

Emotion Theories and Adolescent Well-Being:

Results of an Online Intervention

Eric N. Smith^{1,2}, Carissa Romero^{1,2}, Brian Donovan³, Rachel Herter^{1,2}, David Paunesku^{1,2},
Geoffrey L. Cohen^{1,3}, Carol S. Dweck¹, & James J. Gross¹

¹Department of Psychology, Stanford University; ²Project for Educational Research That Scales (PERTS); ³Graduate School of Education, Stanford University.

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Correspondence concerning this article should be addressed to Eric N. Smith, Department of Psychology, 450 Serra Mall Bldg. 420, Stanford, CA 94305. E-mail: ensmith@stanford.edu.

Abstract

Individuals' theories about emotions—the beliefs about the nature of emotions and the ability to influence them—have been linked to well-being. However, their causal role is not clear. To address this issue, we delivered a randomized controlled intervention to 1,645 middle school students that targeted their theories of emotion through interactive online modules. Students were taught that they could modify their emotions, get better at modifying their emotions with practice, and use strategies to improve their well-being. One month later, we found that students assigned to the intervention condition (compared to an active control condition) reported more adaptive theories of emotion and greater emotional well-being in school, although well-being outside of school was unchanged. Secondary analyses showed that these effects were present regardless of students' race, gender, or grade level. These findings suggest that theories of emotion may be a promising target for improving adolescent well-being.

Keywords: implicit theories, malleable beliefs, theories of emotion, well-being, adolescence

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Adolescence is often an emotional “perfect storm” (see Roeser, Eccles, & Sameroff, 2000). It is not surprising that many students—experiencing greater expectations in schoolwork, shifting peer relationships, and less emotional support from parents and teachers—find their emotional well-being spiraling downwards (Larson, Moneta, Richards, & Wilson, 2002). Yet some students stay resilient through these difficulties. How do they do this?

One contributor to maintaining well-being during this period appears to be students’ *theories of emotions*: an interlocking set of beliefs about the nature of emotions. Past research has found that how people think about their emotions, such as whether emotional experiences can be modified, is related to well-being cross-sectionally and longitudinally (De Castella et al., 2013, 2014, 2015; De Castella, Platow, Tamir, & Gross, in press; Romero, Master, Paunesku, Dweck, & Gross, 2014; Tamir, John, Srivastava, & Gross, 2007). However, the causal role of these emotion theories in determining well-being is not clear. The current research examines the causal link between theories and well-being in a middle school population.

Implicit Theories of Emotion

Do I have the capacity for change? The way people answer this question is the focus of *implicit theories* research. For example, whereas some individuals believe that people cannot change their fixed level of intelligence, others believe that intelligence is malleable and people can develop their intelligence over time. Moreover, those with malleable beliefs of intelligence have more adaptive, engaged responses to challenge (Dweck & Leggett, 1988), which results in better academic performance (Blackwell, Trzesniewski, & Dweck, 2007). Importantly, the

theories themselves are not static, and can be influenced to improve outcomes (Blackwell et al., 2007; Miu & Yeager, 2015; Paunesku et al., 2015; Schleider & Weisz, 2016). Researchers have extended this research on implicit theories into many domains (e.g. personality, Chiu, Hong, & Dweck, 1997; morality, Chiu, Dweck, Tong, & Fu, 1997), including emotions (Tamir et al., 2007).

Differing theories of emotion are associated with different responses to emotional challenges. People who believe emotions can be influenced to a greater degree engage more with emotionally difficult events rather than ignoring or suppressing them (Tamir et al., 2007), which in turn can lead to greater influence over their emotions (Kalokerinos, Greenaway, & Denson, 2015). A long tradition of clinical work has attempted to change people's acceptance of emotional experiences and strengthen emotion regulation strategies to improve clinical outcomes (e.g. Cloitre, Koenen, Cohen, & Han, 2002; Eifert & Heffner, 2003; Hayes, Luoma, Bond, Masuda, & Lillis, 2006), as emotion dysregulation is predictive of common psychopathologies (Gross & Jazaieri, 2014; McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011). Recent work has more directly focused on emotions as a target for clinical intervention with encouraging preliminary evidence (Mennin, Fresco, Ritter, & Heimberg, 2015). As implicit theories have been shown to be domain specific (Dweck, Chiu & Hong, 1995), it is crucial to more fully build out the theories of emotion literature to understand their relationship to well-being outcomes (Romero et al., 2014).

Targeting Adolescent Theories

Adolescence provides a unique transitional time in which to target structuring theories, as this developmental stage involves growing awareness of what individuals feel they have control

over (Chubb, Fertman, & Ross, 1997; Krampen, 1989), and thus may be a crucial window to promote adaptive changes in self-relevant beliefs. As adolescence can be paradoxically a time of both emotional maturation and increased emotionally-driven maladaptive behavior (Dahl, 2004; Steinberg, 2008), it may be a particularly impactful time to promote adaptive theories of emotion. Early adolescent children with malleable beliefs of emotion show fewer depressive symptoms and greater well-being in school (Romero et al., 2014). In later adolescence, malleable beliefs of emotion have been found to predict greater social adjustment and more positive emotions across the transition to college (Tamir et al., 2007). Though this work is promising, studies have yet to experimentally manipulate emotion theories in an applied setting. Notably, some researchers have successfully instilled adaptive beliefs of emotion in a lab setting (see Bigman, Mauss, Gross, & Tamir, 2016), but little has been done in real-world settings to affect longer-term well-being.

The Current Study

The goal of the present research was to test whether teaching an adaptive theory of emotion would allow individuals to stem the decline in well-being during the emotionally difficult time of middle school. We define adaptive theories as encompassing three interrelated beliefs: 1) that emotions can be influenced, 2) that this influence can grow with time and practice, and 3) that I am personally capable of regulating emotions to feel better. Though other emotion beliefs may contribute to well-being (e.g., acceptability of feeling emotions; Rimes & Chalder, 2010), we focused on these malleability beliefs as foundational beliefs that encourage attempts to engage effectively with emotional experiences. We conducted a randomized, controlled direct-to-student intervention to examine the causal relationship between theories of

emotion and emotional well-being in the challenging setting of middle school. We hypothesized that students taught adaptive theories of emotion through our online modules would show greater school well-being over time compared to peers in a control group, due to changes in adaptive theories of emotion. In addition to school emotional well-being, we assessed school-related socio-emotional outcomes (belonging and school satisfaction) and general well-being outcomes to determine the breadth of intervention effects.

Method

Participants

Middle school students from across the United States (CA, CT, FL, HI, TX, UT, WA, WI) participated in this research through an online platform. Schools were recruited by researchers at the Project for Educational Research That Scales (PERTS) through phone calls, social media marketing, and word of mouth. We intended to recruit at least 1200 students from at least 5 schools to provide external validity of our findings, and did not have a specific stopping criteria during recruitment. We allowed all interested schools to participate, as long as they were able to commit to completing the three intervention and follow-up sessions with at least 100 students. Some schools did not fully adhere to these requirements, but were still included in analysis. Prior to the study, participating classrooms sent home parent information forms, at which point parents or guardians could opt their child out of the study. The Stanford Institutional Review Board approved this research and related activities.

Data were collected from 1675 students at 9 schools who completed the pre-intervention baseline survey and the post-intervention follow-up survey. Of those, 30 students (1.8%) were removed: 16 due to completing the follow-up survey the same day as an intervention session, 13

who did not report gender, misreported their grade level, or reported an atypical middle school age, and 1 student who completed the second intervention session prior to the first. Analyses include the remaining 1,645 students (50% female). The majority were White/Caucasian (42%) or Hispanic (31%), followed by Multiracial (15%), Other/Unreported (5%), Asian (4%) and Black/African American students (3%). Some students did not complete particular questions, and thus the degrees of freedom vary across the analyses reported.

Procedure

During school hours, teachers scheduled computer access for their students to sign on to the study web site (www.perts.net) for two 45-min intervention or control sessions and one 15-minute follow-up session. Upon sign-in during Session 1, students gave assent to participate in the study and filled out baseline dependent variables and demographic information. Students were then individually randomized by Qualtrics survey software to either the theories of emotion intervention or to a control condition. In order to blind participants to their random assignment, participants were told there were multiple versions of the program with different activities, and that they should not look at others' screens to protect other students' privacy. Approximately one to four weeks after the first session (Mean=13 days SD=6.5 days), students went back to the study website and signed in with their school codes, names, and birthdays to be recognized in the system. If a student had previously participated, but was not recognized by the website (e.g., due to a non-matching name), they were assigned to the control materials in Session 2, but kept in the treatment group for analysis (n=14). Students who did not sign on to complete the second session of the intervention or control materials (e.g., due to missing that day at school) were also included in all analyses (n=101; 6%). We had pre-specified both inclusion criteria to ensure the

practical robustness of our effect in other school settings. That is, in real-world educational settings, whole classrooms or individual students will sometimes miss a portion of the intervention materials, and thus a stricter test of intervention robustness includes these students. Approximately two to six weeks after the second session (Mean=24 days; SD=8.3 days), all students signed on to the study website and filled out follow-up survey materials, which took 15 minutes. After data were collected, non-matching names were matched across sessions by visual inspection and programmatically merged for data analysis. The timing of sessions was fairly flexible, due to school scheduling constraints and limited school computer access. While reading the intervention and control materials, students were given the option of hearing the module spoken aloud through their headphones.

The two intervention modules were designed to instill an adaptive theory of emotion. Session 1 was intended to give students a better understanding of emotions to set the stage for learning how emotions can be influenced in Session 2. Students in the treatment group during Session 1 learned: 1) what emotions are and how they form, 2) the importance of recognizing when you feel emotions, and 3) that difficulties with emotion regulation are normal. During Session 2, students reviewed the lessons from Session 1, and were then taught adaptive emotion theories and emotion regulation strategies to exemplify how emotions can be modified. These materials were designed to show that 1) people can modify their emotional experience, 2) people can get better at changing their emotions with practice, and 3) everyone can use emotion regulation strategies such as reappraisal to increase their well-being. The intervention focused on common emotionally challenging experiences that occur in school, such as being teased by a peer or receiving a poor grade. The messages were reinforced through interactive components

and short responses to have students use what they've learned in hypothetical situations. In addition, certain messages were added to ensure students did not think they *always* had to attempt to modify their emotions: that even negative emotions can sometimes be helpful and they are a normal part of life. Full intervention materials and procedures can be found in the supplemental materials.

The control condition taught students basic information about how the brain works. The topics included the techniques scientists use to study the brain, localization of function within brain lobes, and how areas of the brain work together in daily life. The control sessions were designed have the same amount of interactivity and structure as the intervention condition, without addressing emotional experiences. Similar control groups have been used in prior implicit theories interventions (see Paunesku et al., 2015).

Primary Measures

Participants completed baseline measures at the beginning of Session 1 and follow-up measures during Session 3. Due to the limited amount of time available for students to fill out these items, scales were made as brief as possible, while maintaining reasonable psychometrics.

Adaptive Theories of Emotions ($\alpha_{Baseline}=.64$; $\alpha_{Post}=.74$). Participants responded to six statements about the nature and malleability of their emotions on a 6-item scale (1="strongly disagree", 6="strongly agree"). These items were based on prior implicit theory of emotion items (Tamir et al., 2007) and the Emotion Regulation Questionnaire (Gross & John, 2003), and modified to clearly tap into three interconnected beliefs. These beliefs included emotion *malleability* ("No matter how hard they try, people can't really change the emotions that they have [reverse-scored];" "The truth is, people have very little control over their emotions [reverse-

scored]”), *incremental improvement* (“You can learn how to control your emotions” ; “You can get better at changing your emotions if you practice”), and the means to emotion malleability: *reappraisal efficacy* (“When I want to feel *less negative* emotion (such as sadness or anger), I can think of things in a new or different way;” “When I want to feel *more positive* emotion (such as joy or amusement), I can think of things in a new or different way.”)

Emotional Well-being in School. Participants indicated their positive and negative emotions felt during school as an indicator of emotional well-being in school (1=“strongly disagree”, 6=“strongly agree”): “I tend to feel a lot of positive emotions at school” and “I tend to feel a lot of negative emotions at school” ($r_s = .53$). Following prior research that suggests the difference between positive and negative emotions is crucial to understanding emotional well-being (Romero et al., 2014; Diener, 1994), we combined these into one index by subtracting negative emotions felt from positive emotions felt.

Additional Measures

School Satisfaction and Belonging. Though our main a priori hypothesis concerned emotional well-being in particular, we also assessed two proximal measures closely tied to emotional well-being in school: School satisfaction (“I am satisfied with my life at school”) and belonging (“I feel like I belong at my school”).

Life Well-being. The intervention messages were focused on scenarios within the school setting, and clarified ways to improve students’ emotional experiences within the confines of school. Nonetheless, we also tested whether these messages might generalize beyond the school setting. We assessed distal measures of overall life well-being with two items similar to those used to assess school well-being, removing the qualifier “at school” (“I tend to feel a lot of

negative emotions” and “I tend to feel a lot of positive emotions”; $r_s = .52$), as well as life satisfaction (“I am satisfied with my life”).

Items were created based on extensive pilot-testing with middle school students, and similar measures have shown adequate validity and reliability in this population (Romero et al., 2014). Correlations from baseline to follow-up within all measures in the control group ranged from 0.57 to 0.71, indicating adequate test-retest reliability. Demographic measures and other measures were also collected for hypotheses not relevant to the current article (See supplemental materials for discussion of all measures obtained).

Results

Preliminary Analyses

Random Assignment. There were no significant baseline differences in school well-being or theories of emotion between the control group and treatment group ($p_s > .45$). Students were also successfully randomized by race and gender ($p_s > .41$).

Baseline Correlations. Consistent with prior research, students with more adaptive theories of emotion reported greater well-being in school, $r(1634) = .30, p < .001$ and more positive socio-emotional outcomes across all additional measures assessed ($r_s > .22; p_s < .001$). All three individual beliefs were correlated with school well-being and with each other ($r_s > .10; p_s < .001$). These findings replicate the expected relationships between adaptive theories of emotion and school well-being in this student population.

Did the Intervention Increase School Well-being?

We used a linear model predicting follow-up school well-being, controlling for baseline school well-being, with a dummy code for treatment (0=Control, 1=Intervention). A hierarchical model, i.e. nesting students within school, and additional analytic models can be found in the supplemental materials. As the hierarchical model did not increase model fit considerably ($\Delta R^2 = .006$), and findings were consistent across models, we report fixed-effects models throughout. Consistent with our hypothesis, students in the treatment group reported higher emotional well-being at school compared to their peers, $\beta=0.10$, $t(1621)=2.48$, $p=.013$, 95% CI [.02, .17].

Simple effects determining the change in well-being over time reveal that students assigned to the control group show a significant decline in school well-being over the intervention period, as found in prior research, $b=-0.44$, $t(1622)=-6.26$, $p<.001$, 95% CI [-.30, -.58], while this decline was reduced by 58% in the treatment group, $b=-0.18$, $t(1622)=-2.67$, $p=.008$, 95% CI [-.05, -.32]. We also tested the generalizability of this effect across sub-populations of students, suspecting the intervention messages would be helpful to students regardless of grade level, gender, or race. We find that none of these demographic variables moderate the intervention effects on school well-being ($ps > .24$).

Were Changes in School Well-being Driven by Theories of Emotion?

We hypothesized that this targeted intervention would increase students' adaptive theories of emotion, which in turn would allow students to maintain a greater level of well-being through emotional challenges in middle school. We find the intervention increased students' adaptive theories of emotion, $\beta=0.25$, $t(1636)=5.93$, $p<.001$, 95% CI [.16, .33] (see Figure 1).

Insert Figure 1 About Here

We then ran a bootstrapped indirect effect model (iterations=1000) to determine whether the intervention effects on school well-being were driven by changes in theories of emotion.

Although we cannot directly test the mediational mechanism due to only two time-points, this model would be suggestive of the proposed theoretical mechanism through theories of emotion.

Using baseline measures as covariates in the model, we find a significant indirect effect, $\beta=0.035$, 95% CI_{boot} [.019, .052], $p_{boot} < .001$ (see Figure 2).

Insert Figure 2 About Here

Secondary Analyses

For the two measures closely related to emotional well-being in school, we found that feelings of belonging were higher in the intervention group compared to control, $\beta= 0.09$, $t(1613)=2.33$, $p=.020$, 95% CI [.02, .17], but general school satisfaction was not significantly different between groups ($\beta= 0.01$, $t(1620)=.25$, $p=.80$, 95% CI [-.07, .09]). When testing whether these effects generalized to distal measures of overall emotional well-being or life satisfaction, we did not find any significant effects (life well-being, $\beta= 0.02$, $t(1622)=0.52$, $p=.60$, 95% CI [-.05, .09]; life satisfaction, $\beta= 0.00$, $t(1614)=0.01$, $p=.99$, 95% CI [-.07, .07]).

We also found that baseline theories of emotion predicted changes in school well-being regardless of condition ($\beta= 0.05$, $t(1616)=2.60$, $p=.009$, 95% CI [.01, .09]), as well as secondary outcomes of school belonging, school satisfaction, overall well-being, and overall life

satisfaction ($\beta > 0.07$, $p < .001$), providing evidence for the predictive validity of the theories of emotion scale.

To understand the intervention effect more fully, we separated the adaptive theories of emotion scale into its three subcomponents to determine whether we successfully influenced these three component beliefs. The intervention increased all three adaptive emotion beliefs compared to the control condition (malleability, $\beta = 0.17$, $t(1625) = 3.79$, $p < .001$, 95% CI [.08, .25]; incremental improvement, $\beta = 0.23$, $t(1622) = 5.23$, $p < .001$, 95% CI [.14, .31]; reappraisal efficacy, $\beta = 0.16$, $t(1625) = 3.42$, $p < .001$, 95% CI [.07, .25]).

Furthermore, we used indirect effect analyses to examine the intervention effects on school well-being through changes in individual beliefs. We found that all three beliefs had a significant indirect effect on the relationship between the intervention and school well-being, controlling for baseline measures (malleability, $\beta = 0.009$, 95% CI_{boot} [.001, .019], $p_{boot} = .028$; incremental improvement, $\beta = 0.025$, 95% CI_{boot} [.013, .041], $p_{boot} < .001$; reappraisal efficacy, $\beta = 0.023$, 95% CI_{boot} [.008, .038], $p_{boot} < .001$). Upon follow-up analyses, we discovered that when the three beliefs were entered simultaneously in an indirect effects model, only incremental improvement and reappraisal efficacy beliefs remained significant indirect effects on the relationship between the intervention and school well-being ($\beta = 0.013$, 95% CI_{boot} [.002, .027], $p_{boot} = .022$; and $\beta = 0.019$, 95% CI_{boot} [.006, .033], $p_{boot} < .001$, respectively), while malleability beliefs did not ($\beta = 0.004$, 95% CI_{boot} [-.004, .013], $p_{boot} = .35$).

Discussion

We set out to determine whether theories of emotions can be influenced to produce meaningful changes in emotional well-being in school. We found that middle school students

randomly assigned to the intervention condition reported more adaptive theories of emotion and greater emotional well-being in school compared to the control group.

The current research is one of the first studies to change theories of emotions to produce improved outcomes in a real-world setting. Prior work has found longitudinal evidence for the importance of students' theories of emotions on emotional well-being (e.g. Romero et al., 2014; Tamir et al., 2007), yet little research has demonstrated how beliefs about our emotions causally affect emotional experiences. This study shows preliminary evidence for theories of emotion interventions, and we encourage researchers to use our open materials to independently pre-register and conduct replication studies to better understand the robustness of these results. In addition, improved emotional outcomes have been achieved through other targeted interventions (Miu & Yeager, 2015; Schleider & Weisz, 2016), and future work should disambiguate the pathways in which distinct implicit theories may lead to similar emotional outcomes (see Schleider, Abel, & Weisz, 2015).

Further, we assess the influence of these theories in the impactful setting of middle school. We delivered the intervention to adolescent students because of the emotionally difficult personal, social, and academic changes that produce notable emotional challenges (Roeser et al., 2000). Consistent with research indicating a decline in emotional functioning over adolescence (e.g. Larson et al., 2002), we find that students in the control group have a fairly steep decline in their emotional well-being in school over just a few weeks. The intervention reduced this decline by 58%.

We find only minimal evidence that students generalized the intervention messages to other facets of socio-emotional well-being. The intervention group did, however, report higher

levels of belonging in school. One reason for this may be that similar to successful interventions directly targeting belonging (Walton & Cohen, 2007), our messages framed negative school emotions as normal and potentially transitory. This suggests students were successful in adapting the broad messages of the intervention to specific concerns of social belonging. In line with prior work demonstrating that satisfaction is distinct from affective well-being (Lucas, Diener, & Suh, 1996), students' greater emotional well-being at school did not translate to greater satisfaction with the general school environment. In addition, we did not find evidence that our intervention messages generalized to distal measures of overall life well-being and satisfaction. This is perhaps because the intervention did not apply the discussed beliefs and strategies to settings outside of school and students require examples to bring theories of emotion to bear in other contexts. Another possibility is that students may simply need more time than our moderate-term follow-up before theories can be adapted to non-academic scenarios. A challenge for future research will be to conduct long-term follow-up on similar interventions and determine how to adapt these messages to increase socio-emotional well-being across settings.

A related challenge is to better understand the underlying beliefs about emotions that promote long-term well-being. When we examine the component beliefs of the adaptive theories of emotion scale, we find that all three were correlated with well-being measures, all were successfully influenced by the intervention, and the intervention had an indirect effect on changes in school well-being through both incremental improvement and reappraisal efficacy beliefs. It is worth noting that increases in malleability beliefs, which have been the focus of past theories of emotion research, were less predictive of changes in school well-being compared to other beliefs. This suggests teaching that emotions are malleable may not be sufficient to drive

changes in well-being. It seems people must also feel efficacious and acknowledge the incremental benefits of effortful practice to obtain benefits. These messages have been explicitly addressed in theories of intelligence interventions (e.g. Blackwell et al., 2007), and suggests researchers adapting this work to other domains should be precise in defining and targeting the beliefs that encompass adaptive theories. However, we must also allow the possibility that the malleability items were not predictive due to the distinct item structure (as they were both reverse-coded and in the third-person form), and future work should ensure these confounds are not the reason for differential findings between beliefs. We also note that our control group did not address emotions or emotion strategies and it is possible that the intervention effects were not unique to learning adaptive theories of emotions. That is, other emotionally-relevant interventions that do not target structuring theories of emotion (e.g. affect labelling, Lieberman, Inagaki, Tabibnia, & Crockett, 2011; reflective writing, Pennebaker, 1997; accepting emotions, Hayes et al., 2006) may be used as comparison groups in future work to clarify the specific benefits of teaching adaptive theories.

We designed the intervention to be brief and delivered directly to students over the internet to minimize burden on schools, maximize fidelity, and be able to scale up if the treatment was found to be effective (see Paunesku et al., 2015). The fairly heterogeneous sample and lack of moderation by school or demographic variables gives initial evidence that this line of research may be broadly impactful. Although the effect sizes were modest, the online direct-to-student delivery and minimal time requirements suggests this work may be a cost-effective method to improve emotional well-being (see Mohr, Burns, Schueller, Clarke, & Klinkman, 2013). We used broad measures of positive and negative emotional experiences as our dependent

measure of well-being at school, as they succinctly capture the broad experience of everyday positive and negative emotions, which is precisely what our intervention targeted. However, other measures that assess specific emotions felt (PANAS; Watson, Clark, & Tellegen, 1988) or symptoms of mood disorders (e.g. CDI:S; Kovacs, 1992) would be informative for future work. Students encounter a variety of emotions in the classroom (Pekrun, Goetz, Titz, & Perry, 2002), and show increasing prevalence of depression in adolescence (Substance Abuse and Mental Health Services Administration, 2016). Thus, more granular measures would capture how specific emotional experiences are being influenced by similar interventions.

The present study provides initial evidence that changing theories of emotion can promote positive well-being in school and sets the stage for future work to determine how to make the benefits generalize beyond the school setting. By further exploring adaptive theories of emotion, we can contribute to a better understanding of students' well-being, and identify new levers of increasing emotional resilience.

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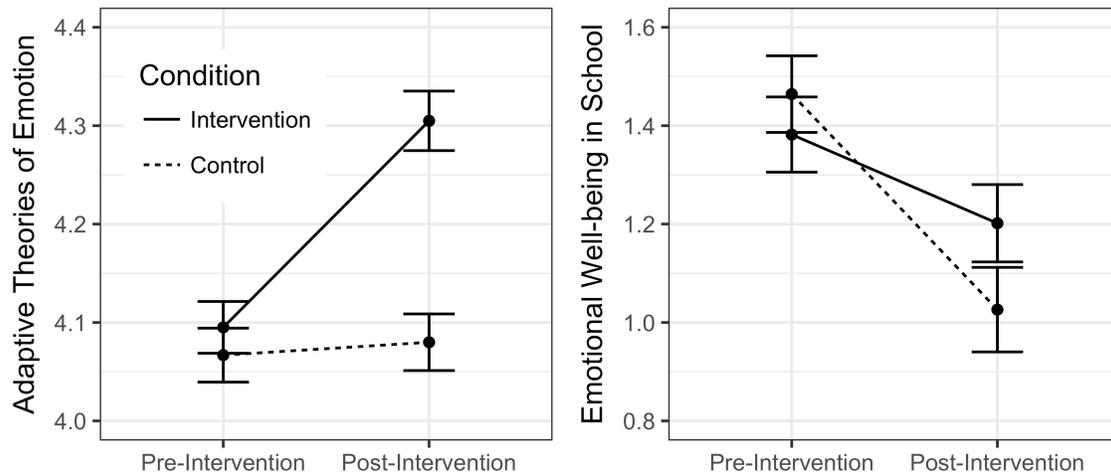


Figure 1: Adaptive Theories of Emotion and School Well-being by Condition. The intervention increased students' adaptive theories of emotion and reduced the decline in school well-being over time. Error bars represent +/- 1 standard errors of the mean.

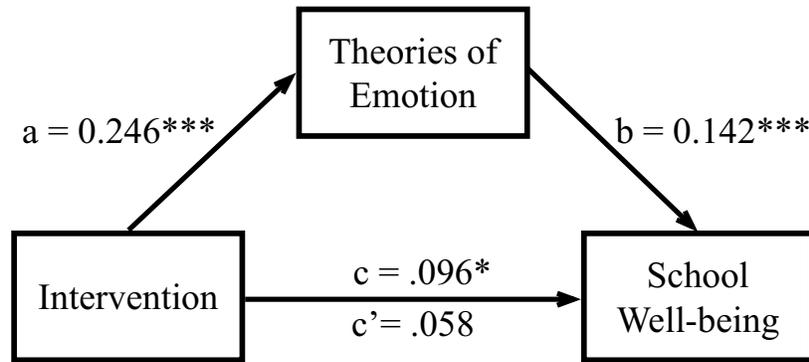


Figure 2: Impact of Intervention on School Well-being through Changes in Adaptive Theories.

The intervention increased students' emotional well-being in school through changes in adaptive theories of emotion. All reported paths are standardized betas, controlling for baseline measures. Results shown are non-bootstrapped coefficients.