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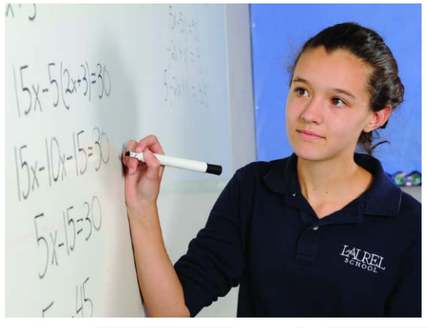
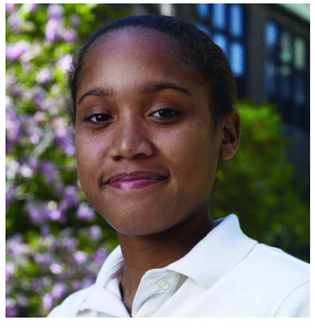
SHIELDING STUDENTS FROM STEREOTYPE THREAT

A GUIDE FOR TEACHERS



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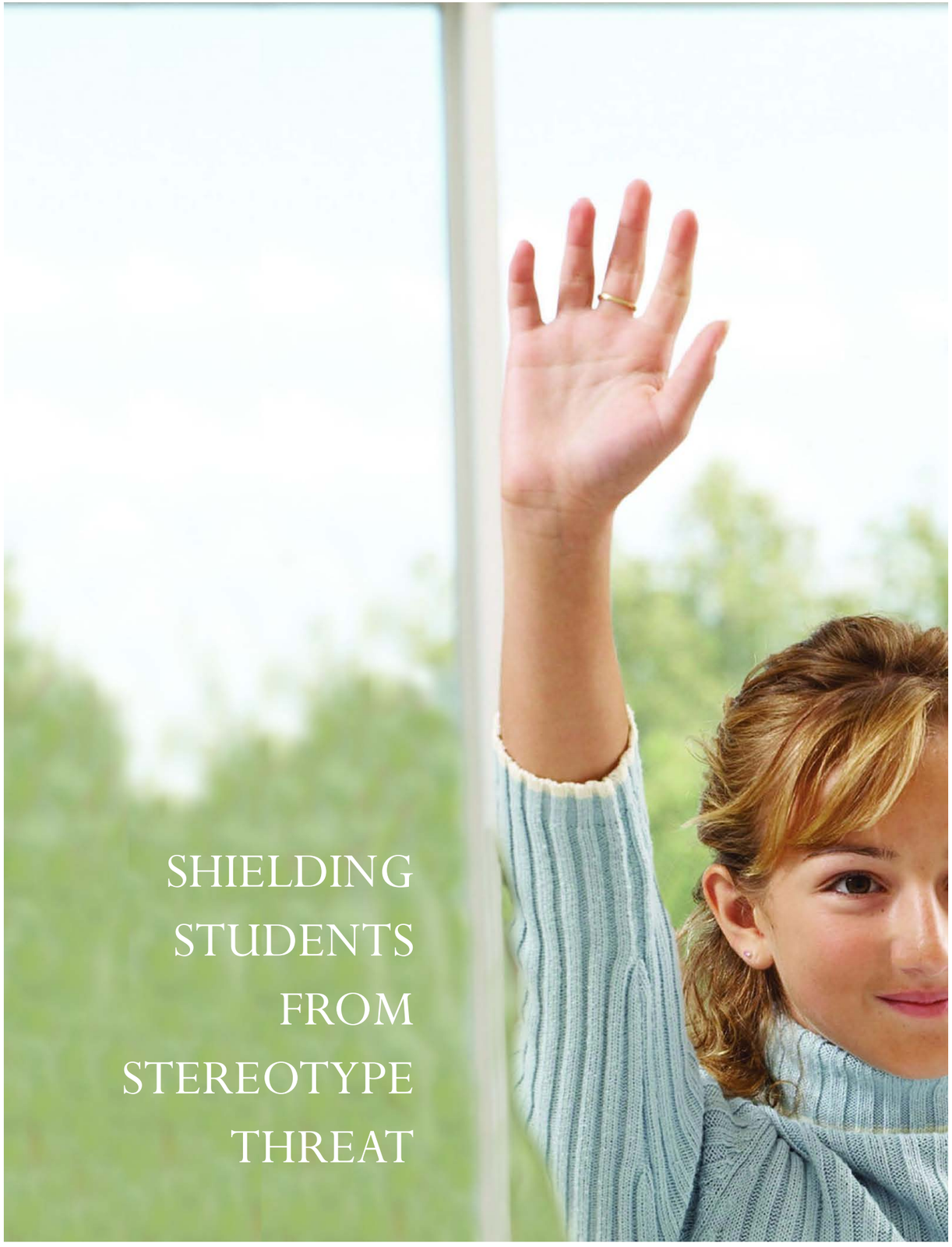
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CONCEPTUAL OVERVIEW

Research demonstrates that the very existence of a negative stereotype (e.g., "boys are better than girls at mathematics") suppresses the test performance of members of the negatively stereotyped group (Aronson, 2002). This phenomenon is known as stereotype threat. Members of negatively stereotyped groups tend to underperform in situations that have the potential to confirm the negative stereotype because anxiety about confirming the stereotype leads to negative thoughts and difficulties with short-term memory (Halpern et al., 2007). As an example of stereotype threat at work, young women who believe that they are taking a test of *mathematics ability* perform less well than young women who believe that the same test is a test of problem-solving strategies (Spencer, Steele, & Quinn, 1999).

Stereotype threat can be particularly salient for students who are eager to disprove negative stereotypes about the groups to which they belong. For example, ambitious female mathematics students who are eager to prove that they are "just as good as boys" on mathematics tests feel heightened pressure in situations, such as standardized testing, where they can demonstrate their abilities in mathematics. Thus, stereotype threat is most likely to effect high-achieving students on high-stakes tests. The effects of stereotype threat are further heightened when the testing situation includes factors that might bring the stereotype to mind (Steele, 1997). For girls facing a negative stereotype about mathematics ability, these factors include: taking mathematics tests alongside boys, being given a mathematics test by a male instructor, and/or being required to provide demographic information about their gender at the start of the test (as is often the case in standardized testing).

A wide variety of interventions have been found to diminish the negative effects of stereotype threat. This guide is designed to help teachers integrate research-based approaches to shielding students from stereotype threat into their everyday teaching practice. The sections below offer specific advice about how teachers can create a stereotype threat-free classroom environment. In general, the following recommendations focus on addressing stereotype threat as it applies to girls taking mathematics courses and tests; the approaches described below can and should also be applied to any context in which stereotypes pose a threat to a member of any negatively stereotyped group (e.g., racial minority students who face negative stereotypes regarding intelligence).

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SHIELDING STUDENTS FROM STEREOTYPE THREAT: DAY-TO-DAY CLASSROOM PRACTICE

EDUCATE GIRLS ABOUT STEREOTYPE THREAT.

Research interventions that teach girls about the phenomenon of stereotype threat have been found to dramatically reduce its negative impact on mathematics test performance (Johns, Schmader, & Martens, 2005). Girls who are taught about the phenomenon of stereotype threat are more likely to attribute their test-taking anxiety to the existence of the negative stereotype (as opposed to an *actual* ability deficit), thus protecting their performance in test-taking situations. Given that the concept of stereotype threat is somewhat complex, high school students are the most appropriate audience for direct teaching about stereotype threat. The remaining recommendations in this guide are appropriate for students at any developmental level.

When teaching students about stereotype threat, be sure to help them appreciate that it is a subtle process that generally operates outside of their awareness. Using the bulleted information provided below, help students develop a specific understanding of how stereotype threat interferes with academic performance.

Research findings about stereotype threat:

- Members of negatively stereotyped groups experience heightened anxiety in situations where they have the potential to confirm the negative stereotype
- Instead of attributing their anxiety to stereotype threat, members of negatively stereotyped groups wrongly attribute their heightened anxiety to:
  - lack of ability, despite *actually having* the ability to do work
    - "I'm not smart enough to do this problem!"

      or
  - situational difficulty, *even when* the demands of the situation are appropriate to their skill level
    - "This test is way too hard!"
- Once anxious, students experience:
  - increased negative thoughts
    - "I can't do this!"
    - "I should have studied more."
  - increased physiological arousal
    - elevated heart rate, blood pressure
  - reduced working memory capacity
    - difficulty thinking
    - "brain freeze"
  - reduced performance expectations
    - "I know I'll fail."
  - increased *or* reduced effort
    - trying too hard (changing answers, ruminating on problems, becoming perfectionistic)
    - giving up (answering randomly, stopping work)
- Not surprisingly, all of these effects *cause students to underperform*.

Once your students understand stereotype threat, it is important to let them know that *being aware of stereotype threat* can effectively shield them from it. For example, Johns, Schmader, and Martens (2005) found that teaching women about stereotype threat before giving them a mathematics test and saying "it is important to keep in mind that if you are feeling anxious while taking this test, this anxiety could be the result of these negative stereotypes that are widely known in society and have nothing to do with your actual ability to do well on the test" (p. 176) significantly improved their test performance.

BE MINDFUL OF SUBTLE TRIGGERS OF STEREOTYPE THREAT.

Subtle factors, such as the ratio of boys and girls taking a test in the same room, or even the presence of a question that asks a student to record her gender, can trigger stereotype threat.

Research demonstrates that stereotype threat is heightened for girls taking tests in rooms in which there are more boys than girls (Inzlicht & Ben-Zeev, 2003; Sekaquaptewa & Thompson, 2003). Further, as the number of males in the room increases, so does the female underperformance (Inzlicht & Ben-Zeev, 2000).

Instructors should seek to alter the female-to-male ratio in classroom settings where males are in the majority. The best time for such an alteration is during mathematics testing, as this is time when stereotype threat is heightened for most female students. If possible:

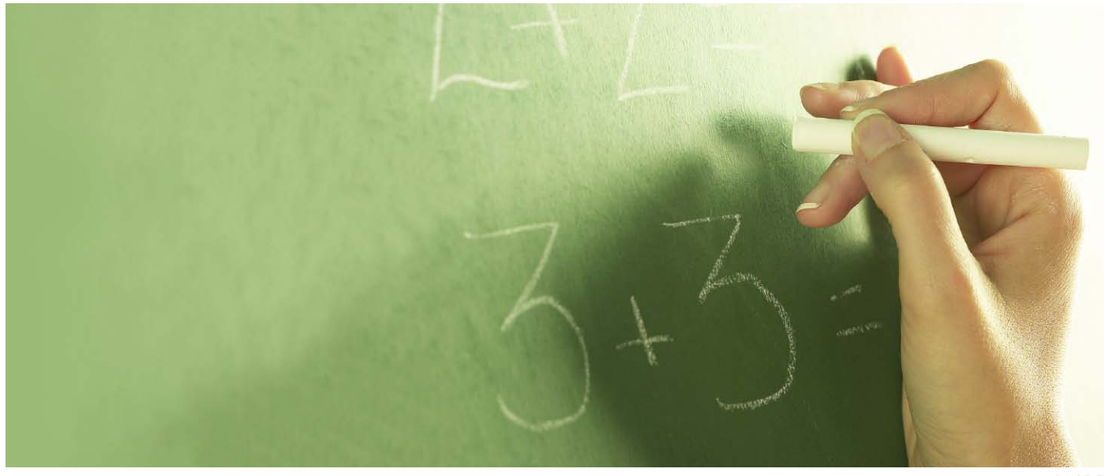
- split the class so that the females all go to one room to take the test and the males go to another;
- alternately, split the class into smaller groups where the number of females outnumbers the number of males in each group.

Putting students into different groups often calls for more than one test proctor. Find a colleague or another adult, preferably a female, to proctor the female students.

Remarkably, stereotypes can be activated by a factor as subtle as a demographics question about one's gender or race. Danaher and Crandall (2008) determined that 4700 more girls a year would receive AP calculus credit if the question that asks about the student's gender were moved to the back of the test.

Most standardized tests require students to complete several demographics questions. While educators may not have the authority to change such requirements, they may be able to ask students to fill in their demographic information after they have completed the test. In addition, instructors should take care to eliminate gender references (e.g., "Good morning, ladies!", "What's up fellas?") from their vocabularies so as not to unnecessarily trigger stereotype threat.

When teachers attend to gender grouping, reporting of demographic information, and gendered references – especially in testing situations – they can shield their female mathematics students from stereotype threat.



more likely to garner the younger student's attention and respect, therefore having a substantial effect on the student's learning, values, and habits.

To be optimally effective the mentor should:

- emphasize the expanding nature of intelligence.
  - Brains, like muscles, develop in response to effort.
  - With continued effort in the face of intellectually challenging work, people can make themselves smarter.
- emphasize external/unstable/specific explanations for when students are having difficulty.
  - For example, mentors should point out that it's the novelty of the material, not the limitations of the student, that make some of the work difficult.

SHIELDING STUDENTS FROM STEREOTYPE THREAT: TESTING CONSIDERATIONS

PROVIDE GIRLS WITH EXTERNAL ATTRIBUTIONS FOR ANXIETY DURING TESTING.

When students are faced with high-stakes testing situations, prepare them by talking about the fact that they might be anxious, but emphasize external explanations for their anxiety. Research shows that the effects of stereotype threat can be reduced by providing students with any of a number of situational (as opposed to stereotype-based) explanations for anxiety. Ben-Zeev, Fein, and Inzlicht (2005) found that women's mathematics test scores improved when they were told that their increased anxiety might result from the (actually non-existent) "subliminal noise generator" that would be making an inaudible tone throughout the testing (p.176). Brown and Josephs (1999) achieved a similar result when they led female test-takers to believe that any anxiety felt while taking a mathematics test was due to the "crash" (manipulated by the experimenters) of a computer program designed to give the women test practice before the actual testing began. In other words, when female students are given ways to attribute anxiety felt during mathematics tests to external (not internal) factors, their performance improves.

Students who are taking tests away from their home schools (as is often the case with the SAT and ACT) should be reminded that anxiety may arise from:

- taking a test in a novel setting;
- taking a test in the presence of people (proctors and students) who are totally unfamiliar;
- taking a test on a weekend day, or outside of one's normal routine.

For testing that happens at one's home school, teachers should point out that girls might feel anxious because they are:

- feeling stressed by the timing of the exam
- trying to manage other obligations (e.g., preparing for an upcoming holiday) at the same time
- aware of disruptions going on around them (e.g., loud students in hall, heavy traffic outdoors, nearby construction, etc.).

The process of shifting blame and anxiety to an external attribute rather than the negative stereotype can ease anxiety and lead to better performance.

An open dialogue about the threat that female students experience in their mathematics courses is a valuable way to begin a new course. In raising the topic with your students, consider asking them to write down their thoughts about girls, boys, and mathematics and then talk about what they wrote. Feel free to ask your students about the stereotypes that exist about girls' mathematics abilities, and to assess the degree to which your students believe these stereotypes or not. In talking with your students about stereotype threat, be sure to let them know that they need not believe the stereotype themselves in order to be threatened by it; they simply need to believe that *other people* believe the stereotype in order to become anxious about the possibility of confirming it.

PROVIDE GIRLS WITH POSITIVE STEREOTYPES ABOUT THEIR MATHEMATICS PERFORMANCE.

Providing girls with positive stereotypes about their mathematics performance effectively offsets the negative effects of stereotype threat (McGlone & Aronson, 2007). Below are some facts that every female student should know.

- Contrary to the stereotyped view that boys are more academically talented than girls, as a group girls:
  - get better grades than boys (Buchmann & DiPrete, 2006)
  - are more likely to go to college than boys (Cho, 2007).
- Contrary to the stereotyped view that boys outperform girls on mathematics tests, standardized tests in the U.S. indicate that girls now score just as well as boys in mathematics (Hyde et al., 2008).

Girls educated in single-sex settings should know that:

- Girls educated in all-girls mathematics courses have higher levels of mathematics achievement than boys and girls in co-educational mathematics courses (Shapka & Keating, 2003).

COMMUNICATE HIGH STANDARDS FOR PERFORMANCE AND ASSURANCES THAT GIRLS ARE CAPABLE OF MEETING THOSE STANDARDS.

In your day-to-day interactions with students, be sure to communicate high standards for performance and assure your students that they are capable of meeting those standards. Research has shown that doing so

- sends the message that the girls are assumed to be capable of doing the work before them;
- reassures girls that they belong in mathematics courses;
- distances girls from the negative stereotypes about girls and mathematics performance (Cohen, Steele, & Ross, 1999).

As a corollary, teachers should be careful to avoid sarcasm and criticism, even if delivered in a humorous manner (Winkelhake, 2008). Sarcasm and criticism can

- be taken personally by students, even if that was not the instructor's intention
- send the message that the classroom is not a safe place for taking risks or testing one's limits
- devalue girls' learning or inadvertently reference negative gender stereotypes
- indicate that the instructor believes negative gender stereotypes, a condition which has been shown in the research literature to heighten stereotype threat (Adams, Garcia, Purdie-Vaughns, & Steele, 2006).

FOCUS ON *IMPROVING* RATHER THAN *PROVING* ABILITY.

Stereotypes, by their nature, assume that capacities are fixed. Students who believe that capacities are malleable are insulated from stereotype threat (Inzlicht & Good, 2004). To help students in seeing their capacities as malleable, it is useful for instructors to cultivate a "growth mindset" as opposed to a "fixed mindset" in students.

"Fixed mindset" students believe that mental abilities are static while "growth mindset" students believe that ability can be improved through effort. Compared to students with a "growth mindset," students with a "fixed mindset" are more likely to give up when faced with academic challenges. Girls are more likely than boys to attribute academic difficulty to lack of ability (a "fixed mindset"), especially in mathematics (Lloyd, Walsh, & Yailagh, 2005).

Research interventions emphasizing that ability can be developed through effort have been found to improve grades and test scores in mathematics (Blackwell, Trzesniewski, & Dweck, 2007).

- Girls who are helped to adopt a "growth mindset" are less likely to view academic difficulty as evidence of lack of ability (Halpern et al., 2007).
- Girls who adopt a "growth mindset" persist when faced with difficult material and outperform students with a "fixed mindset" (Mangels, Butterfield, Lamb & Good, 2006; Utman, 1997).

To help your students develop a "growth mindset," you can teach them some basic information about how the brain works and you can adopt particular teaching strategies that reinforce the idea that the brain is malleable. Below is a list of specific instructions.

- Teach students that:
  - both brains and muscles have tiny structures that can grow and multiply
    - muscles have fibers
    - brains have neurons and dendrites
  - the tiny structures in brains and muscles only develop when challenged by difficult tasks
    - muscles develop when they lift heavy weights
    - brains develop when students do intellectually challenging work
  - both muscles and brains require sustained effort in order to develop
    - muscles grow with regular and repeated workouts
    - brains grow with sustained practice on intellectually challenging material
- Praise effort rather than ability.
- When students have difficulty, focus on explanations that are
  - external (e.g., tricky test)
  - unstable (e.g., still learning a new skill)
  - specific (e.g., had trouble on only *one* test)
- When students have difficulty, avoid explanations that are
  - internal (e.g., the student is bad at mathematics)
  - unstable (e.g., the student will never "get" fractions)
  - global (e.g., the student *always* underperforms)

SHIELDING STUDENTS FROM STEREOTYPE THREAT: SUPPLEMENTAL ACTIVITIES

GIVE STUDENTS OPPORTUNITIES TO REFLECT ON VALUED CHARACTERISTICS AND TO VIEW THEMSELVES AS COMPLEX AND UNIQUE.

Research shows that negative stereotypes pose less of a threat when stereotyped students are given the opportunity to focus on valued aspects of themselves and to think about themselves as complex and unique (Gresky, Ten Eyck, Lord, & McIntyre, 2005; Martens, Johns, Greenberg, & Schimel, 2006). In situations where stereotype threat is heightened for girls, such as during mathematics exam periods, take time in class to have students write about their valued characteristics and to encourage students to think of themselves as having a number of important personal dimensions.

In order to help students reflect on their valued characteristics and unique qualities, guide them through the following activity.

- Ask each student to describe herself in a written list of ten characteristics or values.
  - Encourage students to consider a variety of domains, such as
    - sense of humor
    - creativity
    - developed skills (social, academic, athletic, etc.)
    - relationships with friends/family
- Next, ask each student to rank order her characteristics/values from one to ten in terms of which characteristics/values mean the most to her. The first item on each student's list should be the most valued, the tenth should be the least valued.
- Finally, ask each student to write a paragraph about the first item on her list. In her paragraph, she should describe why the characteristic/value is *personally* important to her and describe a time when it has been particularly important.

When students are given the opportunity to focus on valued aspects of themselves and encouraged to think of themselves as complex and unique, they are distanced from negative stereotypes that apply to the groups to which they belong. Doing so effectively shields students from stereotype threat.

EXPOSE STUDENTS TO POSITIVE ROLE MODELS WHO DEBUNK NEGATIVE STEREOTYPES.

Exposing girls to talented female mathematicians has been found to reduce the negative effects of stereotype threat. These women "represent stereotype-disconfirming evidence about women's inferior mathematics ability, so that women's mathematics test performance is protected after encountering or learning about a female role model" (Marx and Rosman, 2002, p. 1183).

Ideally, schools should aim to have female mathematics teachers who can serve as role models for female students. All schools should work to maintain a balanced ratio of male and female mathematics teachers in order to provide opportunities for female students to have female teachers at some point in their mathematics careers.

Additionally, there are a number of things that any teacher can do to provide female mathematics students with appropriate role models.

- Male mathematics teachers should provide their students with positive female role models by inviting female guest speakers in mathematics fields to class.
- Male mathematics teachers should consider a team-teaching approach with a female colleague.
  - The team-teaching approach works well in situations where a male and female teacher teach different sections of the same mathematics course.
  - The two teachers can work together to plan lessons and assessments, and can occasionally teach the other colleague's class or even teach their classes together.
- Teach students about famous women in mathematics-related fields (mathematics, science, architecture, etc.). Doing so has been found to shield students from stereotype threat (Marx, 2002; McIntyre, Paulson, and Lord, 2003).
- Decorate your classroom with posters featuring accomplished female mathematicians.

HAVE OLDER FEMALE STUDENTS MENTOR YOUNGER FEMALE STUDENTS.

Studies find that having older (e.g., high school or college) students mentor younger (e.g., middle or high school) students eliminated gender differences in mathematics scores for the younger students (Good, Aronson, & Inzlicht, 2003). A female mentor who is relatively close to the younger student's age may be