negotiation and conflict management research

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When the SUIT Fits: Constructive Controversy Training in Face-to-Face and Virtual Teams

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Abstract

One of the major reasons organizations have turned to work teams is because challenges are too complex, and too large in scope, for any single individual to address. As a result, teams must engage in information sharing, exchange, and processing that optimize the use of each team member's knowledge. Accordingly, we invoked a framework called SUIT, based on the theory of constructive controversy, that teaches teams to effectively share, understand, integrate, and make team decisions. We also considered whether a training program developed in accordance with the SUIT principles has stronger effects for virtual teams (VTs) relative to face-to-face (FtF) teams, given that VTs tend to need more information sharing and decision-making support. Using a fully crossed and balanced experimental design, we found that teams receiving SUIT training reported greater constructive controversy levels and, in turn, higher objective task performance. The communication medium did not moderate this effect.

Introduction

Over the past few decades, many organizations have moved toward a team-based structure in an attempt to increase involvement and promote innovation (Kozlowski & Bell, 2003). Yet, assembling people into teams and delegating responsibility to the team, as a unit, lead to a special set of challenges. On one hand, interdependence naturally leads to intrateam conflict because individuals often have different perspectives and viewpoints that must somehow be reconciled for the team to function effectively (Beersma et al., 2009; Jehn, Greer, & Rupert, 2008). On the other hand, using conflicting viewpoints from individuals with diverse functional backgrounds may be necessary for the team to uncover higher quality solutions (Marks, Mathieu, & Zaccaro, 2001). Accordingly, there is a paradox (Amason, 1996), in that teams might reap the most benefit when members present divergent perspectives, yet those perspectives can create conflict. Given that teamwork is a prominent characteristic of the modern workplace, identifying how to create positive and constructive conflict is an ongoing research priority (Mikkelsen & Clegg, 2018; O'Neill & McLarnon, 2018; Tjosvold, 2008a).

The contribution of the current research is threefold. First, we consider whether teams can be trained to effectively engage in a dynamic known as constructive controversy (Tjosvold, 1985). Constructive controversy emphasizes intellectual disagreement (Tjosvold, 1998) and involves "the skilled discussion of

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opposing positions" (Tjosvold, Wedley, & Field, 1986, p. 126). Specifically, "constructive controversy is a cooperative learning procedure in which individuals argue for and against incompatible views and as a team seek an agreement that integrates the best evidence and reasoning from both positions" (Roseth, Saltarelli, & Glass, 2011, p. 2; see also Johnson & Johnson, 2007). Despite a plethora of evidence supporting the positive role of constructive controversy in team decision-making, problem-solving, and effectiveness (Alper, Tjosvold, & Law, 1998; Johnson, 2015; Tjosvold, 1982, 1984, 1991, 1998; Tjosvold, Wong, Nibler, & Pounder, 2002), little empirical research has investigated constructive controversy training in teams (see literature review below). This would seem to be a notable omission given that training-based research can provide unique theoretical evidence regarding the role of constructive controversy. Further, additional training research on constructive controversy may provide an avenue to translate an extensive body of research findings into evidence-based interventions (Tan, 2012; cf. Shuffler, Diazgranados, Maynard, & Salas, 2018).

Second, we considered constructive controversy training in both face-to-face (FtF) and virtual team (VT) environments. In recent decades, VTs have become a normal way of working; indeed, according to one estimate, 67% of multinational corporations utilize VTs (Society for Human Resource Management, 2012). This is likely due to globalization and the advances in affordable information technology (Gilson, Maynard, Jones Young, Vartiainen, & Hakonen, 2015). Moreover, it is expected that VTs will become even more common in the future (Dulebohn & Hoch, 2017). However, meta-analyses indicate that VTs tend to underperform relative to FtF teams in general (Baltes, Dickson, Sherman, Bauer, & LaGanke, 2002) and in decision-making (Lu, Yuan, & McLeod, 2012). Members of VTs struggle to develop a strong sense of cohesion and often misinterpret benign messages as competitive and antagonistic (Swaab, Galinsky, Medvec, & Diermeier, 2012). Thus, constructive controversy training for VTs may be particularly valuable for enhancing information sharing and decision-making.

Third, we employed a fully crossed, balanced, completely randomized experimental design with an objective measure of team task performance. This addresses important limitations of past research that has examined constructive controversy training without random assignment to conditions (reviewed below). Accordingly, cause-and-effect inferences cannot yet be drawn, and the effects of the training on team performance still need to be better understood. Importantly, O'Neill et al. (2017) provided a detailed constructive controversy training framework, called SUIT, that we apply in this experimental research. Thus, there is an opportunity to examine the effectiveness of existing training within an experimental design that will advance more conclusive evidence regarding the SUIT framework.

Hypothesis Development

In this section, we outline the reasoning for our hypothesized model (see Figure 1). Tjosvold (1998, 2008b) offered four mutually reinforcing dynamics of constructive controversy: (a) individuals presenting their own viewpoints to the team, and, in so doing, engaging in cognitive rehearsal that enhances their understanding of their own ideas; (b) once confronted with opposing views presented by one's teammate(s), uncertainty is created and epistemic curiosity is aroused, which causes a search for information about others' perspectives; (c) elements of other team members' viewpoints are integrated into each team member's understanding of the problem; and (d) new solutions, different from any one individual's original position, are developed and agreed upon. Tan (2012) recommended constructive controversy training for effectively addressing different viewpoints based on diverse functional backgrounds by keeping the team discussions learning-oriented and task-focused. When constructive controversy is high, team members should exhibit high epistemic motivation for exchanging accurate information along with deep-level information processing. In contrast, when constructive controversy is low, team members should exhibit a bias for personal preferences along with surface-level information processing.

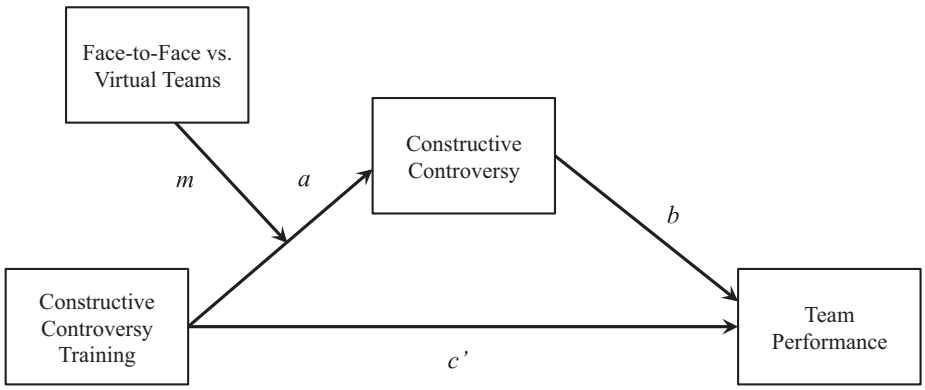

Figure 1. Focal analytical model. Pathways labeled according to typical mediation terminology. *b* reflects Hypothesis 1 (constructive controversy → team performance); *a* reflects Hypothesis 2 (training → constructive controversy); *a* × *b* reflects Hypothesis 3 (indirect effect of training → team performance, via constructive controversy); *m* reflects Hypothesis 4 (effect of training on constructive controversy is stronger for VTs); and *c*′ reflects the direct effect of training on team performance, which we included for completeness but did not directly hypothesize.

The result is high versus low information dissemination and integration, which can impact the team's motivation to identify novel and useful insights (De Dreu, 2007). Teams motivated to engage in epistemic exchanges should achieve stronger problem-solving, decision-making, and performance quality (Johnson & Johnson, 2012). Indeed, extensive correlational studies have established a robust link between the use of constructive controversy and team effectiveness outcomes (see reviews by Johnson, 2015; Tjosvold, 2008a, 2008b). Thus, we propose that:

Hypothesis 1: Constructive controversy will lead to higher objective team performance.

Tan (2012) observed that constructive controversy could be an ideal framework for providing team members with declarative knowledge, communication skills, and attitudes to facilitate effective knowledge integration. Tjosvold and colleagues published two studies investigating constructive controversy training in field teams. Lu, Tjosvold, and Shi (2010) reported on a field study where training involved a 1.5-day workshop followed by regular reflection activities that encouraged engagement in constructive controversy principles over a two-month period. After the two-month period, surveys indicated that mean constructive controversy scores had increased. However, because they utilized a predesign/postdesign without a control group, cause-and-effect could not be established. Tjosvold, Chen, Huang, and Xu (2014) also reported on a quasi-experimental field study involving four call centers assigned to a control condition and one call center assigned to a training condition. Employees in the training condition participated in a one-day workshop as well as follow-up constructive controversy reflection activities for 2 months. These study did not measure constructive controversy directly, but several other teamwork perceptions (e.g., team reflexivity) and outcomes (e.g., call times) were measured. The call center that received the training outperformed the control call centers that received no training. Thus, although field evidence supports the effectiveness of constructive controversy training, both of these studies lacked completely random assignment.

Elsewhere, O'Neill et al. (2017) created a training program that mapped Tjosvold's (2008b) four mutually reinforcing activities onto a learning framework they referred to as "SUIT" (Share, Understand, Integrate, Team decision; see Table 1). *Share* involves maximizing the information pool available to the team without engaging in any judgment or follow-up questioning toward a team member. *Understand* involves exploring the ideas in detail, skillfully asking for additional background, evidence, and rationale, and fully comprehending the ideas. *Integrate* involves combining different ideas in new ways to enhance

Table 1
O'Neill et al.'s (2017) Mapping of Tjosvold's (2008b) Constructive Controversy Framework onto SUIT

Constructive controversy	SUIT
Develop and Express: Includes generating ideas, collecting relevant information, organizing and presenting positions	Share: Prepare and contribute all your ideas to the team for consideration during brainstorming sessions. Develop multiple, unique ideas. Express different ideas, especially when they are against the majority
Question and Understand: Involves listening to other's arguments, asking probing questions to ensure understanding, engaging in role reversal, and rephrasing others' arguments to check whether their understanding is accurate	Understand: Explore all the presented ideas in detail. Question and analyze all the ideas and opinions. Make sure you fully understand and that the team has fully considered each other's views and ideas
Integrate and Create: Include avoiding the assumption that positions are completely incompatible, combining ideas to develop new solutions not originally proposed by either side, taking the best ideas regardless of who expressed them, and integrating ideas to resolve underlying issues	Integrate: Make an effort to integrate distinct ideas to create new and innovative solutions. Remember it is not a competition of ideas. Put aside your feelings in order to integrate views for the best possible solution
Agree and Implement: Involves embracing an effective, rational solution with a clear understanding of how to implement it in order to solve the underlying problem. If the new solution is still not wholly satisfactory, return to the controversy to refine conclusions	Team Decision: Make sure everyone is in agreement. Commit to and implement the decision. Revisit earlier stages if needed to make sure the best decision is being made

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value and innovation. *Team decision* involves summarizing, checking for agreement, and confirming the decision or path forward (returning to earlier stages if agreement is not reached).

SUIT is a targeted training program that addresses a host of complex issues through the use of constructive controversy. Epistemic motivation should be enhanced by creating knowledge and attitudes about the advantages of valuing and utilizing information from all team members. Information processing should be deeper by emphasizing the importance of tactfully seeking deeper understanding regarding the evidence and rationale for various perspectives. Integration should be more likely because team members can capitalize on a greater and more diverse information pool. Process conflicts should be minimized through the emphasis on reaching team decisions that all members support. The purpose of SUIT was to facilitate the use of constructive controversy during team interaction by using a memorable framework (O'Neill et al., 2017).

In the current research, teams were randomly assigned to receive constructive controversy training versus a general teamwork knowledge, skills, and abilities (KSA) training program reported on by Ellis, Bell, Ployhart, Hollenbeck, and Ilgen (2005). The general teamwork KSA training involved reviewing, responding to questions, and discussing the rationale for different perspectives involving a case study relevant to three teamwork competencies from Stevens and Campion's (1994) taxonomy: planning/task coordination, collaborative problem-solving, and communication. We chose Ellis et al.'s training program because it was found to be effective previously. First, it was related to higher teamwork KSA test scores compared to teams receiving no training. Second, it was related to higher behavioral demonstrations of teamwork KSA scores in an action-based team simulation task. Thus, it seemed like a reasonably strong condition against which to examine the effects of constructive controversy training.

O'Neill et al. (2017) found that student engineering design teams trained with the SUIT framework exhibited more healthy patterns, or profiles, of conflict (cf. O'Neill, McLarnon, Hoffart, Woodley, & Allen, 2018) than teams that did not receive the training. However, the study conditions were distributed across multiple cohorts in a quasi-experimental design (i.e., lacking random assignment), and it did not

directly measure whether the training increased constructive controversy or team performance. Given that the SUIT training is based on the theory of constructive controversy, and constructive controversy is related to team effectiveness in correlational research, an experiment including both constructive controversy and team performance measures is needed. Although we do not expect a direct relationship between training and team performance, we do expect an indirect relation through higher constructive controversy. This is because constructive controversy training targets constructive controversy specifically, rather than team performance. Thus, we will test the following predictions within an experimental design:

Hypothesis 2: Constructive controversy training will lead to higher constructive controversy compared to general teamwork KSA training.

Hypothesis 3: Constructive controversy training will be indirectly related to objective team task performance through increased constructive controversy relative to general teamwork KSA training.

In addition to the above considerations, we also felt that it would be useful to examine whether the potential effects of training vary across FtF and VTs. We expected that constructive controversy training could be particularly valuable for VTs, given that these teams tend to struggle with complex tasks and decision-making (Baltes et al., 2002; Lu et al., 2012) and tend to have lower cohesiveness and more destructive conflict (Hambley, O'Neill, & Kline, 2007; O'Neill, Hancock, Zivkov, Larson, & Law, 2016). This may be related to misunderstandings generated through computer-mediated communication, which could create biased searches for, and processing of, information. Interestingly, Swaab et al.'s (2012) communication orientation model proposed that a cooperative orientation (such as that engendered by constructive controversy) can help a team overcome barriers to information exchange in a virtual environment by facilitating trust, rapport, and identity. Accordingly, VTs might experience a greater gain in constructive controversy compared to FtF teams, in response to constructive controversy training. Given this reasoning, we examined the following moderated mediation model:

Hypothesis 4: The positive effect of constructive controversy training compared to general teamwork KSA training on levels of constructive controversy will be stronger for VTs than for FtF teams.

Method

Participants and Procedure

We recruited 240 psychology undergraduate students that we assigned to 80 three-person teams during the course of signing up for the study (MacDonnell, O'Neill, Kline, & Hambley, 2009). The students were recruited using a psychology department research participation system within a large Canadian university. The design was a 2 (FtF vs. VT) $\times$ 2 (constructive controversy vs. teamwork KSA training) completely randomized design with each cell containing 20 teams. The sample was 72.1% female, and the mean age was 20.56 (SD = 3.74). The gender distribution for each condition was randomly determined based on participant sign-ups, which resulted in the following: FTF: 20% male, 80% female; VT: 35% male, 64% female; constructive controversy: 30% male, 70% female; and teamwork KSA: 25% male, 75% female. These gender distributions do not indicate cause for concern involving substantially different gender representations across conditions that could account for the experimental effects.

When participants arrived in the laboratory for the study, they were greeted by one of two research assistants who seated participants around a square table where they read and signed the informed consent form. In the FtF condition, participants remained seated at the table for the duration of the study. In the VT condition, all participant interaction occurred over Gmail text-based chat after the training was completed. To begin, participants were asked to introduce themselves to their team members by

sharing their first name, year of study, and major. After this brief introduction, the training phase began. Participants received either the 12-minute constructive controversy training or 12-minute teamwork KSA training. Next, participants completed the team task and then responded to a constructive controversy survey.

Training

The two training conditions (i.e., teamwork KSA and SUIT) were carefully designed to achieve similar levels of interaction and engagement. Each training protocol lasted approximately 12 minutes. We used PowerPoint presentations in both conditions, and a research assistant regularly asked team members for comments and perspectives throughout. The presentation was administered by one of two research assistants that were trained to ensure that the presentation was delivered in an identical manner. The teamwork KSA training relied on an existing approach utilized by Ellis et al. (2005), in which the team worked through a case and responded to situational judgment test/multiple-choice questions in an interactive, discussion-based (nonevaluative) manner. The SUIT training relied on a video demonstrating constructive controversy, competitive, and avoidance conflict approaches, with discussion guided by a research assistant between each style. Moreover, each training session in both conditions was delivered in a 1(facilitator) to 1(team) manner, helping to ensure engagement and provide the opportunity for teams to ask questions, thus encouraging interactivity throughout training across both conditions. Finally, during the training session the research assistant encouraged participants to vocalize their own views, as Halpern and Hakel (2002) suggested that learning and use of new information can be enhanced by allowing those being trained to rephrase the key concepts in their own words and listen to others' perspectives.

Constructive Controversy Training Protocol

Participants in the constructive controversy training condition were shown a PowerPoint presentation that we created for the purposes of this study (all materials are available from the first author). The presentation explained the different approaches to conflict (avoiding, competitive, and constructive), as well as the steps associated with SUIT, which detailed how to effectively engage in constructive controversy. The participants were then shown a training video that we created specifically for this study. The video demonstrated actors engaging in the avoiding and competitive approaches to managing conflict, and an example of how to use SUIT to manage conflict constructively. After the video was shown, the research assistant showed each part a second time and paused the video to allow the participants to explain in their own words what made each scenario representative of either avoiding, competitive, or constructive approaches. The research assistant also clarified any questions or comments to ensure that all participants understood how to use the constructive controversy principles underlying the SUIT training.

Teamwork KSA Training Protocol

In the general teamwork KSA training condition, participants were shown a PowerPoint presentation of the teamwork knowledge, skills, and abilities training developed by Ellis et al. (2005). The KSA training involved a short case study about an engineering teamwork problem with eight questions interspersed throughout the case. The research assistant read one part of the case and then read aloud a situational judgment question with multiple courses of action that team members could take in response to the given scenario (i.e., in a multiple-choice question format). Each participant privately selected a response option, and then, the research assistant facilitated a discussion of each member's choice as well as the reasoning for the correct choice. The research assistant encouraged questions and facilitated a discussion regarding the explanation about the case throughout the training in order to create a dialogue among the team members. The situational judgment items were not used to assess participant performance or knowledge, but rather to promote a team discussion and the participants understood this. We also note

that this training did not mention constructive controversy, but instead focused on general teamwork issues through Ellis et al.'s (2005) approach involving situational judgment-type questions.

Team Task Performance

Participants completed the Dust Pan task developed by Kerr and Murthy (2009). The task is an accounting problem that asked participants to act as an audit team responsible for identifying three errors that occurred for a particular invoice in which $300,000 is owed to a vendor. First, members had to determine what happened to a missing check that was not received by the vendor. Second, members had to determine how much money they think was owed and to which vendor(s). Third, members had to determine what could have been done to fix the financial error.

Each team member received a set of audit notes that they were allowed to keep for the duration of the task (but not physically share with other team members). All team members received 10 pieces of information as clues for solving the Dust Pan task. However, each team member received either one or two pieces of information that were unique to their own audit notes (i.e., unshared across team members). To find the location of the check and the amount of the error, participants had to share and use their unique information. When the unique pieces of information were shared, teams had the potential to reach the correct decision to the three questions of (a) what happened to the money (b) how much is owed and to what vendor (s), and (c) how to fix the error. Performance scores, therefore, comprised 0, 1, 2, or 3.

Measures

Constructive controversy was measured with seven items from Tjosvold et al. (1986). A sample item is "Team members expressed their own views directly to each other." Items were assessed on a seven-point Likert scale, anchored by *strongly disagree* to *strongly agree*. Reliability, assessed as Cronbach's α, was estimated at .90. Tjosvold et al.'s (1986) measure has also demonstrated evidence of validity in past research, and examples of its use can be found in Chen and Tjosvold (2002) and Alper et al. (1998), among others. Team performance consisted of a single score, with a value ranging from 0 to 3 based on the number of correct responses to the Dust Pan task (see above).

Analytical Procedure

Aggregation

The focal hypotheses were investigated at the team level. Constructive controversy was aggregated to the team level using the team mean with justification from intra-class correlations (ICC), which were .16 (ICC[1]) and .37 (ICC[2]). Although ICC(2) is not high, each team only had three members, and small team size leads to lower estimates (Bliese, 1998, 2000). As our values exceed others deemed acceptable in past research (DeShon, Kozlowski, Schmidt, Milner, & Wiechmann, 2004; Jehn, Greer, Levine, & Szulanski, 2008), they are supportive of aggregation (LeBreton & Senter, 2008).

Modeling Strategy

Confirmatory factor analysis was used to assess the construct validity of the constructive controversy measure. As this was the only multi-item variable contained within this study, only a one-factor model was conducted. The CFA was deemed useful to demonstrate that the items had reasonably strong factor loadings and that the one-factor model demonstrated reasonable indices of fit. Following the CFA, we used a multistep approach to develop indirect effect path models, as illustrated in Figure 1, to assess each of the proposed hypotheses. In Step 1, a model with the relations between training and constructive controversy, constructive controversy and performance, and training and performance was estimated. Training was coded as 0 = teamwork KSA training, and 1 = SUIT training. Hypothesis 1 was assessed by

regressing performance on constructive controversy, reflecting the *b* path from typical mediation models. The relation between training and constructive controversy, the *a* path, provided an assessment of Hypothesis 2. Hypothesis 3, the indirect effect of training on performance, transmitted via constructive controversy, was assessed by computing the $a \times b$ coefficient and examining whether its 95% confidence interval (95% CI), taken over 10,000 bias-corrected bootstrapped samples, excluded zero (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Step 1 made no distinction between FtF and VTs. For Hypothesis 4, Step 2 implemented a multigroup indirect effects path model, to assess whether the *a* pathway, linking training and constructive controversy, differed significantly across FtF teams and VTs (see Chan, 2007). In this model, only the relation between training and constructive controversy was allowed to vary, and the relations between constructive controversy and performance, and training and performance, were fixed to equality, as our theorizing did not extend to moderation of either of those paths. Of note, this model resembles that of Model 7 of Hayes' (2018) PROCESS macros, and Edwards and Lambert's (2007) first-stage moderated mediation model. Models were estimated using M*plus* 7.4 and its robust maximum-likelihood estimator (Muthén & Muthén, 2012, 2015).

Results

We assessed the constructive controversy measure using CFA to provide evidence of its construct validity. All seven items were specified to load onto a single factor, and no residual correlations were specified. The model demonstrated a strong fit to the data, $\chi^2(14) = 20.98$, $p = .10$, comparative fit index (CFI) = .98, root mean square error of approximation (RMSEA) = .05 (90% CI = 0.00–0.08), and standardized root mean square residual (SRMR) = .03. Table 2 contains the standardized factor loadings, residual variances, and R^2 estimates of each constructive controversy item. Together, these results support the construct validity of the constructive controversy measure and provide evidence for its strong measurement properties.

Table 3 contains the correlation matrix and descriptives of this study's variables. Notably, SUIT training correlated significantly with constructive controversy (.37, $p < .01$). Neither training nor communication medium (FtF vs. VT) related significantly to team performance, although the mean for team performance was near the center of the distribution (1.83) and the standard deviation was substantial (1.33). Finally, constructive controversy correlated significantly with team performance ($r = .31$, $p < .01$).

Next, we specified the indirect effects model depicted in Figure 1 for hypothesis testing. We report results from the fully saturated model (i.e., zero estimates for degrees of freedom and χ^2) with the direct effect of SUIT training → performance included for completeness, although removal of the direct effect did not result in an appreciable decrease in fit, $\chi^2(1) = .04$, $p = .84$. Hypothesis 1 proposed that

Table 2
Confirmatory Factor Analysis of Constructive Controversy Measure

Item	λ (*SE*)	σ^2 (*SE*)	R^2 (*SE*)
1. Team members express their own views directly to each other	.68 (.05)	.54 (.07)	.46 (.07)
2. We listen carefully to each other's opinions	.81 (.03)	.34 (.05)	.66 (.05)
3. Team members try to understand each other's concerns	.86 (.03)	.26 (.05)	.74 (.05)
4. We try to use each other's ideas	.73 (.09)	.47 (.13)	.53 (.13)
5. Even when we disagree, we communicate respect for each other	.74 (.05)	.46 (.07)	.54 (.07)
6. All views are listened to, even if they are the minority	.79 (.04)	.38 (.06)	.62 (.06)
7. We use our opposing views to understand the problem	.59 (.06)	.65 (.08)	.35 (.08)

Note. $n = 240$. Estimates from completely standardized solution. λ = factor loading; σ^2 = residual variance; R^2 = variance accounted for (by factor); *SE* = standard error. All estimates are $p < .01$.

Table 3
Means, Standard Deviations, and Correlation Involving Study Variables

	Mean	*SD*	1	2	3	4
1. Training	.50	.50	–			
2. FtF vs. VT	.50	.50	.00	–		
3. Constructive controversy	6.32	.42	.37**	.18	–	
4. Team task performance	1.83	1.33	.10	.15	.31**	–

Notes. $n = 80$. Mean and *SD* for training and communication medium are both .50 given that there was equal sample size in each condition of the 2 × 2 design used in this study.
*$p < .05$. **$p < .01$.

constructive controversy would be positively related to team performance. In the indirect effects model, the path between constructive controversy and team performance was positive and significant ($b = 1.02$, $SE = .34$, $p < .01$). Thus, Hypothesis 1 was supported.

Hypothesis 2 posited that SUIT training would lead to higher constructive controversy among team members, as compared to general teamwork KSA training. This hypothesis was supported ($a = 0.31$, $SE = .09$, $p < .01$). Hypothesis 3 proposed an indirect effect of SUIT training on team performance through constructive controversy. The indirect effect was equal to 0.31 and its 95% CI excluded zero (0.10–0.68), indicating that receiving SUIT training resulted in a significant increase in team performance indirectly through constructive controversy. Thus, Hypothesis 3 was supported.

Finally, Hypothesis 4 stated that SUIT training would result in a greater increase in constructive controversy for VTs, as compared to FtF teams. Implementing a multigroup approach to our indirect effects model (see Figure 1), we allowed the regression path of training on constructive controversy to vary across communication medium. In this model, we placed equality constraints on the linkages between constructive controversy and performance (the *b* path) and training and performance (the *c′* path) across team types as our theorizing focused on the difference in the relation between training and constructive controversy. Thus, our multigroup model had two degrees of freedom and ultimately fit the data well with strong overall model fit indices: $\chi^2(2) = .73$, $p = .69$, CFI = 1.00, RMSEA = .00, and SRMR = .04. In FtF teams, the relation between SUIT training and constructive controversy was $b = 0.23$, $SE = .11$, $p < .05$, and in VTs, the relation was $b = 0.38$, $SE = .13$, $p < .01$. Although this suggests that VTs experienced a slightly stronger gain in constructive controversy from SUIT training compared to FtF teams, this difference was not significant, Wald $\chi^2(1) = .80$, $p = .37$. Thus, Hypothesis 4 was not supported, although effects were in the expected direction.

Discussion

The pace, complexity, and dynamics of teamwork continue to increase with globalization, technology development, and rapidly evolving organizational structures (O'Neill & Salas, 2018). This means that team members must be highly skilled and efficient in sharing, exchanging, processing, and acting on information in order to rapidly solve problems and make effective decisions (Fiore, Graesser, & Greiff, 2018). Constructive controversy, a team principle introduced decades ago (Johnson & Johnson, 1979; Tjosvold, 1985), is strongly aligned with these cognitive and information management requirements facing modern work teams (Tan, 2012). Although extensive survey research has clearly demonstrated that constructive controversy correlates with learning and team effectiveness (see Johnson & Johnson, 2009; Tjosvold, 2008a), there is a need to identify training approaches that can directly influence constructive controversy as a human resource management (HRM) intervention (O'Neill & McLarnon, 2018; Tan, 2012). Whether teams can be trained to engage in constructive controversy, and in turn achieve higher task performance, was the focus of this research.

Three contributions of the current study are noteworthy. First, team members receiving constructive controversy training were more likely to report using constructive controversy than were teams receiving general teamwork KSA training. This is noteworthy because although the previous study by O'Neill et al. (2017) employed constructive controversy training, those authors did not measure actual changes in constructive controversy. In the current study, the SUIT framework derived from constructive controversy theory (Tjosvold, 2008b) appears to achieve its intended purpose of increasing constructive controversy and, in turn, driving team task performance. Moreover, general teamwork KSA training, validated in past empirical research (Ellis et al., 2005), was found to be less effective for producing high levels of constructive controversy. Thus, for HR managers it may be important to understand that general teamwork training will not necessarily create increases in specific teamwork capabilities such as constructive controversy. Rather, focused training may be needed (cf. O'Neill & McLarnon, 2018).

Second, by crossing the training factor with FtF versus VT conditions, we were able to investigate how the training generalizes across media. This is important because (a) VTs are known to experience challenges with respect to cohesion, conflict, and decision-making (Hambley et al., 2007; Lu et al., 2012; O'Neill et al., 2016), and (b) VTs therefore have an increased potential to benefit from training support, and (c) VTs are common and will likely be used more in the future (Gilson et al., 2015). Our findings revealed that communication medium did not moderate the effect of training condition on constructive controversy, suggesting that the training benefits are equal for FtF and VTs, and therefore, the SUIT training is recommended across communication media. In addition, we surmise that the SUIT training could exhibit a stronger effect size in organizational teams dealing with larger, more complex multifaceted decisions that require a longer duration of interaction, research, analysis, and information exchange. Consider a decision involving several different models of organizational change to apply in a large-scale reorganization. A geographically distributed cross-functional VT assigned to present a recommendation to the top-management on a three-month time line could, potentially, benefit from training on constructive controversy more than the short duration teams used in the current study because of the multitude of small but consequential decisions made over time. Of course, this is highly speculative and is a question for future research. The important contribution of the current research in this respect is that the SUIT training was effective for both FtF and VTs, thereby lending further support to additional training studies involving constructive controversy (Lu et al., 2010; Tjosvold et al., 2014).

Third, we utilized a fully crossed, balanced, completely randomized experimental design with an objective measure of team task performance. This allowed us to advance a stronger causal argument that the manipulation of training led to an increase in constructive controversy, which is an important finding because the validity of HRM practices should be understood prior to investing in training in real-world organizational work teams (Shuffler et al., 2018). Although the current study's results should be replicated in the field, our finding that randomized assignment to training conditions affected constructive controversy is a critical contribution to the literature. In addition, past research examined constructive controversy in field teams and student teams, but that research lacked random assignment, and therefore confounding explanations such as demand effects and different environments cannot be ruled out. Moreover, as the vast majority of past research on constructive controversy has been survey driven, the use of an objective measure of task performance offers new evidence that constructive controversy can influence nonsubjective team outcomes. Finally, our results did not support moderation involving communication media, suggesting that the current findings may generalize to both FtF and synchronous VT interactions with equal efficacy.

Limitations and Future Research

As noted above, the current research findings should be generalized to field settings. Lu et al. (2010) and Tjosvold et al. (2014) offered support for constructive controversy training in field teams, suggesting that

training effects are promising. However, future research should apply random assignment to field teams prior to delivering training. There are other generalizability issues in the current research as well. First, the sample was predominantly women, and women have been found to exhibit higher collective intelligence and social sensitivity in groups (Woolley, Chabris, Pentland, Hashmi, & Malone, 2010). Therefore, consideration of more heterogeneous samples is advisable (we expand on this point below). Second, the task used in the current study was a cooperative task rather than mixed-motive. Mixed-motive tasks have individual and team incentives that may create more conflict, which is often a reality in real-world organizational work team tasks (Drolet & Morris, 2000). We expect that SUIT training and constructive controversy may be particularly helpful in mixed-motive tasks by making cooperative interdependence as salient as possible (Tasa & Astray, 2018). However, more research is needed, as clearly mixed motives drive both individual and team motivated behavior (Weingart, Brett, Olekalns, & Smith, 2007). Nevertheless, given the plethora of correlational evidence supporting the positive role of constructive controversy in organizational work teams, as well as the current and past studies supporting constructive controversy training (O'Neill et al., 2017), it would seem reasonable to expect that training on constructive controversy would be effective across numerous team types and contexts. Of course, the transfer environment will be a factor affecting generalizability (Lu et al., 2010), and therefore, factors such as culture, team design, and task design should be considered prior to investing in a constructive controversy training program in the field (cf. Mikkelsen & Gray, 2016).

An issue related to the above is that the SUIT training was aligned with the task requirements in this study. The task was a hidden-profile task that requires team members to share unique information in order to succeed. Constructive controversy encourages sharing, exploring, questioning, mutual understanding, and information exchange. This would be important for performance in a hidden-profile team decision. On the other hand, Ellis et al. (2005) trained teams to improve their KSAs for use in an action task (i.e., a team-based military computer simulation). It is possible that there is a training $\times$ task interaction, such that SUIT would fare less well when applied to action teams versus decision-making within a hidden-profile task. Thus, examining SUIT in other team tasks may be useful.

A limitation to the training manipulation underscoring the current study is that slightly different instructional methods were used, potentially resulting in differences in participant engagement. The teamwork KSA training condition involved the use of a PowerPoint presentation, a case study, and a series of situational judgment/multiple-choice questions with a discussion facilitated by a research assistant. The SUIT training condition involved the use of PowerPoint, along with a video and a research assistant-guided discussion. Unfortunately, the manipulation check included in this research was an assessment of constructive controversy, rather than of participant engagement. However, our research assistants did not notice any apparent differences in participant interest or engagement in either training condition, minimizing the potential of any systematic differences in participant engagement. Thus, we contend that both training methods were approximately similar in the degree of participant engagement. If the SUIT method was more engaging than the teamwork KSA method, that may have led participants to engage in more constructive controversy and, in turn, achieve higher team performance. We cannot rule out this possibility, but we believe it is much less compelling than the content of the training leading to different interactions and, ultimately, improved decision-making performance. Further, the different training conditions were of the same duration (12 minutes) and both involved a substantial discussion-based component, suggesting equivalent involvement. Moreover, keeping the training sessions short helped limit the potential for participant boredom. As well, in neither condition were participants passive, uninterested, or working independently. This is likely in part because of the social context, in which participation in a team discussion was encouraged by the research assistant and there were too few team members for a diffusion of responsibility. Thus, while we believe the results are not due to minor differences in instructional methods, future studies should measure participant engagement and interest to rule out this factor as a possible explanation for the differential effectiveness of multiple training programs.

One limitation involving aggregation pertains to the relatively low ICC(2) value associated with constructive controversy. This is likely in part due to the small group sizes ($n = 3$), which can reduce the reliability of the overall team-level mean (Bliese, 2000). However, given that the observed ICC(1) values were acceptable, we followed a more holistic approach and considered ICC(1) and ICC(2) jointly in making aggregation decisions (cf. Thiel, Harvey, Courtright, & Bradley, in press) as well as following similar decisions in other research (DeShon et al., 2004). However, it is possible that our results could be stronger in larger groups when higher reliability of group means may be observed. A study with larger group sizes could address this.

We expect that our results would generalize to organizations using teams with similar gender distributions, which is certainly common in female-dominated industries, positions, or vocations. It is unclear whether the results would generalize to teams with other gender distributions, and interestingly, there is evidence suggesting that women may outperform men in team settings. For example, laboratory research suggests that collective intelligence and team performance is higher in teams with a higher proportion of females (Woolley et al., 2010). The mechanism for this effect involved women's higher social sensitivity, as measured by the test "Reading the Mind in the Eyes," which involves identifying the correct emotion based on an image of only an individual's eyes. However, SUIT training was also related to more effective conflict management in student teams with a higher proportion of males that were performing an engineering design projects over 13 weeks (O'Neill et al., 2017). Thus, samples of different gender proportions find support for SUIT training. We still recommend that future research involving constructive controversy and SUIT training experiments continue to seek more gender diverse samples.

In future research, it will be important to consider what HRM practices, in addition to training, can create what Tjosvold (2008a) refers to as a "Conflict Positive Organization" (p. 19). Tjosvold points out that the world is becoming increasingly interdependent, and therefore, interactions that promote and emphasize cooperative goals and positive controversy are critical to learning, innovation, productivity, and engagement. Strategic HRM needs to create effective motivational states, human capital, and team involvement (Bell, Brown, & Weiss, 2018; Jiang, Takeuchi, & Lepak, 2013) in order to set the stage for a conflict-positive organization. Conflict prevention and management systems are a set of HRM practices that are designed for a particular organizational context and meant to address conflict escalation and resolution (Lohr, Weinhardt, Graef, & Sieber, 2018). Interestingly, conflict can buffer the negative effects of demographic fault lines (Adair, Liang, & Hideg, 2017), suggesting that conflict management systems will be key components in a diverse workforce. The vital issue is to determine which strategic HRM practices and bundling will be most effective. Indeed, training without consideration of the transfer climate will not likely work (Lu et al., 2010). Thus, as a call to action, we urge researchers and practitioners to work together to determine which strategic HRM practices will lead to the advantage of Tjosvold's (2008a) conflict-positive organization.

Conclusion

In the current research, we report on an experimental study that demonstrates that constructive controversy training, which emphasizes the SUIT framework, leads to higher constructive controversy. In turn, constructive controversy was related to higher objective team task performance. This is important because, as a critical teamwork variable, we need to know how to train teams to employ constructive controversy with rigorous designs. Given the diversity of previous studies that have investigated constructive controversy training in different contexts (laboratory, student learning teams, field teams) and experimental designs (pre/post, quasi-experimental, randomized experimental), as well as the favorable findings reported, it appears that team members can learn to use constructive controversy effectively. Moreover, given the benefits for performance, motivation, and well-being (among others) associated with constructive controversy, it is offered here as a training feature suitable to many team development initiatives that target improved conflict management and decision-making.

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