

# Feeling More Together: Group Attention Intensifies Emotion

Garry Shteynberg  
University of Tennessee

Jacob B. Hirsh  
University of Toronto Mississauga and University of Toronto

Evan P. Apfelbaum  
Massachusetts Institute of Technology

Jeff T. Larsen  
University of Tennessee

Adam D. Galinsky  
Columbia University

Neal J. Roese  
Northwestern University

The idea that group contexts can intensify emotions is centuries old. Yet, evidence that speaks to how, or if, emotions become more intense in groups remains elusive. Here we examine the novel possibility that group attention—the experience of simultaneous coattention with one’s group members—increases emotional intensity relative to attending alone, coattending with strangers, or attending nonsimultaneously with one’s group members. In Study 1, scary advertisements felt scarier under group attention. In Study 2, group attention intensified feelings of sadness to negative images, and feelings of happiness to positive images. In Study 3, group attention during a video depicting homelessness led to greater sadness that prompted larger donations to charities benefiting the homeless. In Studies 4 and 5, group attention increased the amount of cognitive resources allocated toward sad and amusing videos (as indexed by the percentage of thoughts referencing video content), leading to more sadness and happiness, respectively. In all, these effects could not be explained by differences in physiological arousal, emotional contagion, or vicarious emotional experience. Greater fear, gloom, and glee can thus result from group attention to scary, sad, and happy events, respectively.

*Keywords:* group attention, shared attention, shared experience, social influence, emotional intensity

*Certainly there is something in the stimulations afforded by crowd members to one another which augments the responses of each in an extraordinary degree. This has been recognized for a long time; but attempts to explain the mechanism of such interstimulation have been very meager.*

—Floyd H. Allport, 1924, p. 296

This article was published Online First August 25, 2014.

Garry Shteynberg, Department of Psychology, University of Tennessee; Jacob B. Hirsh, Institute of Management and Innovation, University of Toronto Mississauga, and Rotman School of Management, University of Toronto; Evan P. Apfelbaum, Sloan School of Management, Massachusetts Institute of Technology; Jeff T. Larsen, Department of Psychology, University of Tennessee; Adam D. Galinsky, Columbia Business School, Columbia University; Neal J. Roese, Kellogg School of Management, Northwestern University.

Garry Shteynberg and Jacob B. Hirsh developed the theoretical framework. All authors contributed to the study design. Garry Shteynberg and Jacob B. Hirsh performed testing and data collection. Data analysis and interpretation were performed by Garry Shteynberg, Jacob B. Hirsh, and Jeff T. Larsen. Garry Shteynberg wrote the first draft of the paper. All authors provided critical revisions and approved the final version of the paper for submission.

Correspondence concerning this article should be addressed to Garry Shteynberg, Department of Psychology, University of Tennessee, 303F Austin Peay Building, Knoxville, TN 37996-1330. E-mail: [gshteynb@utk.edu](mailto:gshteynb@utk.edu)

The idea that people experience greater emotional intensity when in groups has been a focus of scientific inquiry for well over a century. Some of the most central thinkers in the social sciences have argued that individuals in groups are subject to an “exaggeration of sentiments” (Le Bon, 1897), citing such forces as collective effervescence (Durkheim, 1912/1995), emotional contagion (Freud, 1922; McDougall, 1920), and vicarious emotional experience (Allport, 1924). However, although there is ample evidence that people mimic others’ emotions (Hatfield, Cacioppo, & Rapson, 1993), there is a dearth of evidence showing emotional intensification within groups. Despite anecdotal accounts, we do not know whether such emotional intensification occurs, or how it occurs. Understanding emotional intensification within groups is particularly important given that technological advances have made social gatherings more spontaneous and frequent, even if more transitory. Indeed, the company of others is now nearly omnipresent in modern life. Because emotions may be among the most proximal triggers of action (Frijda, 1986), delineating the psychological drivers of emotional intensification within groups is of critical importance.

We test a novel source of emotional intensification within group settings and examine its implications for subsequent action. We propose that group attention—the experience of simultaneous coattention with one’s group members—increases the intensity of valenced events and, hence, the likelihood of emotion-based action. We further argue that the experience of coattention with one’s

social group is a distinct and previously unrecognized source of emotional intensification, independent from social facilitation effects that produce heightened physiological arousal in the presence of others (Zajonc & Sales, 1966), emotional contagion effects that result from observing others' emotions (Hatfield et al., 1993), and vicarious emotional experiences that result from imagining others' emotions (Niedenthal & Brauer, 2012). Whereas most research on group-based emotion has focused on the affective cues that other group members provide, we highlight the affective consequences of merely attending to the same evocative stimuli at the same time as other group members.

### Group Attention and Emotional Intensification

Coattention with others is a key feature of many social situations and has been argued to be the core component of shared experiences (Shteynberg, 2010; Shteynberg, *in press*). The sense that "we are attending" to the joyous or dreadful events that unfold in front of us is often integral to being in a group (Allport, 1924; Searle, 1995; Tomasello, 1999). However, is mere group attention enough to intensify emotional reactions to an event? That is, does attending to evocative events with fellow group members make sad events more saddening and enjoyable events more enjoyable?

Recent scholarship on group attention opens the door to this possibility. Evolutionary theorists have argued that because social coordination is critical for survival, human cognition has adapted to funnel attentional resources toward targets of cooperative activity (Boyd & Richerson, 2009). Objects and events that are jointly experienced by a group are more likely to serve as future nodes of social interaction and should thus receive a greater allocation of cognitive resources (Sperber & Wilson, 1986). On the other hand, because future cooperation with nongroup members is unlikely, objects and events jointly attended to with strangers should have less relevance. Empirical work supports this notion, as objects and events that are simultaneously attended with one's social group are subject to more elaborative processing (Shteynberg, Hirsh, Galinsky, & Knight, 2014) are better remembered (Eskenazi, Doerrfeld, Logan, Knoblich, & Sebanz, 2013; He, Lever, & Humphreys, 2011; Shteynberg, 2010) and are more readily internalized through social learning (Shteynberg & Apfelbaum, 2013). In contrast, none of these effects are observed when jointly experiencing an event with nongroup members. Moreover, heightened allocation of cognitive resources only emerges during simultaneous viewing of an object, but not during asynchronous viewing of an object (Shteynberg & Apfelbaum, 2013). Similar effects of joint attention are observed among infants (Baron-Cohen, 1995; Bruner, 1983; Tomasello, 1999), where even 4-month-olds display greater neural processing for objects that are coattended with a caregiver (Reid, Striano, Kaufman, & Johnson, 2004).

If group attention influences the allocation of cognitive resources toward information that is jointly attended by one's group members, what might happen when such resources are directed toward affectively charged objects and events? Generally, allocating greater cognitive resources to a stimulus is synonymous with greater cognitive processing of that stimulus (Baddeley, 1992; Hayes-Roth & Hayes-Roth, 1979), which may include both deeper and broader encoding of that stimulus in relation to existing knowledge structures ( Craik & Tulving, 1975). Given that more

cognitive processing of negative events increases negative feelings and focusing on positive events increases positive feelings (Beck, 1976; Joormann & Siemer, 2004; Tesser, Martin & Mendolia, 1995), we expect that group attention will intensify emotional reactions to evocative stimuli: positive stimuli will feel more positive and negative stimuli will feel more negative. Further, this heightened emotional intensity as a result of group attention is expected to increase the likelihood of emotion-based action (Frijda, 1986).

We test these hypotheses in a set of five experiments examining group attention's effect on the intensity of emotional reactions to valenced stimuli. We show the unique effects of simultaneous coattention with one's group members by comparing its effects on emotional intensity relative to attending alone, coattending with strangers, or attending nonsimultaneously with one's group members. In addition, in Studies 3, 4, and 5, we examine whether group attention effects on emotional intensity increase the likelihood of emotion-based action (i.e., charity donations, online information sharing).

We also work to distinguish the proposed effects of group attention from alternative explanations centered on physiological arousal, emotional contagion, and vicarious emotional experience. Critically, in Studies 4 and 5, we test whether group attention leads to greater allocation of cognitive resources, thereby intensifying emotions and subsequent emotion-based actions. Finally, examining the robustness of the group attention effect, we test the impact of group attention on emotional intensity while controlling for other factors that are known to impact affective responses, such as baseline arousal, mood (Forgas, 1995), and gender (Brody & Hall, 2000).

### Experiment 1: Greater Fear Under Group Attention

In Experiment 1, we presented participants with a single stimulus: an advertisement that depicted sharp, shark-like teeth. We expected that the advertisement would be perceived as particularly scary under conditions of group attention—when participants coattended with their social group (i.e., similar others).

### Method and Design

Participants ( $N = 141$ ; 52.6% female;  $M_{\text{age}} = 32.24$ ,  $SD = 11.31$ )<sup>1</sup> were recruited from Amazon Mechanical Turk (Buhrmester, Kwang, & Gosling, 2011) to take part in an online focus group where they would be asked for their opinions on an advertisement. Participants were randomly assigned to one of four experimental conditions: (a) coattending with similar others (group attention); (b) coattending with different others; (c) coattention is absent, but similar others are present; (d) no others are present. These conditions allowed us to examine whether group attention is critical to emotional intensification, or whether the mere presence of one's social group or coattention with strangers can intensify emotion. Participants were paid \$0.51 for their participation.

<sup>1</sup> Six people were excluded from study analyses because they reported prior participation in the experimental paradigm.

To measure baseline mood and arousal, participants reported how happy versus unhappy and how excited versus calm they felt on a 5-point scale (Lang, Bradley, & Cuthbert, 1999). Participants were then asked to select one of five colored avatars (red, blue, yellow, green, orange) to represent themselves in the online focus group. On subsequent screens, depending on their experimental condition, participants saw that (a) two other participants chose the same avatars and would attend to the same advertisement (group attention), (b) two other participants chose different avatars and would attend to the same advertisement (coattention with different others), (c) two other participants chose the same avatars but would attend to a different advertisement (coattention absent, similar others are present), or (d) no other participants were present (alone). The paradigm was programmed to include several features that enhance experimental realism such as intermittent delays and instructions to “wait for the others.”

After the condition manipulation, participants were asked to look at a single advertisement featuring an animal with a large jaw and sharp yellow teeth. Afterward participants were asked, “To what extent do you think the teeth in the advertisement look scary?” (1 = *not at all*, 11 = *very much so*). At the end of the study, participants were asked for their gender and age.

## Results and Discussion

We hypothesized that group attention, or perceived coattention with similar others, would intensify emotional responses to the advertisement. In a test of this hypothesis, a planned contrast found that participants in the group attention condition ( $M = 4.50$ ,  $SD = 3.26$ ) perceived the teeth to be scarier compared to the control conditions ( $M = 3.35$ ,  $SD = 2.53$ ),  $F(1, 131) = 4.21$ ,  $p = .042$ .<sup>2</sup> This difference between conditions was also significant when controlling for arousal, mood, and gender,  $F(1, 128) = 4.11$ ,  $p = .045$ ,  $d = 0.44$ . There were no significant differences among the three control conditions (all  $ps > .19$ ; coattention with different others:  $M = 3.26$ ,  $SD = 2.68$ ; coattention absent, similar others are present:  $M = 3.74$ ,  $SD = 2.52$ ; alone:  $M = 2.97$ ,  $SD = 2.39$ ). Two-way  $p$  values, Cohen’s  $d$  effect sizes, and 95% confidence intervals (CIs) for pairwise comparisons between group attention and each comparison condition (with and without controls) can be seen in Table 1.

We also examined whether the two conditions in which others were present but group attention was absent (coattention with different others; coattention absent, similar others are present) would lead to greater emotional intensification as compared to the alone condition. A planned contrast indicated that there was no difference between these conditions,  $F(1, 131) = 0.88$ ,  $p = .35$ . The results remained nonsignificant when controlling for arousal, mood, and gender,  $F(1, 128) = 0.67$ ,  $p = .42$ .

Experiment 1 suggests that group attention, even when minimally evoked by the appearance of others having chosen similar avatars (Tajfel, Billig, Bundy, & Flament, 1971), intensifies emotional responses to a jointly attended object. Furthermore, given that the effect was not observed when different others were coattending, or when similar others were present but were attending to another advertisement, the results cannot be easily explained by mere social presence and the accompanying physical arousal (e.g., Zajonc & Sales, 1966).

## Experiment 2: Greater Sadness and Happiness Under Group Attention

Whereas Experiment 1 demonstrated that group attention amplifies emotional reactions to aversive stimuli, Experiment 2 was designed to examine whether this effect would generalize across a broader variety of evocative images. We expected that participants who viewed images with their university classmates would feel unhappier when viewing negative images, and happier when viewing positive images as compared to participants who viewed the same images alone. Moreover, we expected that priming participants with their university identity would amplify the group attention effect, as it would remind participants that they are coattending with their social group. On the other hand, we expected that group attention on neutral images would not intensify emotions given that neutral images lack an emotional valence to elaborate upon.

## Method and Design

Participants ( $N = 121$ ; 55.4% female;  $M_{\text{age}} = 19.34$ ,  $SD = 2.24$ )<sup>3</sup> were recruited from a university subject pool to take part in a study wherein they would be asked for their opinions on a variety of topics. In the study, participants were asked to look at and rate 30 images with another participant or alone. Half of the participants were also reminded of their university identity beforehand. This constituted a mixed design with 2 (group attention: Yes vs. No)  $\times$  2 (social identity: Prime Present vs. Absent) as between-subjects factors and image valence as a within-subject factor (12 negative, 12 positive, 6 neutral images).

After informed consent, participants were seated approximately 6 ft away from a 65-in. TV. Participants privately rated their momentary positive activation (PA) and negative activation (NA) using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) to measure baseline mood and arousal before being exposed to images. To index mood, we averaged PA items and reverse coded NA items ( $\alpha = .88$ ; Leue & Beauducel, 2011). The correlation between the summed positive and negative ratings and arousal ratings can be as high as  $r = .90$  (Larsen, Norris, McGraw, Hawkey, & Cacioppo, 2009), so we indexed arousal by averaging all PANAS items ( $\alpha = .82$ ).

Depending on the condition, participants either completed the study with another person (group attention) or alone (no group attention). Participants in the group attention condition were separated by 6-ft.  $\times$  6-ft. dividers so they could not see one another. Moreover, participants were asked to remain completely quiet when viewing and rating the images. A research assistant was located outside of the room to monitor for any communicative cues, with no instances reported. We took these precautions to eliminate the possibility of any data dependencies within a given experimental session.

After being seated, participants were given a pen as a small token of appreciation for their participation. The pen also served as

<sup>2</sup> We conducted this planned contrast based on the empirically confirmed assumption that the means of the control conditions did not differ from one another (Abelson, 1995). Hence, the mean of the control conditions served as a more reliable indicator of emotional intensity in the absence of group attention.

<sup>3</sup> No participants were excluded from the study.

Table 1  
Two-Way *p* Values, Cohen's *d*, and 95% CIs for Pairwise Comparisons Between Group Attention and All Conditions With and Without Controls

Study	<i>n</i>	Dependent variable	GA vs. different others coattending	GA vs. similar others present [95% CI]	GA vs. alone [95% CI]
Study 1	<i>n</i> = 135	Perceived scariness	With controls <i>p</i> = .05; <i>d</i> = 0.53; [-2.73, -0.03]	Post <i>p</i> = .35; <i>d</i> = 0.24; [-1.93, .67]	<i>p</i> = .04; <i>d</i> = 0.56; [-2.81, -0.10]
		Without controls	<i>p</i> = .07; <i>d</i> = 0.47; [-2.60, 0.11]	Pre <i>p</i> = .26; <i>d</i> = 0.29; [-2.08, 0.57]	<i>p</i> = .03; <i>d</i> = 0.58; [-2.90, -0.16]
Study 2	<i>n</i> = 121	Unhappiness and happiness	—	—	Neg <i>p</i> = .09; <i>d</i> = 0.32; [.04, -0.51]
		Without controls	—	—	Pos <i>p</i> = .08; <i>d</i> = 0.32; [-0.03, 0.53]
Study 3	<i>n</i> = 179	Felt sadness	—	Post <i>p</i> = .07; <i>d</i> = 0.39; [-1.08, 0.04]	Neg <i>p</i> = .15; <i>d</i> = 0.27; [-0.55, 0.08]
		Without controls	—	Pre <i>p</i> = .001; <i>d</i> = 0.70; [-1.49, -0.36]	Pos <i>p</i> = .10; <i>d</i> = 0.37; [-1.08, 0.09]
Study 4	<i>n</i> = 190	% Sadness thoughts	—	Post <i>p</i> = .13; <i>d</i> = 0.32; [-1.01, 0.13]	<i>p</i> = .36; <i>d</i> = 0.20; [-.87, 0.32]
		Without controls	—	Pre <i>p</i> = .003; <i>d</i> = 0.63; [-1.45, -0.30]	<i>p</i> = .09; <i>d</i> = 0.37; [-13.53, 0.09]
Study 5	<i>n</i> = 198	% Poverty thoughts	—	Post <i>p</i> = .06; <i>d</i> = 0.41; [-14.27, 0.27]	<i>p</i> = .17; <i>d</i> = 0.28; [-12.13, 2.17]
		Without controls	—	Pre <i>p</i> = .06; <i>d</i> = 0.40; [-14.02, 0.34]	<i>p</i> = .09; <i>d</i> = 0.36; [-3.14, 0.25]
Study 5	<i>n</i> = 198	% Cute puppy thoughts	—	Post <i>p</i> = .09; <i>d</i> = 0.36; [-13.46, 0.92]	<i>p</i> = .05; <i>d</i> = 0.42; [-9.56, -0.08]
		Without controls	—	Pre <i>p</i> = .10; <i>d</i> = 0.35; [-12.13, 2.17]	<i>p</i> = .05; <i>d</i> = 0.40; [-9.21, 0.06]
Study 5	<i>n</i> = 198	% Cute puppy thoughts	—	Post <i>p</i> = .07; <i>d</i> = 0.40; [-3.31, 0.11]	<i>p</i> = .05; <i>d</i> = 0.40; [-9.21, 0.06]
		Without controls	—	Pre <i>p</i> = .33; <i>d</i> = 0.21; [-2.52, 0.86]	<i>p</i> = .05; <i>d</i> = 0.40; [-9.21, 0.06]
Study 5	<i>n</i> = 198	% Cute puppy thoughts	—	Post <i>p</i> = .06; <i>d</i> = 0.40; [-3.26, 0.04]	<i>p</i> = .05; <i>d</i> = 0.40; [-9.21, 0.06]
		Without controls	—	Pre <i>p</i> = .29; <i>d</i> = 0.22; [-2.52, 0.77]	<i>p</i> = .05; <i>d</i> = 0.40; [-9.21, 0.06]
Study 5	<i>n</i> = 198	% Cute puppy thoughts	—	Post <i>p</i> = .06; <i>d</i> = 0.38; [-9.02, 0.25]	<i>p</i> = .05; <i>d</i> = 0.40; [-9.21, 0.06]
		Without controls	—	Pre <i>p</i> = .07; <i>d</i> = 0.38; [-8.95, 0.32]	<i>p</i> = .05; <i>d</i> = 0.40; [-9.21, 0.06]
Study 5	<i>n</i> = 198	% Cute puppy thoughts	—	Post <i>p</i> = .08; <i>d</i> = 0.35; [-8.58, 0.54]	<i>p</i> = .05; <i>d</i> = 0.40; [-9.21, 0.06]
		Without controls	—	Pre <i>p</i> = .10; <i>d</i> = 0.33; [-8.34, 0.78]	<i>p</i> = .05; <i>d</i> = 0.40; [-9.21, 0.06]

Note. GA = group attention; Post = postattention; Pre = preattention; Neg = negative images; Pos = positive images.

an experimental prime to remind participants of their university identity, as half of the pens were branded with the university name (social identity prime), while half had no branding (no prime).

During the study, participants viewed a series of 30 images displayed on the TV. Participants rated how unhappy versus happy they felt while viewing each image on an 11-point Likert scale ( $-5 = \text{unhappy}$ ,  $5 = \text{happy}$ ), using a laptop computer positioned directly in front of them. The 30 pictures consisted of 12 positive, 12 negative, and 6 neutral images from the International Affective Picture System (Lang, Bradley, & Cuthbert, 1999). Participants had 5 s to prepare for each image, 6 s to view the image, and 10 s to record their rating. All participants saw the positive, negative, and neutral images in the same random order.

At the end of the study participants were asked for their gender and age. Additionally, toward the end of the study, participants were asked to what extent they focused on rating the pictures ( $1 = \text{not at all}$ ,  $9 = \text{very much so}$ ).<sup>4</sup>

## Results and Discussion

We hypothesized that participants coattending to the images with their classmates would report feeling unhappier when viewing negative images and happier when viewing positive images, as compared to participants viewing the screen alone. Moreover, we expected that the university identity prime would strengthen this effect because participants would be reminded that they are coattending to the pictures with their social group.

Because image valence was a within-subject variable, we conducted a repeated-measures ANOVA, where the mean ratings of the negative and positive images served as the repeated factor as part of a 2 (Group Attention vs. No Group Attention)  $\times$  2 (High vs. Low Social Identity) design. The image valence by group attention interaction was marginally significant without controls,  $F(1, 117) = 2.79$ ,  $p = .098$ , with participants in the group attention condition tending to be unhappier when viewing negative images ( $M = -1.54$ ,  $SD = 0.83$  vs.  $M = -1.31$ ,  $SD = 0.89$ ) and happier when viewing positive images ( $M = 3.31$ ,  $SD = 0.82$  vs.  $M = 3.08$ ,  $SD = 0.89$ ) as compared to participants in the alone context. When controlling for gender and baseline arousal and mood, the predicted interaction between image valence and the group attention was observed,  $F(1, 114) = 4.18$ ,  $p = .04$ ,<sup>5</sup> where compared to the participants in the alone condition, participants in the group attention condition tended to be unhappier ( $M = -1.54$ ,  $SD = 0.75$  vs.  $M = -1.31$ ,  $SD = 0.74$ ) when viewing negative images,  $F(1, 116) = 2.98$ ,  $p = .09$ ,  $d = 0.32$ , 95% CI [0.04, -0.51], and happier ( $M = 3.32$ ,  $SD = 0.76$  vs.  $M = 3.07$ ,  $SD = 0.76$ ) when viewing positive images,  $F(1, 116) = 3.13$ ,  $p = .08$ ,  $d = 0.32$ , 95% CI [-0.03, 0.53]. Two-way  $p$  values, Cohen's  $d$  effect sizes, and 95% CIs for pairwise comparisons between group attention and each control condition can be seen in Table 1. Contrary to predictions, the three-way interaction between image valence, condition, and university identity prime was nonsignificant,  $p = .94$ , which suggests that the social identity prime did not amplify group attention's effect on emotional intensification.

To examine the influence of group attention on affective responses to neutral images, we conducted an ANOVA with condition (group attention vs. alone) and university identity prime (present vs. absent) as between-subjects factors, with mood, arousal, and gender as controls. As expected, emotional reactions

to neutral images did not differ in the group attention ( $M = 1.49$ ,  $SD = 0.79$ ) and alone conditions ( $M = 1.58$ ,  $SD = 0.65$ ),  $F(1, 114) = 0.23$ ,  $p = .63$ ,<sup>6</sup> nor did the controls have any effect.

Experiment 2 suggests that group attention intensifies emotional responses in the direction of an attended object's valence. Group attention intensified negative emotions in response to negative images and intensified positive emotions in response to positive images. Moreover, group attention did not intensify emotions in response to neutral images, suggesting that a clear initial emotional valence is necessary to generate this effect. Our prediction that the social identity prime would amplify the group attention effect was not supported by the data, however. We suspect that this is because students were well aware that they were coattending with their classmates at baseline. However, lacking a manipulation check, no definitive conclusions can be drawn about this factor.

Experiments 1 and 2 demonstrate that emotional intensification in group contexts occurs even when it is not possible to observe other group members' emotional reactions. Furthermore, in neither of the experiments were participants informed about others' feelings toward the valenced objects, thus making emotional contagion based on actual observations of others impossible. However, as we discuss in Experiment 3, participants may have been influenced by what they imagined were the reactions of others.

## Experiment 3: Greater Sadness and Charitable Donations Under Group Attention

One conceivable alternative explanation for the results of Experiments 1 and 2 is vicarious emotional experience (Niedenthal & Brauer, 2012). It is possible that when a participant knows that their social group is attending to a given object, they can imagine how other group members *might* respond (Allport, 1924), thereby resulting in a vicarious emotional experience. That is, the intensification of emotional experiences in the first two studies may have resulted from participants adopting the emotional states that they imagined their group members were experiencing. We designed Experiment 3 to dissociate this vicarious emotion explanation from that of group attention, and to examine whether the observed emotion intensification effects also trigger action.

Critically, whether a person experiences a valenced event simultaneously with their group members, before their group members, or after their group members should have little bearing on the imagined emotional responses of others, or the personal adoption of such responses. In contrast, simultaneous coattention has been identified as a critical factor in group attention effects (Shteynberg & Apfelbaum, 2013). The heightened allocation of cognitive re-

<sup>4</sup> There was no difference across conditions in reported focus,  $F(1, 119) = 0.20$ ,  $p = .66$ , suggesting that participants in the group attention condition were not aware of greater resource allocation.

<sup>5</sup> Participants in a better baseline mood reported being happier when viewing positive images,  $F(1, 114) = 6.85$ ,  $p = .01$ . Women also reported being unhappier when viewing negative images and happier when viewing positive images, as compared to men,  $F(1, 114) = 44.77$ ,  $p < .0001$ .

<sup>6</sup> Replicating previous results (Shteynberg et al., 2014), mood had more influence on emotional reactions when viewing neutral images for participants in the group (vs. alone) context,  $F(1, 111) = 6.23$ ,  $p = .01$ , such that positive mood lead to greater happiness and negative mood lead to greater unhappiness when viewing neutral images.

sources toward objects of group attention only emerges during simultaneous viewing of an object, but not during asynchronous viewing of the object (Shteynberg & Apfelbaum, 2013). These findings indicate that the sense that “we are attending” to an object is compromised when one’s social group is currently directing their attention elsewhere. We propose that simultaneity of coattention will play a critical role in the intensification of affective experience if group attention is indeed the central mechanism. However, if vicarious emotional experience is driving the observed results, then asynchronous attention with one’s social group should also intensify emotions. Experiment 3 directly tested these diverging theoretical accounts by altering the simultaneity of attention.

The second goal of Experiment 3 is to examine whether group attention can also influence behavioral responses to emotional stimuli. Highly emotional events are powerful instigators of behavior (Frijda, 1986), and group emotions are known to play a strong role in collective mobilization (Barsade & Gibson, 2012; Niedenthal & Brauer, 2012). We thus examined whether the emotional intensification that results from group attention is sufficiently powerful to instigate action in response to the emotional experience.

## Method and Design

Participants ( $N = 181$ ; 52% female;  $M_{\text{age}} = 32.32$ ,  $SD = 11.19$ )<sup>7</sup> were recruited from Amazon Mechanical Turk and watched a single 60 second video depicting homelessness in one of four experimental conditions: (a) similar other simultaneously coattends with the participant (group attention), (b) similar other attends 1 min before the participant attends (postattention), (c) similar other attends one minute after the participant attends (preattention), (d) participant attends alone (alone). Participants were paid \$0.51 for their participation.

After informed consent, we asked participants to rate how happy versus unhappy, and how excited versus calm they felt, as in Experiment 1. Participants then selected one of two owls, koalas, or elephants to represent themselves in an online focus group. With the exception of participants in the alone condition, participants saw that the other participants chose an avatar from the same animal species. Participants were then asked to watch a 1-min video depicting homelessness in one of the four conditions described. We asked participants to confirm their understanding that they would be watching the video with, after, or before another participant, or alone.

After the video, participants indicated how much they agreed with the statement “The video made me feel sad” (1 = *strongly disagree*, 7 = *strongly agree*). They were also asked to indicate what percentage of their payment for participating (0–100%) they would donate to a charity aimed at helping homeless Americans. All participants were paid the full \$0.51 promised for participating. At the end of the study, participants were asked for their gender and age.

## Results and Discussion

We hypothesized that group attention, or simultaneous coattention with similar others, would uniquely intensify the emotional impact of the video about homelessness and, consequently, increase the amount of money donated. If emotional intensification

results from vicarious emotional experience, then attending to the video immediately after or before a similar other should also intensify emotion and encourage donation.

**Group attention hypothesis.** In a test of the group attention hypothesis on sadness, a planned contrast found that felt sadness was higher in the group attention condition ( $M = 5.88$ ,  $SD = 0.98$ ) compared to the control conditions ( $M = 5.34$ ,  $SD = 1.54$ ),  $F(1, 175) = 4.99$ ,  $p = .027$ . The results remained significant when controlling for arousal, mood, and gender,  $F(1, 166) = 7.84$ ,  $p = .006$ ,  $d = 0.48$ <sup>8</sup> (see Figure 1). There were no significant differences in felt sadness among the other three conditions (all  $ps > .16$ ; postattention:  $M = 5.43$ ,  $SD = 1.46$ ; preattention:  $M = 5.00$ ,  $SD = 1.69$ ; alone:  $M = 5.60$ ,  $SD = 1.43$ ). Two-way  $p$  values, Cohen’s  $d$  effect sizes, and 95% confidence intervals for pairwise comparisons between group attention and each control condition can be seen in Table 1.

In a test of the group attention hypothesis on donations, a planned contrast found that there was a trend suggesting that donation percentage was higher in the group attention condition ( $M = 39.14\%$ ,  $SD = 40.58\%$ ) compared to the other three conditions ( $M = 29.13\%$ ,  $SD = 37.82\%$ ),  $F(1, 175) = 2.41$ ,  $p = .12$ . The difference between conditions became marginally significant when controlling for arousal, mood, and gender,  $F(1, 166) = 3.23$ ,  $p = .074$ ,  $d = 0.31$ <sup>9</sup> (see Figure 1). There were no significant differences in donations among the other three conditions (all  $ps > .28$ ; postattention:  $M = 33.15\%$ ,  $SD = 38.75\%$ ; preattention:  $M = 27.58\%$ ,  $SD = 37.19\%$ ; alone:  $M = 26.28\%$ ,  $SD = 37.99\%$ ). Across all conditions, participants donated 31.82% of their \$0.51 payment, or \$0.16.

Finally, we examined whether felt sadness mediated the effect of the group attention condition (vs. the control conditions) on donation amount. We used a bootstrapped mediation analysis to test whether group attention predicted greater feelings of sadness, which, in turn, predicted larger donations (Hayes, 2013). Using 1,000 bootstrap samples and bias-corrected 95% CIs, we found a significant indirect effect of group attention (coded 1 = yes, –1 = no) on donations through felt sadness, effect = 2.04,  $BootSE = 0.84$ ,  $BootLLCI = 0.70$ ,  $BootULCI = 4.03$ . The results remained significant while controlling for gender and baseline mood and arousal, effect = 2.46,  $BootSE = 0.94$ ,  $BootLLCI = 1.01$ ,  $BootULCI = 4.79$ . Specifically, group attention (vs. controls) significantly increased felt sadness ( $b = 0.33$ ,  $SE = 0.12$ ,  $t = 2.83$ ,  $p = .005$ ) and felt sadness increased the size of the donation ( $b = 7.56$ ,  $SE = 1.97$ ,  $t = 3.83$ ,  $p = .001$ ). Finally, the total effect model for donation amount was significant,  $R = .30$ ,  $F(2, 176) = 8.60$ ,  $p = .0003$ .

**Vicarious emotion hypothesis.** The vicarious emotion hypothesis uniquely predicted that the post- and preattention contexts would lead to greater emotional intensification and donation as compared to the alone condition. However, neither sadness,  $F(1, 175) = 2.06$ ,  $p = .15$ , nor donations,  $F(1, 175) = 0.31$ ,  $p = .58$ , were higher in the post- and preattention conditions than in the alone condition. The results remained nonsignificant when con-

<sup>7</sup> Two people were excluded from study analyses because they reported prior participation in the experimental paradigm.

<sup>8</sup> Feeling more aroused,  $F(1, 166) = 2.38$ ,  $p = .054$ , and being female,  $F(1, 166) = 6.92$ ,  $p = .009$ , increased feelings of sadness.

<sup>9</sup> Females donated more than males,  $F(1, 166) = 5.61$ ,  $p = .019$ .

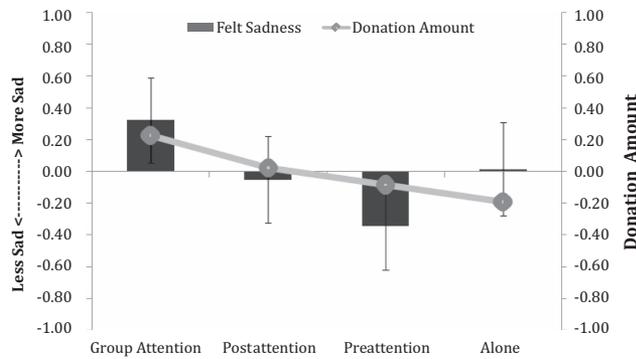


Figure 1. Felt sadness and donation amount across conditions in Study 3. Dependent variables are standardized for purposes of comparison. Error bars represent 95% confidence intervals.

trolling for arousal, mood, and gender (sadness:  $F(1, 166) = 0.74$ ,  $p = .39$ ; donations:  $F(1, 166) = 0.71$ ,  $p = .40$ ).

Experiment 3 provides further evidence that group attention intensifies affective responses. Moreover, we found that greater sadness increased subsequent charitable donations. Given that the emotional intensification effect was absent when similar others attended to the video 1 min before or after the participant, the simultaneity of coattention appears to be a critical factor. It could be argued that group attention simply produced greater levels of vicarious emotion than nonsimultaneous attention. However, under this account, we should still expect a difference in emotional intensification between the nonsimultaneous attention conditions (where vicarious emotion is possible) and the alone condition (where vicarious emotion is not possible). As shown in Figure 1, there was no difference in emotional intensity across these conditions. In all, mere social presence, emotional contagion, and vicarious emotion accounts have difficulty accounting for our results.

#### Experiment 4: Allocation of Cognitive Resources to Negative Stimuli and Increased Sadness Under Group Attention

We have proposed that emotional intensification under group attention is due to a greater allocation of cognitive resources toward the information presented. In Experiment 4, we directly test this account of emotional intensification under group attention. We measure the allocation of cognitive resources toward the stimuli by asking participants to report their thoughts that occurred during the experiment. We assume that the more participants' thoughts refer to the content of the information presented, the more cognitive resources they allocated to processing the information (Cacioppo, von Hippel, & Ernst, 1997; Cadinu, Maass, Rosabianca, & Kiesner, 2005). Moreover, we expect and test whether greater allocation of cognitive resources to the valenced aspects of attended information under group attention will lead to emotional intensification and, consequently, emotion-based action.

#### Method and Design

Replicating the design of Experiment 3, participants ( $N = 190$ ; 53% female;  $M_{\text{age}} = 33.90$ ,  $SD = 11.65$ )<sup>10</sup> were recruited from

Amazon Mechanical Turk and watched a single 35-s video depicting homelessness in one of four experimental conditions: (a) similar other simultaneously coattends with the participant (group attention), (b) similar other attends 1 min before the participant attends (postattention), (c) similar other attends 1 min after the participant attends (preattention), (4) participant attends alone (alone). Participants were paid \$0.51 for their participation.

In all, Experiment 4 was nearly an exact replication of Experiment 3, with one notable difference. Immediately after watching the video, participants in Experiment 4 completed a thought-listing task (Cacioppo & Petty, 1981) in which they were asked to list up to 12 thoughts that they had when watching the video. Participants were told that they could list any and all thoughts that occurred to them, as long as they occurred during the video. Participants had up to 2 min to complete the thought-listing task.

Participants were asked to report their age and gender, as well as, to what extent they were consumed by the experience of watching the video (1 = no, not at all; 7 = yes, definitely).<sup>11</sup> The remainder of the procedure was identical to that of Experiment 3.

#### Results and Discussion

Because the sadness and poverty of the homeless are the primary themes depicted by the video, thoughts that reflect sadness and poverty served as indicators of cognitive engagement with the video content. In order to measure the extent to which participants' thoughts reflected the content of the video, we used LIWC2007 (Pennebaker, Booth, & Francis, 2007) to index the percentage of participants' writing that expressed the sadness and poverty depicted in the video. The LIWC program indexes the sad category by measuring the frequency of words such as despair, sadness, lonely, helplessness, and hopelessness. Although the LIWC program does not have a homeless category, words such as poverty, poor, beggar, begging, and charity are captured by its money category. In all, the average percentage of sad words and money words across all of the participants' writing served as indicators of sadness-related thoughts and poverty-related thoughts.

We hypothesized that group attention would uniquely increase the amount of cognitive resources allocated toward the video as indexed by participants' thought content. Moreover, we hypothesized that as more cognitive resources are focused on the despair and poverty of the homeless people depicted by the video (i.e., the emotional tone of the video), felt sadness and, consequently, donations to homeless charities would increase.

On average, participants listed 7.97 thoughts ( $SD = 2.96$ ) and wrote 4.39 words per thought ( $SD = 3.08$ ). The effect of group attention condition (vs. control conditions) on number of thoughts,  $F(1, 186) = 0.32$ ,  $p = .81$ , and words per thought,  $F(1, 186) = 0.94$ ,  $p = .42$ , was nonsignificant.

**Sadness thoughts.** In a test of the group attention effect on the frequency of sadness-related thoughts, a planned contrast found that the percent of sadness-related thoughts was higher in the

<sup>10</sup> Based on the Cohen's  $d$  of 0.48 observed in Experiment 3, a priori power analysis using G\*power 3.1 suggested a sample size of 190 participants to achieve the power of .80. No participants were excluded from the study.

<sup>11</sup> There was no difference across conditions in reported absorption,  $F(1, 186) = 1.15$ ,  $p = .33$ , suggesting that participants in the group attention condition were not aware of greater resource allocation.

group attention condition ( $M = 21.75\%$ ,  $SD = 18.18\%$ ) compared to the control conditions ( $M = 15.98\%$ ,  $SD = 17.37\%$ ),  $F(1, 186) = 3.78$ ,  $p = .05$ . The results remained significant when controlling for arousal, mood, and gender,  $F(1, 176) = 5.02$ ,  $p = .03$ ,  $d = 0.39$ .<sup>12</sup> There were no significant differences in the percent of sadness-related thoughts among the other three conditions (all  $ps > .88$ ; postattention:  $M = 15.48\%$ ,  $SD = 17.63\%$ ; preattention:  $M = 15.67\%$ ,  $SD = 17.51\%$ ; alone:  $M = 16.77\%$ ,  $SD = 17.33\%$ ). Two-way  $p$  values, Cohen's  $d$  effect sizes, and 95% CIs for pairwise comparisons between group attention and each control condition can be seen in Table 1.

**Poverty thoughts.** In a test of the group attention effect on the frequency of poverty-related thoughts, a planned contrast found that the percent of poverty-related thoughts was higher in the group attention condition ( $M = 2.87\%$ ,  $SD = 5.40\%$ ) compared to the control conditions ( $M = 1.61\%$ ,  $SD = 3.50\%$ ),  $F(1, 186) = 3.40$ ,  $p = .07$ . The results were similar when controlling for arousal, mood, and gender,  $F(1, 176) = 3.37$ ,  $p = .07$ ,  $d = 0.32$ .<sup>13</sup> There were no significant differences in the percent of poverty thoughts among the other three conditions (all  $ps > .37$ ; postattention:  $M = 1.26\%$ ,  $SD = 3.27\%$ ; preattention:  $M = 1.99\%$ ,  $SD = 3.82\%$ ; alone:  $M = 1.58\%$ ,  $SD = 3.40\%$ ). Two-way  $p$  values, Cohen's  $d$  effect sizes, and 95% CIs for pairwise comparisons between group attention and each control condition can be seen in Table 1.

Finally, we examined whether the frequency of sadness and poverty related thoughts mediated the effect of the group attention condition (vs. the control conditions) on felt sadness and the amount that participants donated. We used a bootstrapped mediation analysis to test whether group attention predicted a greater percentage of thoughts about sadness ( $m_1$ ), and poverty ( $m_2$ ), which, in turn, predicted higher felt sadness ( $m_3$ ) and, consequently, larger donations (Hayes, 2013). Using 1,000 bootstrap samples and bias-corrected 95% CIs, we found a significant indirect effect, with group attention leading to a greater percentage of sad thoughts when watching the video, which led to more felt sadness and, consequently, to higher donation amounts, effect = 0.27,  $BootSE = 0.21$ ,  $BootLLCI = 0.02$ ,  $BootULCI = 0.95$ . Results remained significant while controlling for baseline mood, arousal, and gender, effect = 0.23,  $BootSE = 0.17$ ,  $BootLLCI = 0.02$ ,  $BootULCI = 0.75$  (see Figure 2 for complete results). The total effect model for donation amount was significant,  $R = .27$ ,  $F(4, 184) = 3.63$ ,  $p = .007$ . The alternative mediation models tested did not reveal a significant indirect effect (Hayes, 2013; Model 6 mediation analysis tested six alternative indirect effects:  $X \rightarrow M_1 \rightarrow Y$ ,  $X \rightarrow M_2 \rightarrow Y$ ,  $X \rightarrow M_3 \rightarrow Y$ ,  $X \rightarrow M_1 \rightarrow M_2 \rightarrow Y$ ,  $X \rightarrow M_1 \rightarrow M_3 \rightarrow Y$ ,  $X \rightarrow M_2 \rightarrow M_3 \rightarrow Y$ ).

Experiment 4 provided evidence for the idea that group attention funnels cognitive resources toward its targets. In this case, participants in the group attention condition reported more thoughts of sadness and poverty when watching the video—two central themes that were embedded in the video. Furthermore, thought focus on sadness during the video, but not poverty, led to more felt sadness and, consequently, higher donations to homeless charities. One explanation for this disparity is that focusing cognitive resources on poverty may only lead to felt sadness for individuals who empathize with those in poverty; conversely, focusing on the sad state of the homeless may produce a more universal impact on participants' emotional states. In line with our hypothesis, when

group attention focused cognitive resources on the emotional tone of the video, greater emotional intensification occurred. Thoughts of sadness and poverty were not correlated with one another across conditions ( $r = -0.01$ ,  $p = .88$ ), or within conditions (all  $ps > .43$ ).

One potential limitation of the measure of sadness-related thoughts is that the sad category not only captures thoughts about the sad state of the homeless, as intended, but also the sad state of the self. To the extent that the latter is true, the percentage of sadness-related thoughts would simply be another measure of personally felt sadness. Given that the expression of personally felt sadness is more likely to include various forms of the personal pronoun *I* (e.g., "I was sad," "I felt sad," "This makes me sad," "I am sad"), we would expect that the expression of personally felt sadness would result in an increase of first person personal pronouns (i.e., LIWC's "I" category). However, we found that the use of first person personal pronouns was not any higher in the group attention condition as compared to the control conditions,  $F(1, 188) = 0.34$ ,  $p = .56$ . In fact, there was a negative correlation between the use of sadness words and the use of first person personal pronouns ( $r = -.53$ ,  $p = .001$ ). This suggests that the higher percentage of sadness thoughts in the group attention condition was not simply an indicator of greater personal sadness.

Notably, in Study 4, we did not hypothesize an effect of group attention on felt sadness because Study 4 contained a writing prompt that did not only measure thought content about the video, but also generated greater reflection. That is, the writing prompt led participants to engage in greater contemplation of the sad video, resulting in greater felt sadness. Critically, the writing prompt was more likely to increase contemplation in the control conditions than in the group attention condition, because participants in the group attention condition had already allocated significant cognitive resources to the video prior to the writing prompt. As such, due to the presence of the writing prompt in Study 4, participants in the control conditions were expected to experience more reflection, and hence feel more sadness, than participants in Study 3. A direct comparison of control participants' felt sadness between Study 4 and Study 3 suggests that this was the case,  $F(1, 272) = 7.45$ ,  $p = .01$ , with control participants feeling more sad in Study 4 ( $M = 5.80$ ,  $SD = 1.30$ ) than in Study 3 ( $M = 5.34$ ,  $SD = 1.54$ ). Moreover, a direct comparison of group attention participants' felt sadness between Study 4 ( $M = 5.79$ ,  $SD = 1.23$ ) and Study 3 ( $M = 5.88$ ,  $SD = 0.98$ ) suggests that the writing prompt did not increase felt sadness for group attention participants,  $F(1, 93) = 0.15$ ,  $p = .70$ . The combination of control participants increasing their sadness, and group attention participants remaining unaffected in the presence of a writing prompt, predicts the absence of a group attention effect on felt sadness in Study 4. This was the case,  $F(1, 188) = 0.01$ ,  $p = .94$ .

<sup>12</sup> Arousal, mood, and gender controls did not have a significant influence on the frequency of sadness-related thoughts.

<sup>13</sup> Arousal, mood, and gender controls did not have a significant influence on the frequency of poverty-related thoughts.

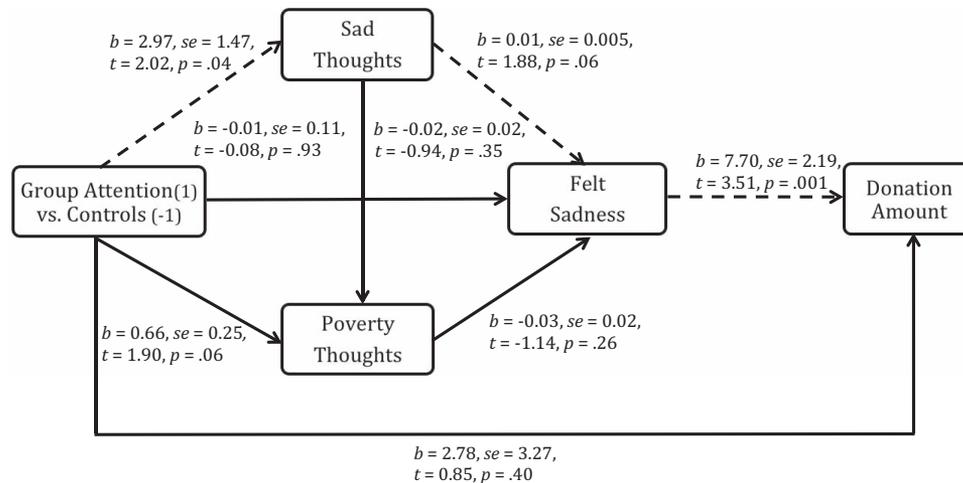


Figure 2. Mediation model tested in Study 4 with arousal, mood, and gender controls. Dashed lines indicate a significant indirect mediation pathway.

### Experiment 5: Allocation of Cognitive Resources to Positive Stimuli and Increased Happiness Under Group Attention

In Experiment 5, we again test the cognitive resources account of emotional intensification under group attention. This time, to lift the mood, we use an amusing video of chubby bulldog puppies running after their tired mother, aiming to feed. We expect that group attention will increase the allocation of cognitive resources to the cute puppies video, thereby increasing participants' happiness. Moreover, research suggests that people share positive events in order to capitalize on the associated positive emotions (e.g., Gable, Reis, Impett, & Asher, 2004). As such, we expected that greater felt happiness would result in more willingness to share the cute puppies video across online channels.

#### Method and Design

Replicating the design of Experiment 4, participants ( $N = 198$ ; 45% female;  $M_{age} = 33.28, SD = 10.49$ )<sup>14</sup> were recruited from Amazon Mechanical Turk and watched a single 33-s video depicting cute puppies in one of four experimental conditions: (a) similar other simultaneously coattends with the participant (group attention), (b) similar other attends 1 min before the participant attends (postattention), (c) similar other attends 1 min after the participant attends (preattention), (d) participant attends alone (alone). Participants were paid \$0.51 for their participation.

As in Experiment 4, immediately after watching the video, participants completed a thought-listing task, in which they were asked to list up to 12 thoughts that they had when watching the video. Participants were told that they could list any and all thoughts that occurred to them, as long as they occurred during the video. Participants had up to 2 min to complete the thought-listing task. Afterward, participants indicated how much they agreed with the following statement "The video made me feel happy" (1 = strongly disagree, 7 = strongly agree). Finally, participants were asked whether they would share the cute puppies video with others via Facebook (yes/no), Twitter (yes/no), Google Plus (yes/no), or

e-mail (yes/no). Responses to the four questions were summed to indicate overall willingness to share across online channels. Technical difficulties precluded the tracking of actual sharing. At the end of the study participants were asked for their gender and age.

On average, participants listed 7.56 thoughts ( $SD = 2.94$ ) and wrote 4.69 words per thought ( $SD = 2.32$ ). The effect of the group attention condition (vs. controls) on number of thoughts,  $F(1, 194) = 0.84, p = .47$ , and words per thought,  $F(1, 194) = 0.14, p = .94$  was nonsignificant.

#### Results and Discussion

Because LIWC2007 (Pennebaker et al., 2007) does not have an appropriate linguistic category that matched the content of the cute puppies video, we constructed a custom dictionary that measured the usage of the following words: cute, puppies, bulldog, hungry, play, fat, run, feed, mom, poor (e.g., "cute puppies," "poor mom"). These words and their derivatives were judged by the authors to refer directly and unambiguously to the content of the video in which chubby bulldog puppies ran after their tired mother, aiming to feed. The custom dictionary was constructed prior to hypothesis-testing analyses. In all, the average percentage of custom dictionary words across the participants' writing served as indicators of cute puppy thoughts.

We hypothesized that group attention would uniquely increase the amount of cognitive resources allocated toward the video as indexed by participants' thoughts referencing video content. Moreover, we hypothesized that as more cognitive resources were focused on video content, participants' happiness would intensify and they would be more likely to share the video.

**Cute puppy thoughts.** In a test of the group attention effect on the frequency of video-related thoughts, a planned contrast found that the percent of cute puppy thoughts was higher in the group attention condition ( $M = 20.67\%, SD = 14.09\%$ ) compared to the control conditions ( $M = 16.51\%, SD = 10.54\%$ ),  $F(1,$

<sup>14</sup> No participants were excluded from the study.

194) = 4.77,  $p = .03$ . The results remained significant when controlling for arousal, mood, and gender,  $F(1, 184) = 5.49$ ,  $p = .02$ ,  $d = 0.40$ .<sup>15</sup> There were no significant differences in the percent of video-related thoughts among the other three conditions (all  $ps > .84$ ; postattention:  $M = 16.65\%$ ,  $SD = 10.60\%$ ; preattention:  $M = 16.89\%$ ,  $SD = 10.93\%$ ; alone:  $M = 16.09\%$ ,  $SD = 10.32\%$ ). Two-way  $p$  values, Cohen's  $d$  effect sizes, and 95% CIs for pairwise comparisons between group attention and each control condition can be seen in Table 1.

**Cute puppy thoughts, happiness, and willingness to share online.** We used a bootstrapped mediation analysis to test whether group attention predicted a greater percentage of cute puppy thoughts ( $m_1$ ), which, in turn, predicted greater happiness ( $m_2$ ) and, consequently, more willingness to share across online channels (Hayes, 2013). Using 1,000 bootstrap samples and bias-corrected 95% CIs, we found a significant indirect effect, where group attention led to a greater percentage of video related thoughts, which led to greater happiness and, consequently, to more willingness to share across online channels, effect = 0.005,  $BootSE = 0.0040$ ,  $BootLLCI = 0.0002$ ,  $BootULCI = 0.02$ . Results remained significant while controlling for baseline arousal, mood, and gender, effect = 0.006,  $BootSE = 0.005$ ,  $BootLLCI = 0.0004$ ,  $BootULCI = 0.02$  (see Figure 3 for complete results). The total effect model for greater willingness to share across online channels was significant,  $R = .26$ ,  $F(3, 195) = 4.73$ ,  $p = .003$ . Alternative mediation models were not significant (Hayes, 2013; Model 6 mediation analysis tested two alternative indirect effects:  $X \rightarrow M_1 \rightarrow Y$ ,  $X \rightarrow M_2 \rightarrow Y$ ).

Experiment 5 provided further evidence that group attention leads to greater allocation of cognitive resources toward valenced stimuli, leading to more intense emotions. Here, participants in the group attention condition reported more cute puppy thoughts when watching the video of bulldog puppies running after their mom. More cute puppy thoughts led to greater felt happiness, which, in turn, led to greater willingness to share the video across online channels. Greater willingness to share more positively valenced events is consistent with previous research suggesting that people further enhance the experience of positive emotions by sharing them with others (Gable et al., 2004).

### Meta-Analyses of the Group Attention Effect

In all, the effect of group attention on felt emotion (Studies 1–3) and thought content (Studies 4 and 5) was tested in five separate studies. Nearly all comparisons between pooled control conditions and group attention conditions were statistically significant, with the rest being marginally significant. However, many differences between individual control conditions and group attention conditions were marginally significant or indicative of a nonsignificant trend in the predicted direction (see Table 1). This was especially the case when arousal, mood, and gender covariates were not entered into the analysis. In order to investigate the robustness of the group attention effect, we conducted several meta-analyses to determine the overall estimate of population effect size  $\delta$  relative to (a) pooled controlled conditions and individual control conditions and (b) with controls and without controls (see Table 2).

Following Cumming (2012), we conducted a random-effects model meta-analysis using ESCI Meta-Analysis software. Controlling for arousal, mood, and gender, we included Cohen's  $d$ s for the

hypothesized effects of the group attention condition (vs. the control conditions combined) on perceived scariness ( $d = 0.44$ , Study 1), unhappiness and happiness (average  $d = 0.32$ , Study 2), felt sadness ( $d = 0.48$ , Study 3), thoughts about sadness and poverty (average  $d = 0.35$ , Study 4), and thoughts about cute puppies ( $d = 0.40$ , Study 5). Results indicate a medium effect size, with  $\delta$ , which is the overall estimate of population effect size, of 0.40, 95% CI [0.24, 0.55]. The same meta-analysis without any controls yielded  $\delta$  of 0.36, 95% CI [0.21, 0.52].

We also conducted meta-analyses comparing the group attention and each of the other conditions separately. For the group attention versus similar others present meta-analytic comparison, we included Cohen's  $d$ s for perceived scariness ( $d = 0.24$ , Study 1), felt sadness ( $d = 0.54$ , Study 3), thoughts about sadness and poverty (average  $d = 0.36$ , Study 4), and thoughts about cute puppies ( $d = 0.38$ , Study 5). Results indicate a medium effect size, with  $\delta$  of 0.39, 95% CI [0.18, 0.60] when including arousal, mood, and gender controls. This meta-analysis without controls yielded  $\delta$  of 0.36, 95% CI [0.15, 0.57].

For the group attention versus alone meta-analytic comparison we included Cohen's  $d$ s for perceived scariness ( $d = 0.56$ , Study 1), unhappiness and happiness (average  $d = 0.32$ , Study 2), felt sadness ( $d = 0.37$ , Study 3), thoughts about sadness and poverty (average  $d = 0.37$ , Study 4), and thoughts about cute puppies ( $d = 0.42$ , Study 5). Results indicate a medium effect size, with  $\delta$  of 0.39, 95% CI [0.21, 0.58], with arousal, mood, and gender controls. This meta-analysis without controls yielded  $\delta$  of 0.33, 95% CI [0.15, 0.51].

In sum, we conducted six meta-analyses, producing overall estimates of population effect size ranging from 0.33 to 0.48. In all cases, 95% confidence intervals did not include 0. We conclude that the data suggests a reliable, medium-sized group attention effect on both felt emotion and thought content.

### General Discussion

The current research found that group attention—the experience of simultaneous coattention with one's group members—increased emotional intensity relative to attending alone, coattending with strangers, or attending nonsimultaneously with one's group members. These effects occurred when observing a scary advertisement, negative and positive images, as well as sad and happy videos. Moreover, Studies 4 and 5 provided evidence that group attention on a given piece of information led to more thought content related to that piece of information, thereby triggering more intense emotional responses and, ultimately, greater emotion-based action. The observed effects could not be easily explained by differences in physiological arousal, emotional contagion, or vicarious emotional experience.

Notably, four of the five experiments utilized paradigms where the perception of coattention was achieved through an online interaction. As such, these studies illustrate that technologically mediated group attention can have a significant influence on emotional intensity, and thereby action propensity. It is

<sup>15</sup> Arousal, mood, and gender controls did not have a significant influence on the frequency of cute puppy thoughts.

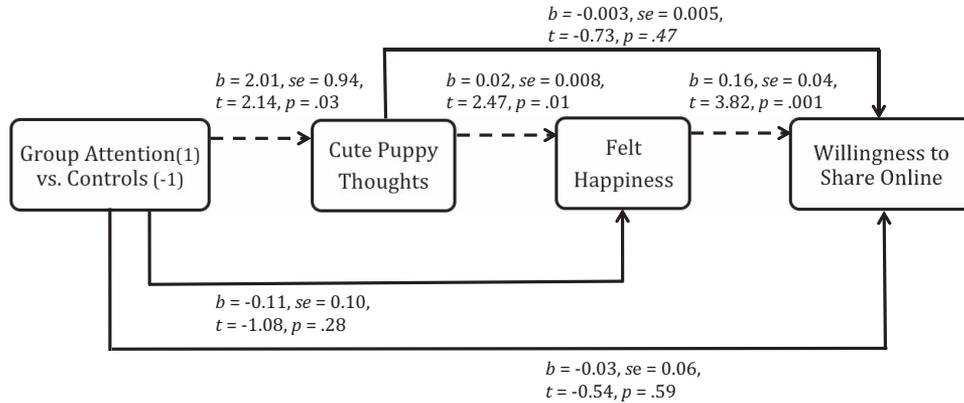


Figure 3. Mediation model tested in Study 5 with arousal, mood, and gender controls. Dashed lines indicate a significant indirect mediation pathway.

conceivable that members of online social networks are, in fact, psychologically rewarded through experiences of coattention that evoke deeper feelings and more assured actions.

One interesting question is whether group attention evokes more intense emotional responses to valenced stimuli because of an individual’s *explicit belief* that targets of group attention hold greater relevance for them. Alternatively, valenced targets of group attention may evoke greater emotional intensity because of a less conscious cognitive process. We believe the latter account is more likely to be the case. For instance, Shteynberg and Apfelbaum (2013) showed that although participants acted as though they were more motivated to learn under group attention (also see Shteynberg & Galinsky, 2011), they did not report feeling more motivated. Moreover, as reported in Experiments 2 and 4 of the current set of studies, participants did not report greater focus in the group attention condition, suggesting that the group-attended images and videos were not felt to be more important. Although these cognitive focus questions were included for exploratory purposes, without formal hypotheses, the results suggest that participants seemed to be unaware that they were allocating greater cognitive resources on targets of group attention. Thus, we argue that the cognitive process by which group attention intensifies emotional responses operates outside of conscious awareness. One may conclude, however, that although the individual does not consciously see targets of group attention as more relevant, the individual’s cognitive system does give targets of group atten-

tion greater consideration. As such, greater emotional intensity under group attention may not be a consequence of explicitly felt relevance based on a specific goal (e.g., Sonnemans & Frijda, 1995). Rather, group attention may unconsciously impact the extent to which aspects of one’s environment merit greater cognitive resources, intensifying emotional reactions to valenced stimuli.

Importantly, we argued that the effects of group attention could be seen as an evolved adaptation that aids future collective action. If so, why would Amazon Mechanical Turk participants, individuals who have very limited prospects of collective action, be affected by group attention? If the group attention mechanism is an evolutionary adaptation (see also Shteynberg, 2010), then it is important to consider the role of group attention in the Pleistocene. Given that human genetic survival was highly dependent on cooperation in small groups with whom future collective action was all but certain (Boehm, 2002; Bowles & Gintis, 2003), the experience of simultaneous coattention with one’s group members meant, with near certainty, that the attended information would serve as a future axis of collective action. Although this may not necessarily be the case in today’s environment, group attention appears to remain as a social-cognitive adaptation. As such, Amazon Mechanical Turk participants need not estimate the likelihood of future social interaction; rather, their perception of simultaneous coattention with their group may be sufficient to focus cognitive resources on the attended target.

Table 2  
Population Effect Size  $\delta$  and 95% CIs for Random-Effects Meta-Analyses Comparing Group Attention and All Comparison Conditions

	GA vs. all other conditions [95% CI]	GA vs. similar others present [95% CI]	GA vs. alone [95% CI]
With controls	$\delta = 0.40 [0.24, 0.55]$	$\delta = 0.39 [0.18, 0.60]$	$\delta = 0.39 [0.21, 0.58]$
Without controls	$\delta = 0.36 [0.21, 0.52]$	$\delta = 0.36 [0.15, 0.57]$	$\delta = 0.33 [0.15, 0.51]$

Note. Meta-analyses based on five studies.

## Emotional Intensification in Groups

The persistent influence of the group on the emotional state of the individual has preoccupied social scientists for more than a century (Allport, 1924; Durkheim, 1912/1995; Freud, 1922; Le Bon, 1897; McDougall, 1920). A large share of this focus has been on the psychological nexus between the subjective states of others and that of the self. From this perspective, other individuals' emotions, attitudes, or behaviors are considered to be the primary source of information impacting one's emotional experience. In this social influence framework (Festinger, 1954), the subjective reactions of others inform one's own.

The current studies, however, suggest that others not only serve as affective, attitudinal, and behavioral signals, but they can also function as coattendants to such signals. Indeed, our findings suggest that simultaneous coattention to valenced images can have a significant bearing on an individual's emotional state, solidifying the affective bedrock of future action.

An important, but unexplored, issue is identifying variables that could strengthen the group attention effect on emotional intensification. Because the key to emotional intensification under group attention is one's awareness that "we are attending," it is possible that any variable that increases such "we attention" would intensify emotions. For instance, it is possible that (a) higher relational closeness among (b) greater number of coattendants would yield more group attention and, hence, more intense emotions.

In all, greater fear, gloom, and glee can thus result from group attention to scary, sad, and happy events, respectively. By demonstrating that group attention can bolster the emotional impact of valenced objects and events, the studies reported provide a novel account of how individuals come to feel more when they are together.

## References

- Abelson, R. P. (1995). *Statistics as principled argument*. New York, NY: Psychology Press.
- Allport, F. H. (1924). *Social psychology*. Boston, MA: Houghton Mifflin.
- Baddeley, A. (1992). Working memory. *Science*, 255, 556–559. doi:10.1126/science.1736359
- Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. Cambridge, MA: MIT Press.
- Barsade, S. G., & Gibson, D. E. (2012). Group affect: Its influence on individual and group outcomes. *Current Directions in Psychological Science*, 21, 119–123. doi:10.1177/0963721412438352
- Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. Oxford, England: International Universities Press.
- Boehm, C. (2002). Variance reduction and the evolution of social control. *Department of Anthropology, USC*.
- Bowles, S., & Gintis, H. (2003). Origins of human cooperation. *Genetic and Cultural Evolution of Cooperation*, 429–443.
- Boyd, R., & Richerson, P. J. (2009). Culture and the evolution of human cooperation. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 364, 3281–3288. doi:10.1098/rstb.2009.0134
- Brody, L. R., & Hall, J. A. (2000). Gender, emotion, and expression. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of Emotions* (2nd ed., pp. 338–349). New York, NY: Guilford Press
- Bruner, J. (1983). *Child's talk: Learning to use language*. New York, NY: Norton.
- Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science*, 6, 3–5. doi:10.1177/1745691610393980
- Cacioppo, J. T., & Petty, R. E. (1981). Social psychological procedures for cognitive response assessment: The thought-listing technique. *Cognitive Assessment*, 309–342.
- Cacioppo, J. T., von Hippel, W., & Ernst, J. M. (1997). Mapping cognitive structures and processes through verbal content: The thought-listing technique. *Journal of Consulting and Clinical Psychology*, 65, 928–940. doi:10.1037/0022-006X.65.6.928
- Cadinu, M., Maass, A., Rosabianca, A., & Kiesner, J. (2005). Why do women underperform under stereotype threat? Evidence for the role of negative thinking. *Psychological Science*, 16, 572–578. doi:10.1111/j.0956-7976.2005.01577.x
- Craik, F. I. M., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology: General*, 104, 268–294. doi:10.1037/0096-3445.104.3.268
- Cumming, G. (2012). *Understanding the new statistics: Effect sizes, confidence intervals, and meta-analysis*. New York, NY: Routledge.
- Durkheim, E. (1912/1995). *The elementary forms of religious life*. New York, NY: Free Press.
- Eskenazi, T., Doerrfeld, A., Logan, G. D., Knoblich, G., & Sebanz, N. (2013). Your words are my words: Effects of acting together on encoding. *Quarterly Journal of Experimental Psychology*, 66, 1026–1034. doi:10.1080/17470218.2012.725058
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117–140. doi:10.1177/001872675400700202
- Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). *Psychological Bulletin*, 117, 39–66. doi:10.1037/0033-2909.117.1.39
- Freud, S. (1922). *Group psychology and the analysis of the ego*. New York, NY: Boni and Liveright. doi:10.1037/11327-000
- Frijda, N. H. (1986). *The emotions*. New York, NY: Cambridge University Press.
- Gable, S. L., Reis, H. T., Impett, E. A., & Asher, E. R. (2004). What do you do when things go right? The intrapersonal and interpersonal benefits of sharing positive events. *Journal of Personality and Social Psychology*, 87, 228–245. doi:10.1037/0022-3514.87.2.228
- Hatfield, E., Cacioppo, J. T., & Rapson, R. L. (1993). Emotional contagion. *Current Directions in Psychological Science*, 2, 96–99. doi:10.1111/1467-8721.ep10770953
- Hayes, A. F. (2013). *An introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press
- Hayes-Roth, B., & Hayes-Roth, F. (1979). A cognitive model of planning. *Cognitive Science*, 3, 275–310. doi:10.1207/s15516709cog0304\_1
- He, X., Lever, A. G., & Humphreys, G. W. (2011). Interpersonal memory-based guidance of attention is reduced for ingroup members. *Experimental Brain Research*, 211, 429–438. doi:10.1007/s00221-011-2698-8
- Joormann, J., & Siemer, M. (2004). Memory accessibility, mood regulation, and dysphoria: Difficulties in repairing sad mood with happy memories? *Journal of Abnormal Psychology*, 113, 179–188. doi:10.1037/0021-843X.113.2.179
- Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1999). International affective picture system (IAPS): Technical manual and affective ratings.
- Larsen, J. T., Norris, C. J., McGraw, A. P., Hawkey, L. C., & Cacioppo, J. T. (2009). The evaluative space grid: A single-item measure of positivity and negativity. *Cognition and Emotion*, 23, 453–480. doi:10.1080/02699930801994054
- Le Bon, G. (1897). *The crowd: A study of the popular mind*. New York, NY: Macmillan.
- Leue, A., & Beauducel, A. (2011). The PANAS structure revisited: On the validity of a bifactor model in community and forensic samples. *Psychological Assessment*, 23, 215–225. doi:10.1037/a0021400
- McDougall, W. (1920). *The group mind*. New York, NY: Knickerbocker Press.

- Niedenthal, P. M., & Brauer, M. (2012). Social functionality of human emotions. *Annual Review of Psychology*, *63*, 259–285. doi:10.1146/annurev.psych.121208.131605
- Pennebaker, J. W., Booth, R. J., & Francis, M. E. (2007). *LIWC2007: Linguistic Inquiry and Word Count*. Austin, TX: liwc.net.
- Reid, V. M., Striano, T., Kaufman, J., & Johnson, M. H. (2004). Eye gaze cueing facilitates neural processing of objects in 4-month-old infants. *NeuroReport*, *15*, 2553–2555. doi:10.1097/00001756-200411150-00025
- Searle, J. R. (1995). *The construction of social reality*. New York, NY: The Free Press.
- Shteynberg, G. (2010). A silent emergence of culture: The social tuning effect. *Journal of Personality and Social Psychology*, *99*, 683–689. doi:10.1037/a0019573
- Shteynberg, G. (in press). A social host in the machine? The case of group attention. *Journal of Applied Research in Memory & Cognition*. doi:10.1016/j.jarmac.2014.05.005
- Shteynberg, G., & Apfelbaum, E. P. (2013). The power of shared experience: Simultaneous observation with similar others facilitates social learning. *Social Psychological and Personality Science*, *4*, 738–744. doi:10.1177/1948550613479807
- Shteynberg, G., Hirsh, J. B., Galinsky, A. D., & Knight, A. P. (2014). Shared attention increases mood infusion. *Journal of Experimental Psychology: General*, *143*, 123–130.
- Shteynberg, G., & Galinsky, A. D. (2011). Implicit coordination: Sharing goals with similar others intensifies goal pursuit. *Journal of Experimental Social Psychology*, *47*, 1291–1294.
- Sonnemans, J., & Frijda, N. H. (1995). The determinants of subjective emotional intensity. *Cognition & Emotion*, *9*, 483–506.
- Sperber, D., & Wilson, D. (1986). *Relevance: Communication and cognition* (Vol. 142). Cambridge, MA: Harvard University Press.
- Tajfel, H., Billig, M., Bundy, R. P., & Flament, C. (1971). Social categorization and intergroup behaviour. *European Journal of Social Psychology*, *1*, 149–178. doi:10.1002/ejsp.2420010202
- Tesser, A., Martin, L., & Mendolia, M. (1995). The impact of thought on attitude extremity and attitude-behavior consistency. In R. E. Petty & J. A. Krosnick (Eds.) *Attitude strength: Antecedents and consequences* (pp. 73–92). Hillsdale, NJ: Erlbaum
- Tomasello, M. (1999). *The cultural origins of human cognition*. Boston, MA: Harvard University Press.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063–1070. doi:10.1037/0022-3514.54.6.1063
- Zajonc, R. B., & Sales, S. M. (1966). Social facilitation of dominant and subordinate responses. *Journal of Experimental Social Psychology*, *2*, 160–168. doi:10.1016/0022-1031(66)90077-1

Received October 3, 2013

Revision received June 30, 2014

Accepted July 7, 2014 ■