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## Induced optimism to lessen hopelessness-related cognitions among young adults at risk for suicidal thoughts and behavior

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### Abstract

**Background:** Hopelessness is one of the best-studied cognitive predictors of depression and suicide. Previous research suggests that hopelessness may develop through repetitive thinking about the occurrence of positive and negative future outcomes. The present study sought to investigate whether mental rehearsal in making optimistic future-event predictions, or *induced optimism*, would lead to reductions in hopelessness, particularly among individuals with a history of suicide ideation or suicide attempts.

**Methods:** Participants with ( $n = 58$ ) and without ( $n = 76$ ) a history of suicide ideation or attempts were randomly assigned to either practice making optimistic future-event predictions or to a control condition in which they practiced making a lexical decision (using the same stimuli) over three study sessions, each separated by one week.

**Results:** Findings offered modest support for the hypothesis that induced optimism would decrease hopelessness but not improve mood; this was regardless of history of suicide ideation or attempts.

**Limitations:** The sample was predominantly female, and assessment of suicide ideation and attempt history was not confirmed by clinical interview, which may limit generalizability.

**Conclusion:** Practice in making optimistic future-event predictions over time may be one way to reduce the hopelessness-related cognitions that confer vulnerability to suicide ideation and behavior.

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#### Contributors

Thomas Matuza: Conceived and designed the study, conducted statistical analyses, drafted and edited the manuscript. Allan Shikh: Assisted with data analysis, reviewed and edited the manuscript. Sarah Sullivan: Reviewed and edited the manuscript. Alyssa Wheeler: Assisted with data collection and prepared data for analysis. Regina Miranda: Conceived and designed the study, conducted statistical analyses, reviewed and edited the manuscript.

#### IRB approval

Study procedures were approved by the Institutional Review Board at the City University of New York.

#### Declaration of Competing Interest

The authors have no conflicts of interest to disclose.

## Keywords

Induced optimism; Hopelessness; Suicide ideation; Suicide attempts; Young adults

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## 1. Introduction

Suicide is a major public health problem in the United States and around the world. Over 700,000 people are estimated to die by suicide each year worldwide (World Health Organization, 2021). In the United States, suicide is among the top three leading causes of death among 15-to-34-year-olds (Centers for Disease Control and Prevention, 2021). Contemporary psychological models of suicide suggest that hopelessness about the future plays a fundamental role in the onset of suicidal thoughts (e.g., Van Orden et al., 2010; Wenzel & Beck, 2008). Hopelessness predicts suicide ideation (Wolfe et al., 2019; Alexopoulos et al., 2021; Ribeiro et al., 2018; Rosario-Williams et al., 2021), suicide attempts (Ribeiro et al., 2018; Liu et al., 2018; Miranda-Mendizabal et al., 2019), and suicide deaths (Beck et al., 2006; Brown et al., 2000; Ribeiro et al., 2018), making it a critical target of intervention. Understanding how to modify the hopelessness-related cognitions that give rise to suicidal thoughts may ultimately prevent the transition to suicide attempts and suicide deaths. This is a need that the present study sought to address.

### 1.1. Development of hopelessness through repetitive thought

Hopelessness has been conceptualized as involving negative expectations about the occurrence of aversive future outcomes and the nonoccurrence of desired future outcomes, combined with a perceived helplessness about changing those outcomes (Abramson et al., 1989). Andersen and colleagues suggested that people become hopeless about the future when they are completely certain that undesirable outcomes will occur and that desirable outcomes will not occur in their futures – i.e., when they develop depressive predictive certainty (Andersen & Lyon, 1987; Andersen, 1990). Building off of Taylor and Schneider's (1989) suggestion that event simulation increases the perceived truth of imagined experiences, Andersen and colleagues (1992) theorized that the process of becoming hopeless about the future begins with repetitive thinking about the future, in the form of rumination about the future (also termed future-oriented repetitive thought; Miranda et al., 2023). They suggested that repetitive thinking, or rumination, about the occurrence of positive and negative future outcomes serves as a form of mental rehearsal that leads to the development of pessimistic future-event schemas. That is, rumination about the future may lead people to develop automaticity in making pessimistic predictions about the future (Andersen et al., 1992; Andersen & Limpert, 2001). This idea is consistent with research suggesting that events that are repeatedly simulated tend to be considered more plausible (e.g., Szpunar & Schacter, 2013). In support of this idea, previous research found that individuals high in depressive symptoms not only rated positive events as less likely to occur and negative events as more likely to occur, but they did so with automaticity (in that they did so equally efficiently when under a cognitive load than when under no cognitive load), relative to individuals mild or low in depressive symptoms (Andersen et al., 1992). These findings suggested that individuals high in depressive symptoms make their pessimistic future-event predictions automatically. A subsequent study replicated this finding with a

subclinical sample of individuals high in depressive symptoms (Andersen & Limpert, 2001) and found that these individuals reported greater rumination in response to a recent negative event, compared to those low in depressive symptoms. Such automaticity may correspond to also having greater certainty in pessimistic future-event predictions.

The role of mental rehearsal in the development of hopelessness has also been supported by research on self- or mood-focused rumination (Nolen-Hoeksema et al., 2008). Previous research suggests that self/mood-focused rumination is associated with reduced positive future-event predictions (Lyubomirsky & Nolen-Hoeksema, 1995), increased depressive symptoms over time (Nolen-Hoeksema, 1991, 2000), and with greater vulnerability to suicide ideation over time (Miranda & Nolen-Hoeksema, 2007). In addition, hopelessness has been found to mediate the relationship between rumination and future suicide ideation (Smith et al., 2006). More recently, pessimistic future-oriented repetitive thought was found to predict severity of suicide ideation at a 6-month follow up indirectly via lower positive future-event fluency (i.e., fluency in generating positive future events that might happen in one's future), higher depressive predictive certainty, and higher depressive symptoms (Miranda et al., 2023). Repetitive thought – whether self-focused or future-oriented – may thus underlie the development of the hopelessness-related cognitions that increase vulnerability to depression and suicide.

## 1.2. Modifying hopelessness-related cognitions

A number of cognitive interventions have been aimed at lessening maladaptive future thinking. Many of them seek to enhance problem solving and/or goal setting skills (Ferguson et al., 2009; Links et al., 2003; Macleod et al., 1998; MacLeod et al., 2008; Vilhauer et al., 2012). Such interventions are theorized to work because they provide people with skills that allow them to see that an unpleasant future is not necessarily unavoidable. However, this approach does not directly address the pessimistic mental rehearsal (rumination) that may underline the development of hopelessness about the future.

In contrast to the aforementioned approaches, Miranda and colleagues (2017) investigated whether practice in making optimistic future-event predictions directly counteracts the pessimistic mental rehearsal believed to lead to hopelessness (Miranda et al., 2017). Among young adults with moderate-to-severe levels of self-reported depressive symptoms, practice in making optimistic future-event predictions resulted in decreases in the certainty with which they made pessimistic future-event predictions. It was also associated, more generally, with increases in optimistic future-event predictions among individuals with varying levels of depressive symptoms, relative to a control condition in which individuals made a lexical decision using the same stimuli. However, such practice did not result in changes in dysphoric mood. These findings suggested that inducing optimism may lessen hopelessness-related cognitions but that, perhaps, additional practice over a longer period of time may be necessary to lead to shifts in mood.

## 1.3. The present study

Given the link between hopelessness and risk for suicidal thoughts and behavior (STB), the present research sought to examine whether practice engaging in the mental procedure of

making future-event predictions might be one way of modifying the hopelessness-related cognitions that confer vulnerability to suicidal thoughts and behavior (STBs). The present study sought to extend Miranda and colleagues' (2017) previous research by examining whether practice in making optimistic future-event predictions over time (i.e., induced optimism) would lessen hopelessness and improve mood among young adults with and without a history of suicide ideation or attempts, and over multiple sessions – unlike Miranda et al. (2017), which only included one practice session and which did not consider individuals' history of suicide ideation or attempts. We predicted that induced optimism would result in lower levels of hopelessness over time, particularly among individuals with a history of STBs. We also hypothesized that the effect of induced optimism would be observed in increases in positive affect and decreases in negative affect over time, relative to a control condition.

## 2. Materials and methods

### 2.1. Overview

Participants with ( $n = 58$ ) and without ( $n = 76$ ) a history of suicide ideation or attempts were randomly assigned to either mentally practice the procedure of making optimistic future-event predictions (induced optimism) – without them being explicitly told that this was what they were doing – or to a control condition involving a lexical decision task. The induced optimism group practiced providing a yes or no response about whether given events – involving an equal number of positive and negative phrases presented one at a time on a computer screen – were likely to happen to them in the future – with the phrases presented so that, without participants being aware, a majority of the positive events participants viewed were ones that they would endorse, while the majority of negative events were ones that they would deny. The control group viewed the same phrases but practiced deciding whether each phrase contained an adjective (see Miranda et al., 2017). Hopelessness and affect were assessed before and after the practice task.

### 2.2. Participants

One hundred thirty-four young adults (103 females), ages 18-33 ( $M = 19.3$ ,  $SD = 2.7$ ), took part in the study between July of 2010 and December of 2013. Participants were selected from a sample of 2050 young adults recruited from a public commuter college in New York City or from colleges in the New York City metropolitan area and were screened for a history of recent (past 6 months) suicide ideation or a lifetime suicide attempt as part of a study of cognitive predictors of suicide ideation and attempts. Fifty-eight individuals with past suicide ideation or attempt (26 with past-6-month suicide ideation but no past suicide attempt, 32 with a lifetime suicide attempt) and 76 individuals without past suicide ideation or attempt took part in the present study.<sup>1</sup> Their STB history was based on their responses to one of two questions: “In the past 6 months, have you thought about killing yourself?”

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<sup>1</sup>In the experimental condition, there were 12 participants with past-6-month suicide ideation and 17 participants with a past suicide attempt (10 with one past suicide attempt, 7 with multiple past suicide attempts). In the control condition, there were 14 participants with past-6-month suicide ideation and 15 participants with a past suicide attempt (8 with one past suicide attempt, 7 with multiple past suicide attempts). A  $3 \times 2$  Chi Square test indicated no association between practice group and suicide ideation/attempt condition,  $\chi^2(3) = 0.30$ ,  $p = .96$ .

(recent suicide ideation) or “Have you ever, in your whole life, tried to kill yourself or made a suicide attempt?” (lifetime suicide attempt history). Given the linguistic requirements of the tasks, participants were required to at least be able to read and understand English at about a high school level and were informed of this requirement when they signed up for the study and also verbally during the consent procedure. Participant ethnoraical self-identifications included 31% ( $n = 42$ ) Asian, 26% ( $n = 35$ ) White, 16% ( $n = 22$ ) Hispanic/Latine, 10% ( $n = 14$ ) Black, 8% Biracial ( $n = 11$ ), and 7% ( $n = 9$ ) Other (including 5 identifying as West Indian, 1 identifying as Asian and South American, and 1 identifying as Puerto Rican and Indian). One additional participant (0.7%) self-identified as Middle Eastern (Egyptian).

### 2.3. Measures and procedure

**2.3.1. Induced optimism**—Participants were randomized via a random number table into either the induced optimism condition or control condition, stratified by history of STB. The procedure in the present study is similar to the one used by Miranda and colleagues (2017), except that participants from both conditions met for three study sessions, each one week apart, as opposed to a single study session (Miranda et al., 2017). During each session, participants mentally rehearsed the same procedure, either making optimistic future event predictions (induced optimism group) or completing a lexical decision task (control group), across four blocks of trials, each consisting of 36 phrases (18 positive, 18 negative). Individuals responded “yes” or “no” to a series of phrases, viewed one at a time on a computer screen, as quickly as possible by pressing the appropriate key on a computer keyboard in response to a command prompt, which was either “Likely to happen to you?” (for the induced optimism group) or “Contains an adjective?” (for the control group). For the induced optimism group, individuals viewed an equal number of positive and negative phrases and were asked to consider whether each event was likely to happen to them at some point in the future. However, the majority of the positive events (40 total out of 144 phrases, 10 per block) participants viewed had been pre-rated (by college students) as being “highly likely” to occur (e.g., *get some rest*), and the majority of negative events that participants viewed (40 total out of 144 phrases, 10 per block) had been pre-rated to be “highly unlikely” to occur (e.g., *be the cause of a world war*). Thus, participants were induced to primarily respond “yes” to positive events and “no” to negative events (without being informed of the induction – i.e., participants did not know that events were pre-configured so that their procedural response would be primarily to endorse positive events and deny negative events). A small number of “highly likely” negative events and “highly unlikely” positive events (8 of each total, 2 of each per block) were presented to decrease the obviousness of the manipulation. The remaining items were phrases that had been pre-rated to be “moderately likely” to occur (24 positive and 24 negative phrases total, 6 of each per block). Participants in the control condition viewed the same phrases but completed the lexical decision task, in which they were asked to respond whether each given phrase contained an adjective. Additional details on these tasks and on selection of stimuli can be found elsewhere (Miranda et al., 2017). The task took about 10-15 minutes to complete.

**2.3.2. Change in hopelessness**—Hopelessness was measured before and after each practice session via the Beck Hopelessness Scale (BHS; Beck & Steer, 1988), a 20-item self-report questionnaire that includes 11 negatively phrased items (e.g., “my future seems dark to me”), and 9 positively phrased items (e.g., “I look forward to the future with hope and enthusiasm”). Response options on the BHS were modified from binary (yes/no) to a 5-point Likert scale in order to enhance measurement sensitivity (see, e.g., Neufeld et al., 2010), and items were averaged to produce a total hopelessness score that could range from 1 to 5. Thus, individuals completed the BHS at the beginning (time 1) and end (time 2) of each session each week, for a total of 3 weeks.<sup>2</sup> Internal consistency reliability at baseline for this modified version of the BHS was high ( $\alpha = .93$ ).

**2.3.3. Positive and Negative Affect**—Change in mood was assessed via the Positive and Negative Affect Scale (Watson et al., 1988). This scale consists of 10 positively valenced (i.e., *interested, excited, strong, enthusiastic, proud*) and 10 negatively valenced (e.g., *distressed, upset, guilty, hostile, nervous*) words describing feelings/emotions. Participants were asked to rate the extent to which they felt each emotion on a scale from 1 (“very slightly or not at all”) to 5 (“extremely”) at the present moment. Participants completed the PANAS each week before (time 1) and after (time 2) the induced optimism/control task. Total scores for positive and negative affect were computed, with a possible range from 10 to 50. The PANAS demonstrated strong internal consistency reliability at baseline, for both positive affect ( $\alpha = .90$ ) and negative affect ( $\alpha = .88$ ).

All participants completed an informed consent process prior to engaging in the study procedure. As part of the consent process, participants were told that they would be asked to take part in three study sessions, separated by one week, during which they would be asked to read a series of phrases on a computer, to make a decision about the statements, and to answer questions about their mood. Participants completed a consent procedure again at each subsequent session. The measures and procedure used in this study were approved by the City University of New York’s Institutional Review Board (Protocol #10-01-019-4471).

## 2.4. Data analysis

A sample of 134 participants provided over 80% power to detect a medium effect size involving main effects and interactions in an Analysis of Covariance and also to detect an interaction effect in a mixed design.<sup>3</sup> Baseline differences in hopelessness, positive affect, and negative affect were examined via factorial Analysis of Variance (ANOVA). The effects of practice condition and STB history on hopelessness and affect over time were examined via three separate mixed design Analyses of Covariance (ANCOVAs), with practice condition (induced optimism vs. lexical decision) and STB history (suicide ideation/attempt history vs. no-suicide ideation/attempt history) as grouping variables, time as a

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<sup>2</sup>Participants also completed a measure of depressive predictive certainty (Miranda & Mennin, 2007). However, baseline scores on this measure were higher in the control condition than in the experimental condition, and thus, we did not include this measure in our analyses.

<sup>3</sup>An initial power analysis conducted prior to initiation of the study had indicated that a sample size of 140 participants would provide 80% power to detect a medium effect size for a Group x Practice Condition interaction in a  $2 \times 2$  factorial design, with the repeated measure design providing additional statistical power.

repeated measure, and hopelessness, positive affect, and negative affect at session 1, time 1, as respective covariates. Missing data were excluded from analyses via listwise deletion.

### 3. Results

#### 3.1. Baseline differences in hopelessness and affect

Before testing our main hypotheses, we conducted analyses to verify that there were no baseline differences in hopelessness, positive affect, or negative affect by practice condition. Thus, three separate  $2 \times 2$  (Condition: induced optimism vs. lexical decision x STB: suicide ideation/attempt history vs. no-suicide ideation/attempt history) univariate ANOVAs were conducted with baseline (session 1, time 1) hopelessness (average BHS score), positive affect (total), and negative affect (total) as the dependent variables. There was neither a main effect of practice condition on hopelessness, positive affect, or negative affect at baseline,  $F_s < 1$ , nor a significant interaction of practice condition and STB on these outcomes,  $F_s < 1$ .

#### 3.2. Change in hopelessness by practice condition

To test the hypothesis that induced optimism would decrease hopelessness, particularly among individuals with a history of STBs, we conducted a  $2 \times 2 \times 3$  (Condition: induced optimism vs. lexical decision x STB: suicide ideation/attempt history vs. no-suicide ideation/attempt history x Time: session 1 (time 2), session 2 (time 2), session 3 (time 2)) mixed design ANCOVA, with hopelessness as the dependent variable, while adjusting for baseline hopelessness (session 1, time 1,  $M = 2.16$ ).<sup>4</sup> We hypothesized a 2-way interaction between Condition and Time and a 3-way interaction among Condition, STB, and Time. A Condition x Time interaction on hopelessness emerged as a linear trend, ( $F(1, 127) = 3.61, p = .06, \eta^2 = .03$ ), but there was no significant or 3-way interaction. To further investigate the Condition x Time trend, we examined pairwise comparisons of hopelessness at time 1 and time 3. Results indicated that there was a statistically significant decrease in hopelessness in the induced optimism condition from session 1 to session 3,  $t(127) = 2.37, p = .02$ , but not in the control condition,  $t < 1$ . See Table 1 and Fig. 1a and 1b.

We followed up these analyses by running a  $2 \times 3 \times 3$  (Condition: induced optimism, lexical decision x STB: suicide ideation, suicide attempt, no-suicide ideation/attempt x Time: session 1, time 2; session 2, time 2; session 3, time 2) mixed design ANCOVA, with baseline hopelessness (session 1, time 1) as a covariate, in order to investigate whether there were differences between individuals with recent suicide ideation compared to those who had attempted suicide. A statistically significant Condition x Time interaction effect emerged as a linear trend,  $F(1, 125) = 4.13, p = .04, \eta^2 = .03$ , with individuals in the induced optimism condition, once again, showing a significant decrease in hopelessness across the time periods after practicing optimistic predictions ( $M_1 = 2.15, SD = 0.66; M_2 = 2.10, SD$

<sup>4</sup>We also examined whether there was change in hopelessness from baseline to follow up separately at each session via  $2 \times 2 \times 2$  (Condition: induced optimism vs. lexical decision x STB: suicide ideation/attempt history vs. no-suicide ideation/attempt history x Time: time 1 vs. time 2) mixed design Analyses of Variance (ANOVAs), given that hopelessness was assessed at each session before and after the practice task. There were no statistically significant 3-way interactions among condition, STB history, and time at each session. However, there was a statistically significant Condition x Time interaction at session 3,  $F(1, 129) = 4.19, p < .05$ , reflecting an increase in average hopelessness from time 1 ( $M = 2.18$ ) to time 2 ( $M = 2.23$ ) in the control condition, across STB history,  $t(129) = 2.67, p < .05$ , but not in the induced optimism condition ( $M = 2.10$  to  $2.09$ ),  $t(129) = 0.29, p = .79$ .

= 0.61;  $M_3 = 2.08$ ,  $SD = 0.61$ ; adjusted  $M = 2.16$ , 2.10, and 2.07 respectively across the three time periods), which was not observed in the control condition ( $M_1 = 2.20$ ,  $SD = 0.76$ ;  $M_2 = 2.22$ ,  $SD = 0.83$ ;  $M_3 = 2.20$ ,  $SD = 0.84$ ; adjusted  $M = 2.16$ , 2.20, 2.18, respectively, across the three time periods). However, there was no significant 3-way interaction among Condition, STB, and Time.

### 3.3. Change in affect by practice condition

To test the hypothesis that induced optimism would increase positive affect and decrease negative affect, particularly among individuals with a history of STBs, we conducted two  $2 \times 2 \times 3$  (Condition: induced optimism vs. lexical decision x STB: suicide ideation/attempt history vs. no-suicide ideation/attempt history x Time: session 1 (time 2), session 2 (time 2), session 3 (time 2)) mixed design ANCOVAs, one with positive affect as the dependent variable, while adjusting for baseline positive affect (session 1, time 1,  $M = 28.83$ ), and the other with negative affect as the dependent variable, adjusting for baseline negative affect (session 1, time 1,  $M = 18.30$ ). We hypothesized a 2-way interaction between Condition and Time and a 3-way interaction among Condition, STB, and Time. There was a significant Condition x Time interaction on positive affect, ( $F(2, 256) = 3.90$ ,  $p = .02$ ,  $\eta^2 = .03$ ), but not negative affect,  $F < 1$ . However, post hoc pairwise comparisons suggested that differences were in the opposite direction to what was hypothesized. Participants reported lower positive affect in weeks 2 and 3 (adjusted  $M = 23.38$  and 23.10, respectively), compared to week 1 (Adjusted  $M = 26.23$ ),  $t(128) = 3.11$  and 3.30,  $p < .01$ , in the induced optimism condition, and decreased positive affect in week 3 (Adjusted  $M = 23.46$ ) compared to week 2 (Adjusted  $M = 25.31$ ),  $t(128) = 2.09$ ,  $p < .05$ , in the control condition. There were no significant condition x STB x time interactions for affect.<sup>5,6</sup>

## 4. Discussion

The present study examined whether induced optimism, or mental rehearsal in predicting that positive events would happen and that negative events would not happen in one's future, would lead to reductions in hopelessness and improvement in affect and whether this effect would be more pronounced among individuals with a history of suicide ideation or attempts. Our findings suggest that induced optimism decreased hopelessness, regardless of whether individuals had a history of suicide ideation or attempts. There was a trend indicating a decrease in hopelessness across time in the induced optimism condition but not in the control condition, such that hopelessness scores were lower by the third week of practice relative to the first week of practice.

<sup>5</sup>Overall, both positive affect and negative affect went down across sessions, such that at each session's baseline, positive affect and negative affect were lower than at the prior baseline session, irrespective of practice condition. In addition, at each session, there was a main effect of time, such that positive and negative affect after the practice task was lower than prior to the practice task (with no significant interaction occurring with practice condition, with the exception of a trend towards an interaction between practice condition and time at session 1,  $F(1, 130) = 3.52$ ,  $p = .06$  (but not at sessions 2 and 3) on positive affect but not negative affect.

<sup>6</sup>Note that despite no statistically significant interaction of practice condition, STB history, and time, pairwise comparisons indicated that there was a significant decrease in negative affect between session 1, time 2 and session 3, time 2 among individuals with a suicide ideation/attempt history in the induced optimism condition, adjusting for baseline negative affect ( $M_{diff} = 2.67$ ),  $t(128) = 2.57$ ,  $p < .05$ , but not in the control condition ( $M_{diff} = 0.96$ ),  $t(128) = 0.91$ ,  $p = .36$ . This was not the case among individuals with no STB history.



The present study is the first, of which we are aware, to examine whether practice in making optimistic predictions, across time, may be one way to lessen hopelessness, particularly among individuals with a history of suicide ideation or attempts. This optimistic form of mental rehearsal may be one way to counteract the pessimistic future-oriented repetitive or ruminative thinking (Miranda et al., 2023) theorized to result in hopelessness, where pessimistic repetitive thought leads an individual to become more fluent in making pessimistic predictions to the point that such predictions are automatic, and thus are perceived by the individual as being certain (Andersen et al., 1992; Andersen & Limpert, 2001; Miranda et al., 2023). This finding is consistent with those of a previous study, which found that induced optimism decreased depressive predictive certainty among individuals with moderate-to-severe depressive symptoms (Miranda et al., 2017). Ultimately, the ability of induced optimism to lower hopelessness, including among those with and without a history of STBs, suggests that inducing optimism may be effective in decreasing hopelessness and thus possibly help prevent depressive symptoms, suicide ideation, and suicide attempts. At the same time, the results should be interpreted with caution, given that they were present only as a trend and were not specific to the STB group.

Unexpectedly, however, induced optimism led to reductions in positive affect, though there was no significant change in negative affect across time. The latter result is consistent with the findings of Miranda et al. (2017), which found no change in negative mood as a result of this same induced optimism paradigm – conducted in one session – among individuals with low, mild, or moderate-to-severe depressive symptoms. It is unclear why the induced optimism paradigm might lead to weekly decreases in positive affect, although it should be noted that there was also a decrease between sessions 2 and 3 of the control condition. Perhaps mentally rehearsing the occurrence of positive events and non-occurrence of negative outcomes, over time, may lead participants to contrast these anticipations with their current reality, and in some cases lead to decreased positive affect, even while it also leads to decreases in hopelessness. Research on self-regulation suggests that when people are setting intentions, they experience decreases in positive affect as they consider obstacles to obtaining their goals, whereas increases in positive affect help people to move from setting intentions to enacting them (Friedrichs et al., 2020; Kazén & Kuhl, 2005). Those who are able to contrast their desired future outcomes against their current reality and consider how to overcome obstacles to obtain their desired future outcomes are more likely to commit to and obtain these desired outcomes, when they have high expectations of success (Oettingen et al., 2009). In contrast, considering desired future outcomes without thinking about the likelihood and steps needed to achieve those outcomes (i.e., engaging in positive fantasies about the future) is associated with negative mood outcomes (Oettingen et al., 2016). Alternatively, it may be that considering that positive outcomes will occur and negative outcomes will not occur without actually imagining those outcomes has little impact on mood. For instance, studies of the effects of positive interpretation training on affect found that positive interpretation training that included imagery led to an increase in positive affect, while positive interpretation training that involved focusing on the verbal meaning of events led to either no change or to a *decrease* in positive affect (Holmes et al., 2006, 2009). Optimistic predictions may thus increase positive affect when accompanied by imagery. Finally, is it possible that since the PANAS positive affect subscale included ratings

of words such as “interested,” “attentive,” and “active,” engaging in the same induced optimism task each week led to habituation to the stimuli and thus increased boredom, which was reflected in reductions in overall positive affect across time, more generally. Additional research is needed to further understand the impact of prospective cognition on affect in the context of an induced optimism paradigm.

This study had a number of strengths. The experimental design enabled us to draw conclusions about causality. Furthermore, practice occurred over 3 sessions rather than a single session, enabling us to observe change in hopelessness over time. Third, the study included an ethn racially-diverse sample. Finally, the findings of the study have clinical significance, as the study included individuals with a history of suicide ideation or attempts.

Despite these strengths, a number of limitations should be noted. The phrases used in the study were pre-rated by college students, without consideration of their history of STBs, and it is unclear whether the stimuli would hold the same relevance or meaning to young adults (whether college students or not) with and without a history of STB. Second, we did not consider specific features of future events, such as the perceived duration of future events – that recent research suggests might be relevant to how individuals with STBs think about the future (Cha et al., 2022). Third, data were collected prior to the COVID-19 pandemic, and it is possible that future-event forecasts have shifted since the pandemic. Fourth, the sample consisted primarily of females, and it is unknown whether findings would generalize to males. In addition, it should be noted that this was not a clinical sample. Suicide ideation or attempt history classification was determined by responses to two questions about suicide ideation in the past 6 months and lifetime suicide attempt history and were not verified by clinical interview. Inducing optimism might be more helpful among individuals with recent suicide ideation or attempt histories. Finally, it should be noted that reductions in hopelessness in the induced optimism condition emerged as a trend; additional research is necessary to replicate these findings. The results should thus be interpreted with caution.

## 5. Conclusion

Our findings suggest that practice in the procedure of making optimistic future-event predictions lowers hopelessness among young adults with or without a history of STB. Taking these findings and the findings by Miranda and colleagues (2017) into account, induced optimism might be helpful in lessening hopelessness and might thus be one way of mitigating risk for suicidal behavior.

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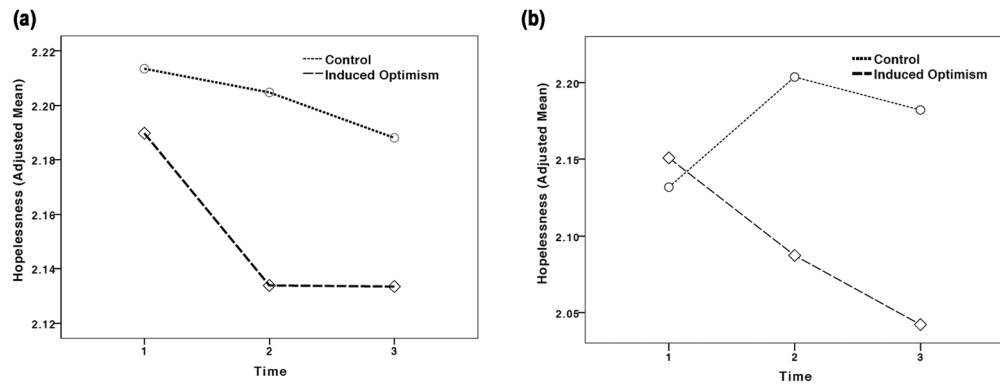
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**Fig. 1.**  
 a. Post-Practice Hopelessness (Adjusting for Baseline) at Each Time Point, by Practice Condition, among No ideation/No Attempt Group  
 b. Post-Practice Hopelessness (Adjusting for Baseline) at Each Time Point, by Practice Condition, among Suicide ideation/Attempt Group

**Table 1**

Hopelessness adjusted means and standard errors, over time, by group and practice condition

Week	Condition	History of Suicide Ideation/Attempt			
		Yes		No	
		<i>M</i>	( <i>SE</i> )	<i>M</i>	( <i>SE</i> )
Week 1 (T1)	Optimism	2.15	(0.05)	2.19	(0.04)
	Control	2.13	(0.05)	2.21	(0.04)
Week 2 (T2)	Optimism	2.09	(0.07)	2.13	(0.06)
	Control	2.20	(0.07)	2.21	(0.06)
Week 3 (T3)	Optimism	2.04	(0.06)	2.13	(0.05)
	Control	2.18	(0.06)	2.19	(0.06)

*Notes.* Week 1 (T1) = session 1, time 2; Week 2 (T2) = session 2, time 2; Week 2 (T3) = session 3, time 2. Optimism = induced optimism condition; Control = lexical decision task condition. Means are adjusted for baseline hopelessness at session 1, time 1.

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