with increased perception of positive emotions and decreased perception of negative emotions in one's partner during the distressing conversation task. With respect to positive emotion perception, the results are consistent with the results of prior laboratory studies suggesting enhanced recognition of positive human smiles (Trevisani et al. 2008) as well as an overly positive bias towards perceiving positive emotions across positive and negative facial expressions in individuals with a clinical history of mania (Lembke and Ketter 2002). Data from the present study importantly extend these results to a more ecologically valid social setting, and one in which decreased perception of positive emotion (and increased negative emotion) may be more adaptive for accurate attunement to the distress and negative feelings of one's partner. By contrast, mania symptoms were associated with decreased perception of negative emotions in one's partner. More broadly, these findings are also consistent with existing literature suggesting that individuals tend to project their own internal emotion states onto those of others, including their spouses (e.g., Epley et al. 2004; Nickerson 1999; Wilhelm and Perrez 2004). Applied to mania symptoms, the experience of heightened positive emotion (and decreased negative emotion) might suggest a potentially "rose-colored" glasses portrait of the social world, where even negative social exchanges are viewed in a positively biased light.

In our third hypothesis, we addressed the question of how mania symptoms influence accuracy in perceptions of partners' negative and positive emotions. Specifically, we hypothesized that mania symptoms would predict poorer empathic accuracy, as indicated by a weaker truth force, and a directional bias, such that they would overestimate their partners' positive emotions and underestimate their partners' negative emotions, during the distressing conversation. We found partial support for this hypothesis for accuracy in perceptions of negative but not positive emotions. Specifically, for positive emotions, we found that mania symptoms of the perceiver did not moderate the truth force, bias force, or directional bias. These results suggest that, contrary to our hypotheses, mania symptoms did not influence empathic accuracy, assumed similarity, or over- or under-estimation of positive emotions in our sample. There are a couple of possible interpretations for these findings. First, when viewed in light of our results for negative emotion (where we found that increased mania symptoms predicted significantly less over-estimation of negative emotion in one's partner and less accuracy in terms of the truth force), this finding points toward a more specific mechanism by which the upper boundaries of positive emotion may become harmful to relationships; namely, that empathic inaccuracy emerges primarily in the perception of negative emotions, while empathic accuracy for positive emotions remains intact. Second, an alternative explanation for these results is that, because partners were engaged in a discussion about suffering, all participants were more focused and attuned to detecting their partners' negative than positive emotions. If this were the case, an overall bias toward perceiving negative, rather than positive emotions (as evidenced by a directional bias toward overestimation of negative emotions and underestimation of positive emotions overall) may have overwhelmed any ASRM-related effects on empathic accuracy for positive emotion. To test this possibility, it will be important for future studies to examine the role of mania symptoms in empathic accuracy in more positive social contexts.

When considering accuracy for negative emotion perceptions, the finding that increased mania symptoms were associated with significantly less over-estimation of

negative emotions in their partners is noteworthy. One counterintuitive interpretation of these findings might be that overestimating negative emotion in a distressed partner could engage motivational systems to detect and attend to the needs of another person in emotional pain (e.g., Goetz et al. 2010), and in doing so, could lead to secondary and more accurate perceptions of partners' negative emotions. Future work should explore the potential motivational and attentional systems required to make an accurate assessment of partners' negative emotions, that may be differentially engaged in those higher versus lower in mania symptoms.

Limitations and future directions

The present results should be interpreted within the confines of several important caveats. First, it is important to note that in our study, we operationalized heightened positive emotion experience using a measure of mania symptoms in a community sample, and not a clinically diagnosed sample of psychiatric patients, and so our results are intended to speak more of broad associations as opposed to features of psychiatric conditions, per se. Further research should also incorporate a clinically diagnosed sample of individuals with a history of mania (i.e., bipolar disorder), and directly evaluate the effects of clinically significant mania symptom profiles on social functioning. Second, it is likely that emotional communication in romantic relationships may differ from other types of relationships (e.g., work colleagues), and thus our findings may not directly translate to interpersonal interactions more generally. Third, while the topic of conversation was chosen to provide a rich context for examining positive emotion persistence in a contextually inappropriate setting (e.g., describing a time of suffering), the extent to which these results generalize to positive social interactions is less clear. Fourth, the study was not able to make direct causal claims between emotion experience and perception with relationship satisfaction and functioning, which is a critical area for future research. Finally, since the present study relied solely on self-report measures, it is imperative for future work to include additional and potentially more objective measures of emotionality, including peripheral physiology (e.g., vagal tone) associated with successful emotion regulatory ability in dyadic interactions (e.g., Butler et al. 2006).

Despite these limitations, these findings represent a first step toward understanding the role of context-inappropriate positive emotion in predicting emotionality during naturalistic social interactions. This study extends previous findings by examining the manifestation of these symptoms directly in a dyadic interaction, and by suggesting one mechanism by which mania symptoms may affect social communication; namely, inaccurate perceptions of partners' negative emotions. In sum, our findings suggest that extremes of positive emotion may lend a rose-colored bias to individuals' emotional experiences in contexts where negative emotions may be more adaptive. In turn, future research should investigate the consequences of biases toward positive emotionality for overall social functioning, particularly the ability to accurately perceive others' changing emotion states over time. More precisely, future studies should aim to elucidate the mechanisms underlying our finding by examining bottom-up attention processing biases during emotionally-evocative conversations to examine potential visual sources of altered emotion perception (i.e., attending away from a partner's distressed countenance) associated with mania symptoms. In addition, future research is clearly warranted to conceptually and empirically disentangle heightened and normative experiences of positive emotion from more clinical variations of mania. This work has the potential to shape future conceptualizations of the role of positive emotion in social relationships, creating a more nuanced understanding of the boundary conditions at which the relational benefits of positive emotions may unwind and deleterious consequences may begin to unfold.

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