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Surprise expression in group decisions: When an emotional expression affects the quality of the group members' processing and judgment

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Abstract

We examined how the expression of surprise affects group processing and judgment. In Experiment 1, participants ($N = 207$) were randomly assigned to interacting groups in which the minority faction showed either surprise or no emotion, and, independent of that, in which the majority faction showed either surprise or no emotion. Groups met to discuss and solve a murder mystery. When at least one faction (i.e., either faction or both factions) showed surprise during group discussion, the group decision was more accurate. Further, group information-processing behavior mediated the effect of surprise expression on group decision accuracy. Experiment 2 ($N = 76$) extended this result through a more controlled, minority/majority influence paradigm. It showed that surprise expression made a minority/majority faction more influential and that this effect was mediated by recipients' reported motivated processing. This research contributes to our understanding of the role of emotional expressions in group decision-making.

Investigating the influence of numerical majority and minority in groups has been a major theme in social psychology (De Vries, De Dreu, Gordijn & Schuurman, 1996; Martin & Hewstone, 2008). Social psychologists have shown that, under certain conditions, both majorities (Mackie, 1987) and minorities (De Vries et al., 1996) might exert influence in groups. Indeed, a recent review of the research accumulated on minority vs. majority influence concluded that minority or majority influence is not a question of "whether" but "when" (Martin & Hewstone, 2008).

Yet, the moderators that determine the influence of minority and majority opinions on elaborative processing continue to be explored. In particular, De Dreu and his colleagues (De Vries et al., 1996; De Dreu, Nijstad & Van Knippenberg, 2008) have theorized that minorities stimulate processing only when factors motivate the recipient of the message to heighten his/her attention. In parallel to that, Martin and Hewstone (2008) recently proposed that even majorities stimulate processing only when factors motivate the recipient to pay closer attention to the content of the arguments.

In this paper, we explore one factor that may affect the motivation to pay attention to minority's or majority's arguments, namely the emotional communication of surprise. In the contexts of discussion groups (Experiment 1) and of social groups (Experiment 2), we examine whether minority and majority factions who express surprise can influence decision-making and judgment in groups. Drawing from recent work on emotional expressions (Van Kleef, De Dreu, & Manstead, 2010b) and on surprise expressions (Horstmann, 2003; Scherer & Grandjean, 2008), we argue that, when minority and majority factions express surprise, group members will engage in greater cognitive effort and processing, leading them to alter their decision-making and

judgment. Thus, we examine whether and how the expression of surprise influences decision-making and judgment in groups.

<div align="center">Motivated Processing in Groups</div>

In a recent theorizing, De Dreu and his colleagues (2008) have offered a motivated information-processing perspective on groups. They suggest that the degree to which information is processed in groups depends on group members' epistemic motivation, or "the willingness to expend effort to achieve a thorough, rich, and accurate understanding of the world" (De Dreu et al., 2008, p. 23). Further, epistemic motivation may affect the extent of both group-level and individual-level information processing. Several studies on interactive group decision-making have supported this perspective. For example, groups under process accountability experience a greater need for information and engage in more systematic information processing; in turn, more systematic processing increases group decision accuracy (Scholten, Van Knippenberg, Nijstad & De Dreu, 2007). Groups under high epistemic motivation (e.g., low time pressure) generally engage in richer debate and are more cognitively productive (Bechtoldt, De Dreu, Nijstad, & Choi, 2010). In general, factors that make group factions *alert* should enhance processing and alter group decision-making and judgment (De Dreu et al., 2008).

Consistent with De Dreu's and colleagues' perspective, a recent review of the minority and majority influence literature (Martin & Hewstone, 2008) concluded that either minority's or majority's influence on judgment in groups may be increased by motivational factors that affect the recipient's cognitive effort. That is, factors other than the source (i.e., minority or majority) affect message scrutiny in groups. Minority stimulates processing only when factors make the recipient pay more attention to the minority (e.g., Gordijn, De Vries & De Dreu, 2002; Martin,

Hewstone & Martin, 2007; Sinaceur et al., 2010). Likewise, people attend to the majority's

underlying argument only when factors increase people's focus and attention (Martin &

Hewstone, 2008). Hence, it seems worth examining further the motivating factors that might

moderate minority's and majority's influence on processing and judgment in groups, particularly

those that make group factions *alert* (De Dreu et al., 2008; Martin & Hewstone, 2008).

<div align="center">Affect and Emotional Expressions</div>

One potent factor that may alter group factions' alertness and motivated information-

processing is emotions. As De Dreu and his colleagues noted (2008, p. 43), emotions might play

an important role in group information-processing and decision-making, but "the relation among

affect and emotions, motivation, and group information processing and decision-making" still

needs to be explored and deserves further research.

Indeed, affect can powerfully influence group decisions (Kelly & Barsade, 2001). Prior

research explored the role of affective states, such as diffuse mood (e.g., Barsade, 2002;

Totterdell, 2000) and feelings (e.g., Levin, Kurtzberg, Phillips, & Lount, 2010) in group

processes and performance. Yet, emotions could impact groups not only in the form of affective

states, but also in the form of discrete emotional *expressions*. By "discrete" emotional

expressions, we mean relatively acute and focused emotional expressions. Research on discrete

emotional expression suggests that emotional expressions can occur independently from feelings

(Fridlund, 1991; Tourangeau & Ellsworth, 1979) and can have independent effects (McCaul,

Holmes, & Solomon, 1982). Thus, the expression of an emotion may have effects independent

of related feelings in groups. Indeed, people are quite adept at reading the discrete emotion

expressions of others (Ekman, 1993), and they attach much importance to those in social

interactions (Van Kleef et al., 2010b).

Recently, considerable research has accumulated on the effects of discrete emotional expressions in social interactions (Van Kleef et al., 2010b), although this research has not examined interactive group decision-making or group factions' influence (i.e., contexts where group members discuss and argue about opinions, typically in intellective or judgmental group tasks). This prior research generally supports the idea that discrete emotional expressions bear important social consequences (Keltner & Haidt, 1999). People are more affected by others who express emotions in social interactions, and this shows in their behavioral responses (Van Kleef et al., 2010b). For example, in feedback interactions, people's creativity can be enhanced by an angry partner, compared to a neutral partner (but only when recipients chronically enjoy high epistemic motivation; Van Kleef, Anastasopoulou, & Nijstad, 2010a). In leader-follower (hierarchical) interactions, the leader's expressing anger rather than happiness increases followers' performance (but again only when recipients chronically enjoy high epistemic motivation; Van Kleef et al., 2009). In negotiations, people make more concessions to others who express negative emotions (Sinaceur & Tiedens, 2006; Van Kleef et al., 2010b). Thus, in general, emotional expressions can serve as incentives for others' social behavior (Keltner & Haidt, 1999). They are an important form of communication (Clark, Pataki, & Carver, 1996; Frijda, 1986).

The Expression of Surprise

One emotional expression that is basic and important (Ekman, 1993), but whose effects, to our knowledge, have not been demonstrated on social behavior is that of surprise. Emotion theorists have argued that surprise is an important emotion because the expression of surprise has the function to draw and redirect attention in social interactions (Frijda, 1986). This attention function of surprise may be especially of use in interactive group decision-making, where

overcoming problems of information-processing and paying attention to the other faction's

viewpoints, thus remaining *alert* is critical (see De Dreu et al., 2008). Further, surprise may

often be experienced in group discussion (Phillips, 2003; Phillips & Loyd, 2006). Indeed,

surprise is a primary, immediate expression of violated expectations (Charlesworth, 1969; Izard,

1977; Scherer & Grandjean, 2008), and violated expectations may often occur in group

discussions due to the potential for disagreements and differences between group factions

(Phillips & Loyd, 2006). Thus, the expression of surprise might importantly affect processing

and final judgment in groups.

Specifically, surprise expression is deemed to communicate high attention (Russell,

1997), for example through a wide-eyed look. According to Frijda (1986), surprise expression

conveys "open attention" and wide –yet concentrated– focus. "The sense of surprise expression

is a passive, receptive mode of attention", he noted (p. 18). Further, surprise expression "implies

reference to something unassimilable" (p. 74); that is, surprise conveys that something is not

understood and needs further explaining (Frijda, 1986). Hence, people interacting with another

who expresses surprise are likely to think that the surprise expresser is processing clues in the

environment attentively and thoroughly (Frijda, 1986).

Empirical research provided support for these arguments. First, people quite accurately

recognize expressions of surprise (Horstmann, 2003; Yik & Russell, 1999). Further, central to

our argument, the expression of surprise is typically understood as a request for more

information (Horstmann, 2003). Observers of surprise expressions are more likely to infer that

someone who expresses surprise would like to know more about the situation (Scherer &

Grandjean, 2008). Consistent with these findings, surprise expressers are typically seen as being

in deep thought (Frijda & Tcherkassof, 1997). Indeed, among all basic emotions, surprise is the

only one that expresses a need for more information (Scherer & Grandjean, 2008).

Although the effect of surprise expressions on perceptions of a need for further

information has not been demonstrated in social interactions, it seems plausible that this effect

would generalize, and that such perceptions could affect the outcome of group interactions.

Indeed, if someone who expresses surprise is seen as needing more information, it seems likely

that others will want to respond to that need for more information, thus triggering greater

motivated effort and processing in the group. In turn, the greater motivated processing should

affect group members' judgment. Thus, we propose that surprise expressions will affect

processing in groups, and, eventually, judgment in groups.

Overview

Drawing from the general theory that factors affect whether group members are

motivated to process information (De Dreu et al., 2008; De Vries et al., 1996), and integrating it

with recent work on emotional expressions (Van Kleef et al., 2010b) and on surprise expressions

(Horstmann, 2003; Scherer & Grandjean, 2008), we propose that surprise expressions will

augment processing in groups. Thus, eventually, surprise expressions will affect final judgment

in groups.

We conducted two experiments using two different paradigms to test our argument.

Using interacting, decision-making groups, Experiment 1 examined whether a group faction's

(i.e., a minority/majority faction's) surprise expressions would affect the group's information-

processing behavior and, in turn, the group's decision quality. Using a non-interacting, social

group, Experiment 2 examined whether a group faction's surprise expressions would affect the

recipient's processing and, in turn, his/her willingness to revise his/her judgment.

We were not sure whether surprise expressions would affect *both* or *either* factions'

influence in groups. The research on minority and majority influence briefly discussed above

(Martin & Hewstone, 2008) suggests that both factions' influence on processing might be

augmented by motivating factors. But, the effect of motivating factors might also be greater for

one faction than for the other (Martin & Hewstone, 2008). Thus, in both Experiments, we

manipulated the minority's surprise expression and the majority's surprise expression

independent of each other in fully-crossed designs. In doing so, we connected the current

research to both the groups and minority/majority influence literatures. Finally, in both

Experiments, we measured motivated processing as our potential mediator for the effect of the

expression of surprise on final judgment.

EXPERIMENT 1

In Experiment 1, we examined whether surprise expressions would affect processing and

judgment in interacting, decision-making groups. That is, we examined actual, face-to-face

interactions between minority and majority factions. We used interacting, decision-making

groups to test effects of surprise expressions on the whole group dynamics. Indeed, group

interactions are dynamic in nature. Thus, in the context of a decision-making task in which

group members need to discuss and exchange arguments to reach a common decision, it seems

plausible that surprise expressions would eventually permeate the whole group interaction.

Indeed, factors that increase interacting group members' epistemic motivation are likely to

increase *group-level* information processing (De Dreu et al., 2008). So the whole group will

show more information-processing behaviors. Based on these arguments, we predict that, in the

context of group interactions aimed at discussing and reaching a group decision, surprise

expressions will trigger more motivated processing at the group level. This, eventually, should increase the group's decision quality.

Method

Participants

Two hundred seven (68.1% female) undergraduate students participated in the experiment for compensation. They were recruited in the street near several urban University campuses. To account for the heterogeneity of the sample, we controlled for demographics (i.e., ethnic background, age, and gender) in all analyses; however, not including participant demographics as controls did not change the results reported below.

Participants first completed a decision-making task individually and generated an individual judgment. Then, they were assigned to three-person interacting groups in which they formulated a group decision to the same task. Participants' assignment to a group was based on conditional random assignment; forming groups was based on the individual judgment participants had generated initially (i.e., before the manipulation and the group discussion). Sixty-nine three-person groups were formed.

Design

We used a 2 (Minority's Emotion Expression: Surprise expression vs. Neutral expression) x 2 (Majority's Emotion Expression: Surprise expression vs. Neutral expression) factorial, between-subject design. Minority/majority status was based on participants' initial individual judgment. As in other research on interactive group decision-making (e.g., Phillips, 2003), the minority was single and the majority was two-person.

We measured the group decision. At the individual level, we measured initial private judgments (i.e., before the group formation and the manipulation). We also measured

confidence in initial private judgments (i.e., before the group formation and the manipulation) to account for the heterogeneity of the sample. Finally, we asked participants to rate group information-processing behavior during group discussion to test for mediation.

Procedure

Materials

A murder mystery adapted from Stasser and Stewart (1992; also, Phillips, 2003; Phillips, Liljenquist, & Neale, 2009; Sinaceur et al., 2010) was used for the individual judgments and group decisions. Contrary to Stasser's and his colleagues' work (e.g., 1992), however, the information in each participant's packet was *identical* across conditions, as in the work of Phillips and her colleagues (e.g., 2003, 2009). It consisted of interviews by a detective and supporting materials, including a list of three suspects (among whom one was the most likely suspect, given the evidence). Before the group discussion, participants were individually asked who they believed was the most likely suspect. They were given 20 minutes for this individual task. This time constraint limited participants' thorough processing of the packet, increasing possible judgment biases to create variation in initial judgments.

Group formation

After participants individually selected a suspect and returned all materials, an experimenter blind to hypotheses composed groups. Groups were composed such that two members shared the same initial judgment (thus, forming the numerical majority), and one other individual held a different initial judgment (thus, forming the numerical minority). Thus, assignment of individuals to a (numerical) minority vs. majority faction was based on initial judgment, specifically how many other group members possessed the same initial judgment.

Conditional on the suspect choice, participants were randomly assigned to a group and to a (numerical) minority vs. majority faction.

Next, surprise expression was randomly assigned to minority members and/or majority members using the between-subject design described above. Importantly, the surprise expression of the minority and the surprise expression of the majority were fully crossed and were randomly assigned independent of each other. This resulted in 18 groups in which both minorities and majorities were in the surprise expression condition, 16 groups in which neither was, 18 groups in which only the minority was, and 17 groups in which only the majority was. Also, no group member knew that other group members had received some emotional expression instructions. Thus, no group member knew what emotion condition the other group members were in.

Manipulation of emotion expression

Before groups gathered, participants were individually (independently) given a set of recommendations about how to influence the other faction in the forthcoming group discussion (adapted from Kopelman, Rosette, & Thompson, 2006; Sinaceur & Tiedens, 2006). In order to create consistency across the two emotion conditions, participants in both the neutral and surprise conditions were told they needed use their emotions in order to influence the other faction in the forthcoming group discussion. So, in both conditions, participants were told to get the other faction to revise its judgment. And, all participants were told that they should follow the advice of experts. However, the two conditions varied in terms of what these experts recommended. In the neutral condition ($N = 101$) participants were told that experts advised to hide their emotions to influence the other faction. They were given a set of recommendations about how to control their emotions, such as staying emotionally calm, keeping a poker face, and

keeping their voice steady. Indeed, this condition was the same as the neutral condition used by Sinaceur and Tiedens (2006), but adapted to the group task context. Participants in the surprise condition ($N = 106$) were advised to express surprise to influence the other faction. They were given a set of recommendations about expressing surprise such as using facial expressions (e.g., widening the eyes, eyebrows up; based on Frijda, 1986), and to use sentences to communicate surprise (e.g., "This really makes me surprised", "It surprises me that…", "I find this startling"). Specifically, the surprise could be directed to the arguments or opinions expressed by the other faction during group discussion (importantly, participants in the neutral condition were equally advised to react to and discuss others' arguments or opinions, but doing so intellectually, without expressing emotions). Finally, in both conditions, the advice was to adopt such behaviors throughout the group discussion. This way to manipulate emotion expressions in face-to-face discussion yields results similar to those of other possible ways (e.g., Filipowicz, Barsade, & Melwani, 2011; Kopelman et al., 2006; Sinaceur, Kopelman, Vasiljevic, & Haag, 2011; Sinaceur & Tiedens, 2006).

Participants were given 10 minutes to individually read and think about their emotion instructions. During that time, they did not know which (minority vs. majority) faction they or the other group members were in. Participants could not show the other group members their emotion instructions nor refer to those. Also, the experimenter was blind to participants' emotion condition. [1]

Group decision

Then, groups gathered for the group discussion. Each group was given 30 minutes to discuss and reach a decision about the most likely suspect. After groups had selected a suspect, participants completed a questionnaire about their perceptions and the group discussion.

Dependent measures

Outcome

The group decision about who committed the murder provided our critical outcome. In other research using the murder mystery materials (e.g., Phillips, 2003; Stasser & Stewart, 1992), Suspect 3 was identified (both through pre-testing and by design) as the most likely "guilty party." To measure decision accuracy, we used the choice of Suspect 3 as the correct answer. The other two choices were considered incorrect, creating a binary dependent variable.

Initial confidence

At the same time as they provided their initial judgment (before the manipulation), participants individually rated how confident they were in that initial judgment on a 9-point Likert scale. This was to account for the heterogeneity of the sample in this study. [2] We report below results in which we controlled for participants' initial confidence (in addition to demographics as mentioned above); however, not controlling for that did not change the results reported below.

Group's information-processing behavior

After the group task, we asked participants to rate how the other faction had behaved during group discussion to explore the mediating role of group's information-processing behavior. Specifically, we asked group members to assess how the member(s) from the other faction had motivated their information processing during group discussion through four items (Cronbach's α = .76): "This group member induced me to go deeper into my reasoning"; "This group member made the group think in a systematic way"; "This group member intellectually contributed to the argument"; "This group member asked lots of questions." These ratings were on 9-point Likert scales. A confirmatory factor analysis verified that these items loaded on one

factor (it yielded only one factor with an eigenvalue greater than 1, i.e., 2.55, which explained

63.76% of the total variance; also, all items loaded positively on that factor with all factor

loadings l's > .69).

First, we averaged the two majority members' ratings to obtain the rating of the minority

faction by the majority faction (Cronbach's α = .70).[3] Second, we averaged the minority

member's rating of the two majority members to obtain the rating of the majority faction by the

minority faction (Cronbach's α = .67). We then added together the two faction averages (i.e.,

each faction rating each other) to create an overall measure of group behavior at the group level.
[4] This was because our critical outcome (the group's decision accuracy) is at *the group level*,

and therefore mediation analyses were conducted at the group level. Importantly, this overall

measure of group behavior excluded participants' rating their own faction or themselves since

we had asked each faction to rate the other faction. Thus, the overall measure of group behavior

was based on ratings by *the other* faction, not by the self.

Manipulation check

To check the effectiveness of the surprise expression manipulation, we asked participants

to rate how much surprise each of the group members had expressed during group discussion on

a 9-point Likert scale.

Felt uncertainty as an alternative explanation

Finally, we wanted to insure that the manipulation of surprise expression did not motivate

information-processing through enhancing *felt* uncertainty. This mattered because *felt*

uncertainty can enhance information-processing (Tiedens & Linton, 2001). Surely, research on

emotional expression suggests that emotional expressions can occur independently from feelings

(Fridlund, 1991; McCaul et al., 1982; Tourangeau & Ellsworth, 1979). Also, prior studies using

a similar manipulation of emotional expression showed that it yielded effects independent of

feelings (e.g., Sinaceur & Tiedens, 2006; Sinaceur et al., 2011). Nonetheless, we measured *felt*

uncertainty to eliminate it as an alternative explanation. So we asked participants to rate how

much uncertainty they *felt* during group discussion through two items (Cronbach's α = .82): "I

felt uncertainty during group discussion"; "I felt hesitation during group discussion."

<div align="center">Results</div>

We first report preliminary analyses and the manipulation check. Second, we report the

analyses on the group's decision accuracy. Third, we examine the mediating role of groups'

information-processing behavior during group discussion (measured at the group level through

each faction rating each other). All tests are two-tailed.

<div align="center">*Preliminary analyses*</div>

To probe whether *felt* uncertainty could be an alternative explanation for our effects, we

ran all analyses both a) without and b) with felt uncertainty. In all analyses, the effect of our

manipulated variables remained the same when controlling for how much participants felt

uncertainty. Specifically, including felt uncertainty as a control did not change any of the results

reported below. Consistent with prior research (e.g., Fridlund, 1991; Sinaceur & Tiedens, 2006;

Sinaceur et al., 2011; Tourangeau & Ellsworth, 1979), these preliminary analyses give us

confidence that the emotion expression manipulation was appropriate for testing our hypotheses.

<div align="center">*Manipulation check*</div>

We conducted a 2 (Group member in surprise condition vs. Group member in neutral

condition) x 2 (Group member in minority vs. Group member in majority) between-subject

ANCOVA on the group members' surprise expression check that resulted from combining

ratings that group members received from others at the faction level. Faction members assigned

to the surprise condition were rated by all other group members as expressing more surprise ($M =$ 4.19, $SD = 2.10$) than faction members assigned to the neutral condition ($M = 2.76, SD = 1.60$), $F(1, 112) = 14.94, p < .0005, \eta^2 = .12$. There were no main or interaction effects by faction. Thus, the surprise expression manipulation was successful.

Group's decision accuracy

First, we tested whether surprise expressed during discussion in the group would increase the group's decision accuracy. We conducted a binary logistic regression on the group's decision accuracy. This logistic regression included as predictors the main effect of minority's surprise expression (Minority's Emotion Expression: Surprise expression vs. Neutral expression), the main effect of majority's surprise expression (Majority's Emotion Expression: Surprise expression vs. Neutral expression), their interaction, the minority's initial accuracy, and the majority's initial accuracy. We controlled for factions' initial accuracy because it increases final group accuracy (e.g., Schulz-Hardt et al., 2006). As expected, the majority's initial accuracy predicted group decision accuracy ($B = 3.55, SE = 1.17$; Wald(1) = 9.24, Exp(B) = 34.65, $p < .005$). So did the minority's initial accuracy ($B = 2.81, SE = 1.02$; Wald(1) = 7.59, Exp(B) = 16.62, $p < .01$), consistent with prior results by Schulz-Hardt and colleagues (2006). [5] Beyond those, there was a main effect of minority's surprise expression, such that group decision accuracy increased after the minority expressed surprise during group discussion ($B = .74, SE =$ .36; Wald(1) = 4.29, Exp(B) = 2.09, $p < .05$). There was also a main effect of majority's surprise expression, such that group decision accuracy increased after the majority expressed surprise during group discussion ($B = .75, SE = .36$; Wald(1) = 4.48, Exp(B) = 2.12, $p < .05$). That surprise expression had a positive effect on group decision accuracy was consistent with our argument. Indeed, this effect of surprise expression seemed robust enough to affect *both*

minority and majority influence. However, these two main effects were qualified by an interaction ($B = .65$, $SE = .33$; Wald(1) = 3.98, Exp(B) = .52, $p < .05$).

Given that main effects are qualified by interactions, we probed the interaction effect. Figure 1 displays the proportions of groups reaching an accurate decision based on the above logistic regression. In probing the interaction, we found that the only notable difference was between the minority neutral – majority neutral cell (17.5% accurate groups) and the other three cells (63.1% accurate groups when the minority only expressed surprise; 58.3% accurate groups when the majority only expressed surprise; 60.7% accurate groups when both did). A logistic regression using contrast coding formally demonstrated this pattern. Specifically, we conducted a binary logistic regression on group decision accuracy with three predictors based on contrast coding (these three predictors formed a set of *orthogonal* contrasts, which allowed to partition out the total variance, Howell, 1997, section 12.3): (1) the difference between the minority neutral – majority neutral cell and the other three cells (i.e., surprise not being expressed vs. surprise expressed by one faction at least); (2) the difference between the minority surprise – majority surprise cell and the two cells in which surprise was expressed by one faction only (i.e., surprise expressed by both factions vs. surprise expressed by one faction only); (3) the difference between the two cells in which surprise was expressed by one faction only (i.e., surprise expressed by the minority only vs. surprise expressed by the majority only). As before, we controlled for factions' initial accuracy (Wald(1)'s > 7.59, Exp(B)'s > 16.62, p's < .01). In this regression, only the first difference was significant ($B = .71$, $SE = .24$; Wald(1) = 9.22, Exp(B) = 2.04, $p < .005$). Neither of the other two differences were significant (Wald(1)'s < .06, p's > .80).

Summary. This pattern of results is clear-cut. It was enough for one faction to express surprise for surprise to affect group decision accuracy, and there was no difference between when surprise was expressed by both factions, by the minority only, or by the majority only. Put it simply, when at least one faction (i.e., either faction or both factions) expressed surprise during group discussion, the group decision was more accurate. We return to this in the General Discussion.

Mediation by group information-processing behavior

Central to our argument is the idea that surprise expression stimulates processing in the group. Thus, we examined whether groups' information-processing behavior mediated the effect of surprise expression on group decision accuracy. Based on the pattern of results we found (i.e., the only significant difference was between the minority neutral – majority neutral cell and the other three surprise cells, and there was no difference between the three surprise cells), we used the model based on orthogonal contrast coding (Howell, 1997, section 12.3) described above. Because group decision accuracy is at the group level, mediation analyses were conducted at the group level.

Figure 2 presents the results of the regression analyses, controlling as before for factions' initial accuracy. First, as reported before, surprise expression affected group decision accuracy. Second, surprise expression affected groups' information-processing behavior ($\beta = .37$; $t(58) = 3.00$, $p < .005$). Third, groups' information-processing behavior affected group decision accuracy ($B = .59$, $SE = .18$; Wald(1) = 10.47, Exp(B) = 1.81, $p < .005$). Fourth, a regression on group decision accuracy was conducted with surprise expression and information-processing behavior as simultaneous predictors. In this regression, the effect of surprise expression was still significant but relatively reduced ($B = .70$, $SE = .29$; Wald(1) = 5.84, Exp(B) = 2.01, $p = .02$),

whereas the effect of information-processing behavior remained significant ($B = .56$, $SE = .20$; Wald(1) = 8.00, Exp(B) = 1.76, $p < .005$). A Sobel test formally showed that the effect of surprise expression was significantly reduced when information-processing behavior was a simultaneous predictor ($Z = 2.06$, $p < .04$). Thus, information-processing behavior partially mediated the effect of surprise expression that we had found on group decision accuracy. [6]

Discussion

Experiment 1 showed that surprise expression increased the group's information-processing behavior, which, in turn, increased group decision accuracy. Specifically, groups' information-processing behavior explained the result found above that in groups in which at least one faction (i.e., either faction or both factions) expressed surprise, the group decision was more accurate. These results were obtained in a fully-crossed design in which we manipulated the minority's and the majority's surprise expression orthogonally. Further, these results were independent of *felt* uncertainty.

Thus, by examining actual, face-to-face interactions between minority and majority factions, Experiment 1 showed that surprise expression affected the *whole* group dynamics in interactive group decision-making. In this way, Experiment 1 supported a motivated information-processing perspective on group decision-making and judgment (De Dreu et al., 2008; De Vries et al., 1996).

EXPERIMENT 2

We conducted a second experiment to further document that surprise expression affects processing and judgment in groups. In particular, we wanted to provide direct evidence that surprise expression affects the recipient's (i.e., the other faction's) processing and judgment in

groups. We did so by using a more controlled paradigm adapted from the minority/majority influence literature (Martin & Hewstone, 2008).

Specifically, Experiment 2 had two goals. First, we wanted to show that surprise expression stimulates processing by using a more controlled paradigm. Although a group interaction is rich (and relatively few studies explored interactive group decision-making), we wanted to further test our theory by using a paradigm that included no interactions between minority and majority factions, thus in which surprise expression could only have a unidirectional effect. In addition, although controlling for *felt* uncertainty did not affect results in Experiment 1, it is possible that *feeling* surprised might have been elicited by our manipulation of surprise expression. Therefore, in Experiment 2 we also wanted to rule out this alternative explanation.

Second, implicit in our argument that surprise expression increases group decision accuracy is the idea that recipients of surprise expression exhibit more flexibility, thus are more willing to revise their judgment. Indeed, for a group to reach higher-quality decisions individual members of the group need to be willing to change their initial judgment in the first place (e.g., see De Dreu et al., 2008; Phillips & Loyd, 2006). In Experiment 2 we directly tested whether surprise expression could instigate such change in recipients in a group. Specifically, we investigated whether surprise expression would make a minority/majority faction more likely to motivate processing, thus more influential with regard to attitudes in a social group. Based on the results of Experiment 1, we predicted that surprise expression would make a faction more influential and more processing-provoking independent of its minority/majority status.

Method

Participants and Design

Seventy-six (47.4% female) students at a University participated in the experiment for compensation. Participants were randomly assigned to 1 of the 8 experimental conditions of a 2 (Source: Minority vs. Majority) x 2 (Source's Emotion Expression: Surprise vs. No surprise) x 2 (Message Strength: Strong vs. Weak) factorial, between-subject design. Following prior research (e.g., Martin & Hewstone, 2008; Ziegler & Diehl, 2011), we manipulated independent variables through providing information on the source. We included message strength as a factor because prior research suggests that it can affect minority/majority influence (e.g., Ziegler & Diehl, 2011).

Overview

Both the materials and procedure drew from prior research on minority/majority influence (Martin & Hewstone, 2008; Martin et al., 2007). The topic of influence was the legalization of euthanasia. The experiment consisted of three stages: pretest (i.e., initial) attitude, source exposure, and posttest (i.e., final) attitude.

Procedure

Initial attitude

Participants were tested individually and completed three booklets. In the first booklet, they indicated their attitude to three social issues on 9-point scales (*1* = disagree completely to *9* = agree completely). Embedded within these items was the target issue of attitudes toward legalizing euthanasia.

Source exposure

The second booklet informed participants of a recent survey of students at their University (the in-group population) concerning legalizing euthanasia. This (fictitious) survey formed the basis for the source's minority vs. majority status manipulation. Specifically,

participants were informed that either 82% (majority) or 18% (minority) of the University students were against legalizing euthanasia. Thus, unfavorable students were either the numerical minority or the majority.

Then, the source's emotion expression manipulation was introduced. Specifically, participants were informed that, after compiling the University survey results, the survey administrators had contacted back those students against legalizing euthanasia to let them know about the survey results and qualitatively interview them. The unfavorable students' reactions to the survey results formed the basis for the source's emotion expression manipulation (for similar procedures, see Martin & Hewstone, 2008; Ziegler & Diehl, 2011). In the surprise expression condition, participants read that the unfavorable students expressed surprise at learning of the percentage of students in favor of legalizing euthanasia. For example, one unfavorable student was quoted saying, "The proportion of favorable students really makes me surprised. I find this startling." In the no surprise expression condition, participants read that the unfavorable students expressed no surprise at learning of the percentage of students in favor of legalizing euthanasia. For example, one unfavorable student was quoted saying, "The proportion of favorable students does not make me surprised at all. I do not find this startling." This way to manipulate emotion expressions is consistent with prior research (e.g., Scherer & Grandjean, 2008; Sinaceur & Tiedens, 2006; Van Kleef et al., 2010b).

Next, participants were informed that the next page contained arguments that summarized the unfavorable students' (i.e., the minority's or majority's) position. Participants thus read three arguments against legalizing euthanasia. Participants could read either one of two versions for these arguments: one weak vs. one strong. This between-subject variation was introduced to manipulate the source's message strength. All arguments were taken from Martin and Hewstone

(2007, 2008). Importantly, all participants were asked to think about the arguments and the

euthanasia issue for at least 5 min.

Final attitude

Finally, participants completed the third booklet. They were asked to estimate the

general proportion of students in the University population who were against legalizing

euthanasia both to reinforce the minority/majority manipulation and as a check of it (this

procedure draws from Martin and Hewstone, 2008, 2007). Then, participants were asked to give

their (final) attitude toward legalizing euthanasia and answered other items as reported below.

<div align="center">

Dependent measures

</div>

All measures were on 9-point Likert scales.

Outcome

Participants' final attitude toward legalizing euthanasia provided our critical outcome.

Lower scores on this scale reflected a more unfavorable attitude toward legalizing euthanasia,

thus *greater* agreement with the source.

Motivated processing

As in Experiment 1, motivated information-processing was our hypothesized mediator

for the surprise expression effect on final judgment. This was measured by having participants

rate three items ("Did you think that being nuanced in your thinking was important when

reflecting on the issue?", "Did you try considering all possible viewpoints when thinking about

the issue?", and "Did you try entertaining all perspectives when considering arguments about the

issue?"), which were averaged into a single index (Cronbach's $\alpha = .84$). A confirmatory factor

analysis verified that these items loaded on one factor. Two participants did not complete the

items, which accounts for fewer degrees of freedom in the motivated processing analyses.

Additional checks

To check the effectiveness of the surprise expression manipulation, we asked participants to rate how much surprise the unfavorable students had expressed in reacting to the survey results. To check the effectiveness of the message strength manipulation, we asked participants to rate how strong the unfavorable students' arguments were.

Results

We first report manipulation checks. Second, we report the analyses on participants' final attitudes. Third, we examine the mediating role of participants' reported motivated processing. All tests are two-tailed.

Manipulation checks

We first conducted a 2 (Source: Minority vs. Majority) x 2 (Source's Emotion Expression: Surprise vs. No surprise) x 2 (Message Strength: Strong vs. Weak) between-subject ANOVA on the surprise expression check. Participants rated the unfavorable students as expressing more surprise in the surprise expression condition ($M = 8.31$, $SD = 1.09$) than in the no surprise expression condition ($M = 2.24$, $SD = 1.88$), $F(1, 68) = 266.88$, $p < .0001$, $\eta^2 = .80$. There were no other main or interaction effects. Thus, the surprise expression manipulation was successful.

We conducted the same 2 x 2 x 2 between-subject ANOVA on the message strength check. Participants rated the arguments as stronger in the strong message condition ($M = 6.46$, $SD = 2.29$) than in the weak message condition ($M = 3.90$, $SD = 2.03$), $F(1, 68) = 25.33$, $p < .0001$, $\eta^2 = .27$. There were no other effects. Thus, the message strength manipulation was successful.

Finally, we conducted the same 2 x 2 x 2 between-subject ANOVA on the minority/majority status check. Participants estimated the general proportion of unfavorable students in the University population as higher in the majority condition ($M = 67.25\%$, $SD = 21.39\%$) than in the minority condition ($M = 24.25\%$, $SD = 14.63\%$), $F(1, 68) = 95.92$, $p < .0001$, $\eta^2 = .59$. There were no other effects. Thus, the minority/majority status manipulation was successful.

Final attitudes

We conducted a 2 (Source: Minority vs. Majority) x 2 (Source's Emotion Expression: Surprise vs. No surprise) x 2 (Message Strength: Strong vs. Weak) between-subject ANCOVA on participants' final attitudes. This ANCOVA controlled for participants' initial (i.e., pretest) attitudes because prior research showed these strongly predict final attitudes (e.g., Laughlin, 1980). As expected, participants' initial attitudes strongly predicted their final attitudes, $F(1, 67) = 236.32$, $p < .0001$, $\eta^2 = .78$. Beyond that, there was a main effect of source status, such that an unfavorable majority made participants adopt a more unfavorable (i.e., lower-scored) final attitude ($M = 6.01$, $SD = 2.54$) than did an unfavorable minority ($M = 6.59$, $SD = 2.40$), $F(1, 67) = 4.23$, $p < .05$, $\eta^2 = .06$, consistent with prior research (e.g., Martin & Hewstone, 2008). There was also a marginal main effect of message strength, such that strong arguments marginally made participants adopt a more unfavorable final attitude ($M = 6.05$, $SD = 2.70$) than did weak arguments ($M = 6.55$, $SD = 2.25$), $F(1, 67) = 3.15$, $p = .08$, $\eta^2 = .04$. Beyond those, there was a main effect of surprise expression, such that an unfavorable faction expressing surprise made participants adopt a more unfavorable final attitude ($M = 6.02$, $SD = 2.43$) than did an unfavorable faction expressing no surprise ($M = 6.59$, $SD = 2.56$), $F(1, 67) = 4.14$, $p < .05$, $\eta^2 = .06$. Finally, there were no interaction effects.

Summary. Consistent with our argument, surprise expression made a minority/majority faction more likely to influence participants' final attitude. This effect of surprise expression seemed robust enough to hold independent of the source's minority/majority status and of message strength.

Mediation by motivated processing

Central to our argument is the idea that surprise expression motivates processing. Thus, we examined whether participants' reported motivated processing mediated the effect of surprise expression on final attitudes.

Figure 3 presents the results of the regression analyses, again controlling for participants' initial (i.e., pretest) attitudes. First, an unfavorable faction expressing surprise made participants adopt a more unfavorable final attitude than did an unfavorable faction expressing no surprise ($\beta = .11$; $t(67) = 2.04$, $p < .05$). Second, participants reported greater motivated processing after being exposed to an unfavorable faction expressing surprise rather than an unfavorable faction expressing no surprise ($\beta = .33$; $t(65) = 2.87$, $p < .01$). Third, participants' reported motivated processing predicted their adopting the unfavorable faction's attitude ($\beta = .19$; $t(71) = 3.43$, $p < .005$). Fourth, a regression on final attitudes was conducted with surprise expression and motivated processing as simultaneous predictors. In this regression, the effect of surprise expression became non-significant ($\beta = .06$; $t(64) = 1.06$, $p > .29$), whereas the effect of motivated processing remained significant ($\beta = .17$; $t(64) = 2.74$, $p < .01$). A Sobel test showed that the effect of surprise expression was significantly reduced when motivated processing was a simultaneous predictor ($Z = 1.98$, $p < .05$). Thus, participants' reported motivated processing mediated the effect of surprise expression on their being influenced by the source. These results replicate and extend those of Experiment 1.

General Discussion

Building off the general theory that factors affect whether groups are motivated to process information (De Dreu et al., 2008; De Vries et al., 1996) with recent work on emotional expressions (Van Kleef et al., 2010b) and on surprise expressions (Horstmann, 2003; Scherer & Grandjean, 2008), we investigated whether surprise expression would affect processing and judgment in groups. Experiment 1 examined actual, face-to-face interactions between minority and majority factions in decision-making groups and the effect of surprise expression on group decision accuracy. Experiment 2 directly showed that surprise expression affects the recipient's (i.e., the other faction's) processing and judgment by using a minority/majority influence paradigm. The current research contributes to our understanding of the role of emotional expressions in group decision-making and is the first to show effects of surprise expressions in social interactions.

In Experiment 1, the pattern of groups' decision accuracy was clear-cut. When at least one faction (i.e., either faction or both factions) expressed surprise during group discussion, the group decision was more accurate. Further, groups' information-processing behavior mediated this effect of surprise expression on group decision accuracy. These results are consistent with a motivated information-processing perspective on group decisions (De Dreu et al., 2008; De Vries et al., 1996); yet, they extend it by identifying surprise expression as an initial trigger. Finally, these results were independent of *felt* uncertainty. In this way, these results also support the theory that discrete emotional expressions shape social interactions independent of feeling states (Van Kleef et al., 2010b). Yet, they extend that theory to group decision-making.

Experiment 2 extended this effect of surprise expression on processing and judgment in groups. It used a minority/majority influence paradigm to rule out the possibility that the

expresser's *feelings* could underlie the effect of surprise expression on processing. Specifically, Experiment 2 demonstrated that a faction expressing surprise influenced the recipient's (i.e., the other faction's) final attitude to a greater extent. Further, participants' reported motivated processing mediated this effect of surprise expression. Taken together, Experiments 1 and 2 provide converging evidence that surprise expression importantly affects processing and judgment in groups.

<div style="text-align:center">The Interpersonal Effect of Surprise Expression in Groups</div>

The interaction effect of surprise expression that we found in Experiment 1, the interactive group decision-making experiment, suggests that it was enough for one faction to express surprise to affect group decision accuracy. Two factions expressing surprise did not add to that. And, whichever faction expressed surprise did not matter. This pattern suggests that surprise expression triggers a dynamic of processing at the group level. Because surprise expressers are seen as reflecting and wanting to know more (Frijda & Tcherkassof, 1997; Horstmann, 2003; Scherer & Grandjean, 2008), factions expressing surprise may stimulate recipients who, in the context of an intellective group decision-making task, may stimulate back expressers. That is, due to the dynamic, intellective nature of the task the *whole* group discussion may be enhanced by one faction expressing surprise. This dynamic interpretation of the pattern we found is consistent with the view that factors that increase group members' epistemic motivation also increase *group-level* information processing (e.g., De Dreu et al., 2008).

Experiment 2 shed further light on the effect of surprise expression on processing in groups. By using a more controlled paradigm in which surprise expression could only have a *unidirectional* effect, it showed that surprise expression affected the recipient's (i.e., the other

faction's) processing. Thus, *one* faction's surprise expression affected the *other*'s processing.

Hence, Experiment 2 demonstrated that surprise expression had an interpersonal effect on

processing in groups, supporting Van Kleef's and colleagues' theory (2010b), yet extending it to

groups.

Overall, our results are two-fold. Experiment 1 showed that surprise expression affected

the whole group dynamics in interactive group decision-making. Experiment 2 directly showed

that a faction's surprise expression increased motivated processing *by the recipient*. These

results are consistent with prior evidence that surprise expressers are seen as reflecting and

wanting to know more (Horstmann, 2003; Scherer & Grandjean, 2008) and, also, with the

argument by emotion theorists that surprise expression communicates high, wide attention

(Frijda, 1986; Russell, 1997). However, our results extend this prior research to social

interactions by showing that surprise expressers not only are seen in certain ways, but also affect

actual processing and, eventually, decision-making and judgment in groups. The emotional

expression of surprise had a powerful effect on group members' cognitions. Corroborating Van

Kleef's and colleagues' theory (2010b, p. 47), this discrete emotional expression was not a

"disruptive force that *interfered* with rational decision-making." Rather, it enhanced rational

decision-making (Experiment 1) and consideration of another's attitude (Experiment 2). To our

knowledge, the current research is the first to show that surprise alters actual judgment and

behavior.

<div align="center">Affect versus Emotional Expressions</div>

Affect has long been a central topic in social psychology, and its role in groups has

recently attracted the attention of researchers (Kelly & Barsade, 2001). Typically, researchers

explored the role of affective states, such as mood and feelings. They found that both mood

(Barsade, 2002) and feelings (Levin et al., 2010) influence group processing. Connected to the

current work, Phillips and her colleagues (2003; 2006) measured group members' affective

reactions, such as surprise *feelings*, and found these related to the group's climate. Yet, the

current work departs from Phillips' and colleagues' work by (1) manipulating surprise

expressions and (2) showing that these influence group members' actual processing and

judgment. Departing from the emphasis on affective states, the current research shows

consequences of discrete emotional expressions in interactive group decision-making and in

minority/majority influence.

Thus, our results speak to recent research on emotional expressions in social interactions

(Van Kleef et al., 2010b). They support the idea that discrete emotional expressions bear

important social consequences (Keltner & Haidt, 1999). Indeed, people notice the emotion

expressions of others (Ekman, 1993), and they attach much importance to those (Van Kleef et

al., 2010b). In turn, emotional expressions serve as a form of communication (Clark et al., 1996;

Frijda, 1986) and influence partners' reactions in social interactions (Van Kleef et al., 2010b).

While consistent with these ideas, our results also specifically support the notion that the

function of surprise expression in social interactions is to draw and redirect attention (Frijda,

1986; Russell, 1997). Consistent with Keltner's and Haidt's view (1999), they highlight that

emotional communications can serve as incentives for others' social behavior, thus playing an

important role in enhancing attention and thinking.

<div align="center">Motivated Information-Processing</div>

Finally, our results support a motivated information-processing perspective on group

decision-making and judgment (De Dreu et al., 2008; De Vries et al., 1996). Specifically, they

suggest that surprise expressions provide a motivation for group members to engage in effortful

behavior and information-processing. As such, surprise expressions seem to trigger epistemic

motivation both at the group level (Experiment 1) and by individual group members (Experiment

2). Indeed, the effect of surprise expression on processing seemed robust enough to hold

independent of the minority/majority status of the expressing faction – something noteworthy

because not many factors show this pattern (Martin & Hewstone, 2008). The motivation to

process information more openly that was provided by surprise expressions seemed potent

enough to overcome attitudinal differences in groups, plausibly because people attach much

importance to others' emotional reactions (Van Kleef et al., 2010b) and make strong inferences

about someone expressing surprise (Horstmann, 2003; Yik & Russell, 1999). The

communication of emotions seems a potent way to trigger motivated information-processing in

groups.

<div align="center">Future Research</div>

Although the effect of surprise expression on processing seemed robust across our two

experiments, there could be several important moderators to this basic effect. First, the current

experiments investigated the effects of surprise expression independent of the expresser's feeling

states. This leaves open the question as to whether the expresser's feeling surprised is *necessary*

for these effects to occur. Thus, future research could uncover whether strategic or genuine

expressions of surprise have similar or different effects.

In addition, the expression of surprise might be *combined* with other emotional

expressions. For example, sometimes a person may be both surprised and angry because of the

expectancy violation, but sometimes the surprise may make them happy (see Phillips, 2003).

Thus, there could be both positive and negative valence associated with the expression of

surprise. This distinction between *positive* and *negative* surprise may importantly moderate the effect of surprise in social interactions.

The current research focused on surprise because, among all basic emotions, surprise is the only one that has been found to express a need for more information (Scherer & Grandjean, 2008). Indeed, factors that make group factions *alert* generally enhance processing in groups (De Dreu et al., 2008), and surprise has been deemed to be the one emotion that communicates high alertness and wide, open attention (Frijda, 1986; Russell, 1997). Nonetheless, other emotional expressions could convey the general perception that the expresser is invested in the decision and much cares about it –e.g., the expresser must have thought about it thoroughly–, thus making recipients pay attention too (see Van Kleef et al., 2010b). For example, in feedback interactions, expressing anger can increase recipients' task engagement and cognitive effort (but only when recipients chronically enjoy high epistemic motivation; Van Kleef et al., 2010a). Consistent with that, anger might convey concentrated focus (but not *wider* thinking; Frijda, 1986). In addition, in negotiations, expressing sadness can increase recipients' concern for the expresser (Sinaceur et al., 2011), which might also make recipients more attentive to the expresser's argument. These effects of anger and sadness might potentially extend to interactive group decision-making and judgment, i.e., when groups discuss and argue about opinions. Perhaps any emotional expression that makes recipients more engaged in the argument would enhance recipients' processing. Thus, future research should further investigate whether, and when, discrete emotional expressions other than surprise influence interactive group decision-making and judgment.

<div align="center">Conclusion</div>

Drawing from the general theory that factors affect whether groups are motivated to process information (De Dreu et al., 2008; De Vries et al., 1996), and integrating it with recent research on emotional expressions (Van Kleef et al., 2010b) and on surprise expressions (Horstmann, 2003; Scherer & Grandjean, 2008), we investigated whether surprise expression affects group judgment and processing. In Experiment 1, when at least one faction (i.e., either faction or both factions) expressed surprise during group discussion, the group decision was more accurate. This effect of surprise expression resulted from the group's greater information-processing behavior. Experiment 2 extended this result by showing that surprise expression made a minority/majority faction more influential. Consistently, this effect of surprise expression resulted from greater reported motivated processing.

The current research contributes to our understanding of the role of emotional expressions in group decision-making and is the first to show that surprise expressions affect social interactions. The current results highlight the impact of discrete emotional *expressions* in interactive group decision-making and in minority/majority influence, hence departing from prior research on interactive group decision-making (e.g., Levin et al., 2010) and on minority/majority influence (e.g., Ziegler & Diehl, 2011) that highlighted the role of affective *states*. The current results also depart from prior work on emotional expressions in social interactions (Van Kleef et al., 2010b) by extending that work to group decision-making and judgment. In this way, our results support a motivated information-processing perspective on group decision-making and judgment (De Dreu et al., 2008; De Vries et al., 1996). Emotional expressions can have a powerful effect on group cognition.

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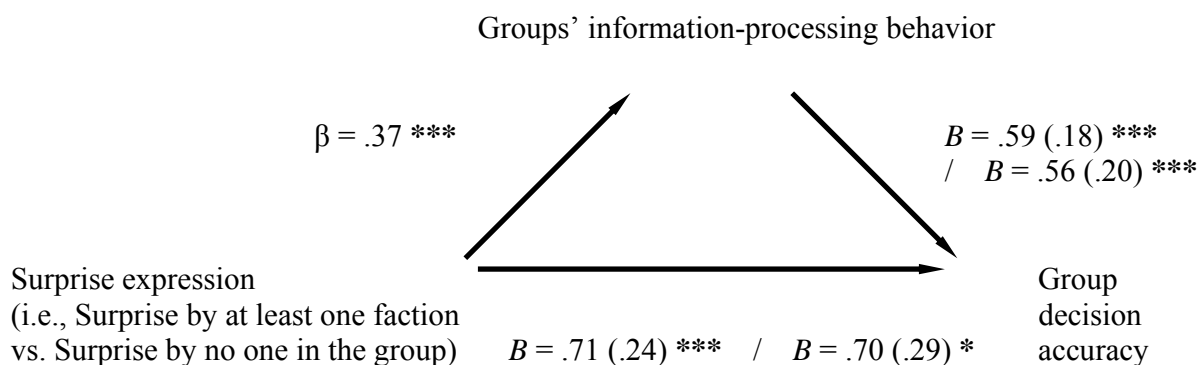
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Figure 1. Experiment 1: Proportions of groups reaching an accurate decision
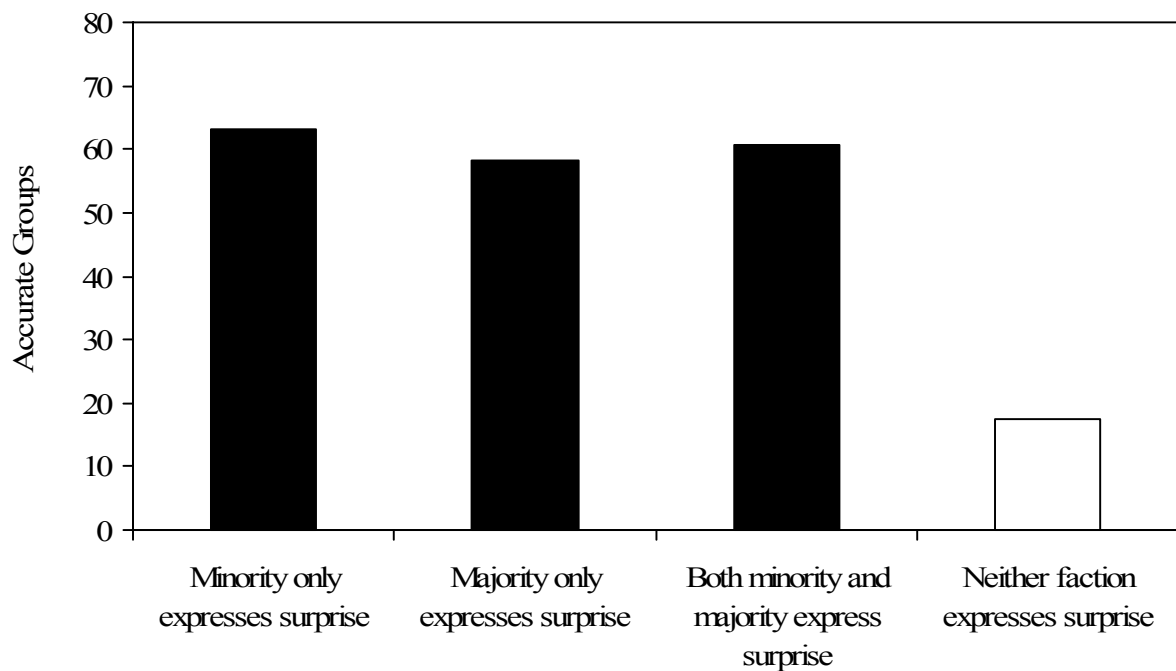
Note. Proportions of groups reaching an accurate decision (in %) were obtained by conducting a binary logistic regression in which factions' initial accuracy was controlled for. The only significant difference was between the minority neutral – majority neutral cell (i.e., neither faction expressing surprise) and the other three cells ($p < .005$).

Figure 2. Experiment 1: Groups' information-processing behavior mediates the effect of surprise expression on group decision accuracy
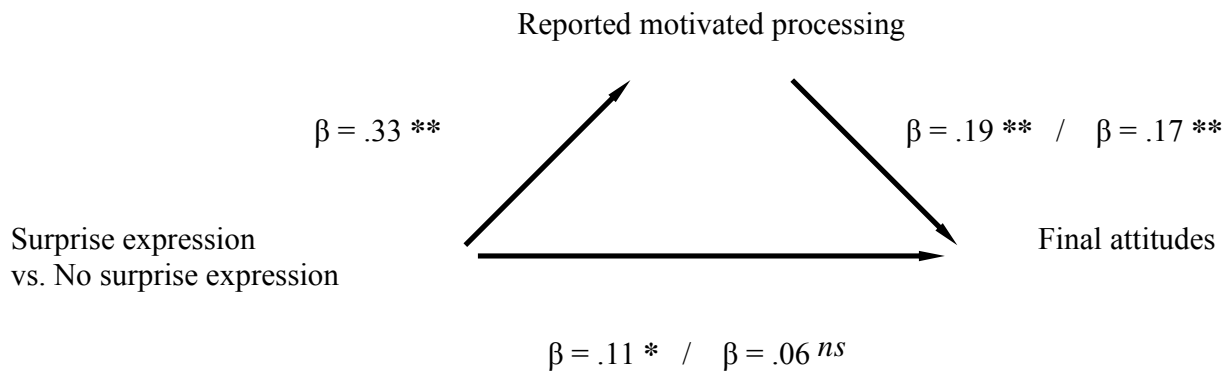
Groups' information-processing behavior

β = .37 ***

B = .59 (.18) ***
/ B = .56 (.20) ***

Surprise expression
(i.e., Surprise by at least one faction
vs. Surprise by no one in the group) B = .71 (.24) ***   / B = .70 (.29) *

Group
decision
accuracy

* $p < .05$ ** $p < .01$ *** $p < .005$.

Note. Regressions that include the Surprise expression predictor also include the other two predictors that are based on orthogonal contrast coding to partition out the total variance (Howell, 1997). Namely, these are the (Surprise by both factions vs. surprise by one faction only) predictor and the (Surprise by the minority only vs. surprise by the majority only) predictor (thus, forming orthogonal factors). We controlled for factions' initial accuracy in all regressions. In the linear regression, the number represents the standardized regression coefficient. In the binary logistic regressions, numbers represent unstandardized coefficients and standard errors are in parentheses. Information-processing behavior was measured at the group level through each faction rating each other.

Figure 3. Experiment 2: Mediation by reported motivated processing

Reported motivated processing

$\beta = .33$ **

$\beta = .19$ ** / $\beta = .17$ **

Surprise expression
vs. No surprise expression

Final attitudes

$\beta = .11$ * / $\beta = .06$ *ns*

* *p* < .05.   ** *p* < .01.

Note. Regressions that include surprise expression as a factor also include the other two

manipulated factors and all their interaction terms (thus forming orthogonal factors). We also

controlled for participants' initial (i.e., pretest) attitudes. Numbers represent standardized

regression coefficients.

Notes

[1] We verified that the experimental factors were not correlated with minorities' or majorities' initial accuracy. Chi-squares showed no significant differences in the distributions of initially accurate minorities or majorities across experimental conditions.

[2] Initial confidence might affect decision quality and information processing in groups (e.g., De Vries et al., 1996; Phillips, 2003). Thus, we controlled for it.

[3] The ICC(1) for the two majority members was .47.

[4] The ICC(1) for the two faction averages was .23, which remained satisfactory (see Klein & Kozlowski, 2001).

[5] As mentioned above, we also controlled for (pre-manipulation) initial confidence. The effect for the control of (pre-manipulation) initial confidence was marginal ($p = .09$).

[6] We also conducted multi-level analyses on faction's behavior to verify that minorities and majorities responded similarly to the other faction's surprise expression. Specifically, these multi-level analyses used a 2 (Faction's emotion condition) x 2 (Faction's minority/majority status) design with factions nested within groups. As expected, there was a main effect of faction's surprise, such that factions expressing surprise motivated the other faction's information-processing to a greater extent ($p < .02$). There was no main effect for faction's

minority/majority status (*ns*). Importantly, there was no interaction due to faction's

minority/majority status (*p* > .49).