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Lost in Translation: How the Way We Talk about Math and Science isn't Helping Anyone

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Jonathan Flynn
Honors Senior Project Motivation Statement
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Lost in Translation

Lost in Translation is a podcast discussing the many ways in which primary and secondary-age children can be exposed to negative attitudes and stereotypes towards science, technology, education and math (STEM). The first episode presents a broad overview of the problem. The second episode dives into how teachers and the physical layout of a classroom can impact a students' enjoyment and attitudes towards STEM. The third episode is similar in structure to the second but instead focuses on how parents or guardians can influence these attitudes, and ends with my own thoughts on how changes in our education system can address the feeling of anti-science sentiment we find ourselves in today.

This project was inspired in part by my own struggles with STEM during my formative years in middle and high school. While I always admired astronauts and field scientists, rarely did I feel confident in my own STEM abilities. These feelings of inferiority were amplified as some of my teachers decided to focus their efforts on other, more successful students, and for a long time I felt that a career in science and science education was out of reach.

Today, accessibility is a topic being addressed on college campuses all across the world. Students and activists are pushing for systemic changes in everything from income inequality to microaggressions to institutionalized racism. It is my hope that STEM is included in the discussion, especially as the number of unvaccinated children increases and the threat of catastrophic climate change worsens. The way we teach STEM needs to change. Unfortunately, research focusing on science and math education is rarely emphasized in the research community, or isn't even seen as a core problem. I hope that this podcast can serve as an introduction for people passionate about changing STEM education for the better by providing the basic facts that have come from this research. This is by no means a replacement for a literature review. It is simply the means for starting a discussion.

With that, I hope you enjoy the podcast!

References for Lost In Translation Podcast

- Benner, A.D., Boyle, A.E. and Sadler, S. (2016). Parental Involvement and Adolescents' Educational Success: the Roles of Prior Achievement and Socioeconomic Status. *Journal of Youth and Adolescence*, 45(6) 1053-1064. doi: 10.1007/s10964-016-0431-4. Epub 2016 Feb 5.
- Eccles, J.S and Roeser, R.W. (2010). An Ecological View of Schools and Their Impact on Development During Adolescence. *Schools, Academic Motivation and Stage-Environment Fit* (pp. 404-430).
- Elliot, A.J., and Harackiewicz, J. M. (1996). Approach and Avoidance Achievement Goals and Intrinsic Motivation: A Mediational Analysis. *Journal of Personality and Social Psychology*. 70(3), 461-475. DOI: <https://doi.org/10.1080%2F09500693.2014.949900>
- Funk, C. and Rainee, L. (2013). Public and Scientist's View on Science and Society. *Pew Research Center*. Retrieved from <http://www.pewinternet.org/2015/01/29/public-and-scientists-views-on-science-and-society/>
- Gonzales, H.B. and Kuenzi, J.J. (2012). Science, Technology, Engineering and Mathematics (STEM) Education: A Primer. *Congressional Research Service*. Retrieved from <https://fas.org/sgp/crs/misc/R42642.pdf>
- Gunderson, E.A., Ramirez, G., Levine, S.C., and Beilock, S.L. (2012). The Role of Parents and Teachers in the Development of Gender-Related Math Attitudes. *Sex Roles*. 66(3-4): 154-166. DOI: 10.1007/s11199-011-9996-2
- Harackiewicz, J.M., Rozek, C.S., Hulleman, C.S., Hyde, J.S. (2012). Helping Parents to Motivate Adolescents in Mathematics and Science: An Experimental Test of a Utility-Value Intervention. *Psychological Science*. 23(8): 899-906. DOI: <https://doi.org/10.1177%2F0956797611435530>
- Kiwanuka, H.N., Van Damme, J., Van Den Noortgate, W., Anumendem, D.N., Vanlaar, G., Reynolds, C., and Namusisi, S. (2017). How Do Student and Classroom Characteristics Affect Attitude Toward Mathematics? A Multivariate Multilevel Analysis. *School Effectiveness and School Improvement*. 28(1):1-21. DOI: 10.1080/09243453.2016.1201123
- Landivar, L.C. (2013). Disparities in STEM Employment by Race, Sex and Hispanic Origin. *U.S Census Bureau*. Retrieved from <https://www.census.gov/prod/2013pubs/acs-24.pdf>
- Maier, M.F., Greenfield, D.B., and Bulotsky-Shearer, R.J. (2013). Development and Validation of a Preschool Teachers' Attitudes and Beliefs Toward Science Teaching Questionnaire. *Early Childhood Research Quarterly*. 28(2): 366-378. DOI: <https://doi.org/10.1016%2Fj.ecresq.2012.09.003>
- McLeod, D. B. (1992). Research on Affect in Mathematics Education: A Re-Conceptualization. In D. A. Grouws (Ed.), *Handbook of Research On Mathematics Teaching and Learning* (pp. 575-596). New York, NY: Macmillan.
- Meece, J.L., Anderman, E.M. and Anderman, L.H. (2006). Classroom Goal Structure, Student Motivation, and Academic Achievement. *Annual Review of Psychology*. 57(1): 487-503. DOI: <https://doi.org/10.1146%2Fannurev.psych.56.091103.070258>

National Assessment of Education Progress. (2015). NAEP Data Explorer (Grade 4 and Grade 8 Results). *The Nation's Report Card*. Grade 4 data retrieved from <https://www.nationsreportcard.gov/ndecore/xplore/NDE> and Grade 8 data retrieved from <https://www.nationsreportcard.gov/ndecore/xplore/NDE>

Perera, L.D. (2014). Parents' Attitudes Towards Science and their Children's Science Achievement. *International Journal of Science Education*. 36(18): 3021-3041. DOI: <https://doi.org/10.1080%2F09500693.2014.949900>

Programme for International Student Assessment. (2015). Results in Focus. *Organization for Co-Economic Development*. Retrieved from <https://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf>

Ware, M. and Mabe, M. (2015). An Overview of Scientific and Scholarly Journal Publishing. *International Association of Scientific, Technical and Medical Publishers*. Retrieved from https://www.stm-assoc.org/2015_02_20_STM_Report_2015.pdf

Xiao, S. and W.A Sandoval. (2017). Associations Between Attitudes Towards Science and Children's Evaluation of Information About Socioscientific Issues. *Science and Education*. 26(3-4): 247-269. DOI: <https://doi.org/10.1007%2Fs11191-017-9888-0>