

Who's modeling STEM learning in children's educational media?

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Why study children and media?

Children spend a lot of time with screens!



And because their brains are still developing, they are more susceptible...



...Both to negative effects

- Violence, aggression (Anderson et al., 2003; Anderson, 1977; Bushman & Huesmann, 2006; Murray, 2007)
- Antisocial behavior (Paik & Comstock, 1994)
- Delayed cognitive development (Nathanson et al., 2007; Vandewater et al., 2005)
- Attention disorders (Zimmerman & Christakis, 2007)



...And to positive effects!

- Academic achievement (Anderson et al., 2001)
- Prosocial behavior (Mares & Woodard, 2005)
- Increased vocabulary (Krcmar, Grela, & Lin, 2007; Rice et al., 1990, Wright et al., 2001)
- Literacy and numeracy (Jennings, Hooker, & Linebarger, 2009; Fisch & Truglio, 2001)
- School readiness (Linebarger et al., 2004;)



Guiding Research Questions

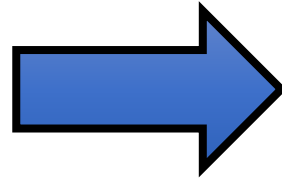
- How do children learn from and respond to media?
- How can we use this understanding to create better, more enriching and more effective programming?



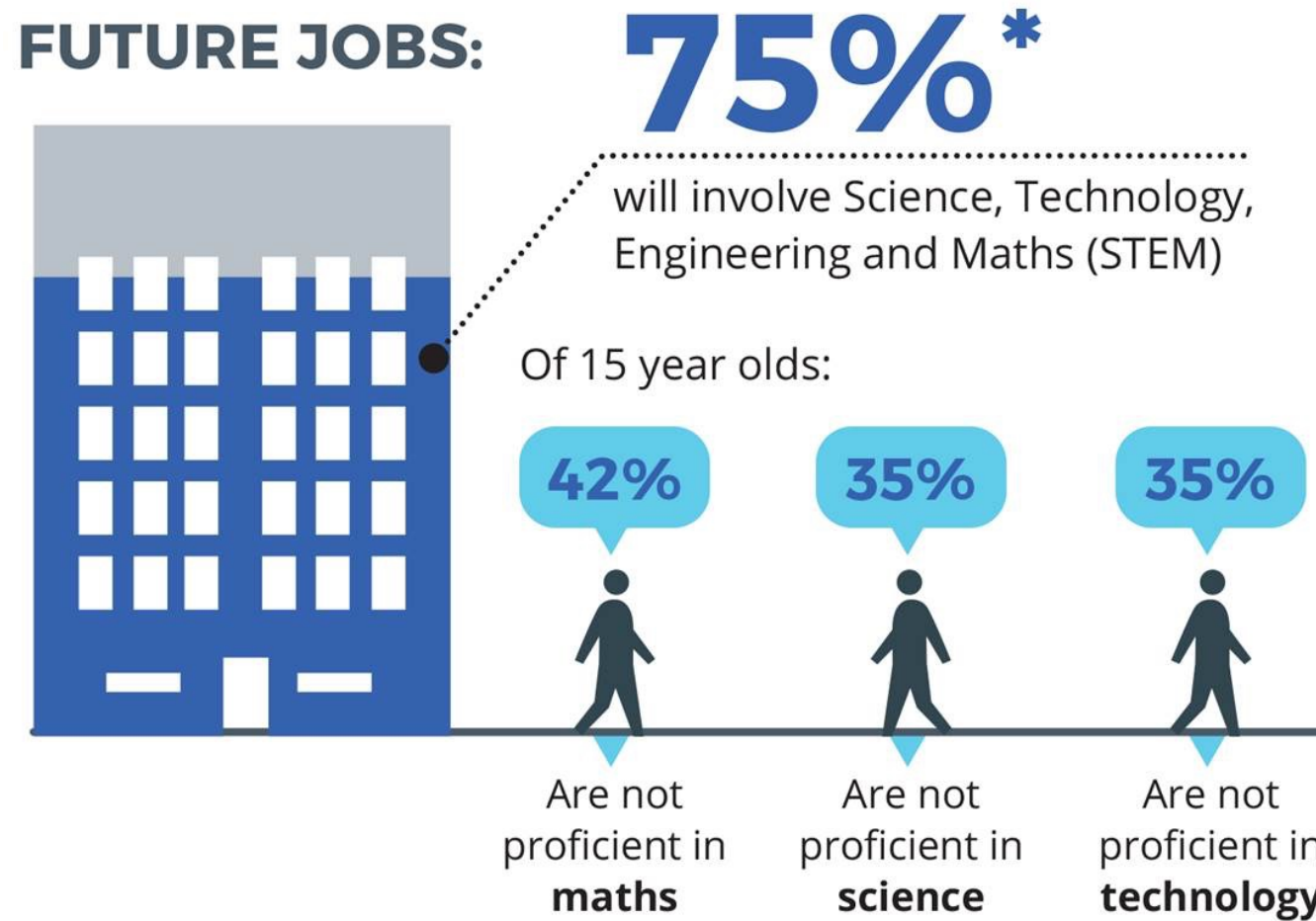
Today's Focus

Gender and Race Representation in STEM TV

- *Can STEM-focused educational media be used to encourage interest in STEM for all children?*



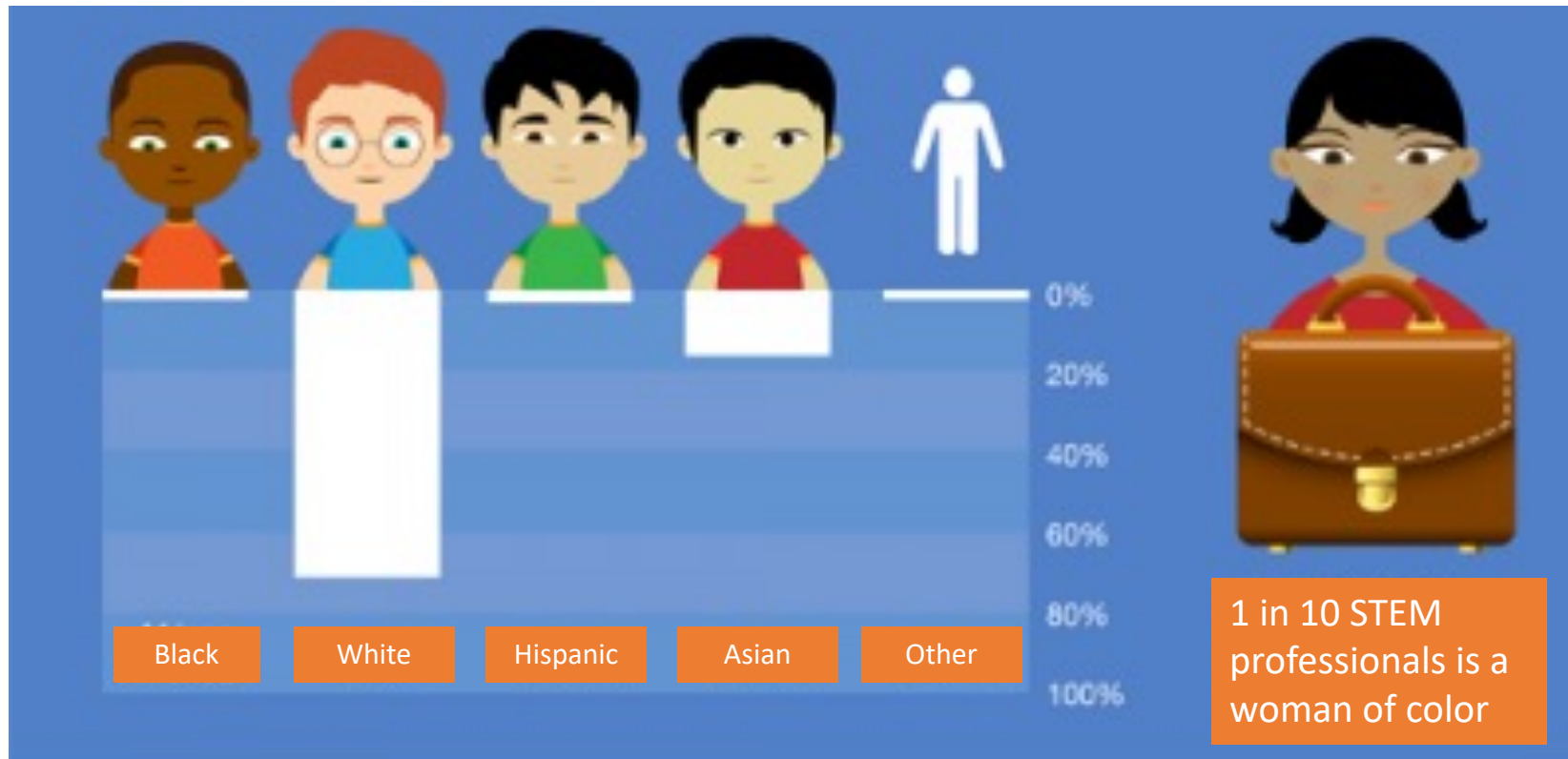
Why STEM?



2017 data from Foundations for Young Australians



Unequal Participation in STEM



2006 data on Scientists and Engineers in the US from TransportationYOU.org



Television – Part of the Problem

- Women and People of Color are consistently underrepresented in the media (Busby, 1975; Mastro & Greenberg, 2000)
- Characters in professional occupations on TV are overwhelmingly male and white (Signorielli & Bacue, 1999)
- Cultivation theory suggests that long-term exposure to these portrayals shapes our worldviews (Gerbner, Gross, Morgan, & Signorielli, 1986)

... But also can be part of the solution

- Policymakers have called for more creative solutions to encourage participation in STEM
- Educational television is a type of informal education that can encourage positive attitudes towards academic subjects (Fisch, 2004)
- Parents look to educational TV as a way to expose their children to science and math (Sheehan, Lauricella, & Wartella, 2017)

But what types of STEM portrayals are children seeing when they watch STEM TV?

Research Questions

1. How does representation of gender and race in STEM television shows for young children compare to the U.S. population?
2. Are there differences by gender or race in who models engagement in STEM learning activities?
3. What types of STEM occupations are depicted in STEM shows for young children?

Sample

- 30 STEM shows for children 3-6 available via broadcast, cable, or streaming
- 3 episodes of each show randomly selected from the most recent season

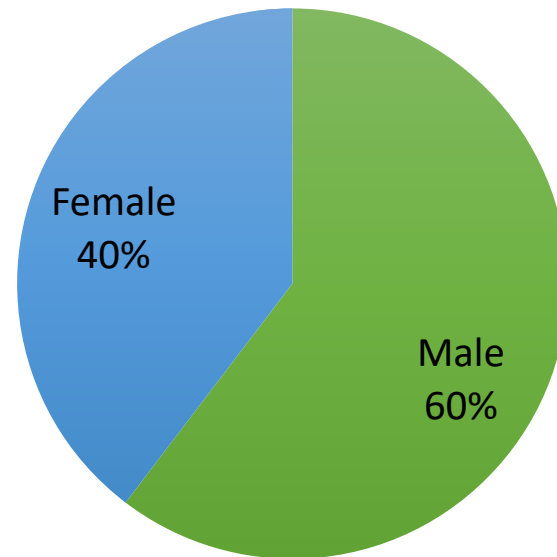


Coding

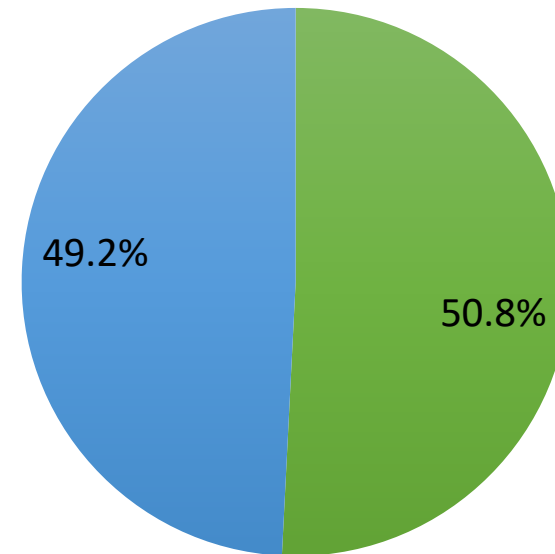
- Each character (N=1,086) was coded for their:
 - Character Attributes (gender, race, age, role in show, human vs. non-human, hair color, eye color, etc.)
 - STEM participation (active vs. passive learning, teaching, making observations, asking questions, investigating, problem solving)

Results - Gender

Sample

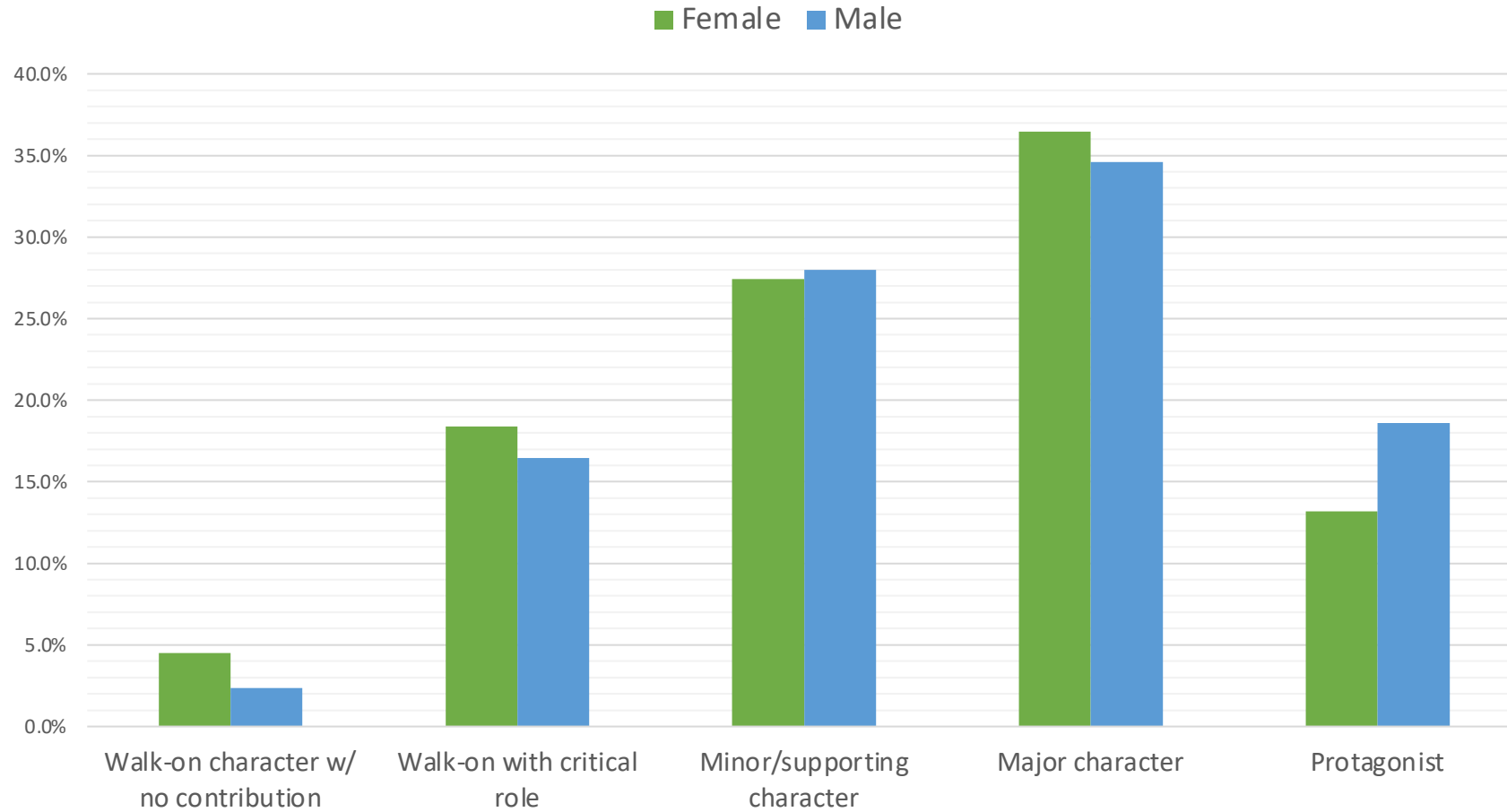


US

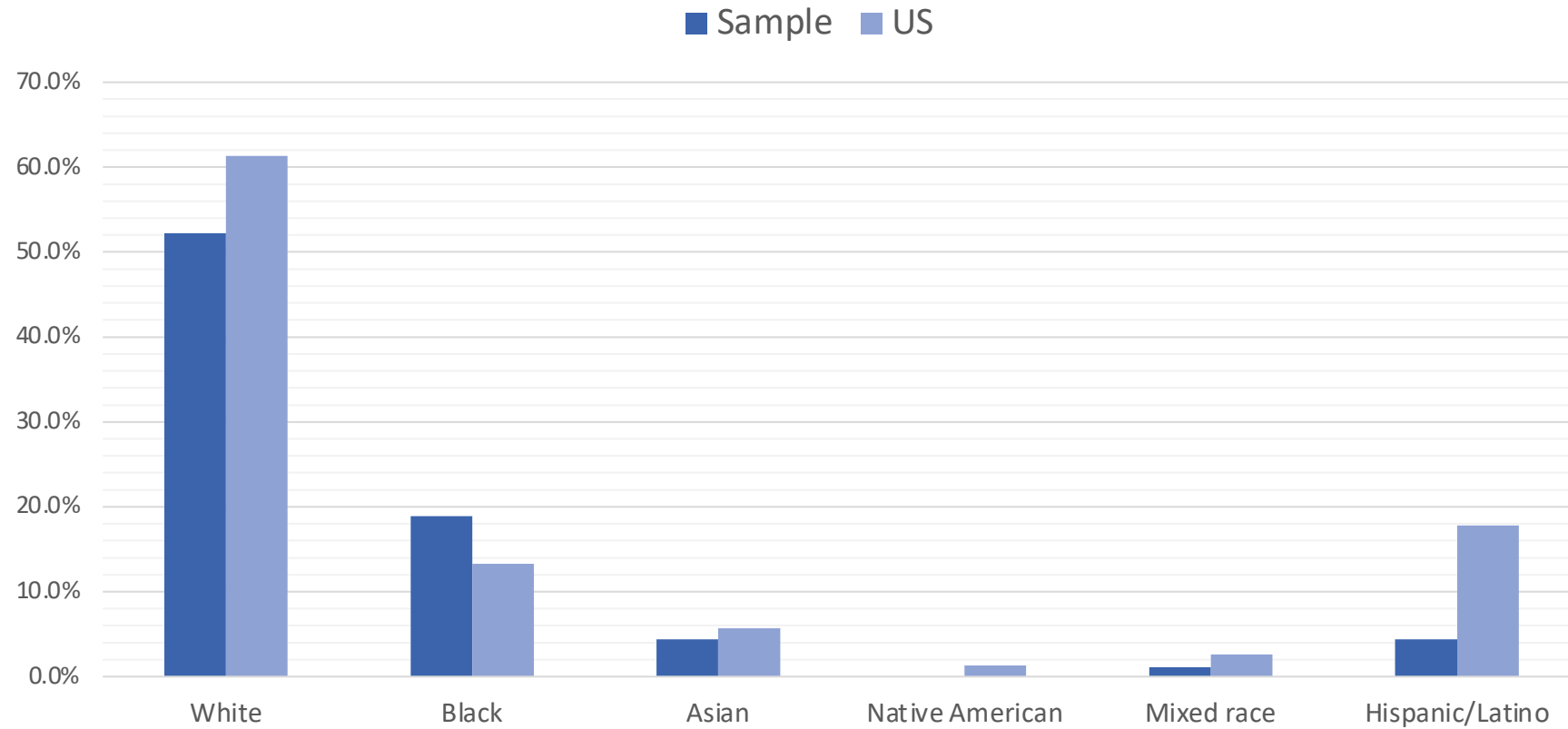


However, this difference disappears when looking only at the human and child characters!

Character Role by Gender



Results - Race

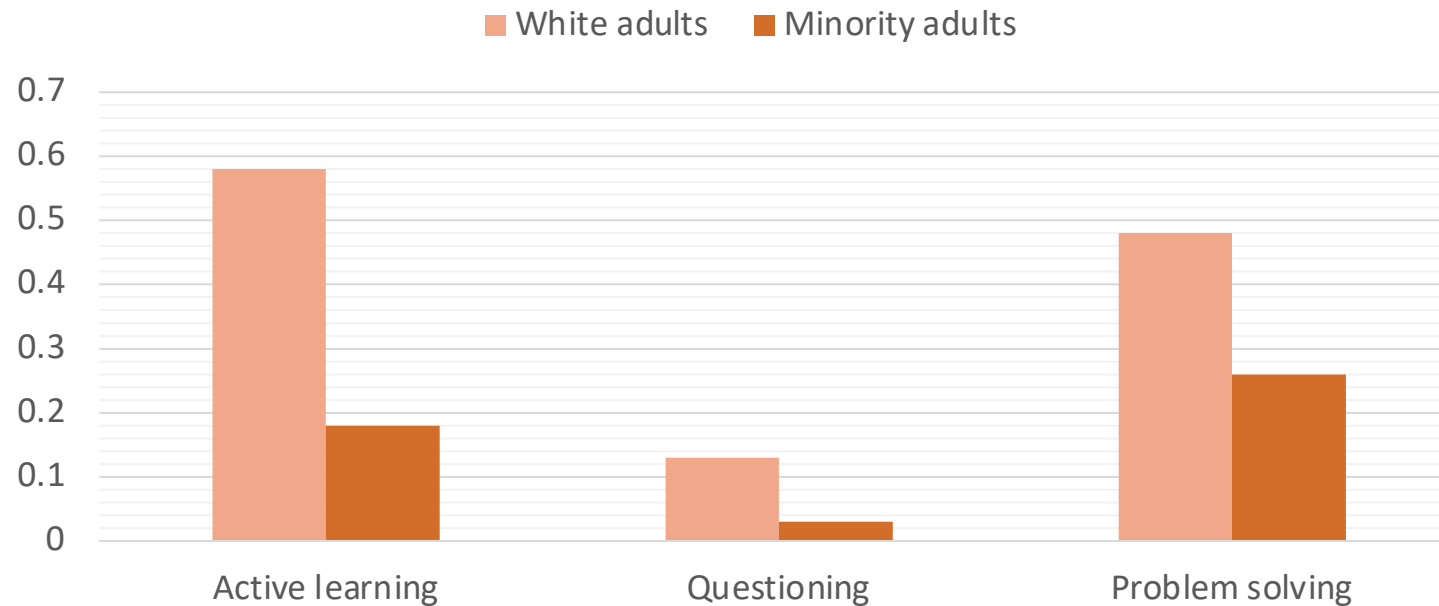


The rise of the “racially ambiguous” character



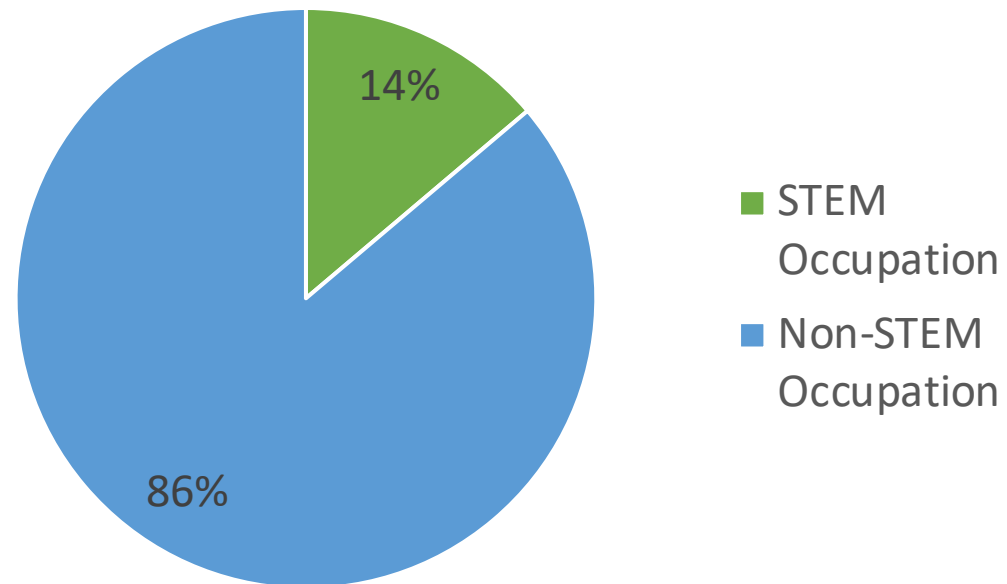
Results – STEM Participation

- Overall, equal STEM participation, except for when you look at adult characters:



Results - Occupations

- Only 13% of characters showed any type of occupation
- Of those:



Conclusions

- More work is needed to reach equal representation, but compared to prior content analyses, things have improved
- Lack of STEM occupation portrayals seems like a missed opportunity for early socialization
- Producers are answering the call for racial diversity with more ambiguous characters, but unclear whether this is an effective strategy

This study (Aladé et al., 2021) was published in the *Journal of Children and Media*. <https://doi.org/10.1080/17482798.2020.1810087>

What's Next?

- More research is needed to better understand and measure the positive impact that diverse portrayals in children's educational media can have on viewers.
 - Better understanding of children's perceptions of characters' race
 - More work throughout various stages of childhood and adolescence
 - Intersection of interest, identity, and learning
- Current study looks at a new television series being created with an intentional focus on culture and inclusion woven into a STEM curriculum. Results coming soon!

Thank you!

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