Two Sides to Every Story: Mitigating Intercultural Conflict through Automated Feedback and Shared Self-Reflections in Global Virtual Teams

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Global virtual teams experience intercultural conflict. Yet, research on how Computer-Mediated Communication (CMC) tools can mitigate such conflict is minimal. We conducted an experiment with 30 Japanese-Canadian dyads who completed a negotiation task over email. Dyads were assigned to one of three conditions: C1) no feedback; C2) automated language feedback of participant emails based on national culture dimensions; and C3) automated language feedback (as in C2), and participants' shared self-reflections of that feedback. Results show Japanese and Canadian partners interpreted the negotiation task differently, resulting in perceptions of intercultural conflict and negative impressions of their partner. Compared to C1, automated language feedback (C2) and shared self-reflections (C3) made cultural differences more salient, motivating participants to empathize with their partner. Shared self-reflections (C3) served as a meta-channel to communication, providing insight into each partner's intentions and cultural values. We discuss implications for CMC tools to mitigate perceptions of intercultural conflict.

CCS Concepts: • **Human-centered computing** → Computer supported cooperative work;

KEYWORDS

Feedback; intercultural conflict; reflection; email; global virtual teams

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1 INTRODUCTION

Advances in telecommunication and information technologies are facilitating the formation of global virtual teams (GVTs) – teams whose members are distributed across geographical, cultural, linguistic, organizational and professional boundaries [19]. GVTs often have limited history as a group, collaborate on short-term, interdependent tasks, and rely heavily on Computer-Mediated Communication (CMC) tools [19]. A recent

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industry report predicted that by 2015, 75 percent of knowledge-based project work in the Global 2000 will be completed by GVTs [30].

A significant challenge GVTs experience is *cultural diversity* - the diversity of team members' cultural backgrounds [25]. Cultural diversity contributes to a lack of shared mental models, increasing the complexity and ambiguity of communication [53]. This can result in misunderstandings, which confirm prejudices, rather than breeding mutual understanding [20]. Compared to homogenous teams, culturally diverse teams experience lower trust and cohesion [54], less effective communication [43] and higher levels of interpersonal conflict [18,28]. If cultural differences are not understood or resolved, GVTs function ineffectively, failing to meet project goals and at times, leading to organizational failures [25].

One approach to mitigate the challenges of cultural diversity is to support GVT members in developing *intercultural competence* – the awareness, knowledge, and skills to interact with people from other cultures [20]. Yet, current technological approaches to developing intercultural competence have focused primarily on simulated game environments, where users learn intercultural competence through interactions with culturally-realistic virtual agents (e.g. [12,21]). To date, little research has explored how CMC tools – in particular, email – can be utilized to support GVT members in developing intercultural competence.

To address this gap, we explore the potential of feedback to mitigate perceptions of intercultural conflict in GVTs. We present the results of a mixed-methods experiment with 30 Japanese-Canadian dyads who completed a negotiation task over email. Dyads were assigned to one of three conditions: C1) no feedback; C2) automated language feedback of participant emails in relation to national culture dimensions; and C3) automated language feedback (as in C2), along with participants' shared self-reflections of that feedback. Results show Japanese and Canadians partners interpreted the negotiation task differently, resulting in perceptions of intercultural conflict and negative impressions of their partner. Compared to C1, automated language feedback (C2) and shared self-reflections (C3) made cultural differences more salient, motivating participants to empathize and yield more to their partner. Shared self-reflections (C3) served as a meta-channel to communication, providing insight into each partner's intentions and cultural values. Our findings identify opportunities for the augmentation of CMC tools to support people in developing intercultural competence, while mitigating perceptions of intercultural conflict.

2 BACKGROUND AND RELATED WORK

We situate this study along three areas of related work: 1) Culture and cultural dimensions, 2) Intercultural conflict in GVTs, and 3) Support tools for GVTs.

2.1 Culture and Cultural Dimensions

Culture is defined as "an accumulated pattern of values, beliefs, and behaviors shared by an identifiable group of people with a common history and a verbal and nonverbal symbol system" [39]. Though culture can be analyzed on several levels (e.g. national, regional, organizational) [25], in this paper, we focus on *national culture* - the values, beliefs, norms and customs associated with the culture of a nation [20]. While no two individuals of the same national culture are identical, members of the same culture often share similar thinking and behavior patterns [20].

To explain and describe differences between national cultures, cultural anthropologists (e.g. Hall [15], Hofstede [20], Trompenaars [63], Ting-Toomey[61]) have proposed a set of cultural dimensions, where a "dimension" is an aspect of a culture that can be measured relative to other cultures [20]. Examples include individualism versus collectivism, power distance, and short-term versus long-term orientation [20]. Each dimension reflects deep-seated cultural values, which in turn influence observable behaviors [20]. Communication breakdowns arise when national cultures lie at different points on these cultural dimensions [15,20,61].

2.2 Intercultural Conflict in Global Virtual Teams

GVTs experience two interrelated challenges which contribute to intercultural conflict: 1) a higher cognitive load, and 2) the cultural diversity of its team members.

First, compared to collocated teams, GVTs operate under a significantly higher cognitive load [19]. CMC tools have reduced access to social and contextual cues [65], exacerbating the likelihood of intercultural miscommunications [53]. GVTs function within a complex situational structure, where complexity increases with each additional location from which members work [19]. This higher cognitive load makes GVTs more susceptible to biased impression formation and attribution errors [19]. Such biases negatively impact team satisfaction and cohesion [19] and increase intercultural conflict [55].

Another challenge GVTs experience is the cultural diversity of its team members [53]. Studies find that GVTs experience intercultural conflict when using CMC [55]. Conflicts arise from national culture differences in direct versus indirect communication styles [53], levels of formality [16,31], ranges of emotional expression [16], relationship versus task-oriented working styles [16,41], perceptions of time [48], and media preferences [34,51,52]. If cultural differences are not understood or resolved, teams function ineffectively, failing to meet project goals and at times, leading to organizational failures [25].

2.3 Support Tools for Global Virtual Teams

To date, current research has focused on developing an understanding of how national culture influences CMC usage among GVTs. Yet, little work has explored how CMC tools can actually mitigate GVT members' experiences of intercultural conflict. To investigate this gap, we draw inspiration from two research fields: 1) technologies for training intercultural competence, and 2) automated feedback tools to support group work. We identify unexplored directions in each field, and use this to motivate our research.

2.3.1. Technologies for Training Intercultural Competence. Effective intercultural communication is not innate, but rather a learned skill, honed through time and experience [20]. One approach to speed this process is to support people in developing *intercultural competence* – the awareness, knowledge and behavioral skills to interact with people from different cultural backgrounds [20]. Current technological approaches to developing intercultural competence take place in simulated game environments, where users learn intercultural competence through interactions with culturally-realistic virtual agents or intelligent tutors (e.g. [12,21,44,47]). Benefits include a safe environment for learners to explore complex intercultural situations without real-world consequences [33]. However, such training approaches also have limitations: 1) it is unclear how much learning effectively transfers to real-world contexts [47], and 2) training takes place prior to real-world interactions, requiring dedicated time and effort to complete. Here, we identify an opportunity for utilizing CMC tools (i.e. existing communication channels GVTs already use) to support team members in developing intercultural competence.

2.3.2. Automated Feedback Tools to Support Group Work. Providing feedback on team behaviors is a key element in teaching collaborative skills [5]. Recent research explored the use of detection tools to automatically detect and provide visual feedback on group behaviors. The goal of feedback is to help team members gain awareness of suboptimal group dynamics (e.g. imbalanced participation), and persuade members to achieve an ideal norm of effective collaboration. The majority of this research explores face-to-face interactions in collocated teams, where automated feedback visualizes members' verbal and non-verbal behaviors (e.g. eye gaze, speaking time) (e.g. [9–11,24,50]). A few studies have also explored automated feedback for distributed teams, who communicate over text-based CMC (i.e. Instant Messaging) (e.g. [6,26,27,59]). Such studies found that automated analysis of language use can reveal teamwork-relevant behaviors [22] and increase awareness of language use among virtual team members, which in turn can enhance group performance [59] and collaboration [27].

We believe there is potential in the use of automated feedback to support GVT members in developing intercultural competence. Yet, we identify two gaps in the literature. First, current studies primarily focus on homogeneous teams, where members come from the same national culture (i.e. American). Second, current studies implicitly assume an ideal "norm" for effective collaboration, where the same feedback is presumed to be interpreted in similar ways by all members. Yet, national culture leads to different notions of teamwork,

communication and working styles [15,20]. Consequently, GVTs may not have a single ideal "norm" for collaboration, where culturally diverse members may interpret the same automated feedback in different ways. A recent study by He et al. (2017) [17] illustrates this notion - in a study of native and non-native speakers using videoconference, providing automated feedback of team members' speech and facial behaviors, combined with members' shared reflections of that feedback revealed different interpretations by native and non-native speakers.

We build upon this work in our study, in the context of culturally diverse teams. While He et al. (2017) explored the combined effect of automated feedback with shared self-reflections, we investigate the impact of [no feedback] versus [automated feedback] versus [automated feedback with shared self-reflections]. We propose three hypotheses. First, we believe automated feedback of team members' behaviors will increase members' awareness of cultural differences, thereby increasing intercultural competence. Shared self-reflections of that feedback may encourage understanding of such differences, potentially further increasing intercultural competence. We hypothesize:

[H1] *Compared to [no feedback], [automated feedback] will increase team members'* ***intercultural competence****. Assuming the previous is true, [shared self-reflections] with [automated feedback] will lead to higher intercultural competence, compared with only [automated feedback].*

Second, previous work found that automated feedback of team members' behaviors can lead members to compare self with others (e.g. [11,17]). This may motivate members to become more similar in terms of their own feedback and others' feedback, particularly if members perceive themselves as doing "poorly" compared to others [17]. We speculate that adding shared self-reflections may promote an understanding of why other members behaved in certain ways, potentially further increasing similarity between team members. Thus:

[H2] *Compared to [no feedback], [automated feedback] will lead culturally diverse team members to become* ***more similar*** *with regards to* ***detected behaviors*** *in the automated feedback. Assuming the previous is true, adding [shared self-reflections] to [automated feedback] will lead members to become more similar, compared with only [automated feedback].* (By "detected behaviors", we refer to the behaviors that are automatically sensed or captured by an automated feedback tool).

Third, since automated feedback can reveal differences in team members' behaviors, members may gain an understanding of how others differ from themselves - for example, that others may value different things compared to themselves. Given this, automated feedback may encourage members to be more receptive to the different ideas or perspectives offered by other team members. We speculate that shared self-reflections may further increase openness or receptivity to different perspectives, since it can reveal others' internal reasoning or explanations for their actions. Thus:

[H3] *Compared to [no feedback], [automated feedback] will lead members to be* ***more receptive*** *to different ideas or perspectives offered by other members. Assuming the previous is true, adding [shared self-reflections] to [automated feedback] will increase receptivity, compared with only [automated feedback].*

Finally, we explore the effect of feedback on participants' perceptions of intercultural conflict. We ask the exploratory research question:

[RQ1] *How does [no feedback] versus [automated feedback] versus [automated feedback with shared self-reflections] influence participants' perceptions of intercultural conflict?*

3 METHOD

To investigate our hypotheses and *RQ1*, we conducted a mixed-methods experiment with 30 Japanese-Canadian dyads who completed a negotiation task over email. Using a between-subjects design, participants were randomized into one of three conditions: Condition 1 - **N**o feedback (N); Condition 2 - automated language feedback in the form of **G**raphs (G); and Condition 3 - automated language feedback in the form of **G**raphs and shared self-**R**eflections (G+R).

3.1 Participants

Dyads were used in this experiment since two-person groups are frequently used for collaboration and negotiation tasks in organizational life [62]. Dyads were composed of Japanese-Canadian pairs. We chose

Japan and Canada since these countries differ significantly on national cultural dimensions such as power distance, individualism versus collectivism, masculinity versus femininity, and short-term versus long-term orientation [15,20]. These differences reflect contrasting cultural values, which in turn, may increase the potential for intercultural conflict.

We recruited 60 participants: 30 Japanese (15 f), and 30 Canadian (15 f). Participants were undergraduate university students whose birth country is Japan or Canada, who currently reside in their birth country and who have never lived outside of their birth country for more than one year. The mean age of Japanese participants is 21.3 years (SD=1.35) and for Canadian participants is 21 years (SD=1.83). The experiment was advertised to participants as an exploration of "how email tools can support communication between people from different cultural backgrounds". Participants were told they would be "completing a decision-making task with a partner from [Japan/Canada] over email", where their conversations would be "analyzed by a text analysis tool". Dyads took between one to three weeks to complete the task and were compensated a monetary amount equivalent to 75 USD. All experiment documents were in English.

3.2 Negotiation Task

3.2.1. Task Type. The type of task being performed significantly impacts the nature of group processes [36,56]. We chose a task type which would increase the likelihood of encountering intercultural conflict. Based on McGrath's Task Circumplex Model [35], we chose a "cognitive conflict" negotiation task, where group members must work interdependently to resolve conflict in viewpoints (i.e. values and attitudes) [35]. This type of task has no objective "correct" answer, where high interdependence evokes increased exposure to the knowledge and perspectives of other members [28], potentially increasing intercultural conflict.

3.2.2. Negotiation task. We adapted the Legislative Dilemma Task [37] – a "cognitive conflict" negotiation task where group members must allocate $1.8 million among five competing social programs. Participants were told to act as the "financial representatives" for a global philanthropic organization called "Envision Change International". Japanese and Canadian partners represented the Japanese and Canadian headquarters respectively, where both partners held the "same status and decision-making power".

Participants could choose from five social programs: 1) Prevention and punishment for high-school bullying, 2) Regulations about workplace overtime, 3) Rehabilitation programs for drug addiction, 4) Integration of immigrants and refugees, and 5) Robots to take care of the elderly. Participants were told that if a program is selected, "funding will be split equally between Japan and Canada". Programs were chosen based on pilot testing of current social issues that were potentially relevant to Japan (programs #2,5), Canada (programs #3,4), or both (program #1).

Participants were told to communicate their "initial funding proposal" to their partner over email, where the goal is to "convince your partner that your proposal is the best option", based on your "personal beliefs and values". By the end of the task, "you and your partner should come to an agreement of fund allocation that you are both happy with". Funding constraints meant that participants can choose at most two social programs, where the first program receives more money than the second.

We chose email for several reasons. First, distributed teams are increasingly choosing email as a channel for negotiation [49,60]. Second, email allowed us to overcome time-zone differences between Japan and Canada. Finally, email is asynchronous and text-based, allowing non-native speakers (i.e. Japanese participants) more time to comprehend foreign speech and plan, produce and edit their own [23].

3.2.3. Dyad composition. To ensure dyads would have something to negotiate, we paired Japanese-Canadian partners who chose different social programs (regardless of whether the programs they picked were consistent with our expectations of Japanese or Canadian preferences). Dyads were randomized across conditions to achieve an equal balance of same-gender and mixed-gender groups.

3.2.4. Task Instructions. Each partner was asked to write 4 emails (in total) to complete the task, with each email containing at least 1-2 paragraphs to ensure enough text to analyze, and to CC a researcher email account for every email. We instructed Canadian participants to write the first email. This decision was made after pilot testing, where Japanese participants expressed they were hesitant and uncomfortable to initiate negotiations in a foreign language.

3.2.5. Pilot testing of social programs. Pilot testing of social programs began with discussions about current social issues with contacts who live in Canada or Japan. From this, we generated an initial list of social programs and asked recruited participants to rank programs in order of personal importance. Based on these results, we removed programs that did not evoke diverging opinions between Canadians and Japanese (e.g. "gender equality in the workplace") and programs which required additional research or technical expertise (e.g. "Phase-out of nuclear power plants").

3.3 Automated Language Feedback (Graphs)

While Condition 1 (N) provided no feedback, participants in Condition 2 (G) and Condition 3 (G+R) were provided with automated language feedback (**G**raphs). We first introduce a framework of intercultural competence, which we used to guide our design of the graphs.

3.3.1. The Cultural Intelligence (CQ) framework. The CQ framework defines four intercultural competences: Cognitive, Metacognitive, Behavioral and Motivational that are transferable across different cultural contexts (Table 1) [2]. In recent years, the CQ framework has gained significant recognition, moving from an academic construct to a practical framework used by industry leaders for intercultural education [40]. We use this framework to guide the design of our feedback.

Table 1. Cultural Intelligence (CQ) Framework

Cognitive CQ:	Knowledge of basic frameworks of cultural values (cultural dimensions).
Metacognitive CQ:	Consciousness and awareness of the cultural knowledge one applies in intercultural interactions.
Behavioral CQ:	The capability to exhibit situationally-appropriate behaviors in culturally diverse situations.
Motivational CQ:	Directing and motivating attention and energy to adapt in new cultural settings.

3.3.2. Graphs of Cultural Dimensions. Automated language feedback was provided in the form of bar graphs, which visualized participants' language usage in relation to cultural dimensions (Fig. 1). We chose five cultural dimensions that differ between Canada and Japan: Emotional Expressiveness [25], Individual-Focus or Group-Focus [20,61], Level of Relationship-Focus [15], Short-term or Long-term Focus [20] and Level of Informality [20]. Bar graphs compared Japanese (orange) and Canadian (blue) partners beside one another. To support participants in developing Cognitive CQ, we provided a brief definition of each cultural dimension (based on cultural anthropology literature) alongside every graph. We intentionally did not indicate how Japan and Canada compare on such dimensions, in order to evoke reflection (Metacognitive CQ) of one's own cultural values compared to their partner's. Participants were told that "each graph reflects common differences in communication styles between different cultures", though "the graphs can be affected by other factors such as personality, mood, environment, language fluency, etc."

Graph feedback was provided in two rounds: Round 1 feedback was calculated based on each partner's first and second emails, and provided after both partners wrote their second email. Round 2 feedback was calculated based on each partner's third and fourth emails, and provided after both partners wrote their fourth and final email. Participants received both rounds of feedback as an attached PDF.

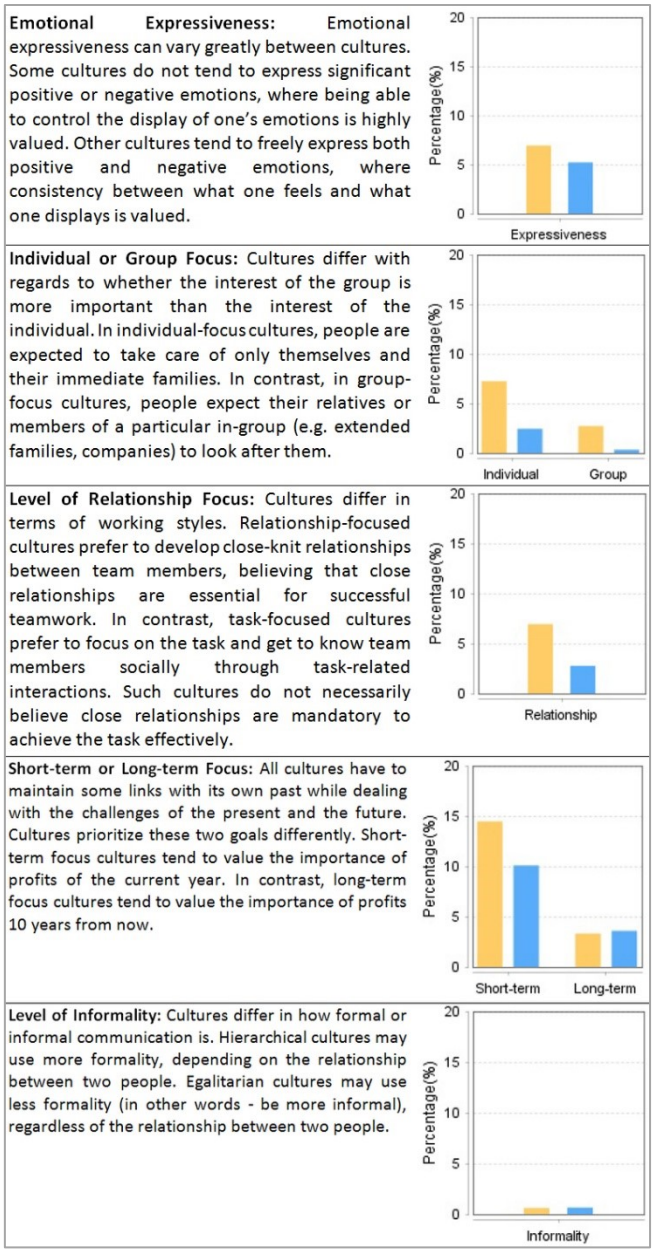

Fig. 1. Example of automated language feedback (graphs of cultural dimensions) shown in Condition 2 and Condition 3. Orange represents the Japanese partner and blue represents the Canadian partner.

3.3.3. Text-Analysis Tool. For text-analysis of participant emails, we used the Linguistic Inquiry and Word Count (LIWC) [45] and its accompanying API. LIWC offers 80 categories of content and function words,

which reflect diverse psychological processes [58]. It is one of the most commonly used and well-validated tools for computational linguistic analysis [58].

Calculations for each graph are shown in Table 2. Underlined words represent LIWC category names, which are in percentage values. The LIWC category of "Dictionary words" reflects the percentage of recognized dictionary words. All graphs represent relative rather than absolute values. Since non-native speakers experience a higher cognitive load due to language barriers [57] and typically write less than native-speakers[3], relative values allowed us to compensate for differences in email length.

Since the literature linking LIWC categories to cultural dimensions is sparse, our decisions of which LIWC categories map to which cultural dimensions are a rough measure based on cultural dimension definitions and LIWC category names. For example, since short-term focus cultures value the here and now, while long-term focus cultures value the past and future [4,20], we refer to the LIWC category of "present focus" (e.g. today, is, now) as a measure for short-term focus, and the LIWC categories of "past focus" (e.g. ago, did, talked) and "future focus" (e.g. may, will, soon) as a measure for long-term focus. One related work exception that directly maps LIWC categories to cultural dimensions is for the individual versus group-focus graph. Individual-focus cultures (also known as "individualistic cultures") can be characterized by self-attentional focus and can be assessed by the LIWC category of "first-person singular pronouns" (e.g. I, me, mine) [38,58,66]. In contrast, group-focus cultures (also known as "collectivistic cultures") can be characterized by other-oriented attentional focus which can be assessed by the LIWC category of "first-person plural pronouns" (e.g. we, us, our) [38,58,66]. The LIWC categories we chose are by no means exhaustive, but rather represent a sampling of language use (and in turn, graph feedback), which we believed might elicit different interpretations by Japanese and Canadian participants.

Table 2. Calculations for graph feedback

Graph 1	**Emotional Expressiveness** = (Positive emotion + Negative emotion) / Dictionary words
Graph 2	**Individual-Focus** = First person singular pronoun / Dictionary words
	Group-Focus = First person plural pronoun / Dictionary words
Graph 3	**Relationship-focus** = (Social processes + Leisure + Home + Affiliation) / Dictionary words
Graph 4	**Short-term Focus** = Present focus / Dictionary words
	Long-term Focus = (Past focus + Future focus) / Dictionary words
Graph 5	**Informality** = Informal language / Dictionary words

3.4 Shared Self-Reflections (of the Graphs)

After seeing the graphs, participants in Condition 3 (G+R) were also asked to fill in a self-reflection, which they were told would be shared with their partner. The self-reflection asked participants to "*reflect upon your own behavior in comparison to your partner*". Each graph offered an example prompt, though participants were told they could write freely. An example prompt for "Emotional Expressiveness" graph is: "*My expressiveness was lower than my partner because….*". An example prompt for "Level of Informality" graph is: "*My informality was higher than my partner because…*". The shared self-reflections aimed to support participants in developing Metacognitive CQ through active reflection of one's own graphs (which reflect national culture values) in comparison to their partner.

3.5 Metacognitive CQ

The authors of the CQ Framework argue that Metacognitive CQ should be one of the central focuses in intercultural education [2]. Using the Cultural Intelligence Scale (CQS) [64], participants in all conditions self-rated their Metacognitive CQ before and after the task, in a pre-task and post-task questionnaire.

Changes in self-ratings reflect how the task experience influenced participants' self-perceptions of their Metacognitive CQ.

3.6 Semi-structured Interview

After the post-task questionnaire, participants in all conditions were interviewed individually in their native language by a researcher of the same cultural background. Interviews took place over Skype audio and lasted between 20 to 50 minutes. All interviewers followed the same protocol. Questions common to all conditions include participants' experience with the task and with their partner, perceived differences in communication styles, communication challenges (if any) during the task, and learnings (if any) about their partner or their partner's culture. Condition 2 and 3 interviews explored additional questions regarding participants' impressions of the graphs in Round 1 and Round 2. Condition 3 interviews explored questions regarding participants' experiences of writing the self-reflection and reading their partner's self-reflection.

Interviews were partially transcribed. Using inductive qualitative methods [8], the first author (Chinese-born Canadian) and second author (Japanese) independently created two affinity diagrams based on the Canadian and Japanese interview data respectively. For each affinity diagram, the assigned author inductively generated high-level themes and relationships between the themes, in the language the interview was conducted in. Next, Japanese themes and participant quotes were translated into English. Finally, all authors collaboratively discussed the high-level themes to iteratively refine the codes. The findings below emerged from this collaborative analysis.

4 FINDINGS

We first identify three areas of intercultural conflict, perceived by participants across all conditions. Next, we address *H1*, *H2*, *H3* and *RQ1* by discussing the impact of Condition 2 (G) and Condition 3 (G+R) feedback. We illustrate using participant interview quotes, which we refer to by condition, group number, and nationality where "CA" stands for Canada, and "JP" for Japan (e.g. C2-G18-JP).

4.1 Areas of Intercultural Conflict

Japanese and Canadian participants approached the negotiation task differently, leading to three areas of perceived intercultural conflict. We contrast Canadian and Japanese perspectives below, and conclude with possible interpretations of these findings.

4.1.1. Conflict #1: Difficulty with Perspective-Taking. Both Canadian and Japanese participants picked programs relevant to their own cultures, and expressed an initial difficulty in relating to their partner's program choices. For example, Canadian participant C1-G2-CA said: *"[Our choices] were directed towards our own experiences. I didn't think 'workplace overtime' and 'robots' applied too much to Canada. At the same time, they didn't think that 'refugees' or the 'drug' one applied much to Japan".*

C1-G4-CA: *"One thing I didn't realize is that workplace overtime has become such a big deal in Japan. That people commit suicide over it. […] That's something that really shocked me and not something I would have expected."*

From the Japanese perspective, C3-G22-JP said: *"We're from different environments, so we have different perspectives. I felt a cultural difference. Sometimes we don't know the background knowledge. Things that are common in Japan aren't common in Canada, and vice versa."*

C1-G6-JP: *"I've never thought about these issues deeply – for instance, I didn't think about refugees at all. I chose social programs only based things happening around me."*

4.1.2. Conflict #2: Asymmetry in Perception of Communication Style Differences. Participants differed in perceptions of communication style differences between them and their partner. Canadians perceived little

to no difference, while Japanese perceived many differences and mimicked their partner to adapt to those differences. We present details below.

Before the task, most Canadian participants expected language barriers. Yet, many were surprised by the English fluency of their Japanese partners, perceiving little to no communication style difference between themselves and their partner during the task. For example, C2-G14-CA: *"It seemed like she was somebody either from Canada or the US. Her English writing skills are pretty good".*

C2-G13-CA: *"I was surprised we had a very similar tone. If I didn't know, I wouldn't have noticed it was someone from a totally different country".*

In contrast, Japanese participants perceived numerous communication style differences compared to their partners, such as email structure, writing style, and negotiation style. For example, C1-G10-JP: *"In Japanese emails, we write 'Dear…' and our name again before starting the main text. But in foreign emails, they write 'Dear...' and only their first name at the very end. In Japanese emails, we'd write our full names and affiliation at the end".*

C1-G4-JP: *"They write conclusions first, then details like examples and reasoning. [In Japan, it's the opposite]. I thought this style is easy for debating, […] for conveying one's opinion. I think this is a cultural thing – a general style of writing in their culture."*

Upon perceiving style differences, Japanese participants would often "mimic" their partner's writing style. For most participants, comprehension of their partner's message was not a problem. However, all Japanese participants expressed challenges with writing and being able to articulately convey their thoughts. Consequently, many participants would mimic their Canadian partner's writing style, with the intention to reduce language and cultural misunderstandings. For example, C1-G5-JP: *"My partner is a good writer. […] So I mimicked his structure and wrote opinions in a similar way. Because we're communicating in English, I should adapt. I'm not used to writing in English, so I should mimic my partner's writing style."*

C1-G6-JP: *"My partner's message looked like it followed some kind of format - program name, fund amount, reason. He also wrote 'Hello' in the beginning and 'Regards' at the end. […] I mimicked his style because there's a language barrier – in order to reduce misunderstanding".*

4.1.3. Conflict #3: Different Negotiation Styles. Canadian and Japanese participants differed significantly in how they approached the negotiation task. Canadian participants expected a back-and-forth discussion of funding allocations as each partner put forth their own opinions. Many were surprised when their Japanese partners yielded easily without an engaging discussion. For example, C3-G22-CA: *"In her second email, she said 'Okay let's go with your idea'. I was really confused because I thought we were supposed to actually argue. […] She was really fast to agree! […] She was like, 'Oh, that's a problem I didn't know about, so yeah, let's go for it'".*

C1-G10-CA: *"He went along with everything I said. He wasn't very critical I guess. […] I'd rather he have more conflicts, I'd prefer if he had stronger beliefs or ideas".*

In contrast, Japanese participants interpreted the negotiation task as coming to an agreement, where both partners would yield and accommodate the other. Many participants were concerned that since English is not their native language, the "*nuance*" of their message may be lost, where the "*tone*" of their message may seem "*abrupt*", "*impolite*" or "*aggressive*". For example, C2-G12-JP: *"I'm not used to communicating in English. I was worried if the nuance was properly conveyed".*

C2-G16-JP: *"I wished I knew how to say things more softly [in English] – be able to adjust the tone of my arguments. I don't want to give the impression that I'm an insensitive person who can't read the atmosphere".*

C2-G18-JP: *"I can't see his facial expressions or his reactions. So I don't know what he's really thinking. I was concerned my partner might think I'm a pushy person".*

Japanese participants were surprised at how directly Canadian partners stated their opinions, perceiving their partner to be "*headstrong*" and "*inflexible*". For example: C1-G7-JP: *"I was shocked to see how strongly my partner stated her opinion. It must be the norms of overseas - not just Canada but globally. I think she wanted to have a debate, but I wanted to come to an agreement. I think it's meaningless to just give opinions".*

C2-G12-JP: *"I got the impression my partner is a straightforward person. I think it's an English way of writing things. […] It's totally not a Japanese way. They don't accommodate their opinions to other people".*

More specifically, Canadian and Japanese participants differed in how they managed conflicting viewpoints during the task. Canadians expected their Japanese partner to directly address points they did not agree with and felt irritated when they did not. In contrast, Japanese participants intentionally avoided direct disagreement or conflict with their partner's opinions, preferring instead to implicitly disagree by proposing their own viewpoints. We present examples from both perspectives: C1-G7-CA: *"My first email was outlining my proposal and why I chose it. They responded the same way, but they didn't touch on anything I had mentioned. A lot of the conversation was trying to evoke more in-depth answers from them. […] It almost seemed like I was pushy with my ideas, just because I was trying to push the conversation forward."*

C2-G18-JP: *"I wrote my opinion but rarely commented on my partner's opinion. Because I didn't know how to react to his opinion. I didn't want to refute his points since I didn't want him to feel bad, but I didn't agree either."*

4.1.4. Possible Interpretations for 'Areas of Intercultural Conflict'. **Conflict #1:** We offer a few possible interpretations. First, language barriers may have contributed to perspective-taking difficulties, where Japanese participants were not able to fully convey or justify their arguments. Another explanation may be that GVT members often fail to communicate critical information about their local situations, where distributed members lack an understanding of each other's situations [19]. An alternative interpretation is the different ways Westerners and East Asians perceive the world [42] - East Asians place greater attentional resources on contextual (environmental) information, while Westerners attend to object features and characteristics. Cultural differences in attentional focus may have contributed to difficulties in perspective-taking, where Canadians and Japanese justified their program choices based on the relevant attentional focus in their own culture.

Conflict #2: Japanese participants perceived numerous communication style differences and mimicked their partner's emails, leading Canadian participants to perceive few style differences. One interpretation is that Japanese participants were motivated to mimic their partner to avoid possible misunderstandings due to foreign language use, self-perceived lack of proficiency in English, or cultural barriers. Another interpretation may be since Canadian partners always initiated the conversation, mimicking an existing template may have been easier for the receiving partner than writing a new email. In either case, mimicking made differences in communication styles less salient for Canadian participants.

Conflict #3: One interpretation may be due to cultural styles of negotiation. Collectivistic cultures (e.g. Japan) emphasize an interpersonal, relationship-based negotiating style [1,14]. Face-saving and direct conflicts are avoided, where Japanese negotiators are reluctant to turn down a proposal explicitly [14]. In contrast, individualistic cultures (e.g. Canada) appeal to logic and 'objective' facts during negotiations [1], valuing direct communication and assertiveness [32]. These differences, along with language barriers, may have contributed to conflicting negotiation styles in our experiment.

4.2 The Impact of Feedback on *H1*, *H2*, *H3*, *RQ1*

We first present quantitative results to address *H1, H2,* and *H3.* Next, we present qualitative findings to address *RQ1.*

4.2.1. Quantitative Results. **Analysis method for *H1*:** To investigate *H1,* we measure the notion of "intercultural competence" using Metacognitive CQ. To investigate the effect of experiment conditions on the *post-task increase of Metacognitive CQ,* we fit a linear model using conditions, nationality, and the interaction between condition and nationality as predictors. The model is nested by dyads. CIs in graphs are calculated directly from the data without adjustments to provide readers with an alternative perspective of the data.

Results for *H1* (Metacognitive CQ): We did not find statistically significant differences between any of the three conditions overall. However, after controlling for nationality, Canadian participants in Condition 1 (N) increased their Metacognitive CQ score post-task more than Canadian participants in Condition 2 (G). The difference between is 1.48 points (95% CI [0.31, 2.64]), $t(54) = 2.54$, $p = .01$. Additionally, Canadian participants in Condition 1 (N) increased their Metacognitive CQ score post-task more than Canadian participants in

Condition 3 (G+R). The score difference between these conditions is 1.20 points (95% CI [0.33, 2.36]), $t(54) = 2.37$, $p = .04$. This result refutes the first half of *H1* ("Compared to [no feedback], [automated feedback] will increase team members' intercultural competence"). Fig. 2 shows *the increase in Metacognitive CQ* score. This score has a possible range between −6 to 6, where positive values reflect an increase in self-rating after the task. In Fig. 2 (right), the unadjusted CI of Canadian participants in Condition 2 (G) is slightly below zero, suggesting that providing feedback slightly lowered Canadians' self-perception of Metacognitive CQ. The difference between Condition 2 (G) and Condition 3 (G+R) for Canadian participants is not statistically significant. For Japanese participants, the differences are not statistically significant. (For further details of this analysis and results, we refer readers to the supplementary materials.)

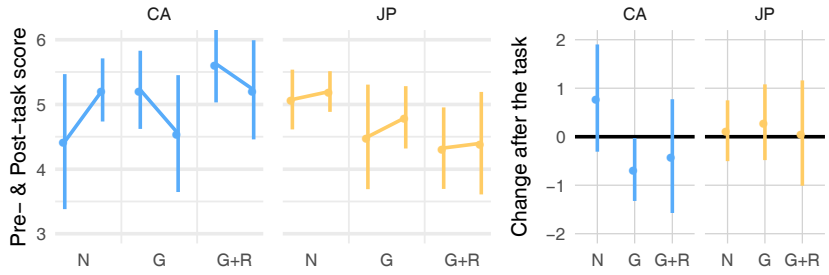

Fig. 2. Metacognitive CQ score pre-task and post-task (left), and changes after the task (right). (Mean ± unadjusted 95% CI)

While our quantitative results do not support *H1*, our qualitative findings indicate Canadians may have been overconfident in their self-rating of Metacognitive CQ (Condition 1), perceiving themselves to have higher Metacognitive CQ merely by going through the task. In contrast, feedback in Conditions 2 and 3 may have increased Canadians' Metacognitive CQ, but led them to perceive themselves as less culturally-aware than they originally believed. Canadians' decrease (rather than increase) in self-ratings may have also occurred due to the CQ Scale [64] - this scale was originally developed for (typically) one-time self-assessment of current skills, rather than for multiple self-assessments after short-term training interventions [2,40].

Our results do not indicate differences across conditions for Japanese participants. Based on our qualitative findings, we speculate this may be because Japanese participants were communicating in a non-native language and subsequently already cognizant of potential cultural differences before beginning the task. Another speculation is that Canadians live in a multicultural environment and in turn, may perceive themselves as culturally competent. They may expect things that happen during the experiment (i.e. graphs, feedback) to fall within their expectations. If something happens outside of their expectations, they may feel surprised. In contrast, Japanese participants live in a (more) mono-cultural environment compared to Canada, and thus, may already expect cultural differences before beginning the task – that is, they are not as surprised by differences revealed in the feedback.

Analysis method for *H2*: To investigate *H2*, we measure the "similarity" of detected behaviors with regards to whether Japanese and Canadian participants became more similar in Round 2 compared to Round 1, in terms of their language use for the five cultural dimension graphs. We used the LIWC 2015 Dictionary [45] to analyze participant emails. LIWC outputs a score $s_c^{(i,j,k)}$, which represents the percentage of words in the LIWC category c, out of total number of words in the email. $s_c^{(i,j,k)}$ represents the i^{th} dyad, the j^{th} email turn, nationality k for LIWC category c. For example, if the second email from the Canadian partner in dyad 1 contains 5 'Emotional expressiveness' words (out of 100 total words), $s_{EmotionalExp}^{(1,2,CA)} = 5$. We calculated the score difference for the cultural dimension graphs in each dyad and grouped the differences in seven dimensions (D): emotional expressiveness, individual-focus, group-focus, relationship-focus, short-term focus, long-term focus, informality (cf. Table 2). The score difference for dimension D is

$$\Delta_D^{(i,j)} = \frac{|\Sigma_{c \in D}(s^{(i,j,\text{JP})} - s^{(i,j,\text{CA})})|}{||D||}$$

The possible value of Δ_D is between 0 to 100. While participants exchanged emails in four turns, we excluded the 4th turn from our analysis for two reasons. First, participants often reached agreement before the 4th turn, where content of the 4th email no longer reflect negotiation processes. Second, the majority of participants' emails in the 4th turn were under 100 words, where low word count decreases reliability of LIWC results [7,45] (See supplementary materials for further details). Therefore, in the following result, we have 3 Conditions × 3 Email turns × 10 dyads = 90 data points. We conducted planned contrasts which compares each email to its previous one (2 – 1 and 3 – 2) for each dimension.

Results for *H2* (Similarity in language use): We found no statistically significant contrasts across conditions, with one exception. For this exception, although the difference is statistically significant, the size of effect is small (1.26 on a scale of 0–100). Since our qualitative findings do not provide further support for this exception, due to space constraints, we refer readers to the supplementary materials for further details. Overall, our results do not support *H2*, where Condition 2 (G) and Condition 3 (G+R) did not lead culturally diverse members to become more similar in cultural dimension language use after receiving feedback. While our qualitative findings indicate participants did have intentions to adapt to one another in Round 2, possible reasons for the above result may be 1) behavior change may have occurred in Round 2, though because we did not inform participants how the graphs were calculated, the ways people changed may not have been detected by the LIWC categories we measured, or 2) despite intention to change, certain aspects of language use – whether spoken or written – are unconscious and can be difficult to influence [27,29,46].

Analysis method for *H3*: To investigate *H3*, we measure the notion of "receptivity" to different ideas or perspectives by comparing how much partners **yielded** to each other in terms of their social program choices. A participant yielded to his/her partner if his/her *INITIAL* choices of social programs differ from the dyad's *FINAL* choices. This difference is determined by the Damerau–Levenshtein distance (*DLDist*): the number of insertions, substitutions, deletions and replacement between *INITIAL* and *FINAL*. In our study, the possible *DLDist* is 0 (*INITIAL* = *FINAL*), 1, or 2 (none of *INITIAL* made it into *FINAL*). We excluded one group from Condition 2 (G) since each partner stated only one program choice in the first email, rather than two. We conducted confirmatory contrast analysis for each nationality, using the same analysis method as in *H1*.

Results for *H3* (yielding behaviors in the negotiation task): Results provide partial support for *H3*. Fig. 3 shows the *DLDist* by conditions and nationality, in terms of proportion of the number of participants (left) and average score (right). Japanese participants yielded more to Canadian partners in Condition 1 (N) compared to Condition 2 (G) and Condition 3 (G+R). The contrast analysis shows *DLDist* difference of 1.61 ± [0.57, 2.65], $t(52) = 3.99$, $p < .001$, suggesting that feedback in Conditions 2 and 3 balanced yielding behaviors between Japanese and Canadian participants. We found no statistically significant differences between Condition 2 (G) and Condition 3 (G+R).

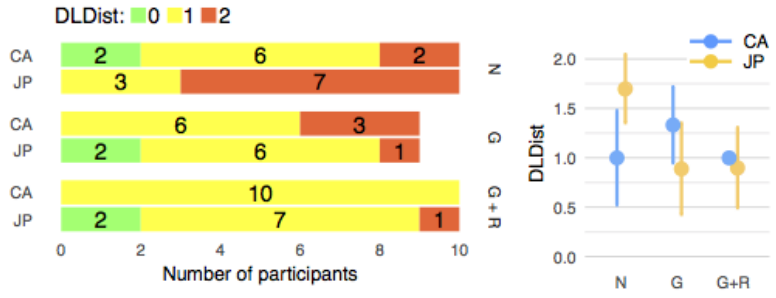

Fig. 3. Participants' yielding behaviors in the negotiation task, in proportion (left) and mean ± unadjusted 95% CI (right).

4.2.2. Impact of Condition 2 Feedback on Intercultural Conflict. To explore *RQ1* – the impact of Condition 2 (G) feedback on participants' perceptions of intercultural conflict, we organize our findings in two parts. First,

we present how Canadians and Japanese participants valued different graphs. Second, we discuss the impact of the graphs on participants' intentions for behavioral changes in Round 2. Throughout this section, we present interview quotes from Condition 2, though the themes we observed were present in both Condition 2 and Condition 3.

Japanese and Canadian participants valued different graphs: Japanese participants highly valued the 'Level of Relationship-Focus' and 'Individual or Group-Focus' graph. All Japanese participants in Condition 2 and 3 interpreted the 'relationship-focus' graph to reflect how much one accommodated and yielded to their partner during the negotiation task. For many, their own score was comparatively lower than their partner's, contrary to their expectations. For example, C2-G17-JP: *"The score was lower than I expected. I was mindful not to make her feel uncomfortable. This isn't a competition, we're trying to reach an agreement. So I was careful not to say things which might destroy our relationship".*

C2-G14-JP: *"I was sad to see my relationship score was low. It was against my expectations. […] I always valued relationship building, but the graph showed that I didn't".*

Some Japanese participants placed high value on the 'Individual or Group-Focus' graph, linking a higher level of 'group-focus' to caring for the relationship by accommodating to their partner. For example: C2-G17-JP: *"I thought my 'group' score would be higher. I showed respect to her opinions and then expressed my thoughts below. It's not what I expected. I don't quite agree."*

In contrast, most Canadian participants did not place high importance on the 'relationship-focus' graph. Many believed that a strong relationship focus was not necessary to perform the task at hand, and may detract from the necessary formality needed to emulate the role of a financial advisor. For example: C2-G17-CA: "*Especially in working emails, […] it should be very formal and not relationship-based. I'm more goal-oriented than relationship-oriented, so this graph wasn't a focus for me".*

Canadian participants valued the 'Emotional Expressiveness', 'Level of Informality', and for some, the 'Individual or Group-Focus graph'. For the 'Emotional Expressiveness' graph, some perceived emotions as detracting from logical decision-making, whereas others interpreted "emotional expressiveness" to reflect engagement or investment in the social programs. For example, C2-G17-CA: "*I found it good we weren't being overly emotional about it, or that's the way I took it. […] Emotions can only go so far. When emotions cloud judgement, […] you might make rash decisions. […] It's a logistics task, so separating that out is pretty important".*

For the 'Level of Informality' graph, most participants felt that formality is required in business emails. However, many also believed that being less formal allows for establishment of rapport, which in turn, allows for effective task completion. For example, C2-G18-CA: "*'Informality' was really low for both of us. That's when I realized, wow, I'm really formal with my communication. Hers was low as well but mine was pretty much zero. So I thought I don't have to be totally rigid and formal in how I communicate, as long as I'm being concise and clear".*

Finally, many participants valued the 'Individual or Group-Focus' graph, where all participants perceived 'group-focus' as better than 'individual-focus'. For example, C2-G20-CA: *"Higher group-focus is better - that's how I want to be perceived – as someone who cares about others".*

In contrast, Japanese participants did not react strongly to 'Emotional Expressiveness' or 'Level of Informality' graph. For the latter graph, Japanese participants were mindful to match the formality of their Canadian partner.

Impact of the graphs on participants' intentions to change in Round 2: Although Canadian and Japanese participants valued different graphs, participants from both nationalities were motivated by the graphs to compromise and accommodate with their partner more in Round 2. We first present the specific impacts of graph feedback in Round 2, and then discuss the general impacts of graph feedback on the three areas of intercultural conflict.

Specific impacts of graph feedback: After seeing the graphs in Round 1, most participants were motivated in Round 2 to "improve" upon the graphs they most valued. Japanese participants aimed to increase their 'relationship-focus' and 'group-focus', by accommodating their partner's opinion, and by mimicking their partner to achieve similar communication styles. Participants perceived similar communication styles may improve their 'Group-Focus' score. For example, C2-G20-JP: *"In Round 1, I*

avoided using casual words even if my partner used them since I was afraid of misunderstandings. But in Round 2, I tried to copy my partner's wording - I felt using non-casual words isn't good for relationship-building. I thought mimicking his style would also improve my 'group-focus'".

C2-G17-JP: *"In Round 1, my 'relationship-focus' was lower than I thought. So I paid more attention in Round 2 to show care to my partner's opinion".*

In Round 2, Canadian participants aimed to increase level of informality and group-focus, and match their partner's emotional expressiveness to show the same level of task engagement. Canadian participants often discussed these three graphs in connection with each other, hoping these changes would lead to better teamwork. For example, C2-G16-CA: *"I was trying to be less formal, not confrontational. […] I was reinforcing and validating what she was saying, like working as a team, as opposed to two people on opposite sides. I tried to increase emotional expressiveness to match hers".*

C2-G18-CA: *"I was afraid I had intimidated my partner. […] I felt it might be better to communicate in a less formal way, making it feel less like a government form and more like figuring out what to eat for dinner. [The graphs] made me think maybe I'm very unemotional and formal. It didn't need to be at that level".*

General impacts of graph feedback on areas of intercultural conflict: We discuss how the graph feedback supported Canadians in perspective-taking of their partner's program choices (mitigating Conflict #1), perceiving cultural communication style differences between them and their partner (mitigating Conflict #2), and motivating Canadians to yield and accommodate their partner more in Round 2 (mitigating Conflict #3). For Japanese participants, the graph feedback motivated specific graph changes to redeem one's score for 'relationship-focus' and 'group-focus' to match with internal cultural values. However, no findings emerged in Japanese interview data regarding general impacts of the graph feedback on mitigating perceptions of conflict.

For Canadian participants, the graph feedback acted as a visible externalization of invisible cultural differences, making differences in cultural communication styles more salient (mitigating participant perceptions of Conflict #2). For example, C2-G15-CA: *"We were speaking English and it didn't even cross my mind it was someone from a different culture. But seeing the graph and taking a step back, like right, he is from a different country and culture and it made sense that we differ on all these traits".*

C2-G17-CA: *"The graphs kind of opened my eyes, like a lightbulb, like, this is actually happening. Before it was like, this is cool, I'm talking to someone from a different culture. Like yes, there's going to be differences but the graphs illustrated for me where those differences lie. It definitely made me more critical and aware of my own writing".*

After seeing the graphs, Canadian participants felt a sense of commonality with their partner, realizing that both were working towards the same goal (mitigating perceptions of Conflict #1). In comparison to Round 1 where some aimed to persuade their partner of their own program choices, in Round 2, Canadian participants were motivated to accommodate and yield more to their partner's choices (mitigating perceptions of Conflict #3). For example, C2-G12-CA*: "In the first two emails, I felt 'Why couldn't he see things my way? My way is clearly the better way'. Once I saw the graphs, I started looking into Japanese culture a bit more, to get a better understanding of the 'overwork' issue. I wanted to ask genuine questions about his arguments, so I could see their benefit in a different light".*

C2-G19-CA: *"In Round 1, I was more 'this is my opinion and I'm sticking to it' and she was more 'I'll listen to your side'. Without the graphs, […] we wouldn't have adjusted our opinions to the other person as fast as we did. I would have eventually adjusted but not in four emails. It would have taken me longer to pick up on her writing style".*

From the Japanese perspective, several participants perceived their partner became more accommodating in Round 2. This changed the impression they had of their partner from a person who is "*inflexible*" and "*non-inclusive*" to a person who is accommodating and cares about the relationship. For example, C2-G17-JP: *"I think my partner started to accept my opinions more [in Round 2]. Her standpoint basically didn't change, but I felt that she showed more respect to my opinions."*

C2-G16-JP: *"My partner suddenly changed his attitude in his third email and yielded to my choices. I was surprised because until then, I thought he's a strong-headed person who doesn't listen to others' opinions".*

4.2.3. Impact of Condition 3 Feedback on Intercultural Conflict. To explore *RQ1* - the impact of Condition 3 (G+R) feedback on participant perceptions of intercultural conflict, we categorize our findings along two themes: 1) writing the self-reflection and 2) reading their partner's self-reflection. We illustrate with interview quotes (which represent participants' intentions when writing the self-reflections, and interpretations when reading their partner's self-reflection), and when relevant, participants' written self-reflections. In Theme 2, we first discuss how the shared self-reflections both mitigated and exacerbated participant perceptions of intercultural conflict. In both themes, we discuss how shared self-reflections acted as a meta-channel to communication, impacting Japanese and Canadian participants in asymmetric ways.

Writing the shared self-reflection: Canadian participants primarily explained their own graph results when writing the self-reflection and at times, implicitly revealed their cultural values. For example, C3-G30-CA: *"My expressiveness was lower than my partner's because I think it would have made this task seem more personal than professional".* Other times, Canadians offered an explanation for the graph in relation to the email content. For example, C3-G27-CA: *"I think I had the higher group-focus because I was thinking of a larger scale picture, of a country rather than a community."* Several Canadians indicated the self-reflections were difficult to write, since they did not know how the graphs were calculated.

In contrast, Japanese participants wrote the self-reflection with the intention to improve their partner's impression of them. As mentioned in "Areas of Intercultural Conflict", all participants felt limited in expressing themselves in a foreign language. Many believed their partners developed negative impressions of them as someone who is "*passive*" or "*not good at debating*", and hoped to improve this through the shared self-reflection. For example, C3-G28-JP: *"I felt I wasn't able to express my ideas properly. In my self-reflection, I tried to explain the graphs objectively. I hope it changed my partner's impression of me".*

Other Japanese participants used the self-reflection to establish rapport with their partner through compliments and praise for their opinions. For example, C3-G29-JP wrote for 'Relationship-Focus': "*My partner is very intelligent and kind, so I tried to use more relationship-focus words, but because my English is poor, I couldn't use them well."* For 'Short-term or Long-term Focus', he wrote: "*At my first email, I focused on long-term goals, but my partner helps me noticing the importance of short-term focus. I was really impressed by her smart point of view."*

Despite their best efforts however, Japanese participants felt it was unlikely they could change their partner's impression of them, since they encountered the same language barriers when writing the self-reflection as in the negotiation task.

Reading my partner's self-reflection: Reading their partner's self-reflections mitigated participant perceptions of intercultural conflict, and provided Canadian and Japanese participants with asymmetric value.

Canadians: 6/10 Canadian participants in Condition 3 felt they gained insight into their Japanese partner from reading their self-reflection, which promoted a sense of commonality and empathy for their partner's perspective. For example, C3-G24-CA: *"My partner wrote he was going off of what he was seeing around him, just like I was. He wasn't understanding how drug rehabilitation programs are important, just like I wasn't understanding how being overworked is. After seeing the [feedback], I realized right away we're both on the same side of things. I was able to be more understanding and more curious".*

Other Canadians felt a "bond" through the shared activity of writing the self-reflection. For example, C3-G26-CA: *"Because he had to do the same thing I did, […] it just brought more of a partnership. It helped us relate and understand each other a lot better. […] I don't think you'd get that just by sending a few emails back and forth".*

Some Canadians gained a "different sense" of their partner after reading their self-reflection, feeling that it allowed for a different type of communication that was not appropriate in the emails. For example, C3-G29-CA*: "He wrote: 'My partner used great formal business-like words and I really respect her'. It was really sweet. Because we never said any compliments to each other [in the emails], it put a different tone when I went*

back to the emails. The reflections were quite informal and you could write whatever. Whereas for the emails, you were trying to act as the financial advisor".

For Canadians, reading their partner's self-reflection established a sense of commonality and rapport with their partner, thus mitigating perceptions of Conflict #1 and indirectly, Conflict #3. However, 4/10 Canadian participants in Condition 3 said they did not learn anything from reading their partner's self-reflections. We discuss this in later sections.

Japanese: All 10 Japanese participants in Condition 3 felt reading their partner's self-reflection was valuable. Although Canadians did not intend to write their self-reflection with the goal to change their partner's impressions of them, Japanese impressions of their partner did change from an "*inflexible*" leader-type to an inclusive "*coordinator*" who cared about the relationship. For example, C3-G22-JP: *"[In Round 1], I had the impression they're individualistic people who don't put emphasis on personal relationships. But after reading her self-reflection, I learned that my partner values relationship building and group-thinking. I looked back on our emails and realized her writing was gentle. I felt we're more similar than I had expected. I was being too defensive".*

C3-G24-JP: *"I didn't know he was consciously choosing words that value relationships. […] I didn't think he cared about those things. He had a strong opinion and insisted on it. Insisting on one's own opinion means he's not thinking about our relationship. When I think about it now, I guess they're different things, but when I was exchanging emails with him, I felt he wasn't thinking about our relationship".*

For Japanese participants, reading their partner's self-reflection led to an improved impression of their Canadian partner, of someone "who cares about the relationship". This in turn, may have mitigated perceptions of Conflict #3.

When self-reflections exacerbated conflict: We now present two dyad-level examples of when self-reflections exacerbated Conflict #3. In both examples, the Japanese partner perceived conflict regarding 'care for the relationship', whereas the Canadian partner did not. Though Japanese partners wrote the value they placed on the 'relationship-focus' graph in their self-reflection, Canadian partners did not realize the significance it had for their partner, and reported gaining no new insights from reading their partner's self-reflection.

Example 1: In this dyad (C3-G27), the Japanese participant perceived her partner as "direct" and "inflexible", saying in her interview: *"I felt like he didn't care about my opinion. He finished his email by expressing his thoughts, rather than asking what I thought".* In her Round 1 self-reflection, she hoped to convey the value 'relationship-focus' had for her: *"I used more relationship-focus words than my partner because I tried to keep good relationship […] to make our discussions work well".* Despite her efforts, the Canadian partner reported in his interview that there was "nothing surprising" in his partner's self-reflection, and did not perceive any conflict between him and his partner.

Example 2: In this dyad (C3-G21), the Japanese partner said during her interview she was "*shocked*" at seeing her low 'relationship-focus' graph in Round 1 and intended to improve this in Round 2. In contrast, the Canadian partner perceived they had a "*good relationship*", where neither partner "*was ever upset about the other's point of view".* In her self-reflection in Round 1, the Japanese partner wrote: "*My level of relationship is much lower than my partner. Was my [e]mail that cold?"* In his self-reflection, the Canadian partner wrote: "*I believe my culture allows for greater use of relationship and informal terms. I believe it helps build a connection amongst team members."*

In her interview, the Japanese partner said she felt offended after reading her partner's self-reflection, saying: *"My partner explained he had a high relationship score because he values cooperativeness and the relationship. I felt like he's implicitly saying I'm not cooperative and didn't care about the relationship. I didn't get over-emotional but […] the process of making the final decision was not one-sided. We both accommodated".* In contrast, the Canadian partner said during his interview: *"Reading her self-reflection made me feel like we're very similar – we both didn't realize we were going to score as high or as low as we did on certain areas. She wrote 'Are my emails too cold?' I guess I could have wrote 'Are my emails too relationship-focused? Am I weirding people out?' (Laughs) It was nice to know we were both in the same boat, which might have made it*

easier to finish our decision". Though both partners valued relationship-building, the Canadian partner's self-reflection unintentionally offended the Japanese partner.

Summary of *RQ1* findings: Feedback impacted Canadians and Japanese differently. For Canadians, Condition 2 (G) feedback mitigated perceptions of Conflict #1 (by evoking a sense of commonality with their partner), Conflict #2 (by making cultural differences more salient), and Conflict #3 (by accommodating their partner more in Round 2). For Japanese, Condition 2 feedback did not mitigate perceptions of Conflict #1, 2, or 3. Condition 3 feedback (G+R) impacted Japanese and Canadians in asymmetric ways. For Japanese, reading their partner's self-reflections improved the impression they had of their partner from an "inflexible" leader to an inclusive "coordinator" who values relationships, potentially mitigating Conflict #3. For some Canadians, reading their partner's self-reflection evoked perspective-taking, mitigating Conflict #1 and indirectly Conflict #3. Other Canadians did not gain insight from reading their partner's self-reflection.

5 OPPORTUNITIES FOR TECHNOLOGY SUPPORT

Combining automatically-detected feedback with team members' interpretations of that feedback: Our findings demonstrate potential in augmenting CMC tools with automatically-detected feedback of observable behaviors. However, contrary to previous feedback tools for homogeneous teams (e.g. [9,59]), our findings show that in culturally diverse teams, the same (automatically-detected) feedback was interpreted in different ways depending on national culture of team members. National culture impacted how members perceived meaning from the graphs, what graphs they valued, and intentional behavioral changes in Round 2. We offer two arguments for why automatically-detected feedback should be accompanied by team members' subjective interpretations of that feedback:

1) Subjective interpretations of feedback offers diverse members the opportunity to explain and externalize deep-seated cultural values. This is important since deep-level cultural differences evoke intercultural conflict [15], but are unconscious and not easily detectable. Improvements to this approach could be to ask members to share their *reactions* (rather than explanations) to the feedback – whether they were satisfied, whether it fit with their notion of their "ideal" self, and what (if anything) they wish to change and why. This could allow participants to focus reflection on the self, while avoiding unintentional conflicts through comparisons with their partner (as in C3-G21). Another improvement may be to ask members to rank the cultural dimension graphs in order of personal importance, and share reasoning for why they ranked that way.

2) Subjective interpretations of feedback can evoke active reflection, supporting members in learning intercultural competence (i.e. Metacognitive CQ) through increased awareness and consciousness of cultural differences. It is interesting to note that some participants struggled with writing the interpretations (self-reflections), indicating that they lacked an understanding of how the graphs were calculated, Yet, providing participants with calculation details may reduce their active reflection processes. As we saw in Conflict #2, mimicry of communication styles does not mean the absence of intercultural conflict. In fact, mimicry may actually exacerbate the asymmetric nature of intercultural conflict – invisible to the person who did not adapt, but visible to the person who did adapt.

Meta-channels to support culturally diverse teams: Participants used the self-reflection as a meta-channel for communication, perceiving it offered a different tone and value compared to email interactions. (An example is when Japanese participants used the shared self-reflection to gain rapport with their partner through compliments and praise). Since GVTs comprise members of different cultural and language backgrounds, meta-channels should allow non-native speakers the opportunity to construct and manage impressions, ideally in their native language.

6 LIMITATIONS AND FUTURE WORK

One limitation of our study is that Canadian participants always initiated the negotiation and offered the first proposal. Since opening offers can serve as anchors for following negotiations [13], future work should randomize which partner initiates the negotiation task. Another limitation is the rough measure we used for mapping LIWC categories to cultural dimensions. Though our findings demonstrate different interpretations

of the cultural dimension graphs by Japanese and Canadian participants, future work should investigate a rigorous mapping of LIWC categories to cultural dimensions, as well as whether randomly assigned graph scores would also evoke reflection and different interpretations in culturally diverse teams. Third, our study investigated intercultural conflict between two national cultures – Japan and Canada – who interacted in English. Future work should explore cross-cultural pairs with different levels of cultural distance (e.g. Japan and China), interacting in a common language other than English. Finally, our study asked undergraduate university students with limited professional working experience to act in the role of "financial advisors", which may have impacted their communication style. Future work should replicate this study with professional GVT members.

7 CONCLUSION

We presented the results of a mixed-methods experiment with 30 Japanese-Canadian dyads who completed a negotiation task over email. We explored three conditions: 1) no feedback, 2) automated language feedback (graphs of cultural dimensions), and 3) automated language feedback as in (2), with shared self-reflections. We identified three areas of intercultural conflict and discussed how feedback in Conditions 2 and 3 impacted participants' perceptions of intercultural conflict, their development of intercultural competence, their language use with relation to the automated feedback, and yielding behaviors within dyads. Our findings demonstrate potential in augmenting CMC tools with automatically-detected feedback with team members' subjective interpretations of that feedback – to mitigate intercultural conflict in global virtual teams.

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