



Applying constructive controversy: The influence of conflict management styles on individual learning from conflict

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Abstract

Prior research indicates that constructive controversy, as a method to support decision-making in conflict-prone situations, positively impacts learning. By using a simulation approach applying the practical procedure of constructive controversy, this study explores the relationship between conflict management styles and individual learning in the application of constructive controversies. Our results show a positive effect of constructive controversy on individuals' learning and indicate that conflict management styles moderate this effect. Participants with high avoidance, low collaboration, and low compromise conflict management styles reported particularly high learning gains from constructive controversy. This is a new insight both for research and practical implementation and bridges the gap to future research applying constructive controversy in organizational settings.

Keywords Constructive controversy · Conflict management styles · Learning · Simulation study

Introduction

Today's organizations are confronted with rapidly changing markets and increasing pressure to innovate. Members of these organizations must navigate complex decisions related to product and process innovation, as well as organizational change. A significant challenge in this process is managing the inherent contradictions that arise when diverse perspectives and conflicting viewpoints must be reconciled. Conflicts can be constructive or destructive. This depends on how individuals and teams are able to discuss and deal with conflicts for the benefit of the organization (Tjosvold et al., 2014).

Organizational science provides methods to support decision-making in conflict-prone situations. Constructive controversy is one such method (Johnson, 2015). It is theoretically grounded, empirically supported, and offers

guidance for its application in organizational teams. Constructive controversy addresses a socio-cognitive conflict, encompassing both cognitive and social dissent between team members that arises during social interactions (Johnson, 2015, p. 52). It is assumed that providing specific instructions on how to discuss a controversial issue by applying constructive controversy can support the learning processes of participating individuals.

The latest research on constructive controversy and learning (Johnson, 2015; Vollmer & Seyr, 2013) demonstrates that this method is effective in fostering learning in both educational and business contexts. However, there is a research gap that is highly relevant for the application of constructive controversy in organizational practice. Despite evidence that constructive controversy fosters learning at the individual and team levels (Tjosvold, 1982; Tjosvold & Deemer, 1980; Tjosvold & Field, 1985; Tjosvold & Halco, 1992; Tjosvold et al., 2004; Tjosvold & Sun, 2001; Tjosvold et al., 2005; Tjosvold et al., 2004; Vollmer & Seyr, 2013), it remains unclear whether all participants of a constructive controversy learn in the same way and at the same rate. Additionally, based on the finding that skilled disagreement on the individual level is one of the most important conditions for constructive controversy (Johnson, 2015, p. 91f), it cannot be assumed that all members of a team have the same skills to manage conflicts.

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Our study broadens the scope of previous research on the effects of constructive controversy on individual learning by including the individual-level concept of conflict management styles. We examine how conflict management styles interact with the perception of how constructive controversy is enacted in a team and its effects on self-reported learning. Our simulation study with higher education students contributes to a better understanding of the conditions for and effects of constructive controversy, serving as a precursor to its examination in an organizational context. Investigating the practical application of constructive controversy provides a solid foundation for its implementation in organizations, acting as a blueprint to support decision-making by utilizing the learning effects of constructive controversy.

Theoretical background

Constructive controversy

“Constructive controversy exists when one person’s ideas, information, conclusions, theories, and opinions are incompatible with those of another, and the two seek to reach an agreement that reflects their best reasoned judgement” (Johnson, 2015, p. 26). Constructive controversy is based on the idea of capitalizing on the potential of conflicts. It has its roots in conflict, developmental, motivational, organizational, cognitive, and educational theories. Johnson (2015) describes it as a rare example of the interaction of theory, research, and practice. Next, we summarize the theory and research with a specific focus on learning. The practical aspect opens a new avenue of research, which we explore in our study.

Johnson (2015) theorizes that individuals experience a cognitive conflict when confronted with other individuals and their different ideas, theories, and understandings of how the world works. This conflict arouses a cognitive disequilibrium and cognitive uncertainty. This subsequently leads to epistemic curiosity, driving individuals to seek adequate knowledge to overcome this disequilibrium. By understanding other perspectives and accepting and incorporating new information, individuals can re-conceptualize their own minds. This process is known as learning.

Research overview The research on constructive controversy addresses both conditions and effects. Conditions for constructive controversy are a cooperative goal structure, rational argumentation, skilled disagreement and active involvement of all participants (Chen & Tjosvold, 2007; Hui et al., 2007; Johnson, 2015; Tjosvold et al., 2003, 2022). Constructive controversy has positive effects on

a variety of outcomes that are important in both educational and business contexts. A meta-analysis focusing on educational settings revealed that constructive controversy leads to higher achievement, higher cognitive reasoning, perspective taking, increased motivation, greater positive attitudes towards work, interpersonal attraction, social support, and self-esteem (Johnson & Johnson, 2009; Vollmer & Seyr, 2013). Tichy et al. (2010) provided evidence for the impact of constructive controversy on moral development. Within the organizational field, Vollmer and Seyr (2013) reported positive effects on decision making, interpersonal relationships, productivity, commitment, empowerment, innovation, and learning. Recent studies highlight the positive effects of constructive controversy training, including its benefits when delivered to online groups (Lu et al., 2010; O’Neill et al., 2019; Tjosvold et al., 2012).

Research on learning In the educational field, constructive controversy has been found to impact higher cognitive and moral reasoning, deeper understanding of opposing positions and perspective taking, motivation to improve one’s own understanding, open-mindedness, creativity, achievement, and task involvement (Johnson & Johnson, 2009). All these effects can be considered expressions of learning. Some of these findings were replicated in studies in the business context (Vollmer & Seyr, 2013). Constructive controversy was found to stimulate learning in workers, foremen, and managers by encouraging deeper problem exploration and employees’ learning orientation (Chen et al., 2011; Tjosvold, 1982; Tjosvold & Deemer, 1980). It also impacts individuals’ epistemic curiosity (Tjosvold & Field, 1985) and their exploring, understanding, accepting, and integrating others’ points of view and ideas (Tjosvold et al., 2005). Moreover, constructive controversy was found to foster learning from mistakes in teams of different functions and from different industries (Tjosvold, 2004).

In summary, empirical studies show a positive impact of constructive controversy on a variety of outcomes, particularly on learning, in both educational and business contexts. In terms of methods, some studies use intervention-based approaches. This applies to the studies in the educational field and partially to the ones from a training context. The studies meta-analyzed by Johnson and Johnson (2009) as well as more recent ones (Hashimoto, 2024; Mitchell et al., 2002, 2003; Monhardt & Monhardt, 2000; Richerme & Miksza, 2020; Santicola, 2015; Tichy et al., 2010; Zhang & Li, 2022) used the practical procedure of constructive controversy in order to teach students in constructive controversy.

In training studies, O'Neill (2019) used different training conditions (constructive controversy using the SUIT model vs. standardized team training) to support team processes and increase team achievement. Likewise, Hémon et al. (2024) used an instructional approach providing the norms of skilled disagreement described by Johnson and Johnson (2009, p. 42).

Studies in the business context used surveys, interviews, and experiments, but did not involve intervention-based approaches. Accordingly, they did not employ the practical procedure of constructive controversy. Thus, we can conclude that the practical procedure “has been examined with respect to a variety of student populations and a number of educational outcomes” (Richerme & Miksza, 2020, p. 29) but, to our knowledge, rarely in the organizational context (an exception is Vollmer et al., 2015).

For this study, we decided to use the practical procedure developed by Johnson (2015) for several reasons. First, as an instructional method it has a direct impact on human behavior, thus fostering learning directly during its application in a team discussion. Second, its impact on learning is well-supported by numerous studies in the educational context, providing a solid foundation for our research. Third, this practical procedure has been rarely used in organizational contexts and needs more research into its conditions, process factors, and outcomes in such settings. Fourth, applying the practical procedure is particularly valuable in an organizational context, where there is a strong demand for practical methods, e.g. for decision making or team development.

Practical application For the application of constructive controversy in an organizational context, Johnson (2015, p.120ff) provides a theory-based practical procedure structuring a constructive controversy, for example in a decision-making situation of a team. A team can follow the practical procedure step-by-step, beginning with proposing courses of action that might solve the problem or conflict the team faces. Normally, two courses of action are selected. Then, the entire team is divided into two sub-teams, so-called advocacy teams. The task of these teams is to advocate for a specific course of action and explain why this presents the most effective solution to the problem. After an open discussion characterized by advocacy, refutation, and rebuttal, advocacy teams reverse perspectives and advocate for the opposing position as sincerely and forcefully as team members can. Then, all team members drop their advocacy roles and reach a decision by consensus. Finally, the team reflects on how well the group functioned during the constructive controversy. By following this practical procedure, the cornerstones of the constructive controversy theory outlined above are implemented,

and participants can benefit from a process of learning. We therefore propose the following:

Hypothesis 1: Applying the practical procedure of constructive controversy has a positive impact on individual learning.

Conflict management styles and their role in constructive controversy

Two of the major conditions for constructive controversy are skilled disagreement and active involvement of all participants, as mentioned above. This entails being critical of ideas rather than people, listening to everyone's ideas, and remembering that we are all in this together, among other factors. It also means not to avoid conflict, yield to others, or impose one's own view on others (Johnson & Johnson, 2009, p. 42 f.). These skills correspond to what theorists of conflict management styles call an integrative or collaborative style and, at the same time, involve refraining from an avoiding, an accommodating and a competing conflict management style (Rahim, 2023; Thomas, 1992). Because research has found that individuals have a variety of conflict management styles, we cannot assume that all members of a team have an integrative conflict management style, which would imply uniform conditions for discussing a conflict-laden issue. Therefore, it is particularly interesting to investigate the role of team members' individual conflict management styles in constructive controversy and how they affect their learning.

Conflict management styles can be defined as “patterned responses, or clusters of behavior, that people use in conflict” (Wilmot & Hocker, 2001, p. 130). Five prototypical conflict management styles have been distinguished according to so-called dual-concern models (Rahim, 2023; Thomas, 1992). As indicated by Thomas (1992), the two dimensions of these models are assertiveness and cooperativeness. Depending upon how assertive and cooperative a person's behavior is, a specific conflict management style will result. *Avoiding* means that individuals deny the conflict or withdraw from communication and dealing with it (low assertiveness and low cooperativeness). *Accommodating* is used when individuals sacrifice their own interests to satisfy the interests of others (low assertiveness and high cooperativeness). *Competing* is characterized by asserting one's own concerns at the expense of others' concerns (high assertiveness and low cooperativeness). *Collaborating* means that individuals strive to integrate the interests of both parties and reach a win-win situation (high assertiveness and high cooperativeness). *Compromising* is applied when individuals try to find a middle ground solution (moderate assertiveness and moderate cooperativeness).

There is a long tradition of research on conflict management styles (Rahim, 2023), with substantial evidence demonstrating their differential effects on various individual-level outcomes such as job performance (Shih & Susanto, 2010), commitment to the organization (Fatima et al., 2024), employee attitudes (Chan et al., 2008), and employee health (Hyde et al., 2006). On the group level, conflict management styles have effects on work effectiveness (Choi, 2013; Somech et al., 2009), satisfaction with group processes (Park & Park, 2008), perceptions of intragroup conflict (DeChurch et al., 2007), and innovation (Paulsen et al., 2009; Wang et al., 2021). More recent studies demonstrate the benefit of using the concept of conflict management styles for individual learning and teamwork (O'Neill et al., 2024). Most studies show in a relatively consistent manner that integrative styles such as collaborating and compromising have positive effects, whereas avoiding and competing have negative effects (for recent studies see Alhamali, 2019, on the effects on team performance, and Taherian et al., 2021, on the effects on individual innovative behavior).

The positive impact of integrative conflict management styles on outcomes is attributed to individuals' abilities to facilitate open-minded discussions (Tjosvold et al., 2014). This supports the integration of different points of view and knowledge. In contrast, competing or avoiding conflict management styles are likely to hinder open-minded discussions. In addition to these general findings, the contingency approach (Van de Vliert, 1997) proposes that the conflict behavior employed depends on the specific situation.

This leads to the assumption that the practical procedure of constructive controversy encourages participants to act differently from their conflict management styles, as they are explicitly requested to follow specific behavioral guidelines outlined by the procedure. For example, the requirement of skilled disagreement and active involvement requests from people with an avoiding or accommodating conflict management style, who generally tend to avoid discussions or to give in, to argue explicitly for an assigned course of action, and in doing so maybe counteracting their preference for avoiding or accommodating. Likewise, individuals with a competing conflict management style are requested to argue not only for one specific or even their preferred course of action, but also for the opposite course of action.

This behavioral shift induced by the practical procedure provides an opportunity to see things differently and, consequently, learn. For individuals with a collaborating or compromising conflict management style, who are generally assumed to be at least partially open-minded, the practical procedure of constructive controversy requires them to act according to specific guidelines. It can be assumed that they will learn in this process. But those with a low preference

for a collaborating or compromising conflict management style may learn to a higher degree because the constructive controversy supports them in overcoming cooperation barriers. We assume further that constructive controversy not only promotes individual learning (Chen et al., 2011) but also triggers the very behavior which is necessary for learning. The meta-analysis of Johnson and Johnson (2009) reveals that controversy, especially when practiced, leads to perspective taking, motivation to improve one's own understanding, open-mindedness, and creativity. We conclude that the behavior triggered by a constructive controversy interacts—and potentially conflicts—with participants' individual conflict management styles. Because conflict management styles differ considerably, we assume that their interaction with constructive controversy is style-specific, with some styles being more compatible with the concept than others.

We explore the relationship between conflict management styles and self-reported learning in the application of constructive controversy and assume a moderating effect of conflict management styles. We justify the proposed moderation effect with reference to Johnson and Johnson (2009), who define skilled disagreement as a condition for constructive controversy. Similar to skilled disagreement, conflict management styles can be seen as conditions that people bring into a constructive controversy. Thus, we assume a moderation effect of conflict management styles on the relationship between the perception of constructive controversy and learning.

Therefore, we propose the following:

Hypothesis 2: Conflict management styles moderate the relationship between the perception of a constructive controversy and learning.

More specifically, we expect differential effects of the preferred conflict management styles as summarized in Table 1. We hypothesize that the effect of constructive controversy on learning is:

Table 1 Hypothesized moderating effects of conflict management styles on the relationship between perception of constructive controversy and learning

Conflict Management Styles	High degree	Low degree	Moderating effect should be...
Avoiding	Learn more (++)	Learn (+)	Positive
Accommodating	Learn more (++)	Learn (+)	Positive
Competing	Learn more (++)	Learn (+)	Positive
Collaborating	Learn (+)	Learn more (++)	Negative
Compromising	Learn (+)	Learn more (++)	Negative

- a) stronger for participants high in avoiding conflict management style than for participants low in avoiding,
- b) stronger for participants high in accommodating conflict management style than for participants low in accommodating,
- c) stronger for participants high in competing conflict management style than for participants low in competing,
- d) stronger for participants low in collaborating conflict management style than for participants high in collaborating, and,
- e) stronger for participants low in compromising conflict management style than for participants high in compromising.

Method

By applying the practical procedure of constructive controversy this simulation study explores the effects of constructive controversy on learning while taking into account individual conflict management styles.

Participants

The study included 29 teams comprised of 116 graduate and undergraduate students from two universities. Of the 116 participants, 74% were female ($n=86$), 24% were male ($n=28$) and two participants did not indicate their gender. Teams ranged in size from three to five members. Overall, there were 25 four-member teams, two three-member teams, and two five-member teams. The sample size was determined by available time and resources. Although power analyses suggested a larger sample would be ideal, practical constraints limited recruitment.

Procedure

The study was conducted during regular courses and conducted face-to-face in standard classrooms at the universities. After providing informed consent and being assured that all information would be treated confidentially, participants filled out a questionnaire on conflict management style and demographics. Then each group of participants was split into two pairs. Each of them was randomly assigned a position for a constructive controversy on working time models in organizations: Position A was in favor of a trust-based model and Position B insisted on controlling working times using time clocks. Each participant read a short description of a scenario of an organization that had to decide between these two options. A trained moderator guided the groups through the controversy strictly following the procedure outlined in Table 2. Moderators refrained

from active involvement in the discussion and merely helped teams adhere to the procedure and monitor time. Participants were able to follow the procedure and adhere to the allocated time. After completion of the constructive controversy, participants filled out a post-discussion questionnaire about their perceptions of the constructive controversy and their perceived learning.

Measures

Conflict management style was assessed before the group discussion with the German version of the Rahim Organizational Conflict Inventory (ROCI-II); a 28-item scale composed of five sub-scales (Bilsky & Wülker, 2000). Items were assessed on a 5-point Likert-type scale

Table 2 Procedural steps, content and duration of a constructive controversy (based on Johnson, 2015)

Procedural step	Content	Duration
1. Preparation for assigned position	Participants read a short description of the scenario under discussion. Each advocacy team prepares the best possible case for its assigned position by researching information, organizing it into a persuasive argument and planning how to advocate the assigned position.	20 min
2. Presentation and discussion I	Presentation of best case per assigned position while the others listen carefully, take notes and clarify open questions. For each position, this presentation is followed by an open discussion during which the other advocacy team critically analyzes and challenges the case presented.	20 min
3. Preparation for opposing position	Advocacy teams reverse perspectives and prepare the best possible case for the other position following the same procedure as in the preparation phase and building on information presented during step 2.	10 min
4. Presentation and discussion II	Each team now advocates their new position (i.e. opposing the initially assigned position) as effectively as possible while the others listen. This is again followed by an open discussion.	20 min
5. Consensus finding	Participants cease advocacy and aim for a consensus by integrating the best evidence and reasoning from the previous discussions.	10 min
6. Reflection	Participants thank each other for the discussion and reflect on any relevant aspects of the group process.	5 min

To support perspective taking and increase the depth of cognitive elaboration we asked participants to physically change positions before advocating for the other position and added a second presentation and discussion round (step 4) to the practical procedure described by Johnson (2015)

ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). *Avoiding* was assessed with six items (e.g. “I usually avoid open discussion of my differences with my peers”, Cronbach’s $\alpha=0.84$). *Accommodating* was assessed with six items (e.g. “I usually allow concessions to my peers”, $\alpha=0.68$). *Competing* was assessed with five items (e.g. “I use my authority to come to a decision”, $\alpha=0.77$). *Collaborating* was assessed with seven items (e.g. “I try to work with my peers to find solutions to a problem which satisfy our expectations”, $\alpha=0.81$). And *Compromising* was assessed with four items (e.g. “I usually propose a middle ground for breaking deadlocks”, $\alpha=0.66$). Each conflict management style was analyzed using a principal component analysis. Results of the analyses showed that each style had only one component (with all eigenvalues above 2.00), with each one explaining more than 39% of the variance. Because conflict management styles refer to individual characteristics, they were treated as individual-level variables.

Perception of constructive controversy was measured immediately after conducting the constructive controversy with an 8-item questionnaire (Tjosvold & Yu, 2007) translated into German. We used the procedure of back-and-forth translation according to Brislin (1986) because no German version of this questionnaire had been available. The first author performed the initial translation from English to German, and the second author performed the back translation from German to English. Both authors have expertise in the field and are proficient in both languages. Disagreements about the translations were resolved by discussion.

An example item is “Within our team we paid attention to everyone’s opinion”. All items were assessed on a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) to assess the extent to which participants perceived that the controversy was constructive. We also analyzed this scale using a principal component analysis. Results showed that it had one component (with an eigenvalue of 3.58) that explained 45% of the variance. Cronbach’s α for the scale was 0.82. Because participants’ perceptions of constructive controversy are strongly based on the team processes that had occurred during the actual constructive controversy, they were treated as a team-level variable. For each team, one value was computed by averaging the responses from all team members.

Individual learning was also measured after conducting the constructive controversy using a scale focused on learning based on Tjosvold et al. (2005). We followed the same back-and-forth translation procedure mentioned above. An example item is “I learned to analyze the topic”. The original 4-item questionnaire was complemented with one self-generated item to better assess individual learning:

“Discussing different viewpoints helped me gain a deeper understanding of the topic”. The other items assessed learning in terms of thinking systematically, solving the problem and having an effective discussion with others. All five items were assessed on a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). We also analyzed this scale using a principal component analysis. Results showed that it had one component (with an eigenvalue of 2.90) that explained 58% of the variance. Cronbach’s α for the scale was 0.81. Because learning specifically refers to which insights individuals acquired during the constructive controversy, it was treated as an individual-level variable.

Results

Assessment of common method bias

Because the measures of perceived constructive controversy and individual learning could potentially overlap, we checked for common method bias (Podsakoff et al., 2003). We first conducted Harman’s one-factor test using an exploratory factor analysis (EFA) on all 13 items from both scales (eight items assessing the perception of the constructive controversy and five items assessing individual learning). As our extraction method, we used maximum likelihood with varimax rotation. Results showed that the first factor had an eigenvalue of 4.14 and the second factor an eigenvalue of 1.22. All other factors had eigenvalues below 1. The first factor explained 20% of the total variance and the second factor explained 13%. The total variance explained by all five factors emerging in the exploratory factor analysis was 58%. This suggests that the items do not load on a single factor because the variance is more evenly distributed across multiple factors. In addition, the scree plot indicated a break after the third factor supporting the conclusion that common method bias is not a significant concern.

We also conducted a confirmatory factor analysis (CFA) to compare a one-factor solution with a two-factor solution. The one-factor model demonstrated poor fit ($\chi^2 = 198$, $df=65$, $RMSEA=0.13$, $CFI=0.72$, $TLI=0.66$). The two-factor model, however, showed improved fit ($\chi^2 = 113$, $df=64$, $RMSEA=0.08$, $CFI=0.90$, $TLI=0.87$). Additionally, the two-factor model had a lower Akaike Information Criterion ($AIC=3133$) compared to the one-factor model ($AIC=3215$), indicating a better balance of fit and parsimony. These results suggest that a two-factor structure better represents the data and that a single-factor solution does not adequately capture the variance in responses, also reducing concerns about common method bias.

Table 3 Means, standard deviations, intraclass correlations, and Pearson correlations for all individual-level variables

Variable	M	SD	ICC(1)	ICC(2)	1.	2.	3.	4.	5.	6.	7.
1. Avoiding	2.73	0.81	0.01	0.05	-	0.30*	-0.11	-0.22*	-0.09	-0.06	0.02
2. Accommodating	3.50	0.47	0	0		-	-0.22	0.13	0.21*	-0.26	0.12
3. Competing	3.09	0.72	0.08	0.25			-	-0.19*	-0.15	-0.02	-0.11
4. Collaborating	4.11	0.47	0.30*	0.62				-	0.52*	0.21*	0.30*
5. Compromising	3.95	0.53	0	0					-	0.21*	0.31*
6. Constructive controversy	4.46	0.47	0.44*	0.75						-	0.47*
7. Learning	3.95	0.67	0.24*	0.55							-

$N=116$, * $p<.05$

Data analytic approach

Table 3 presents means, standard deviations, intraclass correlations, and Pearson correlations for all individual-level variables. For the perception of constructive controversy, data aggregation to the team level was justified as indicated by the high $ICC(1)$ value: 44% of the variance in the perception of constructive controversy was explained by team membership. Both conflict management style and individual learning were treated as individual-level variables for theoretical reasons.

Because the data collected from individual team members were grouped within teams, we used a statistical approach that accounts for this “nested” structure and the resulting non-independent data. Because team members within the same team are more likely to be similar to each other than to members of other teams, we used multilevel models to properly analyze the data. To perform these analyses, we used the statistical software R (R Core Team, 2021). For each hypothesis, we ran one model using maximum likelihood estimation. In these models, we examined participants’ learning as the main outcome at the individual level. The predictors in these models included participants’ conflict management styles (individual-level predictors) and the level of constructive controversy within teams (team-level predictor). To ensure comparability between variables, we standardized all predictors by converting them to z-scores.

Hypothesis testing

Our first hypothesis concerned the impact of constructive controversy on individual learning. We therefore tested a model with one team-level predictor only. Constructive controversy was found to have a positive impact on individual learning ($b=0.27$, $SE=0.06$, $t(27)=4.29$, $p<.001$, 95% CI [0.14, 0.40]). The better team members perceived the execution of constructive controversy, the more learning they reported. Thus, we could find support for Hypothesis 1 in our data.

Our second hypothesis concerned the moderating effect of the different conflict management styles on the relationship

between constructive controversy and individual learning. For each conflict management style, we tested a random-intercepts, random-slopes model. Results of our model test show:

- Avoiding did not predict individual learning ($b = -0.04$, $SE=0.06$, $t(81) = -0.61$, $p=.55$, 95% CI [-0.15, 0.08]) but the perception of constructive controversy did ($b=0.32$, $SE=0.06$, $t(27)=5.04$, $p<.001$, 95% CI [0.19, 0.45]). Furthermore, the cross-level interaction between the individual-level predictor avoiding and the team-level predictor constructive controversy turned out to be significant ($b=0.20$, $SE=0.06$, $t(81)=3.24$, $p=.002$, 95% CI [0.08, 0.32]): The relationship between constructive controversy and individual learning was stronger for those individuals high in avoiding (see also Fig. 1).
- Accommodating did not predict individual learning ($b=0.07$, $SE=0.06$, $t(81)=1.09$, $p=.28$, 95% CI [-0.05, 0.18]), but constructive controversy did ($b=0.23$, $SE=0.07$, $t(27)=3.13$, $p=.004$, 95% CI [0.08, 0.37]). The cross-level interaction between the individual-level predictor accommodating and the team-level predictor constructive controversy, however, did not turn out to be significant ($b = -0.14$, $SE=0.08$, $t(81) = -1.86$, $p=.07$, 95% CI [-0.29, 0.007]).
- Competing did not predict individual learning ($b = -0.02$, $SE=0.06$, $t(81) = -0.26$, $p=.80$, 95% CI [-0.14, 0.11]) but constructive controversy did ($b=0.26$, $SE=0.07$, $t(27)=3.89$, $p=.0006$, 95% CI [0.13, 0.39]). The cross-level interaction between the individual-level predictor competing and the team-level predictor constructive controversy did not, however, turn to be significant ($b=0.09$, $SE=0.05$, $t(81)=1.69$, $p=.09$, 95% CI [-0.01, 0.18]).
- Collaborating did not predict individual learning ($b=0.14$, $SE=0.07$, $t(81)=1.93$, $p=.06$, 95% CI [-0.002, 0.27]) but constructive controversy did ($b=0.33$, $SE=0.07$, $t(27)=4.96$, $p<.001$, 95% CI [0.20, 0.47]). Furthermore, the cross-level interaction between the individual-level predictor collaborating

Fig. 1 Moderating effect of avoiding conflict management style on the relationship between the perception of constructive controversy and learning. Note. CC=Perception of constructive controversy as effective. Avoiding=Avoiding conflict management style. Low= $M-1$ SD. High= $M+1$ SD. Depiction according to Dawson (2014)

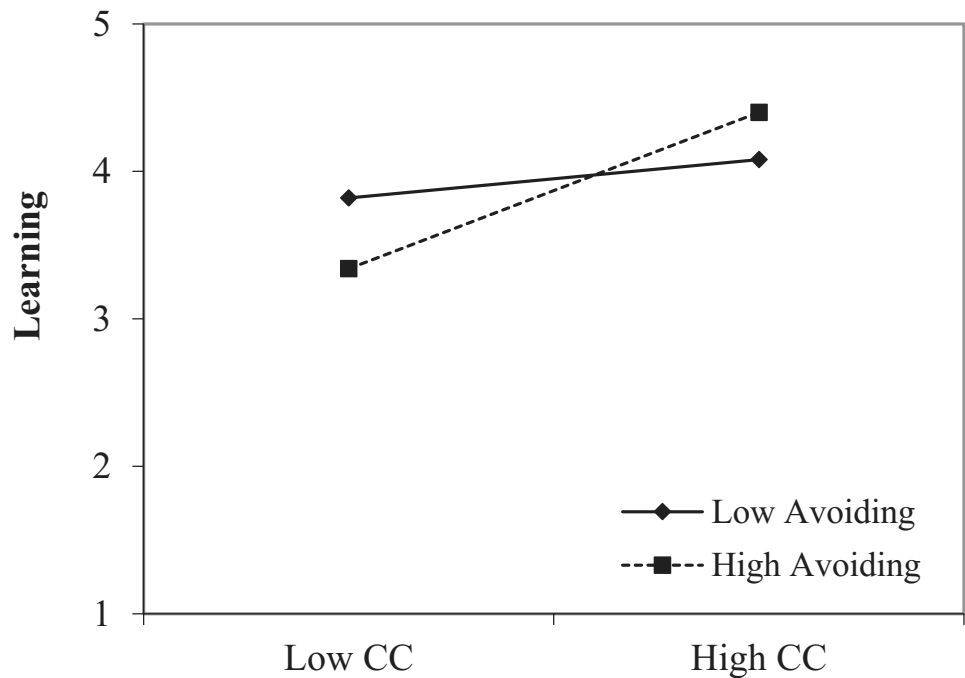
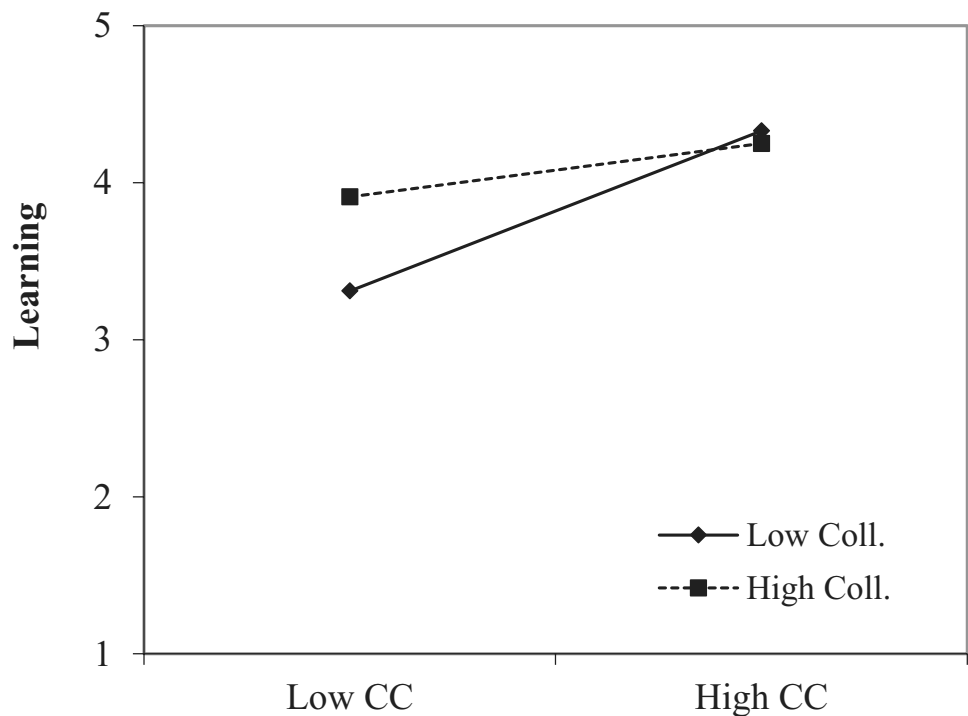


Fig. 2 Moderating effect of collaborating conflict management style on the relationship between the perception of constructive controversy and learning. Note. CC=Perception of constructive controversy as effective. Coll. = Collaborating conflict management style. Low= $M-1$ SD. High= $M+1$ SD. Depiction according to Dawson (2014)



and the team-level predictor constructive controversy turned out to be significant ($b = -0.17$, $SE = 0.06$, $t(81) = -2.85$, $p = .006$, $95\% CI [-0.28, -0.05]$). The relationship between constructive controversy and individual learning was stronger for those individuals low in collaborating (see also Fig. 2).

e) Compromising predicted individual learning ($b = 0.16$, $SE = 0.06$, $t(81) = 2.47$, $p = .02$, $95\% CI [0.03, 0.28]$) and constructive controversy did as well ($b = 0.26$, $SE = 0.06$, $t(27) = 4.03$, $p = .0004$, $95\% CI [0.13, 0.39]$). The higher individuals scored in compromising and the better the constructive controversy was enacted, the more learning they reported. Furthermore, the

Fig. 3 Moderating effect of compromising conflict management style on the relationship between the perception of constructive controversy and learning. Note. CC=Perception of constructive controversy as effective. Comprom. = Compromising conflict management style. Low= $M-1$ SD. High= $M+1$ SD. Depiction according to Dawson (2014)

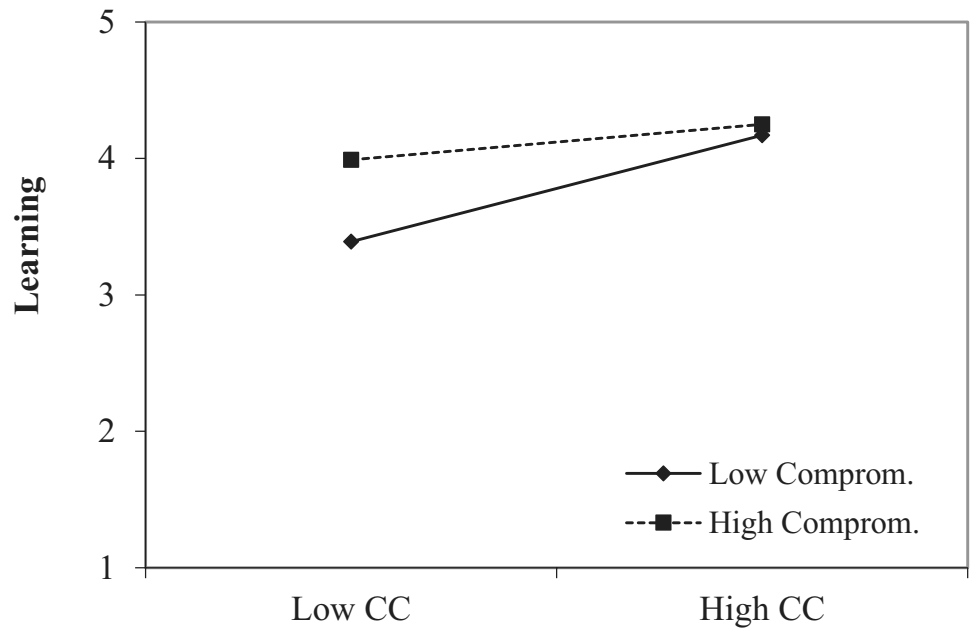


Table 4 Moderating effects of conflict management styles on the relationship between perception of constructive controversy and learning

Conflict Management Styles	High degree	Low degree	Moderating effect was...
Avoiding	Learn more (++)	Learn (+)	Positive
Accommodating			Not significant
Competing			Not significant
Collaborating	Learn (+)	Learn more (++)	Negative
Compromising	Learn (+)	Learn more (++)	Negative

cross-level interaction between the individual-level predictor compromising conflict management style and the team-level predictor constructive controversy was established to be significant ($b = -0.13, SE = 0.05, t(81) = -2.38, p = .02, 95\% CI [-0.24, -0.03]$): The relationship between constructive controversy and individual learning was stronger for those individuals low in compromising (see also Fig. 3).

In summary, we could find support for a moderating effect of conflict management styles on the relationship between constructive controversy and individual learning for some, but not all conflict management styles (for an overview, see Table 4). Regarding effect sizes, the regression coefficients suggest that these moderating effects were generally small to medium in size. Participants with high avoidance, low collaboration, or low compromise conflict management styles reported particularly high learning gains from constructive controversy.

Discussion

By applying the practical procedure of constructive controversy, we examined its effects on individual learning, particularly focusing on how conflict management styles exacerbate or buffer the impact of constructive controversy on the perception of individual learning. We employed a simulation approach, allowing us to maintain relatively controlled conditions for applying the practical procedure of constructive controversy. Results show that participants reported that they learned more when they perceived that the controversy was constructive. Furthermore, participants with high avoidance, low collaboration, and low compromise conflict management styles were especially likely to benefit in their self-reported learning through constructive controversy. The moderation effects were small to medium in size, suggesting that these conflict management styles had a modest to medium impact on the relationship between constructive controversy and individual learning.

Our results confirm the general hypothesis that constructive controversy applied as a practical procedure increases the participants' perception of their individual learning. This supports and builds on results of previous studies (Chen et al., 2011; Johnson, 2015; Johnson & Johnson, 2009; Vollmer & Seyr, 2013). Moreover, our results concerning the effects of conflict management styles shed a differentiated light on the finding that skilled disagreement and active involvement are major conditions for constructive controversy, which states that individuals need an integrative conflict management style and refrain from avoiding, accommodating, and competing conflict behavior (Johnson, 2015).

Results of conflict management styles show that not only individuals with an integrative conflict management style - or the ability of skilled disagreement - can learn from constructive controversy. Avoiding had no significant effect on learning by itself but moderated the positive relationship between the perception of constructive controversy and learning. Similarly, the positive impact of constructive controversy on learning was particularly pronounced for individuals low in collaborating (compared to individuals high in collaborating) and for individuals low in compromising (compared to those high in compromising). In our study, the moderating effects of accommodating and competing conflict management styles point in the same direction but were not significant. This lack of significance may be due to several factors. First, the statistical power to detect moderating effects for these styles may have been limited due to the relatively small sample size and the lower average levels in our sample. Second, it is possible that the influence of these styles manifests only in more extreme conflict situations, while the controversies examined in our study were of a more constructive and less escalated nature. Finally, these styles might be less central in shaping how individuals process and respond to constructive controversy. Accommodating, for example, involves yielding to others' views and may reflect a general tendency to disengage from one's own position, making it less likely to influence how constructively a controversy is perceived and impacts learning. Competing, in contrast, may reflect a zero-sum mindset that overrides learning-oriented engagement, thereby reducing the potential for learning in constructive controversy. In general, the moderating effects can be attributed to the practical procedure of constructive controversy and its identical instruction to all participants regardless of their conflict management style. During the controversy, all participants are instructed to be actively involved, which means they are requested to argue collaboratively for each course of action of the issue under discussion in sub-teams and to determine a solution as a team. Results indicate that this has an important effect on how participants with different preferences in terms of their conflict management styles behave in a situation where cooperative behavior is required explicitly. Individuals with low scores in collaborating are encouraged to collaborate and those with low scores in compromising will find it more difficult to partially withdraw from their point of view. Those with a preference for avoiding cannot avoid because they are explicitly instructed to express their opinion, those who prefer to dominate seem to be contained and those tending to accommodate seem unable to give in so easily when following the constructive controversy procedure. It seems that these participants change their conflict management behavior into a more collaborative way which, in turn, opens their eyes towards other opinions. This

suggests that during a constructive controversy, the behaviors it elicits— such as perspective taking, the motivation to deepen one's understanding, open-mindedness, and creativity (Johnson, 2015; Johnson & Johnson, 2009)— override the individual conflict management styles that participants bring into the interaction as pre-existing conditions. This necessary change in behavior, in turn, seems to increase their perception of learning. The practical procedure can thus be interpreted as a contingency factor (Van de Vliert, 1997) that influences individual behavior during a collaborative discussion. However, it remains unclear if and how the individual conflict management styles change during the discussion process.

In summary, learning is not only a question of one's individual conflict management style, rather, it is a question of how individuals involve themselves in a group discussion. In this study, the question of “how” meant that individuals were formally instructed to argue for different courses of action on a controversial issue. Although they may be personally inclined to one course of action, they also have to find arguments for the opposing course of action. Because rational argumentation is what matters, all advocacy teams are required to present their arguments factually, refraining from using power or hiding behind others. Consequently, those participants with high avoidance, low collaboration, and low compromise conflict management styles report that they have learned more. This is a new insight given the general assumption that participants of constructive controversy should be open-minded and have an integrative attitude. And it is a new insight given the general finding that especially collaborating and compromising conflict management styles are beneficial for outcomes in contrast to avoiding and competing styles (Alhamali, 2019; Taherian et al., 2021).

Given these results, this study deepens our understanding of the conditions necessary for constructive controversy, especially skilled disagreement and active involvement. It extends the scope of previous studies, which primarily analyzed team-level constructs. It also contributes to understanding the effects of individual conflict management styles on learning when applying the practical procedure of constructive controversy. Our empirical results show the differential effects of conflict management styles and reveal their moderating effect on the relationship between the perception of constructive controversy and learning.

Limitations

Despite the strengths of the study, several limitations need to be overcome in future research. First, the sample size in our simulation study was relatively small which may have resulted in insignificant moderating effects. Statistical power needs to

be increased in future studies by recruiting a larger sample. In addition, there is a gender imbalance in our study. Although there is evidence that the preferences of conflict management styles between women and men are quite similar (e.g. Pinto-Moreira, 2021) future studies should control for gender.

Second, the topic of the constructive controversy was not highly personally relevant for participants. Due to the comparability of the procedure and effects we had to choose the same topic for all participants. It thus remains an open question how much learning occurs when conflict-laden topics that have been present in a team over weeks or even months are discussed and how strong the moderating effects of conflict management styles would be in such a case. This limitation can only be overcome by field studies investigating the application of constructive controversy in organizational contexts. Nevertheless, this simulation study will inform such future research by showing that applying constructive controversy *can* impact learning and that conflict management styles *can* have moderating effects on this relationship.

Third, constructive controversy and learning were not measured directly but through participants' responses in a questionnaire. These self-report measures indicate participants' perceptions of constructive controversy and learning. These assessments may differ from actual outcomes. Also, process characteristics such as discussion intensity or individual effort were not assessed. It is therefore not clear what exactly participants do and say during a constructive controversy that facilitates learning and, more specifically, how participants with different conflict management styles act differently or similarly during a constructive controversy.

Practical implications

There is no doubt that collaborating and compromising conflict management styles are beneficial for learning in contrast to avoiding and competing styles (Alhamali, 2019; Taherian et al., 2021), or that skilled disagreement is an important condition for constructive controversy (Johnson, 2015). Thus, it is important to develop the corresponding behaviors in order to profit from them in team discussions. Our results do not suggest that it is useful to try to change conflict management styles. Instead, our results indicate a different approach. This approach is to invest in methods that provide a solid guidance for participants to discuss a conflictual issue in a way that encourages them to actively engage and to be involved in an open discussion, which requests their opinion, prevents them from hiding and challenges them in their point of view. Constructive controversy is such a method that aims at developing a solution that combines the best arguments of all members of a team. Team leaders or members of self-organized teams can use this method in order to encourage all members regardless of

their conflict management preferences and boost the quality of discussions.

Future research

This study has implications for future research. Most importantly, the ecological validity needs to be strengthened by extending this research on applying constructive controversy to real teams in organizations (e.g. Vollmer et al., 2015, for initial positive experiences). These field studies should also take into account that teams in today's organizations often function in new work arrangements that may impact conflicts, the effects of constructive controversy, and how to best implement the practical procedure of constructive controversy in virtual and hybrid settings (Hémon et al., 2024). Furthermore, validating our results with an experimental study design would strengthen their empirical foundation. Following up on experimental work by Johnson and Johnson (2009), who found constructive controversy to be superior to other types of discussion such as debate, concurrence seeking and individualistic efforts, research could also provide insights into which form of discussion is more effective for learning and other outcomes in an organizational context, especially when considering participants' conflict management styles. Finally, studies focusing on how participants behave, how they feel and how they integrate their knowledge and experience in order to make a joint decision could provide insights into the micro-processes of constructive controversy. Especially worthwhile would be an investigation into how behaviors encouraged by constructive controversy instructions, such as perspective taking, motivation to improve understanding, open-mindedness, and creativity, may override individuals' default conflict management styles. Accordingly, future studies should address how conflict management styles develop in terms of individuals' actual behavior during a constructive controversy. This could shed light on how and why high avoiding, low collaborating and low compromising develop and foster learning in the context of the practical application of constructive controversy.

Conclusion

This study explored the practical application of constructive controversy and showed that it led to increased learning, especially for participants with conflict management styles characterized by high avoidance, low collaboration, and low compromising. These findings open a new research avenue that aims at understanding the dynamics of applying constructive controversy in practice, with a particular focus on organizational contexts. Different conflict management styles, especially the negatively connoted ones, do not necessarily

hinder learning. Instead, our findings can be used to better support the active involvement of all participants in the constructive controversy and thereby overcome the potential difficulties resulting from different conflict management styles. This application of constructive controversy provides practical guidance through the sometimes difficult process of discussing controversial issues. It is therefore a feasible and effective way to address the challenges faced by today's organizations.

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Data availability The study materials and raw data are publicly available in our Open Science Framework (OSF) repository: <https://osf.io/bv6eu/>.

Declarations

Ethics approval According to the Swiss Human Research Act this study did not require formal approval by a cantonal ethics committee. However, this study was conducted in accordance with the ethics regulations of the Department of Psychology at the University of Fribourg, Switzerland, which adhere to the principles of the Declaration of Helsinki.

Consent to participate and consent to publish Informed consent to participate was obtained from all individual participants included in the study. Participants signed a consent form to use the data for scientific purposes.

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

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