# " I WANT TO BE LIKE . . . "

by Lisa Ryan and Jocelyn Steinke

We see it all the time: Young students watch Disney's *Hannah Montana* or *Rock Camp* and then want to take singing lessons and be rock stars. Others watch Discovery Channel's *Man vs. Wild* and want to buy pocketknives and go on camping trips. Why do students admire and want to emulate the people they see on TV? Can we as science teachers use the influence of the media to encourage students to rank science-related careers among their top career interests? How do popular images of scientists affect girls' and other underrepresented groups' perceptions of scientists and science careers?

Middle School Students' Identification With Scientists on Television
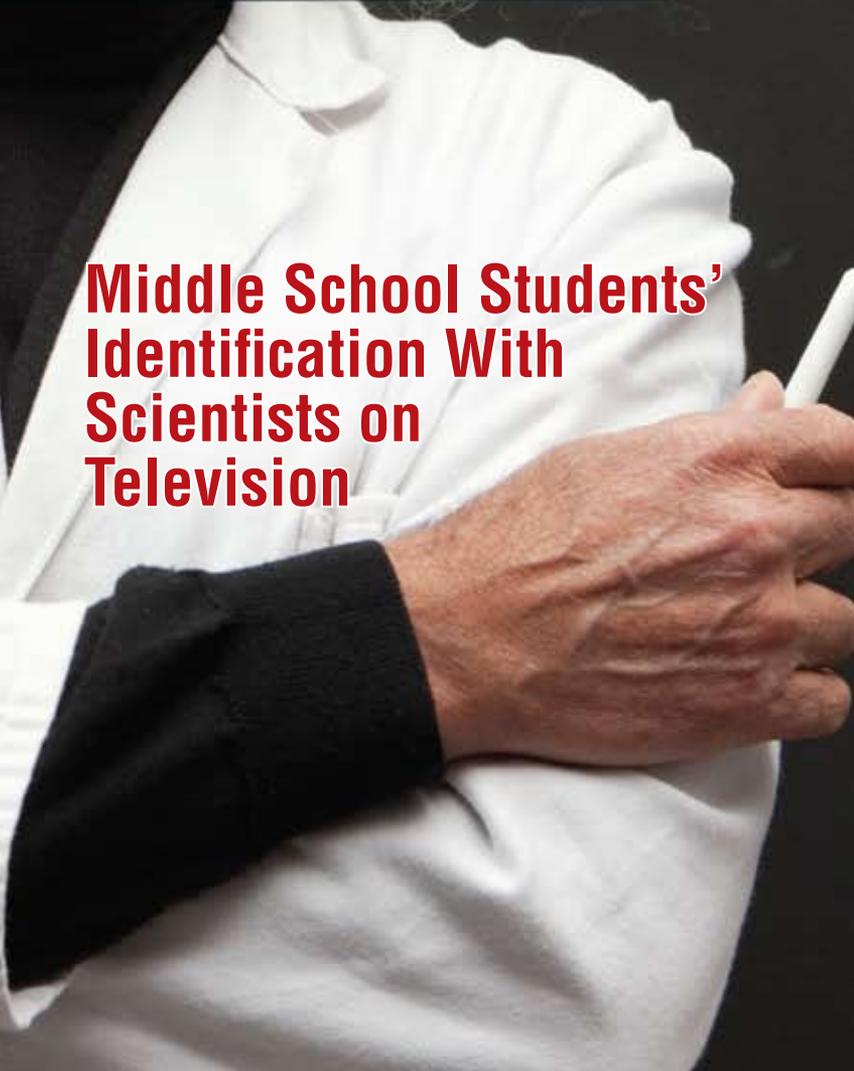
This article describes a study funded by the Research on Gender in Science and Engineering (GSE) Program of the National Science Foundation (NSF). The study focused on gaining a better understanding of how middle school students perceive television depictions of scientists. This study involved collaboration between a major research university and local middle schools and is a good example of how education and social science research can take place in schools. The findings of this research also have implications for middle school science curricula and the ways we as science teachers engage middle school students in science. Background television plays an important role in the identity development of middle school students. Children ages 6 to 18 years old watch or are exposed to approximately three hours of television a day (Jordan et al. 2006). While watching television, adolescents learn attitudes and behaviors, including information about gender roles, from media characters (Bandura 1986). These media models have the potential to foster interest in science by providing "vicarious contact" (Bandura 2002) with scientists when opportunities to directly observe and interact with real human role models are limited or not possible. In addition, studies have linked *wishful identification* (wanting or wishing to be like a media character) to changes related to occupational attitudes, values, and aspirations in viewers

(Tian and Hoffner 2007; Hoffner 1996). With television being such a pervasive influence in adolescents' lives, teachers need to understand its impact and use it to our advantage.

Methodology of the study

The purpose of this study was to determine if viewing clips of scientist characters on television programs promoted students' wishful identification with the characters and whether girls and boys differed in their wishful identification with characters who exhibited different attributes or traits.

The study consisted of two phases. The first phase examined portrayals of scientist characters on television to determine how these characters are portrayed in television programs most likely to be seen or watched by adolescents (Nielson Media Research 1999; NSF; Steinke et al. 2007). A total of 196 scientist characters (on 112 episodes of 14 different programs) were analyzed using a coding scheme to determine the following: gender of the scientist character, professional status, marital status, parental status, and frequency of selected attributes that are known to be masculine (dominant, athletic, independent), feminine (caring, dependent, romantic), scientist stereotypes (nerdy/geeky, works alone), and wishful-identification attri-

| FIGURE 1 | Attributes of male and female scientist characters measured in mean percentage of scenes showing each attribute |
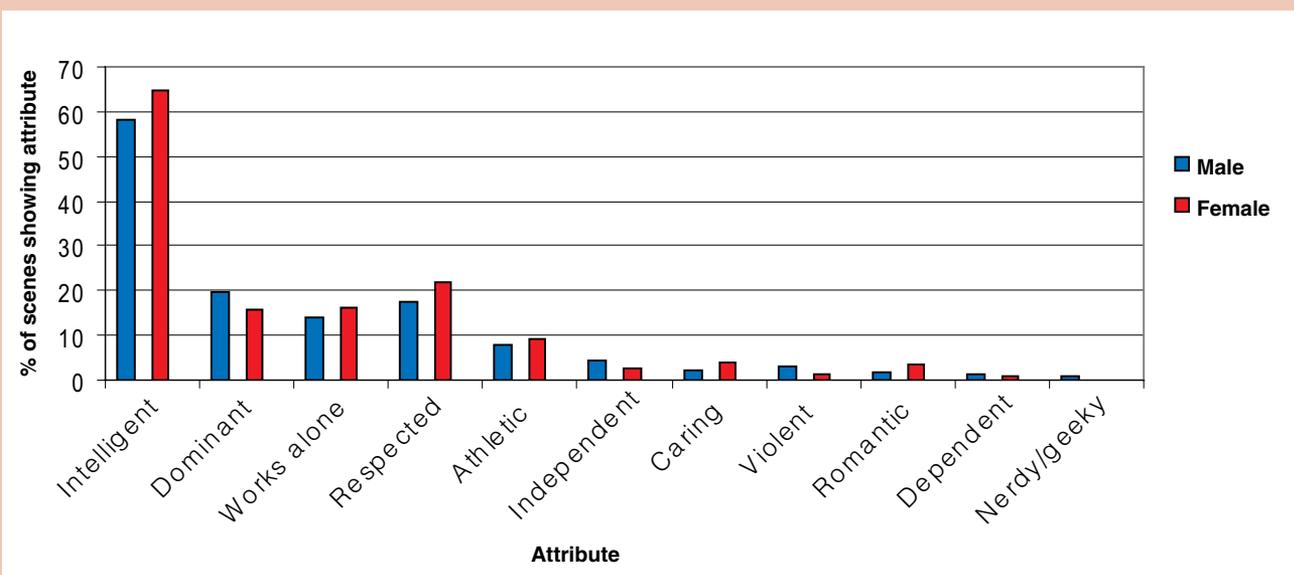
butes (caring, intelligent, respected, violent). Three different television program genres were analyzed: dramas, cartoons, and educational programs.

The second phase of the study explored adolescents' wishful identification with, or desire to be like, television scientist characters, after viewing television clips of scientist characters. A total of 370 seventh graders from three middle schools participated in this phase of the study. The research team conducted the study and collected data in middle school classrooms at these schools during one week. Students first completed a pretest questionnaire that used several items to measure their attitudes toward science and scientists. Students then viewed and completed rating cards for 10 different television clips featuring scientist characters from television programs from one of the three selected program genres. After viewing the television clips, students completed a posttest questionnaire similar to the pretest version. In addition, some students participated in focus groups to discuss their preferences for science television programs and scientist characters.

Findings of the study

Detailed information about the findings of the study can be found on our website, *www.stereotypestompers. com*, but a summary of the highlights follows:

- Male scientist characters were more prevalent than female scientist characters (males: 58%; females: 42%) and were in significantly more scenes than were female scientist characters (one exception was NSF-funded programs, such as *Bill Nye the Science Guy* and *DragonflyTV.*)
- Nearly three-fourths of the scientist characters were white/Caucasian (72%).
- The majority of scientist characters were adults (56%), followed by young adults (25%) and children (as cartoon characters) (19%).
- Male and female scientist characters were equally likely to be shown in high-status scientific positions (males: 80.5%; females: 74.4%).
- Male and female adult characters were equally likely to be shown as married.
- Male and female adult characters were equally likely to be shown as not having children.
- By far the attribute most often portrayed in scientist characters was intelligence. To a lesser extent, they were portrayed as dominant, working alone, respected, athletic, independent, and caring (see Figure 1).

FIGURE 2 Discussion starters/Mini lessons (if there is not time in the curriculum for a full lesson)

1. **How many scientist characters on television can you name?**
   In small groups, use a round-robin format to have students list as many scientist characters on television as they can. After several minutes have the small groups share their lists with the whole class and then discuss any discrepancies. As a teacher, be prepared to throw in a few examples students might not think of, such as Jeff Corwin, the parents of Kim Possible, Dexter and his sister Dee Dee, or the technical guys on *MythBusters.* As a class, work on developing a definition of a scientist. Discuss whether doctors and nurses on television count as scientists. Why or why not?

2. **What are stereotypes and how do they influence us?**
   In a pair-share format, have students come up with a stereotype (assumed characteristics of groups of people) for a particular group of people. Examples: Women like to go shopping. Skaters have long hair. Have a class discussion about stereotypes, what they mean, whether we should assume that they are true, and how they limit people. Ask students for stereotypes of scientists (e.g., they are super intelligent; they work by themselves in laboratories; they are nerdy and geeky; they wear eyeglasses). Discuss whether these stereotypes should be assumed to be true for all scientists. Tell students about gender stereotypes (e.g., men are more dominant; women are more romantic; women are more caring; men are more athletic). Discuss whether these stereotypes should be assumed to be true for all men or all women. Discuss whether stereotypes might influence people in their choice of career. (**Note:** If you feel this is not appropriate for your classroom or that it may lead to inappropriate discussions, do not include this in the lesson.)

3. **What is "wishful identification"?**
   On a piece of paper, have students write down one role model, celebrity, hero, musician, movie star, athlete, or anyone they admire and wish they were like. Have students list the characteristics of that person, or the person's job, that they admire. Have students write a sentence or two about why they wish they could be like that person. Challenge students to think of any scientists, mathematicians, or engineers they admire. Have students describe their image of a "superstar" scientist they wish they could be.

- Male scientists were more likely than female scientist characters to be portrayed with the following attributes: independent, violent, nerdy/geeky.
- Boys showed more wishful identification (WID) with male scientist characters than with female scientist characters across all character attributes, but boys' WID scores were typically lower than girls. Boys showed significantly more WID than girls did with male characters portrayed with the character attribute of dominance.
- Girls showed more WID with both female and male scientist characters than did boys.
- Girls showed more WID than boys with female scientist characters portrayed as dominant or intelligent.
- Students' WID scores were higher for the character attributes of caring, dominance, and respected in comparison with the character attribute alone, and were higher with characters in the drama genre than with characters in the cartoon and education genres.
- Race of participant, attitudes toward science, and attitudes toward women in science did influence a student's WID, but attitudes toward engaging in science-related behaviors, attitudes toward science in the media, current academic self-views related to science, and future academic self-views did not.

FIGURE 3 Classroom activity: Rating scientist characters on television

Teacher instructions

Time period: One or two class periods, and an at-home assignment passed out one week before the first class period.

1. Give each student three to five copies of the character rating card (Figure 4) one week ahead of the day of the classroom discussion to give them adequate time at home to watch and rate the characters. The teacher can assign certain shows for students to watch or let students choose shows. Alternatively, the teacher can get copies of various television series from the public library or video store and show segments of the shows in the classroom. Note: Teachers must make sure that the videos are appropriate for the age group and that the videos comply with all district administrative directives, such as obtaining parent permission.

2. Tell students that you want their honest opinions about what they think about scientist characters on some popular television shows. Don't give them too much information about scientists or gender stereotypes beforehand because it may bias their responses.

3. Instruct students to watch 10–15 minute segments of television shows that contain scientist characters. Some suggestions for television shows are the shows that were used in the study: *Danny Phantom, Dexter's Laboratory, Kim Possible, The Adventures of Jimmy Neutron: Boy Genius, CSI, CSI: Miami, CSI: NY, Bill Nye the Science Guy, DragonflyTV,* and *MythBusters.* (The study used edited versions of some of these shows to avoid scenes featuring violent content or content not suitable for children.)

4. Preview the rating cards with students and make sure all students know what the words mean.

5. Remind students to pay attention to one character at a time, because there will be more than one character in many of the clips.

6. If teachers want to spend more time on this activity, they can turn it into a data-analysis exercise. Once students turn in their rating cards, the teacher should determine a method to combine the classroom data. The teacher may need to create the tallies, or use a database program for students to enter their data. Once tallied, students can compare ratings of various characters by calculating means for the different rating card questions. Alternately, students can create a bar graph similar to the one shown in Figure 1.

7. If the teacher wants to take a less time-consuming or less mathematical approach, students can have small-group or class discussions about the characters' traits and attributes and how most scientists are portrayed on television compared to real-life scientists. (See findings of study in this article or on the website.)

8. Students and teachers can also discuss what attributes or traits might make students want to be like the characters and how those may be different for girls and boys and for people of different races or ethnicities. (See findings of study in this article or on the website.)

FIGURE 4	Character rating card

Name_____

Instructions: Watch a 15-minute segment of a television show with a scientist character and then answer the questions about the character.

What is the name of the television show?_____

Do you watch this show often?_____

What is the name of the character you rated?_____

Is the character male or female? _____

Is the character white, African American, Hispanic, or Asian?_____

	Strongly disagree	Disagree	Agree	Strongly agree
1. I'd like to do the kinds of things the scientist character does on the show.	1	2	3	4
2. The character is someone I would like to try to be like.	1	2	3	4
3. I wish I could be more like the character.	1	2	3	4

Put a check mark on one of the spaces between the words that describe the character to show which word you think the character is like. For example, if you think the character is more intelligent than stupid, the check mark should go closer to the word *intelligent*. If you think the character is average, the check mark should go in the middle.

	1	2	3	4	5	
1. Intelligent	_____	_____	_____	_____	_____	Stupid
2. Romantic	_____	_____	_____	_____	_____	Unromantic
3. Attractive	_____	_____	_____	_____	_____	Ugly
4. Kind	_____	_____	_____	_____	_____	Unkind
5. Aggressive	_____	_____	_____	_____	_____	Peaceful
6. Amusing	_____	_____	_____	_____	_____	Boring
7. Respected	_____	_____	_____	_____	_____	Disrespected
8. Nerdy	_____	_____	_____	_____	_____	Cool
9. Athletic	_____	_____	_____	_____	_____	Uncoordinated
10. Family-oriented	_____	_____	_____	_____	_____	Self-oriented

Do you think this character is a good representation of a real-life scientist? Why or why not?

What this means for teachers

Gender equity in science education is an important issue for teachers, policy makers, and our society. As students will be forced to compete in a global economy, we must do what we can to prepare and encourage all students to pursue STEM careers. According to the recently published *Science and Engineering Indicators*, the science and engineering (S&E) workforce has grown at a rate faster than the total workforce in the United States over the last several decades. However, women and racial and ethnic minorities remain underrepresented in the S&E workforce (NSB 2010). Women represented 27% of the S&E workforce, and college-educated blacks, Hispanics, and other ethnic groups, collectively, represented 10% of those employed in S&E occupations in 2007 (NSB 2010). Research points to the middle school years as the time at which girls start to lose interest in science (AAUW 1998; 2000), so it is especially important for middle school teachers to work against the societal influences that may pull girls away from STEM careers.

Middle school science teachers exert considerable influence on young adolescents at a time when adolescents are beginning to think about future careers. Science teachers can promote interest in science and engineering careers for all students, in general, and for female students and students from underrepresented racial and ethnic minorities, in particular. It is critical during these adolescent years for science teachers to address and challenge students' stereotypes of science and scientists in order to promote the possibility of science careers as options for all students. Using the findings of this study and the attached classroom discussion starters (Figure 2) and classroom activity (Figure 3) about scientist characters on television will help science teachers meet this goal. These activities could be used as part of a larger unit on science and society, and are intended for use in the middle school grades, but could also be used in the lower high school grades. ■

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