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The Language of Conflict Transformation: Assessing Psychological Change Patterns in Israeli-Palestinian Track Two Interactive Problem Solving

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Abstract

Intergroup conflict and hostility remain pertinent problems, often involving mass violence and fundamental harm to the well-being of individuals and societies. Previous studies suggest unofficial third-party dialogue is valuable for changing intergroup disputes and achieving sustainable conflict transformation. However, the *exact mechanisms* that define how it impacts participants remain unclear. To better understand how psychological processes influence dialogue outcomes, we analyzed conflict discourse, specifically examining *linguistic* patterns as the basis for *outcome* assessments of Interactive Problem-Solving in the Israeli-Palestinian conflict using natural language processing (LIWC) and qualitative thematic analysis.

Results indicate substantial cognitive-affective shifts in participant interactions during the dialogue process. Psychological changes in response to the interaction include expressing more positive emotions, and substantial cognitive and social engagement, combined with decreasing psychological distance from outgroup members. Overall, we suggest that Interactive Problem Solving facilitates linguistic and psychological attitude changes away from destructive conflict-supporting beliefs.

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Introduction

In many regions of the world, intergroup conflict and hostility remain pertinent problems (Geoghegan, 2017). They often involve mass violence and fundamental harm to the well-being of the entangled citizens and whole societies, recently exemplified by the tragic October 7th events. Complementing official diplomacy, unofficial Track Two processes have been suggested as useful for changing intergroup disputes and achieving sustainable conflict transformation. Scholars such as John Burton (1997) and Herbert C. Kelman (2009) have developed fundamental conceptualizations in this field, utilizing seminal theories of social psychology (Cuhadar & Dayton, 2011). Despite this excellent scholar-practitioner work on conflict transformation, hardly any research to date has systematically addressed the impact of specific microfoundations such as cognitions or emotions, describing the exact *psychological processes* between participants and facilitators. They influence process *outcomes* in terms of direct results but also impact harmful conflict-supporting attitudes of participants.

Without these foundations, we remain ill-informed about concrete functional mechanisms and, most importantly, about the basis for implementing a transfer of these outcomes, which is essential for the enduring impact of dialogue approaches. Our study extends the existing literature by addressing this gap in our psychological understanding of individual transformation, analyzing an example of intergroup discourse within the Israeli-Palestinian conflict from Kelman's Track Two approach. The study tracks linguistic indicators of psychological change reflecting the dialogue process. In line with Kelman's 'links-in-the-chain' assessment model (Kelman, 2008), the article first presents the participants' motivations to engage in the dialogue and then examines engagement and interaction patterns followed by psychological attitude changes, namely process outcomes. Finally, we propose lessons drawn, providing initial suggestions on how problem-solving discourse could be used in intergroup conflict dialogue and mediation, including helpful agonistic elements (Fisher et al., 2023).

Track Two Dialogues -- Outcome as Basis for Transfer

A growing body of literature has recognized the importance of Track Two dialogue as a third-party intervention method facilitating conflict transformation within *protracted* intergroup conflict, complementing official Track One diplomacy. Namely, Herbert C. Kelman's 'Interactive Problem Solving' (IPS) is an innovative Track Two approach to transform individual and societal disputes (Burton, 1997; Dudouet, 2006; Kelman, 2009). Track Two dialogue has been conceptualized as an unofficial form of conflict resolution between representatives of adversarial groups aiming to de-escalate conflict, improve understanding between the parties, and develop new ideas to be used in the official peace processes (Bercovitch, 2007; Fisher, 1997). Particularly its interactive component as well as its application in *protracted* conflict have been underlined (Fisher, 2007; Fisher & Keashly, 1988). While specific practices in Track Two dialogues vary (Cuhadar, 2009; Çuhadar & Dayton, 2012), the objectives of Track Two in contrast to other third-party conflict dialogue efforts such as mediation,

arbitration, or classic Track One diplomacy are well-described (Bercovitch, 2007; Richmond, 1998). Next to developing creative ideas for solutions, Track Two dialogue wants to *change people* – their intergroup emotions and outgroup attitudes, not just make the parties pragmatically accept any mediation proposal (Clayton & Dorussen, 2022; Fisher et al., 2023; Fisher, 2007; Yawanarajah, 2021). Direct contact and interactions between members of adversarial groups in an affirmative unofficial setting should help *improve relations* and generate a *joint understanding* of the conflict (Kelman, 2008). This is the direct outcome. The improved relations and jointly formulated ideas are then transferred into each society or the official policymaking processes (Cuhadar & Paffenholz, 2020). Recently, deliberations about the necessity for *agonistic* dialogue – discourse about particularly deep intergroup divides such as identity and social justice – have been raised (Fisher et al., 2023). Psychological principles of intergroup contact facilitate these dynamics (Cuhadar & Dayton, 2011; Deutsch, 1994; Pettigrew, 1998; Pettigrew et al., 2011). The recategorization to a common ingroup identity eliciting empathy, trust, and attitude change is suggested as one relevant mechanism (Anastasio et al., 1997; Gaertner et al., 1993). However, intergroup encounters normally avoid antagonistic topics, underlining positive intergroup experiences and similarities. Track Two approaches purposefully discuss opposing perspectives.

Although Track Two activities have become increasingly common over the last couple of decades, the effectiveness of these efforts has rarely been evaluated mainly for practical and confidentiality reasons. While there are multiple quantitative and meta-studies of mediation outcomes (Bercovitch & Houston, 2000; Coleman et al., 2015), very few quantitative analyses of problem solving dialogue exist (Fisher, 2001; Rouhana, 1995). *How* dialogue increases sustainable attitude changes such as trust remains unclear (Fisher et al., 2023; Kressel, 2006), and a specific 'theory of change' is still missing (Shillings & Jones, 2020). Several studies suggest that Track Two successfully evokes positive intergroup encounter effects despite the controversial topics discussed, although the findings rely almost exclusively on case study methods (Fisher, 2007; Fisher et al., 2023).

The study of social and psychological responses to intergroup dialogue and mediation has always faced methodological and conceptual challenges including access to good data (Allen & Sharp, 2017; Reimann, 2004). Negotiation content and participants are usually secret, process documentation had second priority over confidentiality and other practical concerns. This implies a challenge for evaluation (Pruitt, 2011). The field would benefit from research that tracks responses to discourse processes as they naturally unfold, providing a continuous timeline of psychological processes; and comparing subjects' thoughts and feelings via linguistic patterns. One such way is to analyze transcripts or detailed notes. This is an important issue, as we contend that a greater understanding of outcomes in terms of mental shifts of participants will lead to more explicit efforts regarding transfer activities. Measuring transfer directly is not straightforward, as there are many possible interferences (Fisher et al., 2023; Jones, 2020).

Conceptualizations on how to assess Track Two efforts have been developed over the last years by a small group of scholars (d'Estree et al., 2001; Bercovitch, 2007; Fisher, 1997; Jones, 2015; Shillings & Jones, 2021). Nevertheless, these suggestions have rarely been empirically tested (see as exception Fisher, 2007). Rouhana (2000) proposed that the evaluation of problem-solving workshops should distinguish the workshop's impact on the immediate participants and the macro-goals, the impact on conflict dynamics at large. Prior approaches (d'Estree et al., 2001; Pettigrew, 1998) suggested assessing Track Two diplomacy at three levels: the micro level (relational and cognitive changes), the link between the micro level and the macro level (foundations for transfer), and the macro level (foundations for outcome). Kelman himself suggested a 'Links-in-the-Chain'-Model to evaluate IPS, empirically assessing the postulated impact of every conceptual step one by one. This includes the *nature of the participants*, their *engagement* in the process, *changes in interaction* over time,

attitude changes, and *positive outcomes* in terms of creative ideas for solutions or new conflict understanding (Kelman, 2008).

Outcome Antecedents – Linguistic Indicators of Psychological Skills

It has been pointed out, that success in conflict management can be an elusive quest (Bercovitch, 2007; Jones, 2008). Third-party pre-negotiation evaluations often use case study designs, thus providing limited basis for rigorous workshop outcome evaluation (Fisher, 2007). Studies exist in the field of mediation impact (Bercovitch & Houston, 1996; Bercovitch & Gartner, 2006), but these often assume power equality amongst parties and low pre-negotiation conflict intensity. Both are not given within asymmetric protracted intergroup conflict. In many of the examined cases, mediation did not have lasting effects on participants (Pincock, 2013). Do we have to assume limited lasting efforts in the 'uphill struggle' of results transfer into societies in interactive problem solving as well?

Generally, Track Two participants should be open enough for the encounter but contrarian enough to enable open discourse. They should be politically influential or at least active, close enough to the political mainstream of each society, highly credible yet at the same time willing to not only 'sit down with the enemy' but also engage in joint thinking (Kelman, 1990; 2008). Engagement in the process should allow a certain depth of cognitive processing (Bar-Tal, 2011; Fisher & Kelman, 2011). Most importantly, we postulate that there should be some change in interaction over time, indicating a transformation of intergroup attitudes and appraisals despite confrontation (Fisher, 1994; Maoz, 2011) towards recategorization to a common group identity (Anastasio et al., 1997; Gaertner et al., 1993*) and mutual trust* (Ohanyan & Lewis, 2005). It is known for example from working groups that "the more time people spend with other people such as team members, the more our identity becomes fused with them, seeing ourselves as part of the same group" (Pennebaker, 2011). Accordingly, we might assume that emotional positivity overall increases during problem-solving, despite occasional fluctuations to balance optimal tension and acknowledge social justice concerns (Coleman, 2018).

Both indicators – engagement and interaction changes – should result in groups coming to a positive result, for example, a joint 'white paper' to be produced, but can we also conclude indications for positive longer-term attitude shifts in conflict understanding? Contact theory normally excludes the discussion of contentious topics, but this is thoroughly required within Track Two dialogue. Are the relational "insights that [the participants] carry away from their encounter" (Kelman, 2008) impactful enough to change destructive conflict-supporting attitudes (Deutsch, 1994; Saguy & Reifen-Tagar, 2022) and severe psychosocial entrenchment in protracted intergroup conflict (Hameiri et al., 2014)? Creating – to myself and others – a different conflict story through learning and encounters is known to influence minds in other difficult settings. For example, participants recovering from trauma express more optimism, acknowledge negative events, over time construct a meaningful story of their experience, and have the ability to change perspective as they write or discuss (Pennebaker, 2011; Pennebaker & Evans, 2014). Equally, can looking at a complex problem such as protracted intergroup conflict from multiple perspectives generate similar change? Could changes in frequencies of words linked to the need for achievement, power, and affiliation, as well as changes in 'I/we' or emotional tone indicate such an outcome?

One important effect of structured intergroup contact for conflict transformation is reducing stereotyping as indicated in a detrimental conflict-supporting mindset (Saguy & Reifen-Tagar, 2022). A meta-analysis with over 500 studies and more than 250,000 subjects demonstrated that intergroup contact typically reduces prejudice (mean r = −.21) enabling attitude changes (Al Ramiah & Hewstone, 2013; Pettigrew et al., 2011), but these encounters normally do not include explicit discourse about

difficult core conflict topics and the trying task to find solutions. In one of the rare experimental studies on intergroup mediation effects, perspective-taking techniques increase inter*personal* liking between group representatives, the effect was statistically mediated by interpersonal *empathy* and the sense of being heard. However, there was no effect on inter*group* empathy and attitudes (Gutenbrunner & Wagner, 2016). Nevertheless, participants motivated enough for an encounter that entails discussing difficult issues should generate new ideas but also generalize mental shifts of participants (Fisher, 2007).

The Israel-Palestine Conflict

The ongoing dispute between Israel and the Palestinians is an important protracted intergroup conflict (Bar-Tal & Halperin, 2013), with Israel having superior political, economic, and military power (Leshem & Halperin, 2023). For many years, the conflict has had a devastating impact on the daily lives of the Palestinians living under Israeli military rule. Palestinians experience widespread repression, ranging from movement restrictions, detention, and injury, to even death. Israelis also encounter considerable threats, for example through missile attacks or facing military reality in the Westbank. Decadelong efforts to facilitate dialogue within ongoing oppression, and the challenges of life under protracted conflict, allowed us to study the emotional cognitive-affective bases impacting conflict discourse among group members in an ongoing violent conflict. We focus on the seminal work of Herbert C. Kelman over several decades, applying Track Two processes to the Israel-Palestine conflict (Kelman 1990; 2008), arguably one of the most continuous and well-crafted third-party interventions in a major intergroup conflict (Fisher, 2007). The Kelman 'Interactive Problem Solving' approach was developed in the early 1980s to provide a forum for Israelis and Palestinians to engage in problem-solving and to help them explore ideas, options, and solutions that would meet the interests of both parties. Workshops involve a methodology where participants step back from their official positions and explore the underlying needs, interests, and deep-seated roots of the conflict (Jones, 2015).

While previous work has mostly focused on case study formats to explain the impact of Track Two on participants, recent technical advances and access to relevant data hold promise to describe the impact and change process in more detail. The study examines linguistic patterns of psychological change processes such as emotions and social cognitions from a crucial conflict timepoint, the 1999 setting before the start of the Second Intifada. This severe escalation involved suicide bombings and several thousand casualties including minors on both sides over almost a decade. Our study focuses on the analysis of *discourse process* and *outcomes* from Track Two interventions examining micro factors such as emotions and cognitions. Elaborating how this process impacts Israeli–Palestinian problem-solving, allows us to systematically investigate sequence details as indicated by language use. Quantitative measures that provide adequate psychometric properties – in our case natural language analysis – could enable interferences about immediate outcome effects, allowing the study of theoretical relationships and starting to develop scientific models (Fisher, 2007).

Case study formats have demonstrated that social psychology intergroup encounter principles are operational within Track Two. *We first hypothesize that cooperative interactions within dialogue will elicit empathy and trust while improving intergroup attitudes* (Malhotra & Liyanage, 2005; Ohanyan & Lewis, 2005), despite agonistic deliberations inherent to Track Two approaches (Ramsbotham, 2013), Hyp1. *We also hypothesized that factors such as increased knowledge and enhanced positive emotions have positive effects on pre-negotiation outcomes* (Pettigrew & Tropp, 2008), Hyp2. Reduction of negative outgroup attitudes, and particularly threat to the ingroup, are mediators that intergroup contact during unofficial dialogue alleviates (Pettigrew, 2011).

Following the conceptualizations above, several questions guided us during the inquiry:

(a) How was the discourse process affected by people's emotional, cognitive, social, and attitudinal states, RQ1?

(b) Were there any immediate process-related indications for longer-lasting effects, RQ2?

(c) Which *topics* were frequently discussed, RQ3?

(d) How do participants approach needs- as well as solution deliberations, which steps do participants propose (as indicated by content words), RQ4?

Methods

Dataset and Participants

The dataset we analyse in this study, a specific 1999 Track Two workshop, was selected because of its (1) prototypicality of workshop procedure and participants; (2) crucial conflict turning point, concretely the Palestinian disillusion with the Oslo process before the Second Intifada; (3) emotional diversity including strong tensions during the workshop. Taken together, these account for a diversity of individual and interactional process factors (Bercovitch, 2007). Participants include political and civil society leaders in a nonofficial function engaging in informal problem-solving, discussions, and pre-negotiations. The participants were high-ranking professionals, issue experts in various fields, and politically well connected.

Data represents 'Interactive Problem-Solving' work, capturing notes from participants, facilitators and third-party observers within the Israeli-Palestinian conflict carried out in May 1999 before the onset of the Second Intifada in 2000. Table 1 provides descriptive information about the corpus, workshop procedure, and data processing. Data analysis was based on detailed, mostly verbatim notes of the workshop discourse processes that were made by 'third-party observers' who documented the group sessions. The example selected for the current study contains approximately 47,350 words in total. The detailed material covers exceptionally well-documented workshop notes including third-party comments, and even at times descriptions of non- or para-verbal data of the participants. The note-takers changed every thirty minutes. Two separate protocols were created independently for each session. Both versions had to be unified afterward into one agreed account as the basis for this analysis, providing an indirect element of inter-observer reliability, supporting the accuracy of the measures.

Data Processing and Analysis

Language analyses in general reflect the understanding that the words we use encode our attention, thoughts, emotions, and cognitions (Boyd & Schwartz, 2021). For the natural language processing analyses, we used the computerized text analysis program 'Linguistic Inquiry and Word Count' (LIWC 2022). LIWC is a transparent text analysis program that counts words in psychologically meaningful categories. LIWC has empirically demonstrated its ability to detect meaning in a wide variety of settings, including showing attentional focus, emotionality, social relationships, thinking styles, and individual differences (Tausczik & Pennebaker, 2010). LIWC checks each word of a document against an internal dictionary of more than 2,300 words and word stems. Words are assigned to specific linguistic categories, and the percentage of total words in each category is reported. For example, the word "*cried*" falls into four categories: sadness, negative emotion, overall

Table 1

Data corpus infrastructure 'Interactive Problem Solving' workshop 1999 and analysis methods.

1) Participants

4 Israelis (1910* - 6900 w/sp)

4 Palestinians (1880 – 5730 w/sp)

3 Facilitators (915 – 6255 w/sp)

Several 'Third Party' Observers (115 – 235 w/sp)

2) Dialogue Steps & Data Structure

Friday Evening	Saturday Morning	Saturday Afternoon	Sunday Morning	Sunday Afternoon
Intro, Situation Analysis	Major Needs, Fears, Concerns (I)	Major Needs, Fears, Concerns (P)	Visions & Solutions	Overcoming Constraints, Action, Feedback
(9670words/ 140convturns)	(7560w/220ct)	(10220w/240ct)	(10330w/160ct)	(9570w/190ct)

3) Analysis - Methods

Closed Vocabulary NLP ('Linguistic Inquiry and WordCount' - LIWC)

Qualitative Thematic & Discourse Analysis

Open Vocabulary NLP (Meaning Extraction – LIWC/MEM, Topic Modeling via Latent Dirichlet Allocation - LDA)

Note: 1) *One Israeli participant is absent during Day#3 (wordcounts per speaker in brackets) 2) The infrastructure of IPS includes a pre-workshop for each group separately 1-2 weeks before, Saturday evening includes a dinner party with spouses both are not included in the analysis (wordcount/conversational turns per half day in brackets). 3) Visualization examples. Graphical representation of analysis output.

affect, and past tense verb. Our analysis focused on linguistic indicators such as emotional positivity, cognitive processing, social orientation, and psychological distancing (I/we-use). Findings concerning other linguistic variables are available in the online supplementary material.

In recent years, open-vocabulary methods from computer science, such as Latent Dirichlet Allocation (LDA) (Blei et al., 2003; Griffiths et al., 2007) have begun to augment social science language analyses. Rather than using theoretically derived dictionaries developed from psychology and sociology, these approaches are data-driven and bottom-up. For example, LDA identifies semantically related clusters of words based on co-occurrence across linguistic contexts. These model topics can then be used to better understand language patterns akin to data-driven "micro-dictionaries", and derive new hypotheses based on discursive patterns. Topics are often better suited than dictionaries for discovering patterns in "content words" – that is, among words that do not fall within the most frequently used categories of "function words" (such as pronouns and determiners, Eichstaedt et al. 2021).

Language Variables

Selection of the language variables follows the LIWC-22 setup, relying mostly on style words (Pennebaker, 2011). Complementing content words are utilized with topic modeling approaches (Berger & Packard, 2022; Eichstaedt et al., 2021).

Pronouns. Substantial information about self versus group versus other orientation can be learned from pronouns such as *I, we, you,* or *they*, especially in relation to each other or when considering changes in use over time (Pennebaker, 2011). LIWC summary variables such as analytic processes (Markowitz, 2023; Pennebaker et al., 2014), authenticity (Newman et al., 2003), and 'clout' as indicators for resolve and leadership language (Kacewicz et al., 2014) rely heavily on pronoun use.

Emotional Tone. The emotional-positivity index was calculated by the LIWC 2022 software as the difference between the LIWC scores for positive emotion words (e.g., *happy, good, hope*) and negative emotion words (e.g. *bad, hate, hurt, guilty*). Higher scores of emotional tone indicate greater overall positivity. *Positive* and *negative emotions* were also examined separately over time.

Cognitive Processing. The dictionary indicates how often participants used words such as *think, question*, and *because*. Psychologically, it reflects the extent to which participants were concerned with organizing and intellectually understanding the issues addressed in their discussions. This category also includes more specific linguistic subcategories *for insight, causation, certitude*, or *differentiation*.

Social Orientation. The social orientation dictionary includes prosociality words (such as *care, help, talk, share*, or friends and personal pronouns other than first-person singular) as well as conflict words such as *fight, killed,* or *attack*. Psychologically, it reflects how much participants referred to other people – in our case particularly the outgroup – positively or negatively. Motivational drives such as *affiliation* (e.g. *we, our, us, help*) or *power* (e.g. *own, order, allow, power*) are also included as subcategories.

Content Words. Term frequency (TF) is the most basic technique here, consisting of the raw sum of the occurrence of each word found in the text. The "meaning extraction method" (MEM) within LIWC-22 generates lists of frequently and typically used content words, omitting words such as "*the*" or "*a*" but also unusual words used by one distinct speaker only. As relying on mere frequencies might be misleading (Eichstaedt et al., 2021), these lists are often completed by measures such as the TF/IDF-ratio, dividing each word in a document (e.g., in one half day, or one set of speakers) by the frequency of occurrence in the *whole* corpus (e.g., across all days, or all speakers). It compensates that some words appear more frequently in general such as stop-words or function words and determiners (Christian et al., 2016; Fortuna & Nunes, 2018). Also, using "differential language analysis" (Schwartz et al., 2013), word frequencies can be correlated with external variables, such as specific workshop phases to differentiate word use in an earlier phase (needs/concerns analysis) versus word use in a later phase of the workshop (solution/ideas generating) (Eichstaedt et al., 2021).

Topic Modeling. Topic modeling is an alternative for fine-grained language analysis (Ramage et al., 2009; Vayansky & Kumar, 2020). They have similarities to factor- or principal component analysis in that they identify underlying clusters with semantic similarities, but they are adapted for the specifics of language variables including the fact that many words have multiple senses. Latent Dirichlet Allocation (LDA) is a probabilistic clustering approach for topic modeling that groups words into coherent clusters based on co-occurrence in similar contexts (Blei et al., 2003; Eichstaedt et al., 2021; Griffiths et al., 2007). Topics are similar to micro-dictionaries in the closed-vocabulary approach but generated from the data, rather than from theoretically derived categories. Topic models have been used for text exploration within psychotherapy settings (Atkins et al., 2012; Miner et al., 2022) and to understand human traits (Schwartz et al., 2013; Eichstaedt et al., 2021), but to the best of our knowledge not within intergroup mediation or problem solving dialogue.

Statistical Analysis

As we have generally the same speakers throughout the workshop, statistical measures include paired-sample t-tests comparing Friday evening – the start of the workshop – to the last session on Sunday afternoon as well as mixed-factors repeated measures analyses of variance (ANOVAs), examining different trends in the variables over time. Finally, open vocabulary techniques such as term frequencies, TF/IDF (term use in a given section in relation to total word numbers in the document corpus), word correlations with specific workshop phases (needs/concerns analysis phase versus solutions/idea generating phase) and topic modeling (LDA) were applied.

Results

Data from the study were analyzed in four steps, combining quantitative natural language processing with critical qualitative thematic- and discourse analysis. Following Kelman's link in the chain model, we first examined the nature of the participants' motivation, their – mostly cognitive – discourse engagement, affective/emotional changes, and indications for attitude changes along the timeline Friday Evening – Saturday Afternoon – Sunday Afternoon. The different time periods approximately correspond to different parts of the IPS methodology.

Background and Motivation of the Participants

To obtain an idea of the nature of the participants and their motivation to engage in the discourse, we analyzed entries from the presentation round in the beginning. Of the four Israeli participants, two were journalists, one a researcher, and one the Director of an NGO. On the Palestinian side, there was a finance manager, a political economist, a journalist, and a university professor. Two (out of four) Israeli participants and one (out of four) Palestinian are women. Although originally strictly confidential, we know now some details about their backgrounds (Kelman et al., 2018). The participant sample seems relatively typical for the overall workshop participants.

In terms of motivation to participate, most mention a certain peace activist background, such as "*involved in peace and feminist activities, pleased to be here and learn and hear others' stories*" or "*I'm involved in Israeli-Palestinian women's dialogue.*" On the other hand, some are just curious and want to promote their interest. "*I want to see to which extent Israel goes with the peace process… it's important to live in dignity and freedom*" or "*interested in debate with Israelis*" or "*great respect for Herbert Kelman, it is good to promote interest in peace.*" Despite most having a certain association with intergroup peace activities, they are no mere leftist 'doves.' For example, they include former political prisoners in the Palestinian delegation or participants having Israeli military-intelligence backgrounds "*I'm a former IDF colonel, having worked as governor in the West Bank* [in fact in one well-known conflict hotspot] … *I'm an Arabist, speak Arabic.*" As the IPS concept requires, the participants are well-informed beyond the average citizen, motivated, and influential in their respective societies.

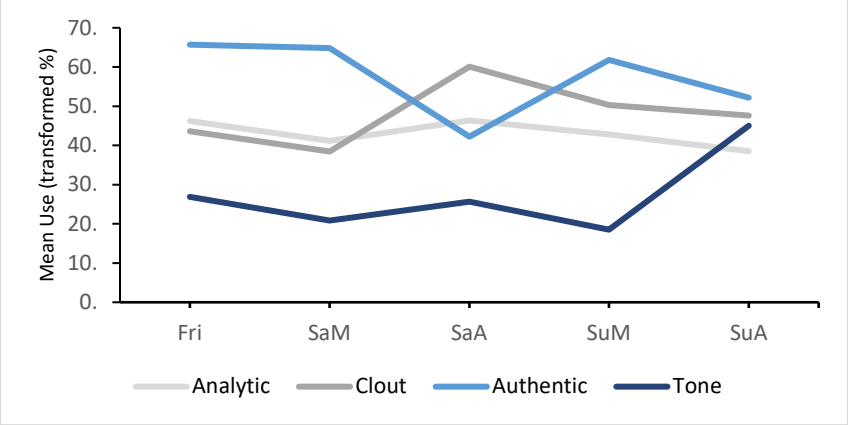
Engagement in the Process

During the problem-solving discourse, the participants display cognitive engagement (words such as *think, because, but, if; M* = 40.03, *SD*=6.29 on a scale from 0-100), authenticity (an index score for perceived genuineness and vulnerability; *M* = 66.84, *SD*=20.70) as well as 'clout' (agentic resolve and leadership language; *M* =38.98, *SD*=18.67) in line with average writing samples (Boyd et al., 2022), for details see online supplementary material). Together, these indicate genuine active and authentic participation, in contrast to stalling or passively boycotting negotiation discourse. As can be seen in Figure 1, participants' increased expressions of clout on Saturday afternoon reflected greater control focus, while the authenticity index as an indicator for vulnerability dropped below baseline, $F(2,28) = 4.78$, $p = .016$, indicating both factors developed differently between the time periods. Qualitative analysis of the data revealed that the participants had an enormous argument towards the end of the Saturday session over the Palestinian needs [Israeli participant "*I am mad… it is your own belligerence*

that brought you here…"], so discussion themes are difficult and agonistic. Nevertheless, emotional tone, increases significantly from Friday evening (M_{FrE}=18.52, SD=14.53) towards the end of the workshop (M_{SuA}=45.94, SD=13.42), t(6)=-4.26, p = .005 in a paired sample t-test. This indicates that indeed emotional factors associated with intergroup empathy and trust increase during conflict dialogue.

Figure 1

Cognitive-emotional processing (LIWC summary variables) throughout the workshop in %



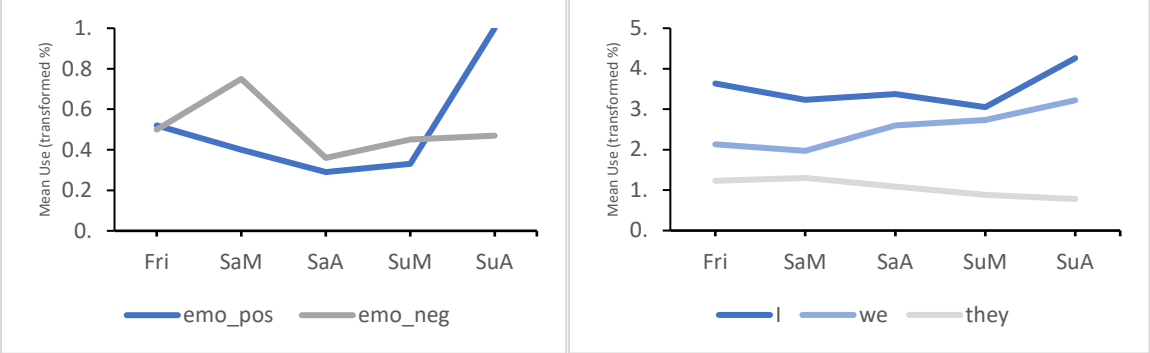
Changes in Interaction over Time

To examine the relations between discourse and impact beyond emotional tone, we further examined positive/negative emotion language and the use of I/we-words. Overall, the discourse process heightened positive emotions among workshop participants in the end, which increased substantially from Friday evening (M_{FrE}=.25, SD=.22) to Sunday afternoon (M_{SuA}=1.08, SD=.59). Comparing Friday to Sunday, a paired sample t-test shows that positive emotions have significantly increased across time (t(6)=-3.32, p = .016) while there was no significant change of negative emotional word use (Figure 2). Comparing the emotions at both timepoints in a repeated measure ANOVA, there was a significant interaction between time and type of emotion, F (2,10) = 10.47, p = .004, meaning both emotions developed in different magnitudes over time. The affective improvement of Sunday is noteworthy because we have included the whole afternoon working session, not only the feedback round when everyone is usually at their best and most polite behavior. Relying on nonverbal/paraverbal data, we have almost as many joking/teasing comments or laughter in the thirty-minute feedback round on Sunday (6) as in the whole workshop together (7).

Prior work has found that the longer people talk with others, the more they use we-words and the less they use I-words. In principle, the more time we spend with other people, the more our reference frame merges with theirs, and the more we are likely to see ourselves as part of a shared group (Pennebaker, 2011). These developments are indicated through a changed I/we-ratio over time. While this is the case for 'normal' interaction groups, for example in work contexts or relationships, it is mostly unclear if also evident in intergroup *conflict* settings, in which difficult, divisive, emotionally 'loaded' topics are discussed, as illustrated by the substantial disagreement described above. In Figure 2, we see indeed an increase in the use of the word 'we' from Friday evening (M_{FrE}=1.55, SD=.64) to Sunday afternoon (M_{SuA}=3.25, SD=1.00), t(6)=-5.35, p=.002. There is no significant change in 'I' use and

Figure 2

Changes in interaction over time (positive versus negative emotions, development of I/we/they-use (LIWC dictionaries) from Friday evening to Sunday afternoon (start to end of workshop in %)



a significant decrease of 'they,' $t(6)=2.69$, $p=.036$ (both measures use the LIWC-22 dictionary which contains not only *I* and *we* but also *my, mine, us, ours, them…*).

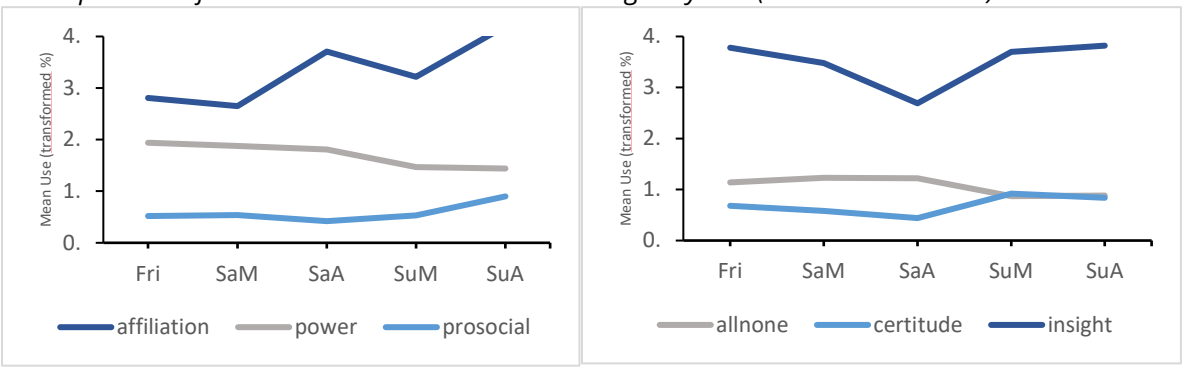
Taken together, our results confirm the initial indication above by showing that even in protracted intergroup conflict, discussing difficult topics in a constructive setting elicits positive emotions and an increasingly productive 'working-group' atmosphere. It seems a constructive atmosphere *while* facing difficult topics can still manifest in positive affective-emotional discourse. However, beyond the constructive situative atmosphere, is there evidence for potentially more durable changes, such as in attitudes?

Attitude Changes – Social Orientation and Cognitive Styles

Our dataset is limited to interactions and immediate outcomes. Can we still observe more 'durable' construct and attitude changes such as those described in the destructive conflict-supporting mindset (CSM) (Deutsch, 1994; Saguy & Reifen-Tagar, 2022)? Changes in interaction as indicated by function-words such as I/we, but also emotions may already suggest more durable effects, for example on negative outgroup beliefs and exclusionary attitudes. We additionally examined changes in personality trait-related social indicators such as prosociality and motivational drives such as needs for *achievement*, *power*, and *affiliation*. We further considered more detailed markers for cognitive style such as *all/none-thinking, insight*, and *certitude*.

Figure 3

Development of social indicators and thinking styles (LIWC dictionaries) over time in %



As displayed in Figure 3, the discourse increased motivational drives such as *affiliation* – indicated for example by *we, our, us* – while usage of *power* words such as *own, order, and allow* decreased. Compared to Friday evening (M_{FrE}=2.07, SD=.57), affiliation word use almost doubles towards the end of the workshop on Sunday (M_{SuA}=4.07, SD=.97), while 'power' indicating word use (M_{FrE}=2.32, SD=.47) decreases (M_{SuA}=1.53, SD=.48). Comparing Friday to Sunday, paired samples t-test shows that affiliation words have significantly increased across timepoints $t(6)=-6.54$, $p = .001$, while decreasing $t(6)=3.31$, $p = .016$ for power words. Repeated measure ANOVA showed an interaction between affiliation and power over time, $F(2,10) =-17.79$, $p = .001$, confirming that both motivational drives developed in different slopes. Additionally, prosocial orientation patterns in people's discussions – indicated by words such as *care, help, thank, please* – increased from Friday evening (M_{FrE}=.53, SD=.15) to Sunday afternoon (M_{SuA}=.91, SD=.27), t(6)=-2.94, p = .026. Combined, these indicators suggest that increasing affiliation reveals inclinations towards a common group identity.

The cognitive styles of the participants need to be examined in a differentiated way. No statistical changes were observed in more fine-grained measures of cognitive processing such as *all/none-thinking*, *insight*, or *certitude*, suggesting at first glance no changes in analytic processing throughout the discourse process. By the end of the study, group members' cognitive processing was more or less at the same level, but trends show an interesting pattern. Repeated measure ANOVA showed an interaction between time and cognitive processes, all/none-thinking and insight at $F(2,10) =9.87$, $p = .004$, meaning the cognitive processing styles developed in different slopes over time. Concretely, while all/none thinking declines from Friday to Sunday (although non-significantly), there is a sharper drop of insight in the middle of the workshop and then an increase again towards the end (same with certitude), indicating deconstruction and reconstruction of cognitive patterns.

Qualitative Considerations. The quantitative outcomes in terms of impact on participants are as well underlined by qualitative data, mainly positive outcome feedback, and long-term cognitive learning. Participants describe new learning and increased knowledge outcomes such as "*this has been a very, very important learning experience… about the Palestinian experience*" or "*altogether I learned more about the other side than I had expected.*" Some of it came unexpected, for example, described as "*there were certainly surprises. Sometimes the complexity [of issues] was surprising*." Notably, the learning has not been merely cognitive but includes affective relational aspects ("*There was a tremendous difference in the spirit but in some way, it is good news because it is good to know… There are a lot of difficulties I didn't expect… I do think we all share the feeling that it should be continued… Before, I thought we could do [this] without dialogues, but I see the necessity now*.") The improved relations are described in affective understanding such as "*I am not as disturbed as IA or IB… have expressed in the past day. I am encouraged… Thousands of victims and history and a lot of blood. I am encouraged. We can't expect to solve it with no fights."* To conclude this section with comments from both sides exemplifying the positive inter*group* generalizations "*that we both survived this weekend, proves we're strong nations*" as feedback from an Israeli participant. From the Palestinian side "*it's still a long way to go, but if we can perpetuate respect on both sides, we will go a long way… I doubted that it would be helpful, but it was helpful because it gave me a chance to listen.*"

To summarize, participants undergo substantial change in terms of mutual understanding, emotions, and social cognition even about agonistic conflict topics. Creating – to myself and others – a different conflict story through learning and intergroup encounters indeed seems to initiate conflict-related attitude transformations.

How does this process help them to approach the second outcome of Track Two dialogue, i.e., how do *improved relations* and *mutual understanding* help with formulating ideas to be transferred into each society or the official policymaking processes? Beyond analysis through predetermined

dictionaries capturing mostly *style* differences, we next use open-vocabulary techniques to examine changes in the *content* of discourse.

Topic Modeling – Understanding Needs and Developing Solutions

After the initial session on Friday evening, the participants engage in listing non-negotiable needs, as well as ultimate fears and concerns on the next day. This can be a delicate process, as we have seen in the example of the fierce argument displayed in Figure 1 (Saturday afternoon). Here, the Palestinian participants basically 'overplayed their hand' regarding their ultimate needs, adding more and more, and thus increasing the pressure on the Israeli participants. Nevertheless, participants engaged again Sunday morning in joint thinking trying to find creative solutions. Table 2 displays the main content word frequencies – general and distinct word usage per workshop phase utilizing two different techniques.

Table 2

15 most likely words Saturday (needs/concerns) versus Sunday (solutions/ideas)

Saturday: Needs/Concerns - Phase						Sunday: Solutions/Ideas - Phase					
	TF	TF/IDF	Word Correlations				TF	TF/IDF	Word Correlations		
Palestinians	128	?	.006	killed	-1.10	Palestinians	86	I	.017	practical	3.77
state	105	not	.006	fears	-0.54	state	76	we	.013	interested	3.54
palestinian	96	need	.004	lack	-0.52	people	72	are	.007	basis	3.47
Israel	80	Palestinians	.004	separation	-0.51	palestinian	71	have	.006	resolution	3.39
needs	69	they	.004	independence	-0.50	right	64	be	.005	spent	3.25
Israelis	64	want	.003	concerns	-0.49	side	61	on	.005	please	3.15
people	61	from	.003	society	-0.49	issue	53	this	.005	viable	2.96
right	52	Palestinian	.003	long-term	-0.47	Israel	51	think	.004	disagreement	2.95
Israeli	51	state	.003	cooperation	-0.45	said	48	about	.004	starting	2.77
peace	47	needs	.002	need	-0.44	things	47	can	.004	while	2.76
side	43	Israel	.002	million	-0.43	Israelis	47	do	.003	principle	2.51
land	42	up	.002	needs	-0.43	Israeli	47	very	.002	disagree	2.45
return	42	Jewish	.001	heard	-0.42	important	46	more	.002	rest	2.40
Jewish	41	victim	.001	under	-0.40	talk	45	has	.001	forward	2.35
Jerusalem	40	land	.001	greater	-0.40	agree	42	agree	.001	find	2.12

Note. TF shows Term Frequency. TF/IDF shows relative use in time period (Term Frequency) divided by total use across the workshop (Inverse Document Frequency). Word correlations obtained through correlation of the word frequency with a dummy variable for time period. As associated with Sunday, the 'not Sunday' associations show up as negative.

Looking at both term frequency columns, it is striking how much the Palestinian focus seems at the forefront. Although not contextualized by differences in word counts between both phases, the most frequent words in both phases are mostly "Palestinian." Apparent Israeli words appear only at TF#4 (concerns phase) and TF#8 (solutions phase) in terms of total frequencies, a markedly Israeli need ("*security*") comes up only at TF#19 on Saturday while a mostly Palestinian concern ("*state*") features prominently on the second rank on *both* days. The low-power group apparently manages to steer discourse toward their own topics. It is also interesting that "*state*" is used twice as frequently as "*land*" – while land is more 'binary' as well as strongly national-religiously ("Holy Land") loaded in this particular intractable conflict context, state seems more neutral and can have different characteristics

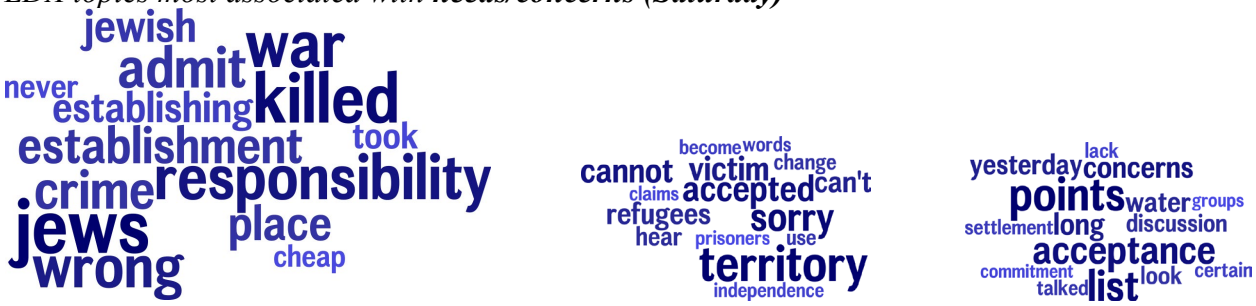
or shapes. The most significant themes in the needs/concerns phase (Saturday), as reflected in patterns of single words, are associated with issues such as the question of the *(Palestinian) "state"* (TF#2), "*land*" (TF#12), the "*right*" *of* "*return*" (TF#8/13), as well as the status of "*Jerusalem*" (TF#15).

In terms of distinct word use for each phase, as reflected in TF/IDF and word associations, we find further cues for needs/concerns elaboration as well as solution-building. High use of question marks indicates an inquiring mindset and interest in the other side, not only voicing their own issues. The words distinguishing the phases make sense in light of mediation theory, showing that words such as "*killed, fears, lack…*" are used more in the concerns phase, whereas in the solutions phase, there is a larger focus on pragmatic solution orientation indicated by words such as *"practical, interested, resolution."* Of note in the TF/IDF results, in the solutions phase positive agentic verbs such as *"can, have, agree…"* are frequently used, which displays strong possibility thinking within the discourse. Positive agency is further underlined by frequent I/we–use in this phase, indicating personal- as well as group references, while the concerns phase is more defined by *they*-use, indicating referral to others (this time indicated by single words, not the LIWC dictionary).

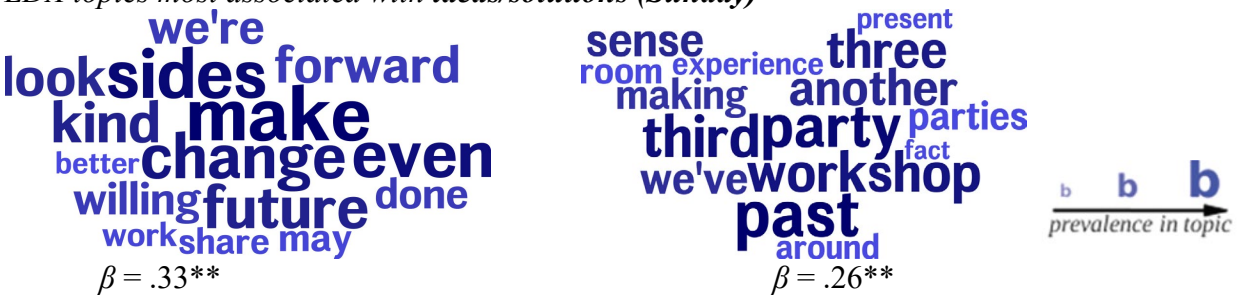
To complement these analyses with another data-driven method, Figure 4 shows the LDA topics (groups of semantically similar words clustered through co-occurrence) most strongly associated with the different phases (for additional information, see online supplementary material).

Figure 4

LDA topics most associated with ***needs/concerns (Saturday)***



LDA topics most associated with ***ideas/solutions (Sunday)***



Note. p** < .01, words within topics are sorted by descending prevalence, color is random for readability

The most significant theme in the needs/concerns phase (Saturday), as reflected in topic patterns of multiple words, is associated with the – deeply agonistic – establishment of responsibility for past wrongdoings. This might indeed be one of the most central underlying 'hot potato'-issues of the Israeli-Palestinian conflict discourse (Kahanoff, 2017). The most relevant topic associated significantly with the ideas/solutions-phase (Sunday) uses positive, forward-looking language, and can

be paraphrased with *"we look forward (both) sides make change, willing (to) share work (for) better future."* The second topic expresses the readiness to engage in further dialogue ("*making another third-party workshop")* arguably referring to the positive "*experience (of the) past three*" days. While not surprising, the results are still remarkable given the broader climate defined by mutual "*fears"* and "*disagreement*" in never-ending cycles of confrontation. Of note, language about deeply divisive concerns such as "*establishing responsibility*" for past wrongdoings emerges while the participants refrain from using language about – arguably simplistic – territorial solutions, indicating that they avoid strategies that might not be sustainable in the light of these deep concerns. Instead, they opt for more process-oriented discursive peace/conflict approaches in consideration of past events.

Summarizing the open-vocabulary results, the needs/concerns phase is overall defined by the 'meta-concern' of taking responsibility for past wrongdoings as well as an inquisitive mindset indicated by the high number of questions. This phase seems to be influenced by mostly Palestinian – the disadvantaged group's – discourse and is marked by agonistic elements, for example over the Palestinian needs. The idea/solutions phase on the other hand is marked by agentic positive mostly *process*-oriented 'can-do' language, indicating a forward-looking openness for change.

Qualitative Considerations. These quantitative linguistic open-vocabulary considerations can be enhanced by examining the final feedback session of the IPS using qualitative methods. Table 4 shows ideas for the process-oriented approach mentioned above alongside two broader themes – overcoming constraints and developing solutions.

Table 4

Better understanding of overcoming constraints and developing creative solutions

Theme	Example Quotes
Overcoming Constraints	*"There is a lot we can achieve but it will be much more difficult than we thought […] I do think we all share the feeling that [this process] should be continued […] Before I thought we could do without dialogues, but I see the necessity now."* ***[Israeli participant]***
	"We can't go for quick solutions. We should work on this more – more education, interaction. I think we need more dialogue." ***[Palestinian participant]***
Specific Solution Suggestion	*"With regards to the question of Jerusalem, both sides should find some creative solution, some functional 'sharing rule' that would symbolically give each side something in the spiritual sense of what Jerusalem means. […] This is more important than a geographical one."* ***[Israeli participant]***
	"The beauty of this question is the fragility of the question […] We need gestures of respect between leaders to be genuine, not condescending. Even before we remove the checkpoints, even before, we need to treat people with deference and respect […] An atmosphere of good will and an atmosphere of equality, we should do things that make people empowered." ***[Israeli participant]***

Commenting on the needs phase, it is important to underline that needs are 'mutual' – both parties have responsibilities and are dependent on each other's 'honest consideration.' One Palestinian 'disadvantaged-group' participant expressed it *"Something else that comes out in this seminar… the mighty Israelis, this nuclear power… still needs reassurance of Palestinians."* It is clearly

expressed by the participants that overcoming the given constraints is more complicated than anticipated – even by informed and resourceful people such as the participants – but dialogue such as the IPS is considered essential in the process. Regarding possible solutions, the importance of symbolism and *"gestures of [mutual] respect"* is underlined. Notably, the solutions include personal commitment, and participants expressing action tendencies such as *"We should work on this. We also have to work on creating awareness… On a personal level, I can start with… making workshops to talk about…."* Importantly, the solution- and action-finding process is a *joint* dialogue, with participants developing ideas further *between* groups, such as starting for example with ***Israeli:*** *"There are several right-wing internet websites that quote negative statements from Palestinian media that in turn makes the Israelis outrageous… There is no counterbalance to this propaganda on both sides…"* ***Palestinian:*** *"I think we should carry this idea to our leaders and communities."*

Discussion

Protracted intergroup conflict is devastating, and useful approaches to transform conflict need strengthening wherever possible. This study explores how the outcome of Track Two discourse, which provides an effective basis for individual conflict transformation, is shaped. Specifically, we examined linguistic interaction indicators, such as positive emotions and social cognition. Results confirm our initial hypotheses. Our study shows *how* IPS positively affects participants' emotions and conflict-related attitudes, facilitates solution generation, and shows *which* discursive content topics are associated with these changes. We found that the usefulness of assessing Track Two dialogue is not only revealed in essential discourse topics (concerns and solutions) but in helpful *processes*, underlining the importance of engaging in interactions to increase mutual understanding.

As positively impacted participants will more likely and substantially engage in transfer activities compared to unaffected ones, we suggest that understanding and strengthening pre-negotiation *outcomes* through linguistic process analysis might be the most influenceable step in strengthening *transfer.* The documented changes over time support the nature of changes in the affective climate and interpersonal relations that are expected in successful IPS dialogue and are thus significant in supporting the IPS model. The more positive emotions at the end of the workshop are also indicative of the typical flow of theories and research relating to group development (Fisher, 1994; Kelman, 2008; Rouhanna, 1995). Group dynamics might arguably be the crucial mechanism for IPS and similar third-party approaches. Changes in cognitive style over time and the *combination* of affective- as well as cognitive indicators with prosocial attitudes (increase of affiliation, decrease in power) might indeed capture the kinds of changes that are expected to occur in probem-solving dialogue, such as more receptivity to relational strategic thinking (Ramsbotham & Schiff, 2018; Rouhana, 1995; Slocum-Bradley, 2013). Finally, our study points to the value of combining qualitative methods with natural language processing, specifically including closed- *and* open-vocabulary approaches.

Theoretical and Applied Contributions

In July 2000, about a year after this workshop, the Middle East Peace Summit at Camp David between United States President Bill Clinton, Israeli Prime Minister Ehud Barak, and Palestinian Authority Chairman Yasser Arafat failed, with both sides blaming each other. In September of the same year, the Second Intifada started. While exact proceedings are discussed elsewhere (Hanieh, 2001; Pressman, 2003), apparently there were four principal obstacles to an agreement – territory, Jerusalem and the Temple Mount, Palestinian refugees' right of return, and Israeli security concerns.

All of these were already debated during the analysed workshop from a *process perspective.* Discussions included enhancing trust through gestures of mutual respect and empowerment, focusing on function and symbolism instead of specific concerns such as territorial matters.

The present study offers a glance at the broad theoretical and empirical potential that emerges from assessing conflict dialogue with open- and closed vocabulary natural language processing, integrating quantified linguistic patterns and qualitative discourse analysis. We offer insights about the important connection between substantive *content* and the *process* of how to achieve this content, a characteristic feature also known from retribution literature, where inclusion in the process can be as important as negotiated compensation (De Greiff, 2006; Moffett, 2017). The same theme emerges in discussions about the importance of 'voice' in conflict resolution (Cleven & Saul, 2021; d'Estree, 2006) and the focus on procedural rather than substantive advice in interpersonal mediation (Garcia, 2020). This study sheds light on how deep-seated agonistic issues – such as past wrongdoings – can be dealt with constructively through iterative dialogue that builds trust and facilitates clashes constructively. Notably, the topics most associated with the needs and solution phases, resemble the 'problem actuation' and 'resource activation' factors known from psychotherapy research (Gassmann & Grawe, 2006; Grawe, 1995) – arguably because of similar focus points over time and process.

As conceptualized, Track Two pre-negotiation generated essential concerns and creative solutions, including process-related ones. Our research provides a detailed qualitative and quantitative account of *how* this was achieved. This research advances the study of intergroup conflict discourse particularly under process considerations. It provides a framework of analysis for the nuanced connection between discourse processes and outcomes, and their association with the transformation of conflict-supporting attitudes (Bell & Song, 2005; Fisher, 2007) using natural language processing (Lin et al., 2016; Tauszik & Pennebaker, 2010). This has been rarely attempted in intergroup conflict dialogue, where the main focus was on transfer, bringing the outcome into each society (Çuhadar & Dayton, 2012; d'Estrée & Fox, 2020; Palmiano Federer, 2021). The study enhances insights into the association of emotional-cognitive processes and outcomes in the mediation- and (pre)negotiation literature (Adam & Brett, 2018; Van Kleef et al., 2008; Van Kleef & Coté, 2018). Up to now, examination of the relations between process and impact in Track Two diplomacy has received limited attention to detailed psycholinguistics perspectives, particularly using natural language processing.

Limitations and Future Directions

The present research demonstrated how 'Interactive Problem Solving' supports conflict transformation through changing conflict-related emotions and cognitive attitudes as well as by foregrounding the topics facilitating these changes. While this study provides methodological insights into the interrelations between dialogue process and outcome using natural language processing in Track Two diplomacy, it is limited in a few respects. For example, regarding the closed-vocabulary approaches, the same pronouns may drive patterns in different categories, e.g., *"good"* is associated with *positive tone* and *positive emotions*, but also with the summary variable *emotional tone* (Hartmann et al., 2019, see also the supplementary information of Eichstaedt et al., 2021 for details). We have addressed this limitation by corroborating our LIWC results using transparent, topic, and word frequency analyses.

The specific historical contextual nature of the study is a further limitation. Future studies should examine these same relationships between discourse processes and outcomes in a variety of conflict contexts from different periods. In addition, analysis of further workshops should

systematically compare outcome quality, for example, using a ranking or other quantification of workshop results as it has been done in dialogue settings such as systems therapy (Atkins et al., 2012). This would enable examining the link between discourse and outcomes more consistently. Empirically establishing which discourse themes are most effective could facilitate uncovering 'common impact factors,' as has been done for example in psychotherapy process research (Atkins et al., 2012; Grawe, 1995; Miner et al., 2023). Particularly, examining how group formation plays out in successful IPS as one essential mechanism and how effective third-party facilitation is required to bring this about might offer further promising research streams. Finally, to establish impact more clearly, it would be desirable to include data on actual transfer behaviour (Kelman, 2008; Jones, 2015), although other areas of research routinely focus on action *tendencies*, for example in the collective action literature (Becker & Tausch, 2017; Van Zomeren et al., 2008).

Conclusion

This study can support conflict scholars and practitioners by shedding light on the discourse processes that impact emotions and social cognition for the promotion of conflict transformation, reduce the activation of conflict-enhancing attitudes, and facilitate the development of solutions. We hope insights from this study will help guide the efforts of those who engage in the difficult task of striving to transform intergroup conflict and help to establish sustainable peace in places where it is genuinely needed.

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