A Formative Evaluation of Your Brain, Yourself!: A Program for Elementary Students to Reduce Stress and Change Beliefs About Ability

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Abstract

The current study is a formative evaluation of a six-week intervention program developed for elementary students. The program aimed to help students (N = 77; 40 3rd graders and 37 4th/5th graders) adopt a growth mindset by expanding their current knowledge of the brain and malleability of their abilities, and by providing them with age-appropriate techniques (or “tricks”) for reducing stress. In our formative evaluation, we focused on whether children understood and related to the concepts we shared. The current formative evaluation program showed promising program effects. Formatively, our program taught students to 1) share information they learned in the program with others and 2) use the behaviors we recommend in the program.

Introduction

Beliefs about intellectual abilities can enhance students’ motivation and academic performance in school (Blackwell et al., 2007; Dweck & Master, 2009). Having a growth mindset—the belief that ability can be improved through effort—has been associated with academic achievement and high performance in school settings (Dweck, 2006; Stipek & Gralinski, 1996). Alternatively, a fixed mindset involves the belief that ability is a fixed trait that cannot be improved and this belief has been linked to poorer performance. Intervention programs to promote a growth mindset, change beliefs about the malleability of ability, and teaching stress management have been linked to higher academic performance (Dweck, 2006; Stipek & Gralinski, 1996). Moreover, adolescent reports of high academic stress and stress management techniques have been linked to higher academic performance (Blackwell et al., 2007), but little attention has been paid to training these skills among elementary school-aged children. We created a six-week program to promote a growth mindset, change beliefs about the malleability of ability, and train elementary students to identify and reduce stress.

Here we present a formative evaluation of our program to determine whether children understood and related to the concepts we shared. The current formative evaluation program aimed to determine whether: 1) students understood the activities they learned in the program with others and 2) students used the behaviors we recommend in the program.

The goals outlined for our intervention program were to:

- a) Explore current knowledge about the brain.
- b) Promote a growth mindset.
- c) Provide information about the malleability of abilities and the plasticity of the brain.
- d) Empower students with age-appropriate strategies for reducing stress.

Method

Participants

Seventy-seven elementary students participated in the program. Forty were third-grade students and 37 were fourth- and fifth-grade students in a combined classroom.

Procedure

Across five sessions, students learned about the brain, mindset, mindfulness, and stress reduction through various lessons and activities. Each session participants completed worksheets in response to questions about their current knowledge and whether they adopted behaviors taught in previous sessions of the program. We created a coding system to evaluate answers to open-ended questions with 20% of cases blind-coded by independent evaluators (average kappa = .85, range .72 to .94). To help students understand that beliefs can help improve behavior, we taught them about optical illusions, or “brain tricks”, by helping them to make a thaumatrope (a card with an image on both sides, which when spun, appears to combine the images).

Materials

Students were provided individual workbooks which they used to record their answers.

Measures

- During each session, students were asked a series of open-ended and Likert-type questions about the following areas:
  - Knowledge of brain and brain care: During the second session, after students had received one week of training about the brain and how to take care of the brain, students were asked: “In the last week, how did you take care of your brain?” Responses were coded as: (a) physical body maintenance (e.g. eating healthy, exercising, body protection), (b) sleeping, (c) exercising the brain, (d) other, or (e) don’t know (k = .80).

Identification of brain care knowledge post-training. During the second session, after students had received one week of training about the brain and how to take care of the brain, students were asked: “In the last week, how did you take care of your brain?” Responses were coded as: (a) physical body maintenance (e.g. eating healthy, exercising, body protection), (b) sleeping, (c) exercising the brain, (d) other, or (e) don’t know (k = .80).

Identifying mindset beliefs post-training. During the second session, after students were asked: “Do you think you can get better at the things you are not good at?” Responses were coded as either (a) yes, (b) no, (c) or don’t know, or (d) k = .82. See Table 1.

Mindset beliefs. During the second session, prior to any training on mindset, students were asked: “What were some of the things you did to help you deal with the stress?” Responses were coded as either (a) not stressed, (b) stressful, (c) not stressed, or (d) other (k = .73). Second, they were asked: “How often did you notice yourself doubting your abilities last week?” Response options were: (1) Not much, (2) Some, or (3) A lot. See Table 1.

Knowledge of stress and stress reduction. During the second session, after students were asked: “In the last week, how did you take care of your brain?” Responses were coded as: (a) physical body maintenance (e.g. eating healthy, exercising, body protection), (b) sleeping, (c) exercising the brain, (d) other, or (e) don’t know. Students were also asked: “Who do you talk to about the brain magic we showed you last week?” Responses were coded as: (a) friends, (b) parents, (c) teachers, (d) grandparents, (e) siblings, (f) no one, or (g) others (k = .81).

Use of stress reduction “tricks”. During the last session, after students had received one week of training on stress and stress-relieving techniques, they were asked: “In the past week, did you notice when you were feeling stressed?” Response options were: (1) I didn’t have any stress, (2) I didn’t notice any feelings of stress, (3) noticed a few feelings of stress, or (4) noticed a lot of feelings of stress. Students were then asked three open-ended questions: “What was some of the things you did to help you deal with the stress?” Responses were coded as: (a) not stressed, (b) stressed, (c) a combination of stress and relief, or (d) other (k = .84). Then they were asked: “Which of the tricks worked best for you?”. Responses were coded as: (a) deep breathing, (b) counting, or (c) other (k = .90). See Table 2. Finally, they were asked: “Which of the tricks we taught you to lower your stress do you think is the best?” Responses were coded as: (a) deep breathing, (b) counting, or (c) other (k = .90). See Table 2.

Results

- When students were asked what the brain does, 81.9% of the sample were able to describe at least one way to take care of the brain (e.g. healthy food, plenty of rest, safe behaviors). When students were asked how many things they did to take care of the brain after we taught them to take care of their brains, 88.5% were able to give an example of how they took care of their brain in the last week (M = 1.08).

One week after the trainawtation demonstration, 67% of the students reported they had explained the brain to at least one other person (Figure 1).

When asked what stress is, 18.2% of students said that stress was anger and 3.9% of students had no idea. Before we taught students how to manage their stress, 36% of the students had no idea whether stress could be managed. After training, 61.1% of the stress-reduction techniques taught to students were used and 63% of the techniques taught were reported as a stress-reduction “trick” that worked best for them (Figure 2).

Discussion

The preliminary findings of our formative program evaluation showed promising program effects. Based on these results, we believe that children as young as third grade can perform basic stress-reduction methods. This formative program evaluation demonstrated that children responded to the program and produced positive outcomes as measured by the number of stress-reduction techniques they employed, their understanding of how to care for their brains, and their sharing of brain magic with other individuals who did not take part in the program.

Further quantitative summative outcome studies are needed based on the results of this intervention and should involve a randomized trial to assess change over time in some of the measured indicators as well as comparisons between those who receive the program and those who do not. Future interventions should also capitalize on the natural curiosity of children to understand the brain. Overall, findings from this formative evaluation have practical implications for parents, teachers, school counselors, and educators who work with elementary students.

Acknowledgement

We greatly appreciate the time the families devoted for this study. We are also thankful for the members of the Family Interaction Research Lab for assisting with the recruitment and analyses of these data which made this work possible.

To learn more about our lab or to download this poster with references please visit: http://online.sfsu.edu/devpsych/fair

Table 1

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<td>Other</td>
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Table 2

<table>
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<th>Frequency</th>
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<td>Magic trick</td>
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<tr>
<td>Wash hands</td>
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<tr>
<td>Other</td>
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</tbody>
</table>

Figure 1

"Who did you share the brain magic with?" Which "tricks" worked best for you?

- Friends
- Parents
- Teachers
- Grandparents
- Siblings
- Others

Figure 2

Post-training responses 3rd, 4th, and 5th graders gave when asked the open-ended question "Which stress-reduction techniques worked best for you?"