



Testing the impact and durability of a group malleability intervention in the context of the Israeli–Palestinian conflict

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Fostering perceptions of group malleability (teaching people that groups are capable of change and improvement) has been shown to lead to short-term improvements in intergroup attitudes and willingness to make concessions in intractable conflicts. The present study, a field intervention involving 508 Israelis from three locations in Israel, replicated and substantially extended those findings by testing the durability of a group malleability intervention during a 6-month period of frequent violence. Three different 5-hour-long interventions were administered as leadership workshops. The group malleability intervention was compared with a neutral coping intervention and, importantly, with a state-of-the-art perspective-taking intervention. The group malleability intervention proved superior to the coping intervention in improving attitudes, hope, and willingness to make concessions, and maintained this advantage during a 6-month period of intense intergroup conflict. Moreover, it was as good as, and in some respects superior to, the perspective-taking intervention. These findings provide a naturalistic examination of the potential of group malleability interventions to increase openness to conflict resolution.

intergroup conflicts | psychological interventions | mindsets | emotions

It is becoming increasingly difficult to ignore the suffering generated by intergroup conflicts. Millions of refugees are fleeing their homes, and the resulting humanitarian crisis is being felt around the world, transforming local and regional conflicts into an urgent global challenge. Recent analyses suggest that the number of state-based armed conflicts is reaching a new peak since the collapse of the Soviet Union (1), supporting the notion that we are truly in the midst of a global escalation of intergroup conflicts. These recent developments emphasize the importance of finding ways to attenuate the destructive effects of intergroup conflicts.

Recent research by Halperin et al. (2) addressed one obstacle to conflict resolution for parties involved in intractable conflicts. This research showed that fostering the general perception that groups have a malleable (rather than fixed) nature can lead to significant improvements in intergroup attitudes and willingness to make concessions. Halperin and coworkers exposed Israelis and Palestinians to a brief article explaining that groups do not have a fixed, inherent nature but, rather, are capable of positive change (with no mention of Israelis or Palestinians). Those receiving the message that groups can change, compared with a group that read about the stability of groups, showed more positive attitudes toward each other, which led to greater willingness to entertain serious compromises for the sake of a peace. Subsequent work supported the finding that a belief that groups can change and improve increases willingness to interact with the other side (3) and enhances the quality of such interactions (4). Taken together, these findings begin to suggest that changes in perceived group malleability may be effective in improving intergroup interactions. However, major questions remain.

The purpose of the current research was to address three of these major questions. First, recognizing the importance of replicable findings, particularly when it comes to findings of relevance to key societal issues, we sought to replicate our previous laboratory research

in a more naturalistic context, using a field intervention. Second, considering the importance not only of replicability but also of durability of results, we sought to determine whether any positive effects of the intervention would endure during a 6-mo period in the face of continued conflict. Third, even if findings were replicable and durable, ideally our intervention should still be compared with another intervention that is widely believed to be effective in conflict resolution (5, 6). We therefore sought to test the efficacy of our intervention against a perspective-taking intervention that was as effective, context-sensitive, and “nonreactive” as we could make it.

To achieve our three research goals, we initiated a field intervention ($n = 508$; 191 males and 317 females; age, $M = 28.81$ y, $SD = 8.69$ y) during a period of extensive violence in the Israeli–Palestinian conflict (October 14, 2014–January 15, 2015). Participants were randomly assigned to one of three conditions (malleability, perspective-taking, and coping), each consisting of one 5-h workshop. The study as a whole was conducted in one of three locations in Israel (North, Central, and South) to avoid recruiting participants from the same small social networks. Participants were told that they were taking part in a pilot leadership program that was designed to examine and improve the effectiveness of leadership workshops. Leadership was chosen as a focus to provide an appealing framework that would be broad enough to encompass all three interventions.

The malleability intervention focused on the possibility of positive group change, and the important role that leaders have in

Significance

The importance of psychological factors in conflict resolution has been well established in laboratory experiments. However, these factors have rarely been examined in longitudinal field experiments. The goal of the current project was to address this gap by comparing the effectiveness of psychological interventions during a period of extensive violence in the Israeli–Palestinian conflict. An intervention that spoke to the idea that groups can change and improve over time (a group malleability intervention) proved superior to a control intervention in improving attitudes, hope, and willingness to make concessions, even 6 months after the intervention. These findings provide evidence from a longitudinal field experiment that group malleability interventions can increase openness to conflict resolution.

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identifying and amplifying such change. The perspective-taking intervention focused on the importance of taking the other side's perspective when leading a group, even in challenging situations. It was chosen because of its suggested potential for conflict resolution and prejudice reduction (5, 6). However, after a series of three pilot studies, it was altered to enhance its effectiveness by de-emphasizing perspective-taking in the local Israeli–Palestinian context (7–9) (which evoked resistance from some participants), and instead discussing the importance of perspective-taking in general. We call this the enhanced perspective-taking condition. The coping-with-stress intervention was designed to teach participants useful coping skills to overcome stressors that leaders often encounter. Coping was chosen and prepiloted as a control condition because it provided useful leadership-related skills, but also because it was unrelated to group malleability or conflict resolution. Furthermore, a similar workshop has been used as a neutral control condition for a malleability intervention (10). None of the three workshops treated the local conflict as a focus of the workshops. As part of the interventions, participants filled out a preworkshop questionnaire, a postworkshop questionnaire, and 2-wk, 2-mo, and 6-mo follow-ups.

Our assessments were designed to replicate our prior studies, with a few additions. General malleability mindset, which also served as a manipulation check, was assessed at all points, using five items, such as, “As hard as it is to admit, it is impossible to change the central characteristics of nationalities and groups.” Specific negative attitudes were assessed at all points, using seven items, such as, “To what extent would you say that the Palestinians are evil?” In addition, we added a measure of participants' hope regarding a shared future with the Palestinians, which was suggested as an important outcome in the discussion of the original paper (2) and later explored in additional projects (11, 12). Participants' hope regarding the relationship with the Palestinians was assessed at all points, using a three-item scale, which examined participants' hope, despair, and optimism regarding the future relationship with the Palestinians. In addition to these measures, we included three measures that examined willingness to make concessions. First, as in the original study, participants' support for a two-state solution was assessed at all points, using a five-item scale. However, we added a second concession measure in the 6-mo follow-up, as we suspected that dramatic changes in public opinion regarding the two-state solution rendered the items on our old scale obsolete (see ref. 13). This is because some major parties in the Israeli government have completely abandoned the two-state solution as a viable resolution to the conflict. The concession measure was a six-item scale including items better suited to the current political situation, such as, “Israel should release Palestinians' tax funds in order to promote the negotiations” (see *SI Appendix* for all items). Finally, we added two decision-making measures that related to participants' willingness to share resources and to trust the other side, and that served as indications of conciliatory behavior. These measures included a dictator game (assessed in all follow-ups; ref. 14) and a trust game (assessed at the 6-mo follow-up; ref. 15). In the dictator game, participants were asked to divide resources worth hundreds of millions of Israeli Shekels between Israelis and Palestinians. We decided to use the dictator game only during the follow-ups (2 wk, 2 mo, 6 mo) so as not to risk hinting at the purpose of the workshop during the pre- and the earlier postmeasures. In the trust game, participants were actually given 10 NIS (\$3) and were asked to transfer some or all of the amount to a Palestinian player, in the hope that the Palestinian player would reciprocate. The trust game was used only once, during the 6-mo follow-up, because any outcome of the trust game could affect future measures (16). Finally, to mask the purpose of the study, the relevant questions were embedded in a variety of distractor questions that focused on other contemporary issues. The order of the questions was randomized between participants (see *SI Appendix* for full description of measures).

Based on our first goal (replication in a real-world context), we hypothesized that we would reproduce previous findings and that

the malleability intervention would be superior to the coping control intervention in improving negative attitudes and increasing hope, thus leading to increased willingness to make concessions (H1). Based on our second goal, we expected these effects to be evident 6 mo after the intervention (H2). Finally, based on our third goal, we expected that the group malleability intervention would be as good as, and in some cases better than, the perspective-taking intervention (H3). One outcome that we hypothesized would be better in the malleability condition was participants' hope regarding the future with the Palestinians. We hypothesized that although changing the perception of group malleability would open the possibility of potential group change, and thus lead to hope, taking the other side's perspective would not necessarily lead to long-term improvements in hope.

Results

Before conducting our primary analyses, we examined differences in preworkshop (baseline) measures for all relevant outcomes (see *SI Appendix* for full analysis). These comparisons led us to conclude that when comparing the postworkshop outcomes, controlling for these variables would increase the precision of the estimates of our model.

To showcase both the immediate and long-term effects of our workshops in a single model, we used a three-level, cross-classified, multilevel model that modeled changes in outcomes during the 6-mo period after the workshop. The level 1 model, within participants, specified how each participant's outcome changed as a function of time. The level 1 model included a main effect of time, and where they yielded better model fit, time-varying predictors to allow for shifts in slope between two (postworkshop measure to the 2-wk follow-up, and the 2-wk to 6-mo follow-ups) or three (postworkshop measure to 2-wk follow-up, 2-wk to the 2-mo follow-ups, and 2-mo to the 6-mo follow-ups) periods. Time was defined as weeks since the workshop, and was defined differently for each participant, according to the date they completed each survey (for the dictator game, it was defined as weeks since the 2-wk follow-up, the earliest available measurement for this outcome). The level 2 model predicted the parameters of the level 1 model, using between-participant predictors: dummy-coded condition, baseline (preworkshop) malleability beliefs, and the baseline version of the outcome, where available. Participants were cross-nested within workshop week (1 of 12 consecutive weeks in which the workshop was administered) and within instructor. Thus, the model contained six random effects: random intercepts for instructor and workshop week at level 3; a random intercept for participant, a random slope for week within participant and their covariance at level 2; and a within-participant residual at level 1. Centering our model on different time points and different conditions allowed us to answer a few questions for each outcome: first, is there a difference between the conditions at each of the postworkshop measures? Second, looking at change over time, are there differences in slopes between conditions?

In light of our hypotheses and with the intention of conducting only two comparisons for the three conditions (malleability, perspective-taking, and coping) for each outcome variable (postworkshop, 2-wk, 2-mo, and 6-mo follow-ups), we used between-condition dummy coding comparing the malleability condition with both the coping and the perspective-taking condition. For this reason, negative condition-contrast coefficients for positively valenced outcomes (e.g., hope, concessions) and positive coefficients for negatively outcomes (e.g., negative attitudes) indicate a condition difference in favor of the malleability condition. The longitudinal model also included random effects, which accounted for the nesting of time within participants and the cross-nesting of participants within workshop week (1 of 12 wk in which the workshop was administered) and within instructor (see *SI Appendix* for full description). Because the number of participants decreased in each follow-up (postworkshop = 508, 2-wk = 494, 2-mo = 410, 6-mo = 299), we used all available participants in each time point.

Table 1. Comparison between malleability and coping

Outcome	Comparison	Time point	B	z	P	d
Malleability mindset	Malleability vs. coping	Postmeasure	-0.40 [-0.54, -0.24]	-5.21	<0.001	-0.40
		2 wk	-0.44 [-0.58, -0.29]	-5.98	<0.001	-0.45
		2 mo	-0.44 [-0.59, -0.29]	-5.59	<0.001	-0.44
		6 mo	-0.44 [-0.66, -0.22]	-3.93	<0.001	-0.45
Negative attitudes	Malleability vs. coping	Postmeasure	0.18 [0.08, 0.28]	3.49	<0.001	0.18
		2 wk	0.19 [0.09, 0.29]	3.73	<0.001	0.20
		2 mo	0.23 [0.12, 0.34]	4.09	<0.001	0.24
		6 mo	0.33 [0.16, 0.30]	3.79	<0.001	0.34
Hope	Malleability vs. coping	Postmeasure	-0.38 [-0.56, -0.21]	-4.26	<0.001	-0.34
		2 wk	-0.32 [-0.50, -0.15]	-3.57	<0.001	-0.28
		2 mo	-0.26 [-0.45, -0.07]	-2.73	0.006	-0.23
		6 mo	-0.39 [-0.63, -0.15]	-3.17	0.002	-0.34

Comparisons in level between the malleability and the coping conditions for each time point. These comparisons were made by centering the longitudinal model on different time points. For each time point, we present the coefficient, confidence intervals, z scores, P values, and Cohen's d for each comparison.

There was no difference in attrition rate between the three conditions, as well as no drop-out bias in terms of participants' sex, age, or political affiliation (*SI Appendix*).

We tested our first and second hypotheses by comparing the malleability condition with the coping condition. We first examined differences in malleability mindset, which served as a manipulation check. Results indicated that participants' malleability mindset was significantly higher in the group malleability condition compared with the coping condition at every time point (Table 1). Although participants in the malleability condition showed a decrease in malleability mindset over time [$b = -0.005$ (95% CI, -0.010, -0.001); $z = -2.21$; $P = 0.03$; $d = -0.13$], and there was a nonsignificant decrease in the coping condition during the same period [$b = -0.004$ (95% CI, -0.008, -0.001); $z = -1.51$; $P = 0.13$; $d = -0.09$], there was no significant difference in slopes between the conditions [$b = 0.002$ (95% CI, -0.005, 0.008), $z = 0.45$, $P = 0.65$, $d = 0.04$]. Importantly, although the preworkshop malleability mindset was controlled in the current analysis, malleability mindset levels in the 6-mo follow-up in the malleability condition were still higher than participants' premeasures.

After the analysis of the manipulation check, we examined our outcome measures, looking first at negative attitudes toward the Palestinians. Overall, comparing the malleability condition and the coping condition at each point, we found significantly more negative attitudes in the coping condition in each of the post measures (Fig. 1A and Table 1). There were no changes in negative attitudes over time in the malleability condition, and an over time increase in the coping condition. However, there were no significant differences in slopes between the two conditions. Therefore, examining changes in negative attitudes per week, we found no significant interaction between the postworkshop-to-6-mo slopes in the two conditions [$b = 0.003$ (95% CI, -0.002, 0.009); $z = 1.25$; $P = 0.21$; $d = 0.09$]. Looking at change for each condition, results suggested no change in negative attitudes in the malleability condition [$b = 0.000$ (95% CI, -0.004, 0.004); $z = 0.01$; $P = 0.99$; $d = 0.00$] and a marginally significant increase in negative attitudes in the coping condition [$b = 0.003$ (95% CI, 0.000, 0.007); $z = 1.74$; $P = 0.08$; $d = 0.09$].

Further exploring our outcome measures, we examined hope regarding future relations with the Palestinians. Overall, looking at differences in degree of hope at each of the postworkshop times, we found that participants in the malleability condition reported significantly higher levels of hope at each of the postworkshop points (Fig. 1B and Table 1). There was a decrease in hope over time after the workshop, both in the malleability condition and the coping condition, and no significant difference in slopes between the conditions. Thus, examining changes in hope over time in each condition during the next 6 mo, we found that the changes in slopes of

our two interventions over time were not reliably different [$b = 0.003$ (95% CI, -0.006, 0.013); $z = 0.73$; $P = 0.47$; $d = 0.08$]. Further examining the slope in each condition revealed a significant decrease in hope from the postworkshop measure to the 6-mo follow-up, both in the malleability condition [$b = -0.018$ (95% CI, -0.024, -0.011); $z = -5.44$; $P < 0.001$; $d = -0.40$] and in the coping condition [$b = -0.014$ (95% CI, -0.021, -0.008); $z = -4.24$; $P < 0.001$; $d = -0.33$]. This overall decline in hope in both conditions during the 6 mo was perhaps a result of the high levels of intergroup violence throughout this period; however, the effect of the group malleability intervention did not decline. Furthermore, although preworkshop hope was controlled in the current analysis, hope levels at the 6-mo follow-up in the malleability condition were still higher than participants' premeasures (*SI Appendix*).

Next, we examined participants' willingness to make concessions to the Palestinians. We first examined the traditional measure of support for the two-state solution. Overall, looking at differences between the conditions in the postworkshop measures, we found no differences in level of support for the two-state solution between the malleability and coping condition (*SI Appendix*). Looking at difference in change over time between the two conditions, we found a reduction in slope (change in support per week) for both conditions [malleability: $-b = 0.005$ (95% CI, -0.011, 0.000); $z = -1.96$; $P = 0.05$; $d = -0.12$; coping: $-b = 0.006$ (95% CI, -0.011, 0.000); $z = -2.03$; $P = 0.04$; $d = -0.13$]. However, these slopes did not significantly differ [$b = 0.00$ (95% CI, -0.008, 0.007); $z = -0.11$; $P = 0.91$; $d = -0.01$]. This meant that the nonsignificant difference in level of support for the two-state solution between the malleability and coping condition immediately postworkshop continued to be nonsignificant at each of the three follow-ups (*SI Appendix*).

As noted, one possible reason for this null difference between the conditions at each time is that dramatic changes in public opinion regarding the two-state solution rendered the items on our old scale obsolete. Consistent with this reasoning, the 6-mo measure of concessions, which was more relevant to the current political climate (and included items relating to releasing Palestinians' tax funds, removing preconditions for negotiations, and transferring information on Palestinian casualties to their families), yielded a significant difference between the malleability condition and the coping condition [$b = -0.49$ (95% CI, -0.80, -0.19); SE = 0.15; $t(198) = -3.20$; $P = 0.01$; $d = -0.45$]. Furthermore, we treated our decision-making tasks as another indication of participants' conciliatory behavior. Looking at the outcomes of these tasks at the 6-mo follow-up, results indicated an increased willingness to allocate resources to Palestinians in the dictator game [$b = -4.40$ (95% CI, -8.35, -0.46); $z = -2.19$; $P = 0.03$; Fig. 2]. Longitudinal analyses of the dictator game revealed that differences between the malleability and coping conditions were

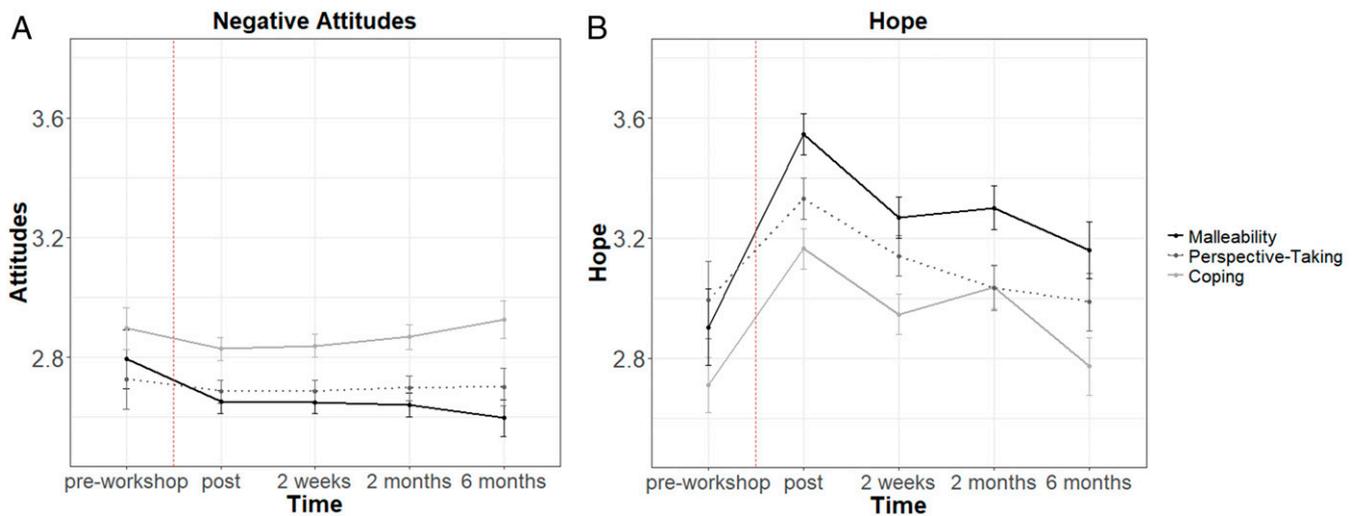


Fig. 1. Average ratings of participants' negative attitudes (A) and hope (B) at each point for all three conditions, obtained from the longitudinal model. Error bars are SEs. For the sake of simplicity, the distance between points has been constrained to be equal despite the differences in time. The reported slopes account for the actual differences in time between points (in weeks).

significant in each of the three follow-ups (*SI Appendix*). Results further suggested a significantly greater willingness to trust a Palestinian confederate in the trust game [$b = -0.60$ (95% CI, $-0.86, -0.34$); $SE = 0.13$; $t(199) = -4.54$; $P < 0.001$; $d = -0.64$].

Overall, these results support our first and second hypotheses by indicating sustained differences between the malleability and coping conditions on all measures except for support for a two-state solution. In light of these findings, we examined whether the differences between the malleability and coping condition in level of malleability mindset at the postworkshop measure mediated differences in our dependent variables in the 6-mo follow-up. We conducted a mediation analysis, including measurement of participants' malleability mindset at the postworkshop measure, as a mediator of all outcomes at the 6-mo follow-up. Results suggested that participants' postworkshop malleability mindset significantly mediated the coping vs. malleability condition contrast for all outcomes (see *SI Appendix* for full analysis).

Our third hypothesis was that the group malleability would be at least as good, and in some respects (such as participants' hope) better, than the perspective-taking condition. To test this hypothesis, we first examined differences in malleability mindset, which served as a manipulation check. First comparing the two conditions at each point, we found that levels of malleability mindset were significantly higher for the malleability condition compared with the perspective-taking condition at each of the postworkshop measures (Table 2). Examining changes in the two conditions over time, we found no significant difference in slopes between the two conditions [$b = -0.001$ (95% CI, $-0.008, 0.005$); $z = -0.43$; $P = 0.67$; $d = -0.04$].

Turning from the manipulation check to the relevant outcomes, we first examined differences in negative attitudes. The difference in negative attitudes between the two conditions was nonsignificant immediately postworkshop and remained nonsignificant throughout the next 6 mo (Fig. 1A and Table 2). Similar to the malleability condition, the postworkshop to 6-mo follow-up slope of the perspective-taking condition was not significantly different from zero [$b = 0.000$ (95% CI, $-0.004, 0.004$); $z = -0.12$; $P = 0.90$; $d = -0.01$], and there was no significant difference between the slopes in the different conditions [$b = 0.000$ (95% CI, $-0.006, 0.005$); $z = -0.09$; $P = 0.93$; $d = -0.01$]. These findings suggested that negative attitudes were similar in the two conditions.

However, participants in the malleability condition expressed higher levels of hope compared with the perspective-taking

condition immediately after the workshop, controlling for pre-workshop malleability mindset and hope [$b = -0.22$ (95% CI, $-0.39, -0.04$); $z = -2.40$; $P = 0.016$; $d = -0.19$]. This difference was nonsignificant in the 2-wk follow-up but reemerged as significant at the 2-mo follow-up (Table 2). Finally, at the 6-mo follow-up, the difference in levels of hope between the perspective-taking and malleability conditions was nonsignificant, but in the expected direction (Fig. 1B and Table 2). Similar to the malleability and the coping conditions, the perspective-taking condition also exhibited a significant decrease in hope per week during the 6-mo postworkshop [$b = -0.013$ (95% CI, $-0.019, -0.006$); $z = -3.83$; $P < 0.001$; $d = -0.29$]. There was no significant difference in overall slope between the malleability and perspective-taking conditions [$b = 0.005$ (95% CI, $-0.004, 0.014$); $z = 1.07$; $P = 0.29$; $d = 0.11$].

We then examined differences between the malleability and the perspective-taking condition in willingness to make concessions. No significant differences were found in support for a two-state solution or in the new concessions measure at any point (*SI Appendix*). Although we did find a reduction in support for the two-state solution in the perspective-taking condition, as indicated by a negative postworkshop to 6-mo follow-up slope [$b = -0.009$ (95% CI, $-0.014, -0.004$); $z = -3.31$; $P = 0.001$; $d = -0.20$], this slope was not significantly different from the slope in the malleability

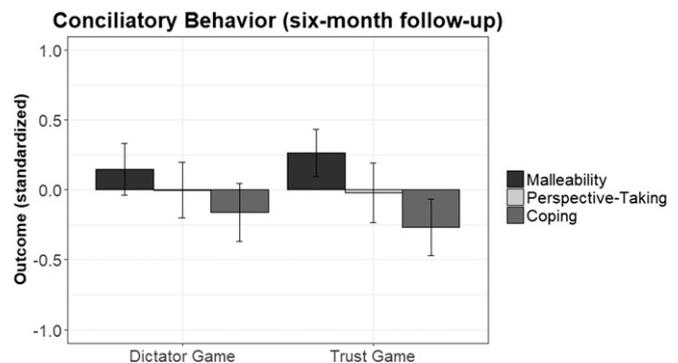


Fig. 2. Performance in two decision-making tasks (standardized) at the 6-mo follow-up. Error bars are 95% confidence intervals.

Table 2. Comparison between malleability and perspective-taking

Outcome	Comparison	Time point	B	z	P	d
Malleability mindset	Malleability vs. perspective-taking	Postmeasure	-0.14 [-0.29, 0.002]	-1.94	0.05	-0.15
		2 wk	-0.26 [-0.41, -0.12]	-3.59	<0.001	-0.26
		2 mo	-0.21 [-0.36, -0.06]	-2.72	0.01	-0.22
		6 mo	-0.25 [-0.47, -0.03]	-2.24	0.03	-0.25
Negative attitudes	Malleability vs. perspective-taking	Postmeasure	0.03 [-0.07, 0.13]	0.67	0.50	0.04
		2 wk	0.04 [-0.06, 0.13]	0.70	0.48	0.04
		2 mo	0.06 [0.05, 0.16]	1.01	0.31	0.07
		6 mo	0.10 [-0.07, 0.27]	1.20	0.23	0.11
Hope	Malleability vs. perspective-taking	Postmeasure	-0.22 [-0.39, -0.04]	-2.40	0.02	-0.19
		2 wk	-0.13 [-0.31, 0.05]	-1.43	0.15	-0.11
		2 mo	-0.27 [-0.46, -0.08]	-2.77	0.01	-0.24
		6 mo	-0.17 [-0.41 0.06]	-1.43	0.15	-0.15

Comparison between the malleability and the perspective-taking conditions. These comparisons were made by centering the longitudinal model on different time points. We present the adjusted, unstandardized coefficient for each time point, confidence intervals, z scores, P values, and Cohen's d for each comparison.

condition [$b = -0.004$ (95% CI, $-0.011, 0.004$); $z = -1.00$; $P = 0.31$; $d = -0.09$].

On the decision-making tasks, levels of resources allocated to the Palestinians in the dictator game did not differ between the perspective-taking and malleability conditions at any of the three points assessed (SI Appendix). Neither the initial difference at the 2-wk follow-up nor the 2-wk-to-6-mo follow-up slope was significantly different between conditions ($z_s < 1.30$; $P_s > 0.19$). However, although not specifically predicted, there was a significant difference between the two conditions in the trust game at the 6-mo follow-up, such that participants in the malleability condition were willing to allocate more resources to a Palestinian confederate compared with participants in the perspective-taking condition [$b = -0.56$ (95% CI, $-1.01, -0.10$); SE = 0.22; $t(295) = -2.44$; $P = 0.01$; $d = -0.34$] (Fig. 2).

Overall, we found that the malleability condition was as good as, and in a few cases, such as participants' hope at two points and their performance in the trust game, better than the enhanced perspective-taking condition (see SI Appendix for a full analysis of all outcomes relevant to this claim). Finally, we assessed mediation, using the same mediation model that was used to assess post-workshop malleability mindset as a mediator of 6-mo outcomes in the malleability and the coping conditions. Results suggested that for the outcomes in which significant differences were found between the malleability condition and the perspective-taking condition, malleability mindset was a mediator for these differences. We report the full model in the SI Appendix.

Discussion

The current research had three objectives. First, recognizing the importance of replicable findings, particularly when it comes to findings of relevance to key societal issues, we sought to replicate our previous laboratory research in a more "real-world" context. Our findings suggest that changing people's perceptions of group malleability, without focusing on the specific conflict, led to lower negative attitudes toward Palestinians and higher hope for a mutual future compared with the control coping condition.

Our second objective was to test whether the effects of the intervention would endure during a 6-mo period in the face of continued conflict. Results indicated, first, that differences between the group malleability and coping condition in participants' attitudes toward Palestinians were evident 6 mo after the interventions. Next, we did not find differences in participants' support for a two-state solution, perhaps for reasons discussed earlier. However, our updated concession measure did indicate a significant difference between the malleability group and the control group in willingness to make concessions, such as "Israel should show willingness to

acknowledge the Palestinians as a nation," and "Israel should remove all pre-conditions for negotiations with the Palestinians." Furthermore, significant differences were found on the decision-making tasks during the 6-mo follow-up: those in the group malleability condition were willing to give more resources to the Palestinians in a dictator game, and were more willing to trust a Palestinian confederate in a trust game. These findings are encouraging, especially considering the fact that the intervening period was one with particularly high levels of intergroup violence.

Our third objective was to test the efficacy of our intervention against a prominent intervention for conflict resolution. We found that our group malleability intervention led to greater hope at two of the four points and greater trust at the 6-mo assessment compared with the perspective-taking intervention. In other outcomes, our group malleability intervention was at least as good as the enhanced perspective-taking intervention, and both were found to be superior to the coping control condition (SI Appendix).

The uniqueness of both the group malleability and perspective-taking interventions, compared with most past interventions, stems from the fact that they were not focused on the local conflict. Rather, they conveyed a general message that then was presumably applied by participants to their local situation. Telling participants directly that their adversary can improve or that they should take the perspective of their adversary is likely to spark resistance, which we hopefully minimized. This finding is encouraging because it also indicates that our workshops could be used in a variety of intergroup conflicts with fewer context-specific modifications than might typically be necessary. The long-term effects of these workshops during this extremely challenging period in the Israeli-Palestinian conflict suggest that these general messages can potentially withstand continued intergroup aggression, aggression that might lead to the rejection of a more specific or targeted message.

Our group malleability intervention has potentially wide-reaching implications for a variety of cases in which intergroup relationships are hindered by negative intergroup attitudes and lack of hope. For example, our workshop could potentially be used to train professionals who are vulnerable to developing intergroup bias in their daily lives. Police officers, nurses and doctors, judges, and many other professionals whose work is highly affected by their relations to negatively stereotyped groups could potentially benefit from our workshops. The general message of the workshop has the advantage, discussed here, that it does not raise the resistance these professionals may have to (or the offense they might take at) a direct message about changing their attitudes or reducing their prejudice (see ref. 17 for an example of a potential use).

Together with these potential contributions, several limitations of the present research bear mentioning, along with associated future

research directions. First, our analyses focused on attitudes and desired behavior toward Palestinians, without examining the influence of our interventions on real interactions between the two groups. It would be interesting to extend our studies to real encounters between Israelis and Palestinians, both examining everyday interactions and processes of intergroup negotiations in official gatherings (for an initial attempt, see ref. 4). These interactions could occur via organized means (e.g., through organized contact encounters or mutual projects), but could also be examined in more spontaneous interactions in schools and workplaces. Exploring the influence of group malleability interventions on real interactions opens a variety of interesting directions for investigation. For example, a positive encounter between groups after a malleability intervention may even further strengthen perceptions of possible outgroup change. Future work should explore these potential cycles.

Second, the current project examined the effect of our intervention on Jewish-Israeli participants, who traditionally represent the more powerful side in the Israeli–Palestinian conflict. Previous work has suggested that changing perceptions of group malleability was effective for Palestinian participants as well. However, further work should explore these effects in a more naturalistic setting.

Third, the current study did not examine the potential for spontaneous communication of the interventions to the immediate social environment surrounding those who were exposed to the interventions. Future work should examine whether the effects of our interventions spread and whether certain steps could be taken to increase this transmission to nonparticipants.

In conclusion, the current study provides evidence for the possibility of reducing some of the negative effects of intractable conflicts by changing perceptions of group malleability within the context of the Israeli–Palestinian conflict. We hope that the current study opens the door for many possible extensions of this work and to the possibility of more successful peace processes in the future.

Materials and Methods

Participants. Recruitment to the study was conducted by paid recruiters. Recruiters received 1,000 NIS (~\$250) for recruiting 30 participants for the study. To maintain diversity, each recruiter was allowed to recruit only one batch of 30 participants. Both the participants and the recruiters were told that they were taking part in pilot work that was designed to examine and improve the effectiveness of leadership workshops. We used a large and diverse sample of 510 participants. Two participants were removed for not completing necessary measures, resulting in 508 participants (191 males and 317 females; age: $M = 28.81$ y, $SD = 8.69$ y). All participants completed preworkshop and postworkshop questionnaires. Ninety-seven percent of participants completed the 2-wk follow-up ($n = 495$), 80% completed the 2-mo follow-up ($n = 410$), and 59% of participants completed the 6-mo follow-up ($n = 300$). No significant differences were found in participants' age, sex, or political ideology, both in the initial sample and during the 6-mo follow-up. Participants received 350 NIS (\$90) in coupons (which could be used at a variety of businesses including food, clothing and sports stores) in exchange for participation in the workshop and for filling out the first four measures (pre, post, 1-wk, and 2-wk follow-ups). Those who agreed to

participate in the 2-mo and 6-mo follow-ups received an additional 50 NIS (\$13) for each one.

Procedure. Our field interventions were conducted during 12 consecutive Fridays, each Friday in a different location in Israel (North, Center, and South). Each week our workshops included 40–45 ($M = 42.33$, $SD = 6.46$) participants who were randomly divided into three conditions (malleability, perspective-taking, and coping). We used three full-time, trained instructors and one substitute instructor for all the workshops. Instructors were randomly assigned to a different condition every week. The instructors were blind to the goals and hypotheses of the study. We conducted an intensive instructor training before the workshops.

Each workshop was 5 h long and included a preworkshop questionnaire (30 min), general leadership content (similar to all conditions, 1.5 h), and the relevant content of each conditions (3 h). The general leadership content section was identical in all three groups and was inspired by a Leadership Development Model created by the Harvard Kennedy School's Center for Public Leadership (Harvard Kennedy Center for Public Leadership, 2009). Participants learned about transformational leaders (18) and about how different leadership styles influence group performance. After the general leadership content, the workshop shifted to fit with each of the conditions (see full description of the workshop in the *SI Appendix*). The structure of the interventions was similar for all conditions in terms of schedule and type of activities. However, the main message of each intervention was different according to each condition.

Measures. Before the workshop, participants completed two preworkshop questionnaires. The first preworkshop questionnaire was similar to the post and follow-up questionnaires and was designed to establish a baseline for the analysis (see full description of the questionnaire in *SI Appendix*). Participants received this questionnaire 4 d before the workshops and were asked to complete it in 2 d. Those who did not complete the first preworkshop questionnaire were unable to participate in the workshop. The second preworkshop questionnaire was given to participants at the beginning of the workshops and included variables that can potentially moderate the influence of the interventions on the outcomes, such as participants' relationship to Israel and personality attributes.

After the workshops, participants filled out a postworkshop questionnaire that was similar to the preworkshop questionnaire completed at home. A week after the workshop, participants received a short poststudy reminder that was designed to refresh their memories about the general theme of the workshop. During the reminder, participants were asked to repeat the general theme of the workshop, as well as to provide a few examples from the past week in which they used the lessons they learned. Finally, participants filled out a biased questionnaire with condition-specific items such as "I am able to identify changes around me" for the malleability condition. Filling out these items, which received high ratings, guided participants to agree with the message of the workshops. Two weeks, 2 mo, and 6 mo after the workshop, participants received follow-up questionnaires. These questionnaires did not include refreshers of the workshop content. The content of the questionnaires was almost identical in each of these measures to the preworkshop measures, with a few additional measures during the 2-mo and 6-mo follow-ups. See *SI Appendix* for the complete timeline of the intervention.

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- Melander E, Pettersson T, Themner L (2016) Organized violence, 1989–2015. *J Peace Res* 53:727–742.
- Halperin E, Russell AG, Trzesniewski KH, Gross JJ, Dweck CS (2011) Promoting the Middle East peace process by changing beliefs about group malleability. *Science* 333:1767–1769.
- Halperin E, et al. (2012) Promoting intergroup contact by changing beliefs: Group malleability, intergroup anxiety, and contact motivation. *Emotion* 12:1192–1195.
- Goldenberg A, et al. (2017) Making intergroup contact more fruitful: Enhancing cooperation between Palestinian and Jewish-Israeli adolescents by fostering beliefs about group malleability. *Soc Psychol Personal Sci* 8:3–10.
- Galinsky AD, Moskowitz GB (2000) Perspective-taking: Decreasing stereotype expression, stereotype accessibility, and in-group favoritism. *J Pers Soc Psychol* 78:708–724.
- Bilali R, Vollhardt JR (2013) Priming effects of a reconciliation radio drama on historical perspective-taking in the aftermath of mass violence in Rwanda. *J Exp Soc Psychol* 49:144–151.
- Vorauer JD, Sasaki SJ (2009) Helpful only in the abstract? *Psychol Sci* 20:191–197.
- Zaki J, Cikara M (2015) Addressing empathic failures. *Curr Dir Psychol Sci* 24:471–476.
- Sassenrath C, Hodges SD, Pfattheicher S (2016) Its all about the self: When perspective taking backfires. *Curr Dir Psychol Sci* 25:405–410.
- Yeager DS, Trzesniewski KH, Dweck CS (2013) An implicit theories of personality intervention reduces adolescent aggression in response to victimization and exclusion. *Child Dev* 84:970–988.
- Wohl MJA, et al. (2015) Belief in the malleability of groups strengthens the tenuous link between a collective apology and intergroup forgiveness. *Pers Soc Psychol Bull* 41:714–725.
- Cohen-Chen S, Halperin E, Saguy T, van Zomeren M (2014) Beliefs about the malleability of immoral groups facilitate collective action. *Soc Psychol Personal Sci* 5:203–210.
- Hilal J (2007) *Where Now for Palestine? The Demise of the Two State Solution*, ed Hilal J (Zed Book, London).
- Bolton GE, Katok E, Zwick R (1998) Dictator game giving: Rules of fairness versus acts of kindness. *Int J Game Theory* 27:269–299.
- Berg J, Dickhaut J, McCabe K (1995) Trust, reciprocity, and social history. *Games Econ Behav* 10:122–142.
- Engle-Warnick J, Slonim RL (2004) The evolution of strategies in a repeated trust game. *J Econ Behav Organ* 55:553–573.
- Paluck EL (2009) Reducing intergroup prejudice and conflict using the media: A field experiment in Rwanda. *J Pers Soc Psychol* 96:574–587.
- Bass BM (1985) *Leadership and Performance Beyond Expectations* (Free Press, New York).