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Executive Function

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Recommended Citation

Geffen, Susan Ph.D., "Executive Function" (2022). *Sample module-themed coursework with Sesame Street examples*. 9.

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Module: Executive Function

Overview and Rationale

This module will explore the various aspects of executive function (inhibition, cognitive flexibility, working memory). Students will use topical readings and Sesame Street video clips to explore how executive function develops throughout childhood and adolescence, common methods for studying executive function (e.g., Stroop task, marshmallow task), and techniques that parents and teachers can use to help children develop executive function skills.

Potential Classes: Intro Psych, Developmental Psychology (Child Development, Lifespan Development), Education classes

Potential Format and Modality: Lecture or seminar class; online, hybrid, in-person

Topical Readings

General Overview

- Archibald, S. J., & Kerns, K. A. (1999). Identification and description of new tests of executive functioning in children. *Child Neuropsychology*, 5(2), 115–129.
<https://doi.org/10.1076/chin.5.2.115.3167>
- Baddeley, A. (2010). Working memory. *Current Biology*, 20(4), R136–R140.
<https://doi.org/10.1016/j.cub.2009.12.014>
- Diamond A. (2013). Executive functions. *Annual Review Of Psychology*, 64, 135–168.
<https://doi.org/10.1146/annurev-psych-113011-143750>
- Executive function milestones*. Sesame Street in Communities. (2020, July 24). Retrieved June 15, 2022, from
<https://sesamestreetincommunities.org/activities/milestones-executive-function/>
- Gilbert, S. J., & Burgess, P. W. (2008). Executive function. *Current Biology*, 18(3), R110–R114.
<https://doi.org/10.1016/j.cub.2007.12.014>
- Linebarger, D. L. (2014). Lessons from Cookie Monster: Educational Television, Preschoolers, and Executive Function. *The University of Iowa. College of Education*.
- Memisevic, H., & Bisevic, I. (2018). Exploring the link between inhibitory control and cognitive flexibility in preschool children. *Cognition, Brain, Behavior. An Interdisciplinary Journal*, 22(1), 1–11. <https://doi.org/10.24193/cbb.2018.22.01>

Influencing Factors

- Altun, D. (2022). Family ecology as a context for children’s executive function development: The home literacy environment, play, and screen time. *Child Indicators Research*, 1–24.
<https://doi.org/10.1007/s12187-022-09920-w>
- Lamm, B., Keller, H., Teiser, J., Gudi, H., Yovsi, R. D., Freitag, C., ... & Lohaus, A. (2018). Waiting for the second treat: Developing culture-specific modes of self-regulation. *Child Development*, 89(3), e261-e277. <https://doi.org/10.1111/cdev.12847>

Merz, E. C., Wiltshire, C. A., & Noble, K. G. (2018). Socioeconomic inequality and the developing brain: Spotlight on language and executive function. *Child Development Perspectives*, 13(1), 15–20. <https://doi.org/10.1111/cdep.12305>

Training

Diamond, A., & Lee, K. (2011). Interventions shown to aid executive function development in children 4 to 12 years old. *Science*, 333(6045), 959–964. <https://doi.org/10.1126/science.1204529>

Video Clips:

Selective Attention and Cognitive Flexibility

- [Sesame Street: Furry Potter and the Goblet of Cookies](#) (Harry Potter Parody - 5:13)
 - Summary: Professor Crumblemore teaches Furry Potter (Cookie Monster) to carefully listen to and follow instructions in order to get the Goblet of Cookies.
- [Sesame Street: Abby and Emmy Rossum Stay Focused!](#) (2:01)
 - Summary: Emmy Rossum and Abby Cadabby work together to stay focused on the task at hand despite the distractions around them.
- [Sesame Street: Cookie's Crumby Pictures](#) (15 videos including Furry Potter)
 - Summary: Youtube playlist containing 15 Cookie Monster parodies meant to help young children develop and strengthen their executive functioning skills.

Inhibition and Gratification Delay

- [Sesame Street: The Waiting Game with Guy Smiley](#) (4:44)
 - Summary: Guy Smiley gives Cookie Monster a cookie and tells him that, if he waits to eat it until Guy Smiley returns, he'll get two cookies. Cookie Monster, with the help of Guy Smiley's backup singers, demonstrates a number of skills he uses to resist temptation and delay his own gratification.
- [The Marshmallow Test](#) (3:27)
 - Summary: Multiple clips of a researcher giving a child one marshmallow and telling the child that, if they wait to eat it until the researcher returns, they will get two marshmallows. The children demonstrate a number of skills they use to resist temptation and delay their own gratification.
- [Sesame Street: Sir Ian McKellen Teaches Cookie Monster to Resist](#) (start at 1:29)
 - Summary: Sir Ian McKellen, with Cookie Monster's help, explains and demonstrates the meaning of the word "resist."

Activities

Jigsaw Activity

- Assign articles on executive function (e.g. *Executive functioning milestones*; Linebarger, 2014; Diamond, 2013) for students to read before class. During class, show [The Waiting Game](#). Have students complete a jigsaw activity, initially discussing what executive

function looks like at different developmental stages. Divide the class into four initial expert groups, with each group focusing on a specific age group — 24 months and under, 2 years, 3-4 years, and 5-6 years. Give the groups time to discuss, then have 1-2 students from each expert group (depending on class size) form new jigsaw groups to recommend advice/activities for parents and other adults looking to help children strengthen their executive functioning skills.

- *Notes: appropriate for both lecture and seminar-based classes. Could be adapted for a synchronous online class using breakout rooms.*

Discussion Activities

- Assign articles on executive function (e.g. Linebarger, 2014; Merz et al. 2018; [Executive functioning milestones](#); Diamond, 2013; Memisevic et al., 2018; Diamond & Lee, 2011) for students to read before class. During class, show [Furry Potter and the Goblet of Cookies](#) (or any of the Cookie's Crumbly Pictures).
 - Split students into small groups to discuss Sesame Street as a media intervention and why these types of interventions might be particularly important.
 - *Notes: would pair well with Merz et al. 2018. Appropriate for both lecture and seminar-based classes. Could be adapted for a synchronous or asynchronous online class using breakout rooms and/or discussion boards.*

OR

- Split students into small groups to discuss techniques used in the video clip to foster the three core executive functioning skills (e.g. cognitive flexibility, inhibition, working memory)
 - *Notes: appropriate for lecture-based classes. Could be adapted for a synchronous online class.*

OR

- Split students into small groups to discuss the pros and cons of how executive function skills and behaviors are shown in the video relative to Linebarger's point that Cookie Monster's impulsivity may be sending the wrong message to children about their behavior. Have students brainstorm ways the video could be redone to positively demonstrate aspects of executive function (e.g., cognitive flexibility).
 - *Notes: would pair well with Linebarger 2014. Appropriate for both lecture and seminar-based classes. Could be adapted for a synchronous or asynchronous online class using breakout rooms and/or discussion boards.*
- Before class, have students read Lamm et al. 2018. During class, show [The Marshmallow Test](#) and/or [The Waiting Game](#).
 - Split students into small groups to compare techniques used in each clip to resist temptation and delay gratification. Students can discuss how successful each technique was, brainstorm additional ideas, and discuss which techniques are likely to be more successful at different ages (e.g., two-year-old, eight-year-old, 15-year-olds).

OR

- Split students into small groups to discuss potential flaws in the Marshmallow Test. Have them consider factors, outside of cognitive ability, that could influence a child's performance on this task.
 - *Notes: both sets of discussion questions are appropriate for both lecture and seminar-based classes and could be adapted for a synchronous or asynchronous online class using breakout rooms and/or discussion boards.*
- During class, show students [Abby and Emmy Rossum Stay Focused!](#) and [Sir Ian McKellen Teaches Cookie Monster to Resist](#). Split students into pairs/small groups and have them compare and contrast how the “word of the day” is presented in each video clip. Ask them to consider the types of executive function skills needed to effectively “resist” and “focus.”
 - *Notes: appropriate for lecture and seminar-based classes. Could be adapted for a synchronous online class using breakout rooms.*

Related Modules:

- [Cognition](#)
- [Academic Readiness](#)
- [School Readiness Behavior](#)
- [Social-Emotional Development](#)