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## Developing ReApp: an emotion regulation mobile intervention for intergroup conflict

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### ABSTRACT

People living in areas of intractable conflicts experience extreme negative emotions which ultimately lead to support of aggressive policies. Emotion regulation and particularly cognitive reappraisal has been found to be effective in reducing negative emotional experiences and shifting policy preferences. Therefore, it is important to develop scalable, evidence-based interventions aimed at regulating negative emotions in such contexts. In this paper, we introduce ReApp – a mobile game, aimed at training people to regulate their emotions using cognitive reappraisal. We examine the game's effectiveness in reducing negative emotions and support for aggressive policies in the context of the Israeli-Palestinian conflict. Results indicate that people who played ReApp experienced lower levels of anger and disgust, and were less supportive of aggressive political policies targeted at the outgroup. We believe that games such as ReApp could potentially influence mass audiences and by that promote conflict resolution.

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Intergroup conflict; emotion regulation; cognitive reappraisal; persuasive gaming

Anyone who has been exposed to a violent conflict knows the negative feelings it involves. Feelings of anger, hatred and fear are frequently experienced by the people involved in the conflict, leading them to war and guiding their behaviours during wartime (Bar-Tal, 2000, 2013; Lindner, 2006; Maoz & Ellis, 2008; Maoz & McCauley, 2008, 2009; Staub, 2005). Another severe implication of these group level emotions is the fact that they motivate uncompromising positions which constitute one of the major barriers towards peace (Halperin, 2011). It is obvious that this endless cycle should be ceased. But how?

This question has led researchers in recent years to develop psychological interventions aimed at decreasing negative emotions in order to increase support for conciliatory policies, and decrease support of aggressive policies (for a review see: Gross et al., 2013; Halperin, 2014; Halperin & Pliskin, 2015). Although successful interventions have been advanced in recent years (see: Čehajić-Clancy et al., 2016), most

of them suffer from two main limitations: (1) they are typically difficult to scale up for mass dissemination; (2) participants in these interventions are motivated to participate because they are compensated for their participation (e.g. money or academic credits). Thus, even though some of these interventions have shown to be effective, in order to promote conflict resolution, these lab-tested interventions should be developed and scaled up so that they reach a massive target audience, that is not necessarily motivated to participate in a conflict resolution activity.

In this paper, we describe the development of *ReApp*, a mobile game aimed at training people in emotion regulation in a fun and engaging way. Specifically, the game trains people in employing an emotion regulation strategy called cognitive reappraisal. This strategy involves reinterpreting the situation in a manner that increases or decreases the emotional reaction to it (Gross, 1998). In what follows, we first review the relevant literature from both an emotion

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regulation perspective as well as a gaming perspective for developing ReApp. Next, we describe in brief the App's development process, and finally, we describe an empirical laboratory study that examined the game's effectiveness in the context of the Israeli-Palestinian conflict.

## Group-based emotion regulation

Individuals who live in societies engaged in intractable conflicts experience extreme negative group-based emotions on a daily basis (Bar-Tal, 2000, 2013; Halperin, 2011). Group based emotions are defined as emotions that are experienced as a result of an individual's identification with a certain group (Mackie et al., 2000; Smith, 1993; Smith & Mackie, 2008). In the context of intractable conflicts, group-based emotions have been found to contribute to both the escalation (see for example: Cheung-Blunden & Blunden, 2008; Lerner et al., 2003; Skitka et al., 2006), as well as the de-escalation of conflicts (see for example: Čehajic et al., 2008; Cohen-Chen et al., 2014; Moeschberger et al., 2005; Tam et al., 2007). It is no wonder, therefore, that in recent years scholarly attempts to identify ways to decrease the magnitude and the impact of destructive group-based emotions have received growing scholarly attention.

Emotion regulation refers to processes by which individuals influence which emotions they have, when they have them and how they experience and express these emotions. Importantly, when regulating their emotions, people may increase, maintain, or decrease positive and negative emotions (Gross, 2015). One particularly important form of emotion regulation is *cognitive reappraisal*, (hereafter simply reappraisal) which involves changing the meaning of a situation to change the emotional response to it (Gross, 2008). Reappraisal has largely been studied in comparison to expressive suppression, another emotion regulation strategy that involved conscious inhibition of expressive behaviour (e.g. Gross, 1998). While both strategies have been studied in the context of group-based emotions (e.g. Gross et al., 2013; Halperin et al., 2013; Westerlund et al., 2019), reappraisal, but not suppression, was found to be particularly effective for decreasing negative group-based emotions and increasing positive group-based emotions (Halperin et al., 2014; Halperin et al., 2013). For example, Halperin and Gross (2011) found that Israelis who tended to use reappraisal more frequently during a war between Israelis and Palestinians, maintained more hope towards the

future relations with Palestinians, and in turn were more supportive of providing humanitarian aid to Palestinians (Halperin & Gross, 2011).

In a follow up project, reappraisal was found to play a causal role in the regulation of group-based emotions. In two studies participants were instructed to regulate their emotions using reappraisal. While in both control and reappraisal conditions participants were asked to read an anger-inducing text, in the reappraisal condition, they were asked to adopt a neutral perspective while reading it. Across both studies, participants who were instructed to reappraise, experienced lower levels of negative emotions and higher levels of positive emotions toward the Palestinians (Study 1) and toward one's least liked group (Study 2). Reappraisal participants were also less supportive of intolerant policies toward these groups (Halperin et al., 2014). After establishing the positive role reappraisal may play in intergroup contexts, we wanted to examine whether we could train people to use reappraisal in their daily lives. Subsequently, we wanted to see if reappraisal training could lead to effective emotion regulation in response to conflict related events as they unfold, and whether these effects would endure over time. To do so, we taught and trained Jewish-Israeli participants to use reappraisal one week prior to a dramatic political event (the Palestinian United Nations bid in September 2011). We then measured participants' emotional and political reactions a week, as well as five months after training. We found that participants trained to reappraise were more supportive of conciliatory policies and less supportive of aggressive policies towards Palestinians. We also found that these effects were mediated by changes in negative and positive emotional experiences (Halperin et al., 2013, Study 2). These studies provide supportive evidence that teaching people to reappraise can decrease their negative intergroup emotional experiences and as a result effect their support for conciliatory as well as aggressive policies toward the adversary.

However, while these studies show promising results, they have two important limitations. First, such studies may be particularly hard to scale up in order to reach a massive amount of people. Specifically, providing emotion regulation instructions may not be effective for long term enduring effects, and training people on an individual basis to regulate their emotions is both costly and time consuming. Second, these studies were conducted among participants who were motivated to both participate (as they were compensated for their participation), and down

regulate their emotions (as they were explicitly instructed to down-regulate). Indeed, reappraisal training can be effective for those who are motivated to engage in emotion regulation in the first place (Tamir et al., 2019). However, as scholars have pointed out (Porat et al., 2016, 2020; 2018), in conflict situations people may not be motivated to regulate their emotions at all, and at times they may be motivated to up-regulate, rather than down-regulate negative intergroup emotions. Therefore, for effective employment of emotion regulation outside of the laboratory one needs to be motivated to (1) learn how to reappraise; (2) apply the strategy in a manner that decreases rather than increases negative emotion; and (3) apply reappraisal in her daily life. Hence, for real-world application, it is important to develop an intervention that can be scaled-up to reach masses, and to provide an alternative motivation to engage in the intervention. Games may be a good means to do so.

### Interventions – from theory to practice

Gamification is the process by which game mechanics are added to non-game processes, programmes and platforms, to create incentives and engaging experiences. Put simply, it's about making processes more fun within a set of limitations (Bogost, 2016). By adding game elements to non-game activities and platforms, the use of gamification has the ability to create a participation-and-reward system that shapes user behaviour and increase her motivation to continue engaging with the activity (Swan, 2012). Mobile phone game apps in particular can be easily distributed to a mass audience as they are common (e.g. with over 5 billion unique mobile subscribers globally "GSMA Intelligence," n.d.), and they are frequently used making them familiar and easy to use (for a review see: Konrath, 2015). Importantly, scholars have repeatedly found that using mobile phones for experimental tasks leads to more engagement (for example see: Matthews et al., 2008; Stone et al., 2002). Thus, training people how to regulate their emotions using a mobile game has the potential of being easily disseminated to a mass audience, and at the same time be engaging.

One genre of games that is particularly relevant for this project is coined persuasive gaming. These are games intended to influence players' thoughts and actions in real life by conveying ideas, values and sometimes by means of persuasion. By that,

persuasive games may fulfil a purpose beyond the self-contained aim of the game (Bogost, 2016; Mitgutsch & Alvarado, 2012; Sicart, 2018). Importantly, persuasive games can be used in the education system, workplaces, and one's home to enhance learning. Although empirical evidence about the impact of these games are rather limited (Giessen, 2015; Mitgutsch & Alvarado, 2012), the trend to design them is rapidly growing (McGonigal, 2015).

Previous scholarly work has utilised gamification in both conflict resolution and emotion regulation domains. However, a comprehensive review of these games is beyond the scope of the current paper. With regards to conflict resolution, two games that were examined within the context of the Israeli-Palestinian conflict in recent years are *PeaceMaker* (Impact Games 2007) and *Global Conflict* (Serious Games Interactive, 2008). Previous work suggests that playing these games had positive effects on the ability to take the other's perspective (Gonzalez & Czlonka, 2010), led to increased knowledge about the conflict (Cuhadar & Kampf, 2014; Kampf & Cuhadar, 2015), and improved intergroup attitudes (Alhabash & Wise, 2012; Kampf, 2016; Kampf & Cuhadar, 2015). With regards to emotion regulation, while a number of emotion regulation mobile apps were developed in recent years (see for example: *MobiMood* and *Panoply*), emotion regulation games are scarce. One exception is *Good Blocks*, a game that was recently developed by Guy Doron and Gur Ilany. The game is based on CBT (cognitive behavior therapy) principles, and is designed to enhance psychological well-being, improve self-esteem, body image, social anxiety and mood. It is based on the mechanism of swiping positive emotions or thoughts towards you (downwards), and negative ones away from you (upwards) ("*Good Blocks* | Samuramu," n.d.). Another game recently developed by Sara Konrath is *RAKI* (random app of kindness), a mobile game designed to increase empathy among teenagers. *RAKI* consists of nine mini-games that train participants various strategies related to increasing empathy (e.g. emotion recognition, control and management of cognitive processes, perspective taking). A study conducted among 106 preteens and teens revealed that after two months, children who played with *RAKI* were more likely to feel compassion and help someone in distress ("*Random App of Kindness game Random App of Kindness*," n.d.).

In sum, it appears that there has not been an attempt to create a game that specifically attempts

to decrease negative group-based emotional experiences in the context of long-term intractable conflict. Thus, the goal of the current project was to develop a game that will teach its players to regulate their emotions using reappraisal in a manner that can also be applied to group-based emotions that arise in response to conflict related events.

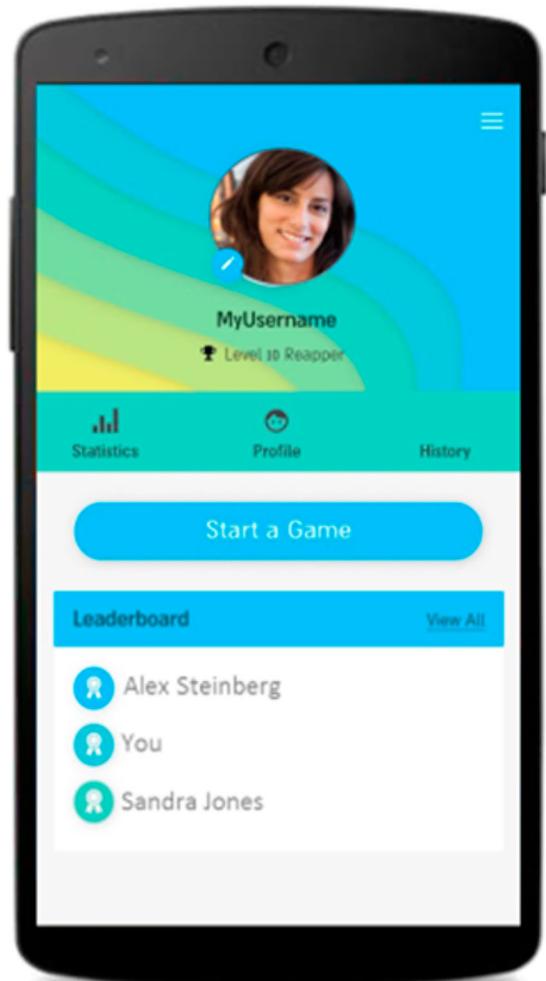
## Introducing ReApp

The development of ReApp was done in an interdisciplinary collaboration between social psychologists, digital media experts, and game designers all coming from different academic institutes in Israel. The development phase took us approximately eleven months, and consisted of four user studies (see: Erel, 2017, as well as the supplementary materials section for more information on the development phase). We were opting to develop a mobile, multi-player game that would train people to regulate their emotions using cognitive reappraisal.

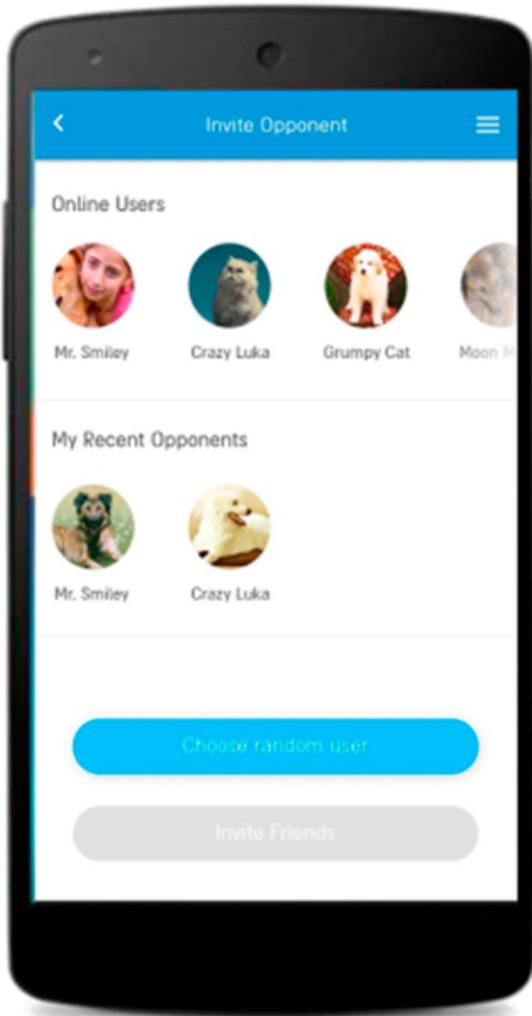
As a first step in the development process, we conducted a user study to ensure that people could successfully implement reappraisal when provided with written instructions rather than undergoing face to face training. Following this study, over the course of a few months, we brainstormed different genres of games that could serve our purpose of teaching reappraisal (e.g. action-adventure, platform games, etc.). During this phase, we formulated the basic structure and mechanisms of the game and created a paper prototype version. In the second user study we wanted to ensure that participants understood the rules of the game and found it engaging. In addition, we wanted to test a number of the games' elements such as time constraints and reappraisal tools. Following this user study, we created the digital prototype of the game that included our finalised reappraisal tools. The third user study examined this prototype version, focusing on the clarity of instructions, the extent to which participants successfully employed reappraisal, as well as the extent to which they found the game fun and engaging. After obtaining promising results, we sought to create a final digital prototype version, and conducted a fourth user study to determine the emotion eliciting stimuli that would be included in the game.

In its current version, ReApp is a turn-based game for two-player, in which each player attempts to regulate her opponents' emotions using cognitive reappraisal. Our underlying assumption was that

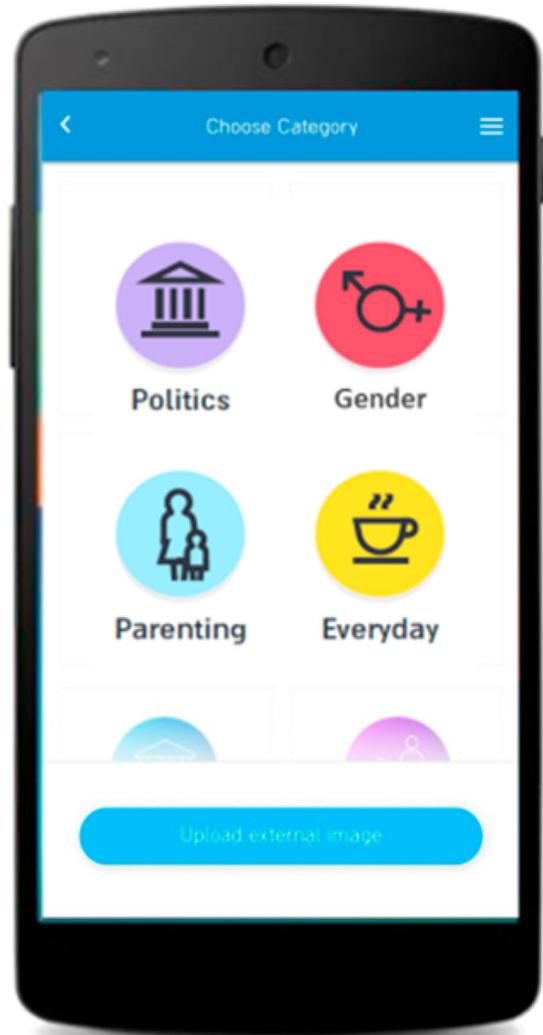
reappraising for another person could improve one's own reappraisal skills. The game's landing page (Figure 1) depicts the player's history including her scoreboard and statistics. On this page, the player can also access a tutorial (see Appendix 1) that briefly explains what reappraisal is. To start a new game, the player is asked to either invite an online friend to play with or is assigned a random player (Figure 2). The game begins when the player who initiated the game chooses an image category out of four possible categories (parenting, gender, general, and politics) (Figure 3), or uploads an image from her phone.<sup>1</sup> Both players are then presented with the same image and have 15 seconds to indicate their emotional response from five possible emotions



**Figure 1.** Start a new game. You can also watch your score board or statistics.



**Figure 2.** Invite an opponent, from a list of online users or randomly.



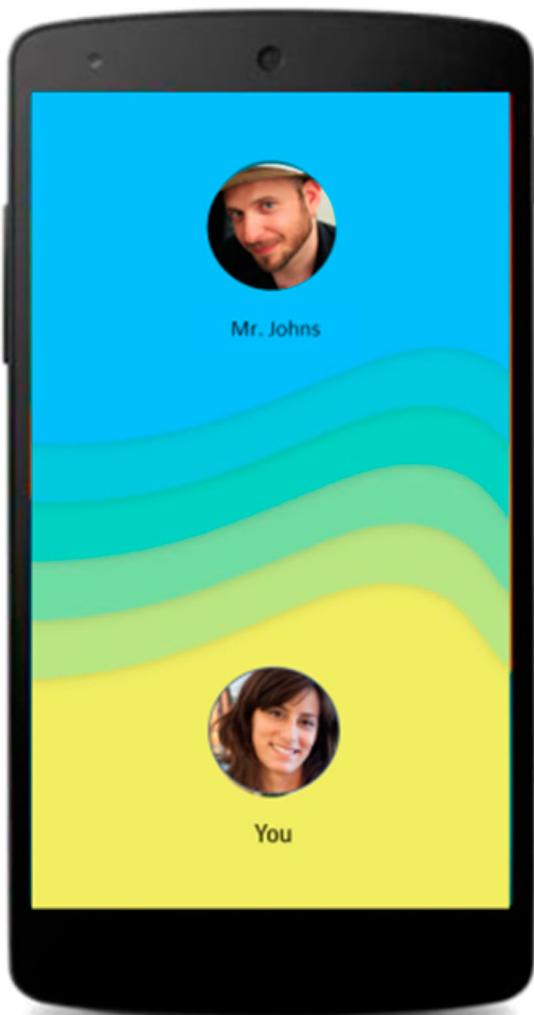
**Figure 3.** Choose a category.

(i.e. anger, sadness, disgust, fear and joy), and to rank the emotion's intensity on a scale of 1 (not at all) to 6 (extremely) (Figures 4–6). Then, both players receive their opponents emotional ranking (i.e. the emotion the image elicited and its intensity) (Figure 7) and are challenged to change it for the better (Figure 8). Each player has 75 seconds to modify the image using two reappraisal tools: inserting a title and/or a speech bubble (titles can consist of up to 140 characters, while speech bubbles can consist of up to 80 characters) (Figure 6).<sup>2</sup> Both of these tools allow players to easily alter the meaning of the image and by that reappraise it. Following this, the players receive each other's "reappraised image" (Figure 9) and are asked to report on their emotional experience

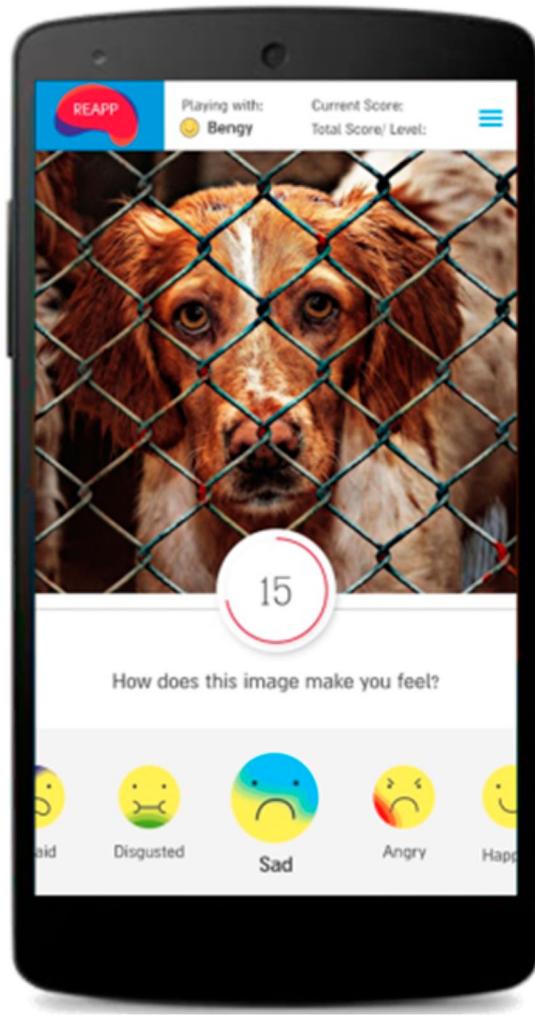
(i.e. emotion type and intensity) again. Their scores are determined according to their relative success in helping their partner regulate her emotions. The current version of ReApp is hosted on Google play and Apple Store and is available only for registered test users to download on their own mobile phones.

### The present study

The goal of the current study was twofold. First, we wanted to test whether ReApp was effective in training its players to reappraise, and as a result successfully regulate their group-based negative emotions. Second, we wanted to test whether successful emotion regulation of group-based emotions,



**Figure 4.** Wait for the match to start.



**Figure 5.** Choose the emotion the image make you feel.

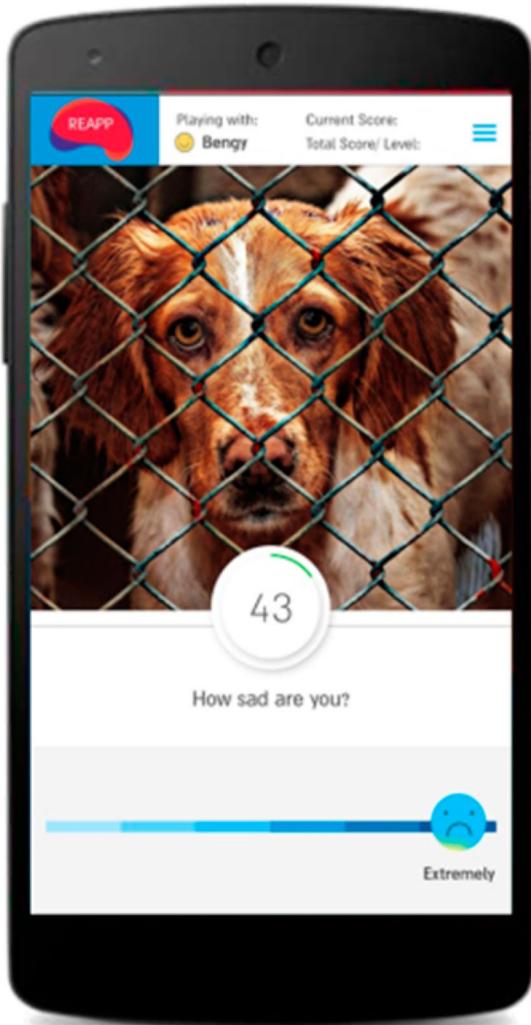
through effective use of ReApp, also altered political attitudes. To address these two goals, we focused on three group-based emotions: anger, fear and disgust. We hypothesised that participants who played ReApp will be more successful in down regulating these emotions, and that decreased levels of anger, fear and disgust would lead to less support of aggressive policies related to the political conflict.

## Method

### Participants

Seventy Jewish-Israeli participants (41 females, 29 males,  $M_{age} = 29.82$ ,  $SD = 9.59$ ) were recruited to

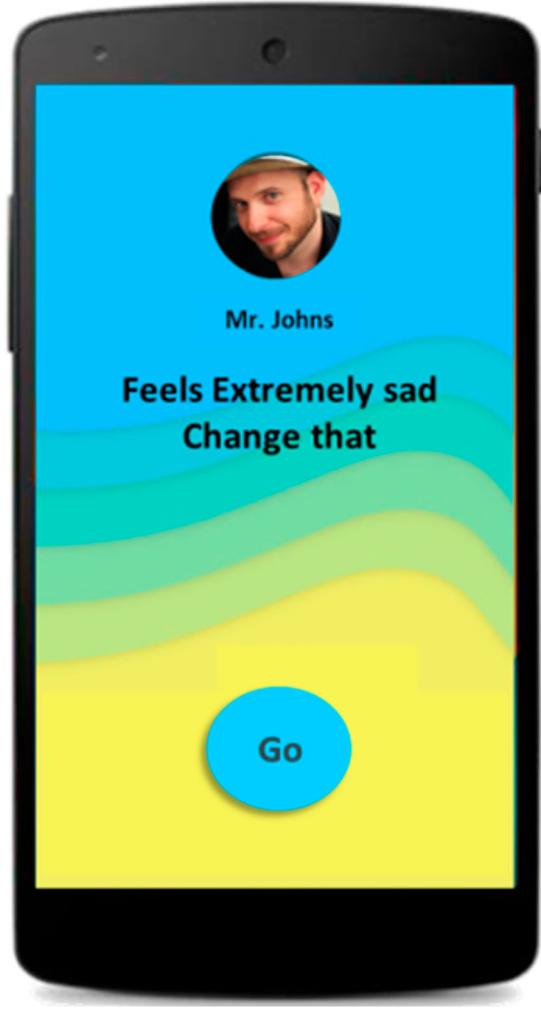
participate in the study. While some participants ( $n = 20$ ) received academic credits in return for their participation, others were recruited via snow-ball sampling on a voluntary basis ( $n = 50$ ). We opted for a balanced sample in terms of political orientation, therefore we invited more liberals to participate when using snow-ball sampling. Our sample consisted of 28 participants who self-identified as rightists (40%), 14 participants who self-identified as centre (20%), and 28 participants who self-identified as leftists (40%). The sample was largely secular, with 71% of participants identifying as such, 20.3% identifying as secular-traditional, 5.8% identifying as traditional, and 2.9% identifying as religious.



**Figure 6.** Choose your level of emotion.

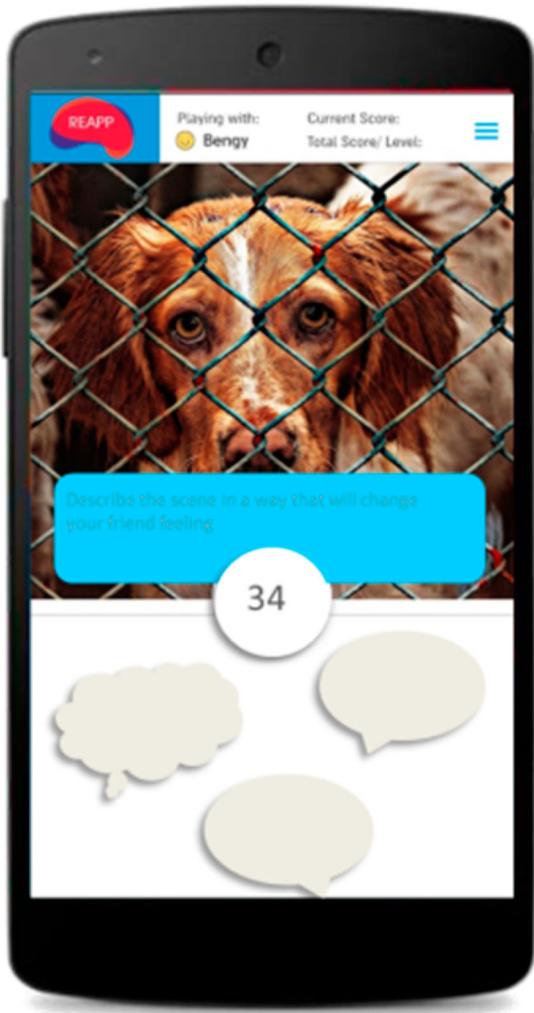
### *Procedure*

Participants arrived at the lab in pairs, and were seated in separate rooms, where they were asked to sign a consent form. Then, they were asked to fill out a short questionnaire measuring their tendency to use reappraisal and suppression in their daily lives. Upon completing the questionnaire, participants were seated together in a new room and were randomly assigned to either an experimental or a control condition. Participants in the experimental condition played ReApp, while participants in the control condition played “Connect Four.”<sup>3</sup> We chose this game for three reasons. First, like ReApp, this game was also a two-player game that is played on a mobile device. Second, each round was similar in

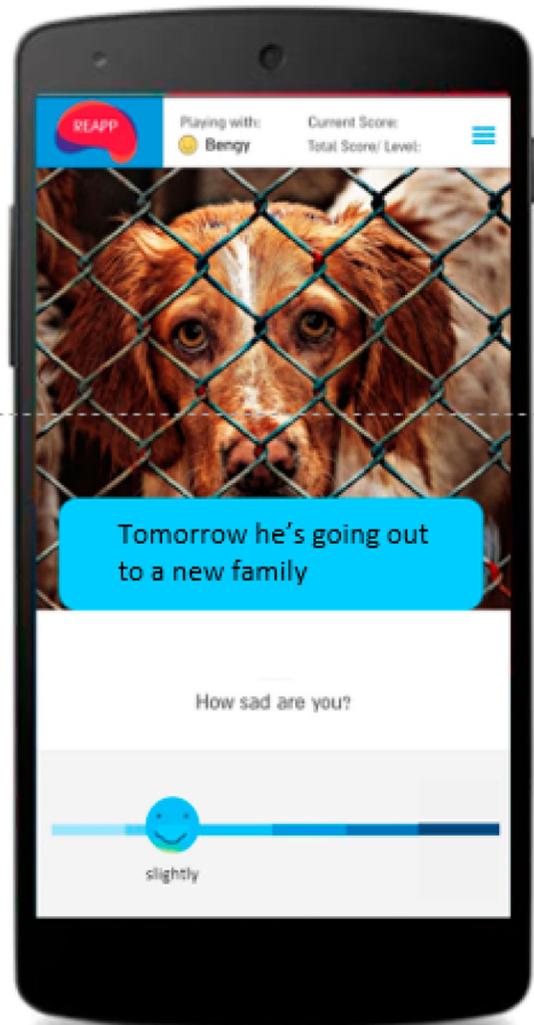


**Figure 7.** Each player receives his opponent’s level of emotion; his goal is to change it.

duration to the length of a round in ReApp. Third, this game was neutral in the sense that it did not teach any cognitive skill that could alter our dependent variables. Participants in both conditions were presented with their games’ instructions, and the experimenter ensured that they understood the rules of the game. Specifically, in the reappraisal condition, participants were told that reappraisal is an emotion regulation strategy for up- and down-regulating emotions and were provided examples on how they could employ the strategy in both directions. In addition, the experimenter remained present for a practice round, during which participants were allowed to ask questions if something was unclear. Following this, the experimenter left



**Figure 8.** Edit the image using the reappraisal tools: Add a title, or drag a speech bubble.



**Figure 9.** After exchanging images, you'll receive the reappraised image, and decide your current level of emotion.

the room, leaving participants to play for five additional rounds (approximately 15 minutes).

In the next stage, participants were separated again and were asked to fill out additional survey questionnaires. In the first part of this questionnaire, participants were told that they would be asked to view a number of images (see all images in Appendix 2). Participants in the experimental condition were told that the emotion regulation strategy they just learned and practiced could also be used to regulate one's own emotions. They were asked to use this strategy when looking at these images. Participants in the control condition were told to respond to the images naturally, that is, no explicit instructions for emotion regulation were

given. Participants were then presented with five conflict inducing images which served as our stimuli. Following each image, participants were asked to rate the extent to which they felt five emotions. They were also asked to share their thoughts regarding the image. Finally, they were asked about their support of a related political policy. Then, we measured the extent to which participants reported trying to regulate their emotions and the extent to which they used reappraisal or suppression when viewing the images. Finally, we asked participants to report on their familiarity with the opponent, as well as a number of socio-demographic factors.<sup>4</sup> Overall, the experiment lasted approximately 45 minutes.

## Measures

### Emotion regulation questionnaire (ERQ)

Participants were asked to rate ten items on a scale of 1 (strongly disagree) to 5 (strongly agree). The ERQ (Gross & John, 2003) consists of two scales assessing individual differences in the habitual use of cognitive reappraisal (six items) and expressive suppression (four items) ( $\alpha$ 's = .72, .78, for reappraisal and suppression respectively).

### Emotional experience

For each of the five conflict inducing images, participants were asked to rate the extent to which they experienced anger, fear and disgust, as well as joy and sadness which served as distractor items. Emotions were ranked on a 1 (not at all) through 6 (to a very high degree) scale. We averaged across the five images for each emotion separately ( $\alpha$ 's = .78, .87, .86, .84, .81, for anger, joy, fear, disgust and sadness respectively).

### Support for aggressive policies

Participants were asked to rate the extent to which they support or oppose a political statement related to the image. Sample item: "As long as Hamas continues to fire rockets, Israel has the right to prevent the flow of electricity to the Gaza Strip". Items were ranked on a scale ranging from 1 (not at all) to 6 (to a very high degree). We averaged across all statements to create one indicator ( $\alpha$  = .75).

### Emotion regulation attempts

Participants were asked to rate three items measuring the extent to which they tried to regulate their emotions when viewing the images. Sample item: "to what extent (if any) did you try to regulate your emotions when looking at the images". Items were ranked on a scale ranging from 1 (not at all) to 6 (to a very high degree) ( $\alpha$  = .69).

### Emotion regulation strategy

Participants were also asked to rank six items measuring the extent to which they employed reappraisal (four items) or suppression (two items) when viewing the images. Sample item for reappraisal: "when I was viewing the images, I changed their meaning", sample item for suppression: "when I was viewing the images, I thought about something else". Items were ranked on a scale ranging from 1 (not at

all) to 6 (to a very high degree) ( $\alpha$ 's = .84, .48 for reappraisal and suppression respectively).

### Familiarity with opponent

Participants reported on the extent of familiarity with their opponent on a 1 (not familiar at all) to 5 (highly familiar) scale.

### Opponents' gender

We computed a dummy variable indicating whether participants were both from the same gender (0 = same gender 1 = different gender).

### Socio-demographic measures

Participants indicated their age, gender, political orientation, religion, and levels of religiosity at the end of the experiment.

## Results

### Preliminary analyses

We first wanted to ensure that our conditions were similar on a number of important factors pertaining to participants' characteristics (i.e. gender, age, political orientation, habituation of reappraisal and suppression) and their opponents in the game (i.e. opponent's gender, and familiarity with the opponent). We conducted two chi-square tests to determine whether there were differences across conditions with respects to participants' gender, and with respect to the opponent's gender, and found no differences on both parameters ( $\chi^2(1) = 2.88, p = .08; \chi^2(1) = .95, p = .32$  for gender and opponent's gender respectively). We conducted *t*-tests to determine whether there were differences across conditions with respect to participants' age, political orientation, reappraisal and suppression habituation, and opponent familiarity. We found no differences with respect to age and political orientation ( $t(67) = -1.53, p = .13, t(68) = -.70, p = .48$ , for age and political orientation respectively). However, we did find differences with respect to habituation of reappraisal, suppression and participants' familiarity with the opponent. Specifically, we found that participants in the experimental conditions ( $M = 2.91, SD = .53$ ) reported lower levels of reappraisal habituation than participants in the control condition ( $M = 3.72, SD = .59, t(68) = 5.97, p < .001$ ). Participants in the experimental condition ( $M = 3.35, SD = .71$ ) also reported of higher levels of suppression habituation than participants in the control condition ( $M = 2.26, SD = .77,$

$t(68) = -6.08, p < .001$ ). These differences indicate that participants in the experimental condition employed reappraisal strategies less frequently and suppression strategies more frequently, providing a more rigorous test of our hypotheses. Moreover, we found that participants in the experimental condition were more familiar with their opponent ( $M = 3.94, SD = 1.23$ ) than participants in the control condition ( $M = 2.09, SD = 1.12, t(68) = -6.58, p < .001$ ). Thus, we controlled for these three factors in all of our subsequent analyses.

### Manipulation checks

Next, we wanted to test whether participants in the experimental condition reported regulating their emotions to a greater extent than participants in the control condition when they viewed the conflict inducing images. We conducted a regression analysis while controlling for reappraisal and suppression habituation as well as familiarity with the opponent and found significant differences. Specifically, we found that participants in the experimental condition ( $M = 4.62, SD = 1.04$ ) reported attempting to regulate their emotions to a greater extent when viewing the conflict inducing images than participants in the control condition ( $M = 2.79, SD = 1.17, \beta = .62, p < .001$ ).

We also expected participants in the experimental condition to report using reappraisal more frequently when viewing the conflict inducing images compared with participants in the control condition. To demonstrate that our effect was specific to the use of reappraisal, we also examined whether participants reported using suppression more frequently when viewing the images. However, we did not expect to find such differences as participants were not trained or instructed to use this strategy. To test this, we conducted two regression analyses while controlling for reappraisal and suppression habituation as well as familiarity with the opponent. We found that participants in the experimental condition ( $M = 4.41, SD = 1.22$ ) reported employing reappraisal to a greater extent than participants in the control condition ( $M = 2.43, SD = 1.15, \beta = .74, p < .001$ ). We did not find differences with regards to suppression (experimental:  $M = 2.31, SD = 1.17$ ; control:  $M = 1.93, SD = 1.21; \beta = .12, p = .52$ ). This finding partially rules out concerns regarding demand characteristics, because if participants understood that they were expected to simply decrease negative emotions, we would expect them to report using any strategy, including suppression.

Thus, if this were the case, we would expect to find differences with respect to reported use of suppression as well.

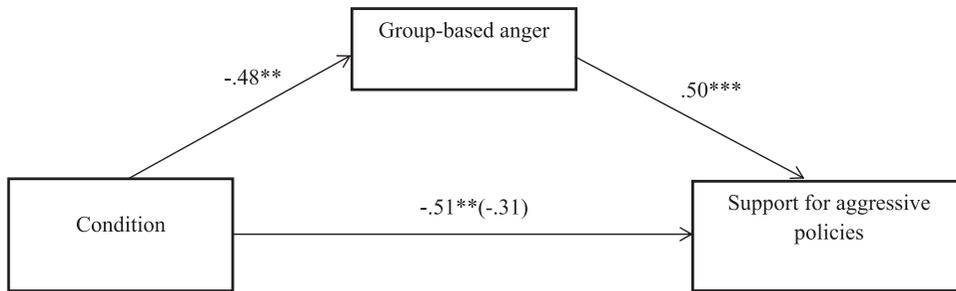
### Main effects

To test whether participants in the experimental condition experienced lower levels of anger, fear and disgust compared to participants in the control condition, we conducted three regression analyses. We entered the dummy condition variable as the predictor of the relevant emotion scale (i.e. anger, fear, or disgust), and we entered reappraisal and suppression habituation, as well as familiarity with opponent, as control variables. We found significant differences for anger ( $\beta = -.48, p < .01$ ) and disgust ( $\beta = -.43, p < .05$ ), such that participants in the experimental condition ( $M = 3.85, SD = 1.11, M = 2.73, SD = 1.20$  for anger and disgust respectively) felt significantly less anger and disgust than participants in the control condition ( $M = 4.93, SD = .96, M = 4.02, SD = 1.41$  for anger and disgust respectively). Surprisingly, we did not find differences between the experimental condition ( $M = 2.73, SD = 1.23$ ) and the control condition ( $M = 3.08, SD = 1.34$ ) for experienced fear ( $\beta = .09, p = .63$ ).<sup>5</sup>

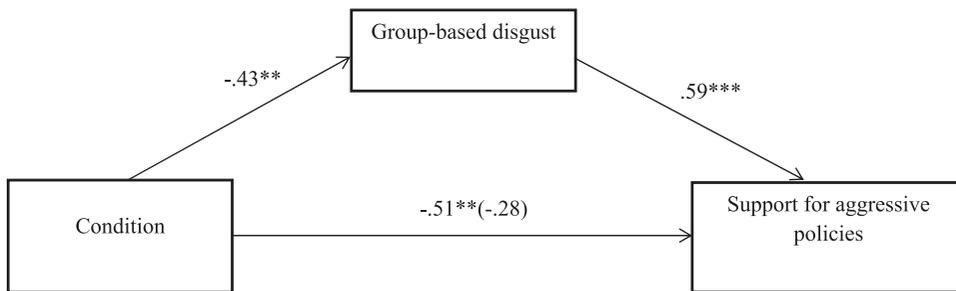
Next, we wanted to test whether there were significant differences across conditions in support for aggressive policies. To test this, we conducted a similar regression analysis, this time with support for aggressive policies as the outcome variable. We found that participants in the experimental condition ( $M = 3.10, SD = .79$ ) were significantly less supportive of aggressive policies towards the Palestinians than participants in the control condition ( $M = 3.87, SD = 1.16, \beta = -.51, p < .01$ ). These suggest that participants who played ReApp reported experiencing lower levels of anger and disgust when evaluating a conflict inducing image and showed less support of aggressive actions against Palestinians. The decrease found with respect to support for aggressive policies further alleviates concerns regarding demand characteristics, because if participants understood that they were expected to simply decrease negative emotional experiences, it shouldn't have affected their support for aggressive policies.

### Mediation analyses

To test whether experienced emotion (i.e. anger or disgust) mediated the relations between condition and support for aggressive policies, we employed Baron and Kenny's (1986) regression procedure. As shown in Figures 10 and 11, we found evidence for



**Figure 10.** Condition (coded: 0 = control, 1 = experimental) and support for aggressive policies, as mediated by group-based anger, while controlling for reappraisal and suppression inhibition and familiarity of opponent.



**Figure 11.** Condition (coded: 0 = control, 1 = experimental) and support for aggressive policies, as mediated by group-based disgust, while controlling for reappraisal and suppression inhibition and familiarity of opponent.

mediation of both anger and disgust, which was confirmed when using the procedure of Hayes' (2013) PROCESS bootstrapping command (Model 4; 5,000 iterations). The total effect of the manipulation on support for aggressive policies ( $b = -1.09$ ,  $SE = .36$ ,  $t = -2.96$ ,  $p < .01$ ; 95% CI[-1.82, -.35]) was reduced when anger or disgust were entered in the model ( $b = -.65$ ,  $SE = .35$ ,  $t = -1.82$ ,  $p = .07$ ; 95% CI[-1.36, .06];  $b = -.59$ ,  $SE = .33$ ,  $t = -1.80$ ,  $p = .07$ ; 95% CI[-1.26, .06], for anger and disgust respectively). The indirect effect was statistically different from zero ( $b = -.44$ ,  $SE = .20$ ; 95% CI[-.87, -.08];  $b = -.46$ ,  $SE = .21$ ; 95% CI[-.88, -.05], for anger and disgust respectively). Participants in the experimental condition felt less anger and disgust, which in turn, led to weaker support for aggressive policies towards the Palestinians.

## Discussion

Previous research on emotion regulation in intergroup conflict settings has demonstrated that teaching people to regulate their negative emotions using cognitive reappraisal reduces negative

emotional experiences in response to real-world events, and as a result leads to less support of aggressive policies (Halperin et al., 2013). The goal of the current project was to develop and test the feasibility of ReApp, a mobile game designed to teach and train its users to regulate their emotions using cognitive reappraisal in a fun and engaging way. We assumed that people who played the game would better regulate their emotions when confronted with conflict-related information. Indeed, our study suggests that ReApp was successful in training players to use cognitive reappraisal. Participants who played ReApp for 15 minutes, reported lower levels of anger and disgust when evaluating conflict related images. We did not find significant differences for fear. This may be because the images participants responded to induced higher levels of anger and disgust compared with fear. However, in the future it is important to test whether ReApp is also instrumental for down regulating fear. In addition, we found that participants who played ReApp were also less supportive of aggressive policies against Palestinians. Importantly, we found that reduced levels of anger and disgust mediated the associations between our experimental

conditions and support for aggressive policies. These results suggest that ReApp is effective for training people to regulate their emotions using cognitive reappraisal.

We believe that these results augment previous research on emotion regulation in several important ways. First, we demonstrated that reappraisal may be taught and trained without human intervention. To the best of our knowledge, this is the first attempt to teach and train participants in employing cognitive reappraisal without providing direct human feedback to participants. Our encouraging results provide initial evidence that this can be achieved, which has applied as well as theoretical implications for scholars in the field. Second, our work provides preliminary, though suggestive evidence to the notion that by regulating another person's emotions using reappraisal can improve one's own ability to regulate her own emotions. Previous work has shown that helping others regulate their emotions may have personal benefits such as decreases in depression, and increases in the tendency to reappraise in one's daily life (Doré et al., 2017). However, to the best of our knowledge, this is the first experimental evidence that tests the effects of learning to reappraise by practicing on another individual. More research is needed to fully understand the processes underlying these effects. Thus, we urge scholars working on emotion regulation in particular to examine this new approach to teaching emotion regulation strategies. Moreover, future research should examine which is a better approach to teaching emotion regulation strategies – learning and practicing in regulating one's own emotions, or another's emotions.

Our results also have important implications for practitioners working in the field of conflict resolution. A major problem that practitioners face in their daily work concerns the lack of motivation to both participate in conflict related interventions, and rethink existing entrenched attitudes. Thus, mobile games that are fun, easy and accessible may be a great mean to overcome this motivational problem. Moreover, indirect approaches that target emotion rather than attitudes may be particularly valuable in charged intergroup contexts, where people may not be open to direct attempts to persuade them to change their attitudes. While developing such interventions may be costly, the ability to disseminate them to a mass audience in a relatively quick time is another important benefit for practitioners.

While these results are promising, the current investigation has several limitations. First, we tested ReApp's effectiveness in controlled laboratory conditions, which creates inherent limitations on the conclusions one may draw from this single study. For example, participants did not get to practice their skills on a daily basis in a naturalistic environment, therefore it is hard to determine what the accumulated effect of playing the game for a longer period of time may be. Thus, future research should examine the games' effects over time. Second, participants in the experimental condition were instructed to use cognitive reappraisal when responding to the conflict related images. Even though we were able to demonstrate specificity to the use of reappraisal, given our current design, we were not fully able to rule out concerns regarding demand characteristics. Therefore, future research should examine the effectiveness of ReApp in a more naturalistic setting, where participants are not instructed to employ the reappraisal method. Relatedly, given that people may effectively regulate their emotions simply by being instructed to do so (e.g. Tamir et al., 2019), a more conservative test of the games' effectiveness would be to ask control participants to regulate their emotions, as oppose to asking them to respond naturally. Third, our study design was such that participants reacted to conflict related images rather than actual political events. However, reappraising real-world events as they unfold should be more challenging than reappraising images. Thus, future research should examine whether these effects extend to real-world conflict related events. It would be interesting to see whether players of ReApp would also show reduced negative emotional experiences in response to real-world conflict events, and will that translate into actual support for conflict related political policies. Fourth, emotional experiences and support for political policies were measured immediately after playing the game. Thus, it is still unknown whether ReApp may have long term effects. Fifth, the game in its current version is not fully developed. We would like to see advanced stages and reappraisal tools (i.e. free hand drawing and emoticons) developed in future work, as well as empirical examination of these in future scholarly work. Finally, a major goal in developing ReApp was to overcome the lack of motivation to engage in emotion regulation, and specifically decrease negative group-based emotions, that conflict related events give rise to. ReApp, being a fun and engaging game, partially takes care of this

problem because we assume that if people like the game then they would be motivated to practice their regulation skills more often, including in response to conflict related events. However, one motivational problem that remains is that in conflict related contexts, people may be motivated to experience negative group-based emotions rather than decrease them (Porat et al., 2016, 2020). While playing ReApp may lead people to engage in more regulatory processes when responding to conflict related events, it may also lead people to utilise this new acquired skill to increase, rather than decrease, their negative emotions. This in turn may result in increased support for aggressive policies. While our results do not provide any evidence to suggest this process, it is a possibility that should be further investigated in future research, especially when testing ReApp in a more ecologically valid setting.

The present research introduces a new mobile game that has the potential of training people on how to regulate their emotions in a fun and engaging manner. We believe that this is an important step that utilises academic knowledge and translates it into effective tools that can be implemented for mass audiences.

## Notes

1. This feature was not tested in the current experiment.
2. Players who reach advanced stages will also unlock additional reappraisal tools such as free-hand drawing using one's fingers, and emoticon stickers that may be placed on top of the image.
3. In this game, players take turns dropping coloured discs from the top of a seven-column, six-row vertically suspended grid. Their objective is to be the first to form a horizontal, vertical, or diagonal line of four of one's discs.
4. The survey consisted of a number of additional exploratory items that are not relevant for the current paper.
5. We ran similar regression analyses for joy and sadness and found that conditions did not differ significantly ( $\beta = .18$ ,  $p = .32$ ,  $\beta = -.11$ ,  $p = .54$  for joy and sadness respectively).

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No potential conflict of interest was reported by the author(s).

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## References

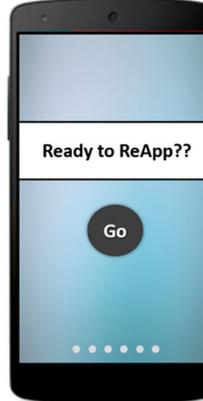
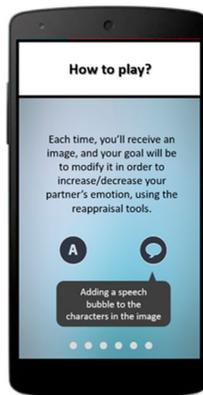
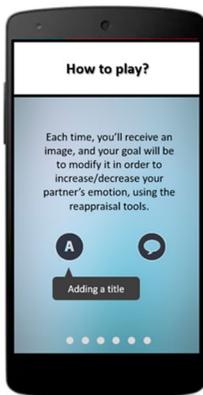
- Alhabash, S., & Wise, K. (2012). Peacemaker: Changing students' attitudes toward Palestinians and Israelis through video game play. *International Journal of Communication*, 6, 356–380.
- Bar-Tal, D. (2000). From intractable conflict through conflict resolution to reconciliation: Psychological analysis. *Political Psychology*, 21(2), 351–365. <https://doi.org/10.1111/0162-895X.00192>
- Bar-Tal, D. (2013). *Intractable conflicts: Socio-psychological foundations and dynamics*. Cambridge University Press.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173–1182. <https://doi.org/10.1037/0022-3514.51.6.1173>
- Bogost, I. (2016). *Play anything: The pleasure of limits, the uses of boredom, and the secret of games*. Basic Books.
- Čehajić-Clancy, S., Goldenberg, A., Gross, J. J., & Halperin, E. (2016). Social-psychological interventions for intergroup reconciliation: An emotion regulation perspective. *Psychological Inquiry*, 27(2), 73–88. <https://doi.org/10.1080/1047840X.2016.1153945>
- Čehajic, S., Brown, R., & Castano, E. (2008). Forgive and forget? Antecedents and consequences of intergroup forgiveness in Bosnia and Herzegovina. *Political Psychology*, 29(3), 351–367. <https://doi.org/10.1111/j.1467-9221.2008.00634.x>
- Cheung-Blunden, V., & Blunden, B. (2008). The emotional construal of war: Anger, fear, and other negative emotions. *Peace and Conflict: Journal of Peace Psychology*, 14(2), 123–149. <https://doi.org/10.1080/10781910802017289>
- Cohen-Chen, S., Halperin, E., Crisp, R. J., & Gross, J. J. (2014). Hope in the Middle East: Malleability beliefs, hope, and the willingness to compromise for peace. *Social Psychological and Personality Science*, 5(1), 67–75. <https://doi.org/10.1177/1948550613484499>
- Cuhadar, E., & Kampf, R. (2014). Learning about conflict and negotiations through computer simulations: The case of PeaceMaker. *International Studies Perspectives*, 15(4), 509–524. <https://doi.org/10.1111/insp.12076>
- Doré, B. P., Morris, R. R., Burr, D. A., Picard, R. W., & Ochsner, K. N. (2017). Helping others regulate emotion predicts increased regulation of one's own emotions and decreased symptoms of depression. *Personality and Social Psychology Bulletin*, 43(5), 729–739. <https://doi.org/10.1177/0146167217695558>
- Erel, L. (2017). *Examining the effectiveness of ReApp, an emotion regulation training mobile game in the context of intergroup conflicts*. Interdisciplinary Center.
- Giessen, H. W. (2015). Serious games effects: An overview. *Procedia – Social and Behavioral Sciences*, 174, 2240–2244. <https://doi.org/10.1016/j.sbspro.2015.01.881>
- Gonzalez, C., & Czlonka, L. (2010). Games for peace: Empirical investigations with PeaceMaker. In J. Cannon Bowers & C. Bowers (Eds.), *Serious game design and development*:

- Technologies for training and learning* (pp. 134–149). Hershey, PA: IGI Global.
- Good Blocks | Samuramu. (n.d.). Retrieved March 18, 2019, from <http://samuramu.com/goodblocks/>
- Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, 2(3), 271–299. <https://doi.org/10.1037/1089-2680.2.3.271>
- Gross, J. J. (2008). Emotion regulation. In M. Lewis, J. M. Haviland-Jones, & L. F. Barrett (Eds.), *Handbook of emotions* (pp. 497–513). Guilford Press.
- Gross, J. J. (Ed.). (2015). *Handbook of emotion regulation*. Guilford Press.
- Gross, J. J., Halperin, E., & Porat, R. (2013). Emotion regulation in intractable conflicts. *Current Directions in Psychological Science*, 22(6), 423–429. <https://doi.org/10.1177/0963721413495871>
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85(2), 348–362. <https://doi.org/10.1037/0022-3514.85.2.348>
- GSMA Intelligence. (n.d.). Retrieved March 18, 2019, from <https://www.gsmaintelligence.com/>
- Halperin, E. (2011). Emotional barriers to peace: Emotions and public opinion of Jewish Israelis about the peace process in the Middle East. *Peace and Conflict: Journal of Peace Psychology*, 17(1), 22–45. <https://doi.org/10.1080/10781919.2010.487862>
- Halperin, E. (2014). Emotion, emotion regulation, and conflict resolution. *Emotion Review*, 6(1), 68–76. <https://doi.org/10.1177/1754073913491844>
- Halperin, E., & Gross, J. J. (2011). Emotion regulation in violent conflict: Reappraisal, hope, and support for humanitarian aid to the opponent in wartime. *Cognition and Emotion*, 25(7), 1228–1236. <https://doi.org/10.1080/02699931.2010.536081>
- Halperin, E., & Pliskin, R. (2015). Emotions and emotion regulation in intractable conflict: Studying emotional processes within a unique context. *Political Psychology*, 36, 119–150. <https://doi.org/10.1111/pops.12236>
- Halperin, E., Pliskin, R., Saguy, T., Liberman, V., & Gross, J. J. (2014). Emotion regulation and the cultivation of political tolerance: Searching for a new track for intervention. *Journal of Conflict Resolution*, 58(6), 1110–1138. <https://doi.org/10.1177/0022002713492636>
- Halperin, E., Porat, R., Tamir, M., & Gross, J. J. (2013). Can emotion regulation change political attitudes in intractable conflicts? From the laboratory to the field. *Psychological Science*, 24(1), 106–111. <https://doi.org/10.1177/0956797612452572>
- Hayes, A. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.
- Kampf, R. (2016). Long-term effects of computerized simulations in protracted conflicts: The case of global conflicts. In A. Meschtscherjakov, B. De Ruyter, V. Fuchsberger, M. Murer, & M. Tscheligi (Eds.), *Persuasive technology* (Vol. 9638, pp. 242–247). [https://doi.org/10.1007/978-3-319-31510-2\\_21](https://doi.org/10.1007/978-3-319-31510-2_21)
- Kampf, R., & Cuhadar, E. (2015). Do computer games enhance learning about conflicts? A cross-national inquiry into proximate and distant scenarios in global conflicts. *Computers in Human Behavior*, 52, 541–549. <https://doi.org/10.1016/j.chb.2014.08.008>
- Konrath, S. (2015). Positive technology: Using mobile phones for psychosocial interventions. In Z. Yan (Ed.), *Encyclopedia of mobile phone behavior*. <https://doi.org/10.4018/978-1-4666-8239-9>
- Lerner, J. S., Gonzalez, R. M., Small, D. A., & Fischhoff, B. (2003). Effects of fear and anger on perceived risks of terrorism: A national field experiment. *Psychological Science*, 14(2), 144–150. <https://doi.org/10.1111/1467-9280.01433>
- Lindner, E. G. (2006). Emotion and conflict: Why it is important to understand how emotions affect conflict and how conflict affects emotions. In M. Deutsch, P. T. Coleman, & E. C. Marcus (Eds.), *The handbook of conflict resolution* (Chapter twelve, 2nd ed., pp. 268–293). San Francisco, CA: Jossey-Bass.
- Mackie, D. M., Devos, T., & Smith, E. R. (2000). Intergroup emotions: Explaining offensive action tendencies in an intergroup context. *Journal of Personality and Social Psychology*, 79(4), 602–616. <https://doi.org/10.1037/0022-3514.79.4.602>
- Maoz, I., & Ellis, D. G. (2008). Intergroup communication as a predictor of Jewish-Israeli agreement with integrative solutions to the Israeli-Palestinian conflict: The mediating effects of out-group trust and guilt. *Journal of Communication*, 58(3), 490–507. <https://doi.org/10.1111/j.1460-2466.2008.00396.x>
- Maoz, I., & McCauley, C. (2008). Threat, dehumanization, and support for retaliatory aggressive policies in asymmetric conflict. *Journal of Conflict Resolution*, 52(1), 93–116. <https://doi.org/10.1177/0022002707308597>
- Maoz, I., & Mccauley, C. (2009). Threat perceptions and feelings as predictors of Jewish-Israeli support for compromise with Palestinians. *Journal of Peace Research*, 46(4), 525–539. <https://doi.org/10.1177/0022343309334613>
- Matthews, M., Doherty, G., & Coyle, D. (2008). Designing mobile application to support mental health interventions. In *Handbook of research on user interface design and evaluation for mobile technology* (pp. 635–656). <https://doi.org/10.4018/978-1-59904-871-0>
- McGonigal, J. (2015). *Superbetter: The power of living gamefully*. Penguin.
- Mitgutsch, K., & Alvarado, N. (2012). Purposeful by design? A serious game design assessment framework. In *Proceedings of the International Conference on the Foundations of Digital Games* (pp. 121–128). ACM.
- Moeschberger, S. L., Dixon, D. N., Niens, U., & Cairns, E. (2005). Forgiveness in Northern Ireland: A model for peace in the midst of the “troubles”. *Peace and Conflict: Journal of Peace Psychology*, 11(2), 199–214. [https://doi.org/10.1207/s15327949pac1102\\_5](https://doi.org/10.1207/s15327949pac1102_5)
- Porat, R., Halperin, E., & Tamir, M. (2016). What we want is what we get: Group-based emotional preferences and conflict resolution. *Journal of Personality and Social Psychology*, 110(2), 167–190. <https://doi.org/10.1037/pspa0000043>
- Porat, R., Tamir, M., & Halperin, E. (2020). Group-based emotion regulation: A motivated approach. *Emotion*, 20(1), 16–20. <https://doi.org/10.1037/emo0000639>
- Porat, R., Tamir, M., Wohl, M. J. A., Gur, T., & Halperin, E. (2018). Motivated emotion and the rally around the flag effect: Liberals are motivated to feel collective angst (like conservatives) when faced with existential threat. *Cognition and Emotion*, 1–12. <https://doi.org/10.1080/02699931.2018.1460321>
- Random App of Kindness game Random App of Kindness. (n.d.). Retrieved March 18, 2019, from Random App of Kindness game website: <http://www.rakigame.com/>
- Sicart, M. (2018). Play in the information age. *Philosophy & Technology*. <https://doi.org/10.1007/s13347-018-0311-9>

- Skitka, L. J., Bauman, C. W., Aramovich, N. P., & Morgan, G. S. (2006). Confrontational and preventative policy responses to terrorism: Anger wants a fight and fear wants "them" to go away. *Basic and Applied Social Psychology, 28*(4), 375–384. [https://doi.org/10.1207/s15324834basp2804\\_11](https://doi.org/10.1207/s15324834basp2804_11)
- Smith, E. R. (1993). Social identity and social emotions: Toward new conceptualizations of prejudice. In D. M. Mackie & D. L. Hamilton (Eds.), *Affect, cognition and stereotyping* (pp. 297–315). <https://doi.org/10.1016/B978-0-08-088579-7.50017-X>
- Smith, E. R., & Mackie, D. M. (2008). Intergroup emotions. In M. Lewis, J. M. Haviland-Jones, & L. F. Barrett (Eds.), *Handbook of emotion* (3rd ed., pp. 428–439). New York, NY: Guilford Press.
- Staub, E. (2005). The origins and evolution of hate, with notes on prevention. In R. J. Sternberg (Ed.), *The psychology of hate* (pp. 51–66). <https://doi.org/10.1037/10930-003>
- Stone, A. A., Shiffman, S., Schwartz, J. E., Broderick, J. E., & Hufford, M. R. (2002). Patient non-compliance with paper diaries. *BMJ, 324* (7347), 1193–1194. <https://doi.org/10.1136/bmj.324.7347.1193>
- Swan, C. (2012). Gamification: A new way to shape behavior. *Communication World, 29*(3), 13–14.
- Tam, T., Hewstone, M., Cairns, E., Tausch, N., Maio, G., & Kenworthy, J. (2007). The impact of intergroup emotions on forgiveness in Northern Ireland. *Group Processes & Intergroup Relations, 10*(1), 119–136. <https://doi.org/10.1177/1368430207071345>
- Tamir, M., Halperin, E., Porat, R., Bigman, Y. E., & Hasson, Y. (2019). When there's a will, there's a way: Disentangling the effects of goals and means in emotion regulation. *Journal of Personality and Social Psychology. https://doi.org/10.1037/pspp0000232*
- Westerlund, M., Antfold, J., & Santtila, P. (2019). Negative views of out-groups and emotion regulation strategies: Evidence for an association with the tendency to suppress emotion expression, but not with cognitive reappraisal or emotion dysregulation. *Current Psychology, 1*–12. <https://doi.org/10.1007/s12144-019-00430-7>

## Appendices

### Appendix 1. The game's tutorial



## Appendix 2. Images participants responded to



**Figure A1.** Qassam hit a house in Sderot.



**Figure A2.** Knesset member Zoabi's speech in the Palestinian Authority.



**Figure A3.** Hamas Protest in Gaza.



**Figure A4.** Launching rockets from Gaza.



**Figure A5.** Palestinian protest in Bil'in.