



## Sympathy for the devil? The physiological and psychological effects of being an agent (and target) of dissent during intragroup conflict



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### HIGHLIGHTS

- We examined intragroup conflict at the individual level
- We tested cardiovascular effects of being an agent and target of dissent
- Targets exhibited avoidance responses; Agents exhibited approach responses
- Targets experienced threats to all fundamental psychological needs
- Agents experienced threats to belonging and self-esteem but not control needs

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### ABSTRACT

Research has accumulated on the impact of intragroup conflict on group outcomes, but little is known about the effects of dissent on the individuals who provide it. Here, we examined how being the agent *and* target of dissent impacted physiological responses and psychological needs. Groups of three (a participant and two confederates) completed a marketing task. Participants were assigned to an agent of dissent, target of dissent, or inclusion control role. Agents of dissent exhibited an approach-motivated cardiovascular profile: low vascular resistance and rapid sympathetic recovery. Conversely, targets displayed avoidance responses: vasoconstriction. Role assignment also impacted basic psychological needs. Targets experienced threats to all fundamental needs, but agents only exhibited threats to belonging and self-esteem (not control or meaningful existence) needs. Taken together, agents and targets of dissent responded vastly differently in this group performance context. Implications for health and performance are discussed.

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### Introduction

Organizational decisions are rarely unilateral. Important decisions are typically made in groups. During the decision process, groups strive to reach strategic consensus – agreement on strategy-relevant content (see Kellermanns, Walter, Floyd, Lechner & Shaw, 2011, for a review) – which improves coordination after decisions, assists in the implementation of agreed strategies, and attenuates self-interest (Guth & MacMillan, 1986; Kellermanns & Floyd, 2005). Strategic consensus has an overall positive effect on organizational performance, but is not necessarily beneficial for decision outcomes, particularly objective outcomes (Kellermanns et al., 2011). In cohesive social groups, members can be motivated to maintain cohesion. If motivation to conform limits critical scrutiny of options, classic research indicates that

the resulting *groupthink* can impair decision making (Janis, 1972, 1982). Thus, under some circumstances intragroup conflict can benefit group performance. However, little is known about the psychological profiles, and nothing is known about the physiological profiles, of the individuals who are tasked with engaging in dissenting behavior. This is especially important given that basic psychological needs of belonging can be threatened by dissenting from a consensus. For instance, individuals providing rejecting feedback to others may damage relationships. Towards this end, we integrate social stress models with research on psychological factors to establish profiles of dissenters (and targets of dissent).

#### *Intragroup conflict and “Devil’s advocates”*

Intragroup conflict is perceived incompatibility or difference among group members (De Dreu & Gelfand, 2008). A large corpus of research has accumulated in the past half-century (plus) on intragroup conflict and its effect on conformity and performance (Asch, 1955; see De Dreu

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& Weingart, 2003, and De Wit, Greer, & Jehn, 2012; Schwenk, 1990 for meta-analytic reviews). These efforts identified three subtypes of intragroup conflict (relationship, process, and task conflicts), which moderate associations with outcomes. Each subtype involves disagreement among group members but differ in the focus of the disagreement. *Relationship conflict* entails disagreement regarding personal issues (personality clashes or differential values). *Process conflict* is disagreement about logistics (how the group makes decisions). Finally, *task conflict* involves disagreement about decision content/outcomes (what the group ultimately decides) (Jehn & Bendersky, 2003). Whereas relationship and process conflicts predict less cohesion and positive affect, task conflict exhibits no such negative associations (De Wit et al., 2012). More importantly, task conflict positively predicts decision quality and performance compared to other types of intragroup conflict as it helps overcome confirmatory biases (Schulz-Hardt, Brodbeck, Mojzisch, Kerschreiter, & Frey, 2006; Schweiger, Sandberg, & Rechner, 1989; Schwenk, 1990) and enhances innovation (e.g., De Dreu, 2006; De Dreu & West, 2001).

Business and government leaders, conscious of the benefits of task conflict, have developed methods to foster beneficial conflict. The most widely used approach is assigning a member (or members) of the group to act as a “Devil’s advocate” (DA) by dissenting to others’ ideas/suggestions regardless of whether they agree or not. The central aim of the DA is to dissent without necessarily offering a counterplan. Meta-analytic data suggests that the DA type of intragroup task conflict improves decision outcomes relative to strategies involving no conflict (Schwenk, 1990).

Although the extant literature suggests that intragroup task conflict can facilitate group outcomes, no research to date has examined the effects of task conflict on the individuals who are assigned to provide it. Given the important effects that social-situational factors have on emotions, decisions, and health (Barrett, 2006; Lieberman, 2007; Slovic, Peters, Finucane, & MacGregor, 2005; Stroebe, 2011), it is integral to understand how dissent impacts individuals in group performance contexts. To illustrate, current models of emotion indicate that emotional experiences are constructed from situational factors, bodily responses, cognitive appraisals, and language (e.g., Barrett, 2006). Although task conflict (and rejection more broadly) is an oft studied situation, the bodily responses and appraisal processes of agents who provide rejecting feedback remain unclear. Along these lines, the research presented here examined the physiological and psychological effects of providing and receiving dissenting feedback.

#### *Task conflict as stress*

Group decision tasks are acutely stressful goal-directed, motivated performance situations. There exist situational demands (making a choice or completing an assignment) that the group must meet. DAs are agents of dissent in this context. Here, we conceptualize dissent as any response aimed as dissenting to, rejecting, or disagreeing with the input of another, the *target* of dissent. Thus, task conflict involves an agent and target(s). Although the organizational literature routinely discusses stress in intragroup conflict settings, to our knowledge no research to date has actually measured individuals’ stress responses during group performance. Towards this end, this research is the first to examine how being the agent and target of dissent affects cardiovascular responses with an eye towards understanding motivational orientation. To do so, we relied on the theoretical framework provided by the biopsychosocial (BPS) model of challenge and threat (see Blascovich & Mendes, 2010, for a review).

Broadly, BPS models explain how acute stress responses unfold in active, goal-directed situations. More specifically, the BPS model of challenge and threat provides a theory of how appraisals of situational demands interact with appraisals of coping resources to determine responses in motivated situations. Challenge and threat states are both accompanied by sympathetic nervous system (SNS) activation, but differ in antecedent processes and downstream responses. Individuals

experience challenge when sufficient coping resources exist to meet demands. This elicits approach motivation and resultant physiological changes including dilation of the peripheral vasculature so as to increase the delivery of oxygenated blood to the brain. Alternatively, threat manifests when demands exceed resources, producing avoidance motivation. The body, in turn, decreases cardiac efficiency and constricts the vasculature in anticipation of harm.

Targets of negative social feedback typically experience threat (Blascovich, Mendes, Tomaka, Salomon, & Seery, 2003). In fact, negative social evaluative feedback is one of the most effective and reliable means to activate the hypothalamus–pituitary–adrenal (HPA) axis – a primary stress system that responds to threat – in the laboratory (see Dickerson & Kemeny, 2004, for a review). The pattern of reactivity for agents of dissent is less clear. On one hand, dissenting is an approach-motivated act. DAs must actively act against others. Dissonance theory suggests that engaging in such approach-motivated behaviors should elicit responses consistent with that motivational orientation. If so, this would produce approach-oriented physiological reactions (cf., Jamieson et al., 2013a, 2013b). Alternatively, providing dissenting feedback can potentially damage relationships, which could bring about threat responses if dissent diminishes social coping resources.

Delineating physiological responses of agents and targets of dissent has direct implications for understanding downstream responses. For instance, threat predicts impaired decision making in the short-term (Kassam, Koslov, & Mendes, 2009) and is associated with more rapid cognitive decline with age over the long haul (Jefferson et al., 2010). On the other hand, approach-motivated responses have been linked to improved cognitive performance (Dienstbier, 1989; Jamieson et al., 2010b), but can also promote risky decision making (Jamieson et al., 2013a). Because no studies to date have examined how agents of dissent respond physiologically during group performance, research has likely missed information pertinent for understanding health and decision outcomes in group performance contexts. The research presented here fills this gap in the literature.

#### *Fundamental psychological needs*

The stressful nature of task conflict stems from the rejecting feedback provided by the agent to the target(s). Not only does providing and receiving negative feedback affect physiological responses as specified above, but it also has important consequences for psychological processes. The temporal-need threat (TNT) model provides a theoretical framework to understand the psychological impact of dissent during group performance.

The TNT model posits that social exclusionary/rejecting acts reflexively threaten four fundamental psychological needs: belonging, self-esteem, control, and meaningful existence (see Williams, 2009, for a review).<sup>1</sup> Belonging and self-esteem needs are associated with maintaining and developing social connections with others. Control and meaningful existence needs are independent of social-relational factors, and are determined by the individual’s ability to autonomously make decisions and enact behaviors (Williams & Nida, 2011). Empirical research demonstrates that being the target of negative social feedback threatens all four of these basic psychological needs (Williams, 2009). Need-threat then predicts negative mental health outcomes (e.g., Baumeister & Leary, 1995; Smith et al., 1999), and even activates

<sup>1</sup> This research focused on social rejection in group contexts. Thus, we relied on the organizing theoretical framework provided by the TNT model. However, the basic psychological needs argued for by TNT correspond to those featured in other prominent models, such as self-determination theory (SDT; Deci & Ryan, 2010). For instance, TNT and SDT include a social connection factor (belonging in TNT, relatedness in SDT), a self-guided behavior factor (control in TNT, autonomy in SDT), and a positive self-regard factor (self-esteem in TNT, competence in SDT). The meaningful existence factor from TNT is associated specifically with the experience of rejection/exclusion.

neural networks underlying physical pain (Eisenberger, Lieberman, & Williams, 2003). Agents of rejecting feedback, on the other hand, tend to exhibit need satisfaction, not threat (Zadro, Williams, & Richardson, 2004).

During group performance, targets of dissent should respond similarly as targets of other forms of rejection/exclusion. That is, targets may lose their sense of belonging as their ideas are discounted, and self-esteem is expected to decrease because it is at least partly tied to inclusionary status and competence (Leary, Haupt, Strausser, & Chokel, 1998). Control is stripped away because targets have no impact on decision outcomes. Finally, existential needs are threatened because rejection renders the target's input, and mere presence in the group, meaningless. Likewise, providing dissenting feedback may also be expected to threaten belonging and self-esteem needs: agents of dissent endanger social connections by actively rejecting others. However, agents are not likely to experience threats to control or meaningful existence needs. Providing dissenting feedback, instead, satisfies the need of the individual to influence group outcomes. Similarly, dissenting to others requires that fellow group members acknowledge the feedback by either a) responding to or refuting it, or b) acquiescing.

As with stress responses, research has yet to examine the impact of being an agent or target of dissent in group performance situations on basic psychological needs. Thus, this research is the first to specify the unique psychological experiences of dissent agents and targets, which has important implications for group performance outcomes and downstream individual processes, most notably health and well-being.

#### Current research & predictions

Intragroup conflict in the form of dissent is commonly employed to improve group performance outcomes (De Dreu & Weingart, 2003). The research reported here examines the effects of dissent on individual group members' physiological and psychological responses. To test predictions, we manipulated agent/target status in the context of a group performance task. Groups of three (a participant and two confederates) were instructed to create a novel marketing plan for an everyday object (a stapler). Participants were randomly assigned to an agent, a target, or an inclusion control condition.

First, we sought to differentiate the cardiovascular responses of agents and targets during group performance. Compared to participants in the other conditions, agents of dissent were expected to exhibit an approach-motivated physiological profile. Consistent with dissonance theory, we hypothesized that agents instructed to engage in approach-motivated behaviors (actively rejecting others' ideas) should experience cardiovascular responses consistent with that motivational orientation: decreased vascular resistance throughout the marketing task, greater sympathetic nervous system (SNS) activation at the outset of the marketing task, and a rapid recovery from stress (i.e. quick return to homeostasis) after the conclusion of the group task compared to the other conditions. On the other hand, we predicted that targets of dissenting feedback would display avoidance-oriented, threat responses compared to the other groups as indexed by increased vascular resistance throughout (and extending beyond) the marketing task.

To further examine stress responses we also measured cognitive appraisals of stress. As specified above, the BPS model of challenge and threat posits that challenge responses (i.e. the predicted pattern for agents) occur when appraisals of coping resources exceed appraisals of situational demands (Blascovich & Mendes, 2010). On other hand, threat responses (i.e. the predicted pattern for targets) manifest when demands exceed resources. Similar to the cardiovascular predictions outlined above, we anticipated that agents of dissent would report greater challenge appraisals and targets would report greater threat appraisals relative to the other groups.

Immediately following the group performance task, participants reported on their fundamental psychological needs. We hypothesized that targets would report threats to four fundamental needs (belonging, self-esteem, control, and meaningful existence) compared to included

controls, while agents were expected to exhibit threats to only belonging and self-esteem needs (not control or meaningful existence). If predictions are supported, the different psychological experiences of agents/targets suggest that targets suffer greater need-threat than the agents who provide dissenting feedback. This information is important for understanding motivation and behavior as past research demonstrates that threats to belonging needs (and need threat more generally) motivate performance after ostracism (Jamieson, Harkins, & Williams, 2010), and a multitude of data indicate that psychological need threat can have damaging effects on mental and physical health (e.g., Ryan, 1995; Ryan & Deci, 2000; Williams, 2009).

## Method

### Participants

One hundred and three (103) participants (63% female; 58 White, 14 Black, 10 Hispanic, 21 Asian) were recruited using online subject pool systems (SONAs) and posted flyers. Participants ( $M_{age} = 21.04$  years,  $SD = 1.26$ ; range: 18–25) were prescreened and excluded for hypertension, pacemakers, cardiac medications, and pregnancy/breast-feeding. Participation lasted approximately 1 1/2–2 h and participants were compensated two credit-hours or \$10.

### Procedure

After providing consent, participants were affixed with noninvasive sensors and then rested for a 5-min baseline recording. Participants then met their interaction partners (actually confederates working in the lab). The three completed a modified Fast Friends task (Aron, Melinat, Aron, Vallone, & Bator, 1997): a laboratory paradigm developed to increase interpersonal closeness and group cohesion (e.g., Page-Gould, Mendoza-Denton, & Tropp, 2008). For 7-min the three took turns asking/answering a series of personal questions. Confederates acted friendly throughout the interaction. After the allotted 7-min experimenters returned and escorted the participant to a private testing room.

The experimenter then explained that the participant and his/her interaction partners would complete a group performance task. The goal was to create a marketing plan for an everyday object: a stapler. Groups had 5-min to discuss each of the three topics: demographics (who the stapler should be marketed to), content (the advertisement content), and resource allocation (how best to assign resources to different outlets such as print vs. TV vs. social media). The task was completed via typed responses over an online chat program (Gmail's G-chat), and cardiovascular measures were recorded throughout. An experimenter informed groups when to start/stop segments via an intercom. Responses of the other group members were controlled by research assistants in an adjacent room.

Participants were randomly assigned to one of three conditions during the marketing task: agent of dissent (Devil's advocate), target of dissent, or inclusion control. Participants assigned to the agent (i.e., DA) role were given the following additional instructions:

During the marketing task today, we would like you to act as a Devil's advocate. That is, throughout the task we would like you to disagree with the other participants' ideas regardless of whether you actually agree with them or not. The reason you have been assigned to disagree with others' ideas is because during most group projects members are hesitant to question each other. Unfortunately this "groupthink" often leads to poor decisions. Better decisions result when ideas are challenged...So please try to question and disagree with each idea that the other participants offer during the marketing task. Let no opinion or idea go unquestioned.

Participants assigned to be targets of dissent had their ideas rejected. Confederates rejected/dissented to any idea the participant offered

during the marketing task. For instance, one of the confederates' stock response stems was, "I don't think it's a good idea to \_\_\_\_\_ because..." To enhance believability, dissenting responses were tailored to match the content of participants' suggestions. In the inclusion control condition there was no task conflict. Confederates accepted and integrated each other's and the participant's ideas into the marketing plan.

Immediately following the three segments of the marketing task, participants rested alone for 3-min so we could assess recovery following stress. After recovery, participants completed stress appraisals and psychological need measures.

### Cardiovascular measures

The following measures were collected at 1000 Hz: electrocardiography (ECG), impedance cardiography (ICG), and blood pressure (BP). Signals were integrated with a Biopac MP150 hardware. ECG and ICG signals were scored offline by trained personnel. Signals were visually examined and ensembled averages were analyzed using a Mindware software. Reactivity scores were computed by subtracting scores taken during the final minute of baseline (the most relaxed period) from those collected during the first minute (the most reactive period) of each segment and the last minute of recovery. Analyses focused on pre-ejection period (PEP) and total peripheral resistance (TPR).

PEP is a chronotropic measure of the contractile force of the heart. Greater SNS activation is indicated by shorter PEP intervals. Consistent with physiological toughness models (cf., Dienstbier, 1989), challenge states tend to elicit more SNS activation than threat states. TPR is a measure of vasoconstriction/vasodilation. When threatened the vasculature constricts, producing high TPR scores. Alternatively, challenge states are associated with dilation of the peripheral vasculature as the body increases delivery of oxygenated blood to the brain.

### Questionnaire measures

#### Stress appraisals

Immediately after the marketing task, participants completed a measure of stress appraisals that assessed cognitive appraisals of challenge and threat (Mendes, Gray, Mendoza-Denton, Major, & Epel, 2007, see Appendix A of the SOM for the scale).

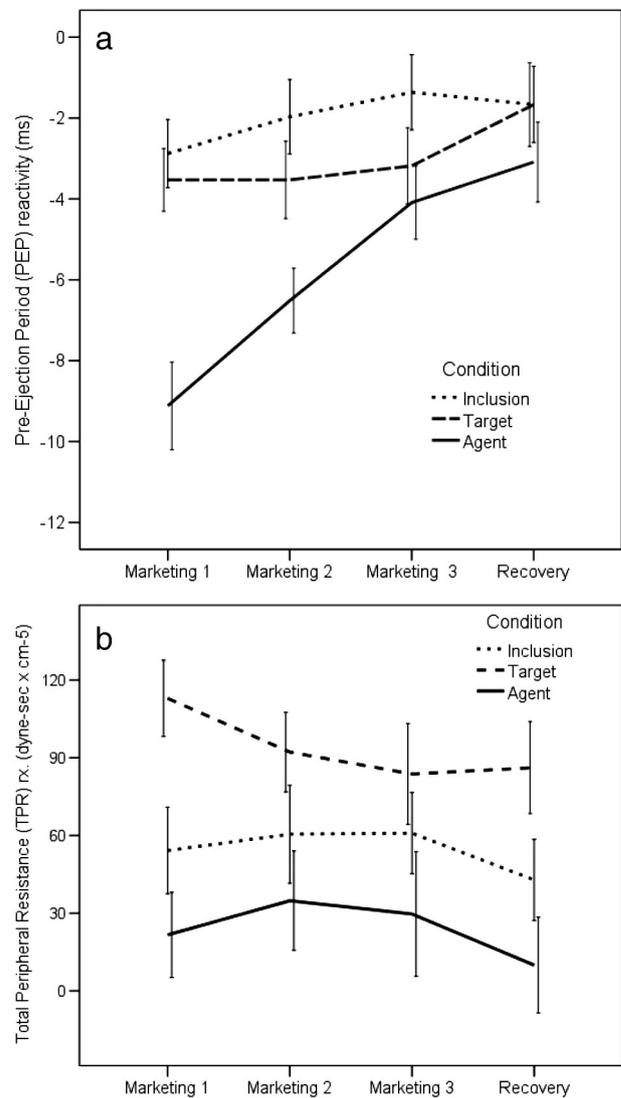
#### Psychological needs

Also after the group task participants completed a fundamental psychological need questionnaire (Williams, 2009, see Appendix B of the SOM for the full scale) to assess the impact of agent/target role on their psychological experience of the task. The scale separately assesses each psychological need: belonging, control, self-esteem, and meaningful existence.

## Results

### Cardiovascular reactivity

Because of ICG signal artifacts, the cardiovascular data from five participants (2 agents, 1 target, and 2 controls) could not be analyzed. We first assessed raw scores at baseline to examine whether group differences might have obscured reactivity effects. No baseline differences were observed in PEP or TPR as a function of condition,  $F_s < 1$ . Reactivity scores were then analyzed in 4 (Time: marketing segment 1 vs. marketing segment 2 vs. marketing segment 3 vs. recovery period)  $\times$  3 (Condition) mixed-ANOVAs. Planned contrasts (Kirk, 1995) were used to test a priori predictions. Means and standard errors are presented in Fig. 1. See Supplemental material for observed power levels for predicted effects.



**Fig. 1.** Cardiovascular reactivity (a: PEP; b: TPR) as a function of time. Scores reflect changes from baseline to the first minute of each time segment (i.e. data are not continuous). Error bars correspond to  $\pm$  standard error of the mean.

#### Pre-ejection period (PEP)

Analysis of PEP produced main effects for condition,  $F(2,95) = 5.81$ ,  $p = .004$ ,  $d = .50$ , and time,  $F(2,95) = 14.57$ ,  $p < .001$ ,  $d = .78$ . However, these should be interpreted in the context of the predicted Time  $\times$  Condition interaction,  $F(2,95) = 7.10$ ,  $p = .001$ ,  $d = .55$ . As depicted in Fig. 1a, agents exhibited more SNS arousal during the first and second marketing segments than targets,  $F(1,66) = 6.12$ ,  $p = .016$ ,  $d = .61$ , and inclusion controls,  $F(1,66) = 7.51$ ,  $p = .008$ ,  $d = .68$ . By segment three, agents were marginally more aroused than controls,  $F(1,66) = 3.31$ ,  $p = .073$ ,  $d = .45$ , but did not differ from targets,  $F < 1$ . Finally, at recovery no significant differences were observed between groups,  $p_s > .27$ .

#### Total peripheral resistance (TPR)

Analyses of TPR produced only the predicted main effect for condition,  $F(2,95) = 6.70$ ,  $p = .002$ ,  $d = .53$  (see Fig. 1b). Across all segments of the marketing task and lasting through recovery, participants assigned to the DA role exhibited significantly lower TPR scores (less vasoconstriction) than targets,  $F(1,66) = 13.86$ ,  $p < .001$ ,  $d = .92$ , and marginally lower TPR scores than inclusion participants,  $F(1,66) = 3.05$ ,  $p = .085$ ,  $d = .43$ . Moreover, targets of negative feedback

**Table 1**  
Stress appraisals and fundamental psychological needs as a function of role assignment.

Role	Stress appraisals				Psychological needs							
	Challenge		Threat		Belonging		Self-esteem		Control		Meaningful existence	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Agent	5.47 <sub>a</sub>	1.02	1.91 <sub>a</sub>	1.16	4.68 <sub>a</sub>	1.28	4.39 <sub>a</sub>	1.15	5.33 <sub>a</sub>	1.03	5.37 <sub>a</sub>	1.20
Target	4.82 <sub>b</sub>	.97	2.56 <sub>b</sub>	1.50	4.24 <sub>b</sub>	1.41	4.02 <sub>a</sub>	1.44	3.32 <sub>b</sub>	1.47	4.51 <sub>b</sub>	1.23
Inclusion	5.08 <sub>a,b</sub>	1.04	1.69 <sub>a</sub>	1.08	5.84 <sub>c</sub>	.87	5.18 <sub>b</sub>	.90	5.33 <sub>a</sub>	.79	5.88 <sub>a</sub>	.61

Means not sharing a subscript within a column differ at  $p < .05$ .

experienced more vasoconstriction compared to inclusion controls,  $F(1,66) = 4.11, p = .047, d = .50$ . Please refer to the Supplemental online material (SOM) for additional physiological measures and analyses.

The cardiovascular data indicates that, consistent with research on social evaluative threat (Dickerson & Kemeny, 2004), targets of dissent experienced an avoidance-motivated, threat response as indexed by greater vasoconstriction relative to the other groups. On the other hand, agents of dissent exhibited an approach-motivated physiological profile compared to the others. That is, agents experienced heightened SNS activation at the outset of the marketing task, quickly returned to homeostasis after, and exhibited less vasoconstriction relative to the other groups. In sum, a priori physiological predictions were supported. Individuals assigned to provide versus receive rejecting feedback during group performance demonstrated diametrically opposite patterns of reactivity.

#### Questionnaire measures

Means, standard deviations, and group comparisons are presented in Table 1.

#### Stress appraisals

Challenge and threat appraisals were analyzed separately. Challenge appraisals produced an effect for condition,  $F(2,100) = 3.53, p = .033, d = .38$ . Agents exhibited higher challenge appraisals ( $M = 5.47, SD = 1.02$ ) compared to targets ( $M = 4.82, SD = .97$ ),  $F(1,66) = 7.04, p = .010, d = .65$ . Agents' challenge appraisals were also numerically higher, but did not significantly exceed those of inclusion controls ( $M = 5.08, SD = 1.04$ ),  $F(1,65) = 2.56, p = .114, d = .40$ .

We also observed a condition effect for threat appraisals,  $F(2,100) = 4.44, p = .013, d = .42$ . Targets of negative feedback reported higher threat appraisals ( $M = 2.56, SD = 1.50$ ) than agents ( $M = 1.91, SD = 1.16$ ),  $F(1,66) = 4.54, p = .036, d = .53$ , and inclusion conditions ( $M = 1.69, SD = 1.08$ ),  $F(1,65) = 8.14, p = .006, d = .71$ .

#### Psychological needs

As a result of correlations among psychological needs ( $r_s > .63, p < .001$ ), psychological need data were first analyzed in a multivariate model (MANOVA). Psychological needs were standardized as z-scores and entered simultaneously. This test produced a multivariate main effect for condition, Wilks'  $\lambda = .431, F(8,194) = 12.70, p < .001, \eta_p^2 = .344$ . An examination of means suggested that the pattern of effects varied as a function of psychological need. Univariate analyses are presented below.

Significant condition effects were observed for each psychological need: belonging,  $F(2,100) = 16.26, p < .001, d = .81$ ; control,  $F(2,100) = 36.03, p < .001, d = 1.20$ ; self-esteem,  $F(2,100) = 8.68, p < .001, d = .59$ ; and meaningful existence,  $F(2,100) = 15.01, p < .001, d = .78$ . As illustrated in Table 1, both agents and targets of dissent exhibited lower levels of belonging needs relative to included controls,  $p_s < .001$ . Similarly, agents and targets exhibited lower levels of self-esteem needs than controls,  $p_s < .008$ . Consistent with predictions, a

different pattern emerged for control and meaningful existence needs. Targets reported reduced control needs relative to agents and inclusion controls,  $p_s < .001$ . Likewise, targets exhibited lower levels of meaningful existence needs than agents and controls,  $p_s < .001$ . Taken together, participants assigned to be targets of dissenting feedback during the group task exhibited threats to all four fundamental psychological needs compared to the inclusion control participants. However, the agents of dissent only exhibited threats to belonging and self-esteem needs relative to controls. Their control and meaningful existence needs were met during the group performance task.

#### Discussion

This research examined the effects of receiving and providing dissenting feedback on physiological responses and psychological experiences during group performance. There were several noteworthy findings. First, agents and targets of dissent showed differential cardiovascular response patterns. Agents exhibited an approach-motivated cardiovascular profile – increased SNS activation combined with a rapid return to baseline (see PEP findings) and less vasoconstriction (see TPR findings) – relative to the other groups. Conversely, targets displayed avoidance responses – SNS activation (see PEP findings) and greater vasoconstriction lasting throughout the study (see TPR findings) compared to others. In addition to eliciting different physiological responses, role assignment also impacted stress appraisals. Consistent with the cardiovascular data, agents of dissent perceived their possessed coping resources to meet the demands of the situations, whereas targets appraised task demands as exceeding resources during group performance.

The different patterns of physiological responding and cognitive appraisals experienced by agents and targets of dissent have direct practical import, as well as implications for theory development. For example, the data reported here are important for understanding health and decision making outcomes in organizational settings (e.g., Jamieson et al., 2013a; Jefferson et al., 2010; Kassam et al., 2009). To demonstrate, approach-motivated physiological responses are tied to risky decision making (Jamieson et al., 2013a). Agents of dissent who experience an “approach” response profile may be likely to suggest or endorse riskier ideas. On the other hand, the threat responses that targets experienced predict cautious decision making (Kassam et al., 2009). Thus, the knowledge provided by this research provides a lens through which to interpret individuals' behavior in group settings.

More broadly, the cardiovascular data contributes to research that suggests that being the target of negative social feedback is harmful (cf. Dickerson & Kemeny, 2004). That is, being ostracized, rejected, bullied, or as suggested here even having one's ideas shot down in group performance contexts can have serious negative health effects if experienced repeatedly (Cacioppo, Hawkey and Berntson, 2003; Copeland, Wolke, Angold, & Costello, 2013; Stroud, Tanofsky-Kraff, Wilfley, & Salovey, 2000; Williams, 2009). Thus, interventions developed to improve responses to negative social evaluation may also have a place in organizational settings. For example, emotion regulation strategies

that encourage targets of negative feedback to reappraise stress responses as beneficial have been shown to improve physiological functioning and performance (see Jamieson, Mendes & Nock, 2013b, 2013c, for a review). The data presented here suggest that a similar approach may be deployed in organizational settings, and group performance contexts specifically, to help inoculate individuals against the potential harms of negative feedback.

A second set of noteworthy findings emerged in our fundamental psychological need analysis. Whereas targets of dissent experienced threats to all fundamental needs, agents only exhibited threats to belonging and self-esteem needs compared to participants in the other groups. As hypothesized, agents' control and meaningful existence needs were met (cf. Zadro et al., 2005). Given the multitude of data on the association between threats to psychological needs and poor health and well-being outcomes (e.g., Ng et al., 2012), targets of dissent are at greater risk for these negative outcomes than the agents who provide the feedback. Moreover, findings from the bullying literature underscore the potential import of the psychological need data reported here. Targets of bullying (who also experience need-threat) exhibit poor long-term health and wealth outcomes, but no adverse long-term effects were observed for agents of bullying (Wolke, Copeland, Angold, & Costello, 2013). Similarly, ostracizing others has been associated with positive personal outcomes, but being the target of ostracism is a wholly negative experience (Zadro & Gonsalkorale, in press). Thus, assigning individuals to DA roles may thwart belonging and self-esteem needs, but this role assignment is psychologically less adverse than being the target of repeated negative feedback.

As noted above, the data observed here are consistent with effects from the ostracism and bullying literatures. This correspondence suggests interesting avenues for future research. Bullying is a form of active social rejection: individual(s) take direct action against others, whereas ostracism is more passive: rejection stems from ignoring others. In either case, though, the exclusionary behavior is intended. Agents of bullying/ostracism are not told to do so. Here, we instructed people to reject others' ideas. It is interesting that explicit instructions elicited a similar pattern – adverse consequences for targets, minor/no negative consequences for agents – as has been observed in studies of naturally-occurring dissent/rejection. Future studies may seek to tease apart how conforming to instructions, as was done here, differs from and is similar to naturally-occurring dissent/rejection.

Although this research provides insight into response profiles of agents and targets of dissent, limitations should be considered. First, in accordance with the implementation of DA methods, dissent was manipulated explicitly. Agents were instructed to disagree with others. This allowed us to make causal conclusions, but limited generalizability. That is, spontaneous dissent that emerges from differences in viewpoints may affect agents differently compared to the effects observed here. However, research suggests that spontaneous versus instructed conflict may actually have similar effects (Boyle, Hanlon and Russo, 2012).

These results also raise questions about potentially important moderators. Notably, group context should be considered when interpreting these findings. Here, groups were comprised of three undergraduate students. Participants were (presumably) working with peers. The result was a flat hierarchical structure. However, many group performance contexts in organizational settings include clearly delineated hierarchies. An interesting avenue for additional research would be to examine the impact of dissent when feedback occurs across status. For example, rather than the approach-motivated stress response agents of dissent displayed here, agents who reject their boss's ideas might exhibit threat responses. Moreover, targets of dissent occupying high-status positions within the group may respond with anger, not threat, when their input is rebuffed.

Taken together, these findings provide a theoretical framework through which to interpret decisions and behavior during group performance. For instance, given the cardiovascular profiles it may not be

surprising if an individual resists a risky choice after her/his idea has been rejected. Moreover, the psychological and physiological profiles of agents and targets of dissent outlined here have the potential to help develop laboratory paradigms for studying situations in which dissent spontaneously emerges. That is, by establishing profiles here, future studies may seek to validate spontaneous rejection/dissent paradigms using similar psychological and/or physiological measures.

On a practical level, task conflict can benefit objective performance outcomes (see De Wit et al., 2012 for a meta-analytic review). Thus, organizations seek to promote task conflict in stable, open-minded groups (Bradley et al., 2013). By examining individual-level outcomes, this research established physiological and psychological profiles for agents and targets of dissent. Organizations should consider the costs/benefits of role assignment for health and well-being outcomes when tasking individuals with DA assignments. More broadly, this research highlights the importance of considering social-situational factors when mapping health and behavior in organizational settings. Assigning individuals to roles in the context of group performance is not without consequences. Role assignment can directly impact biological and psychological outcomes, which feed-forward to affect individuals after the group disperses.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.jesp.2014.07.011>.

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