



## Sources of Information about the Brain Science of Coaching

*Amber Halliburton*

### Abstract

This *CASEmaker* presents the cohesion between the brain science of decision-making and evidence-based coaching characteristics. The resources in this paper identify the specific commonalities found across bodies of literature and draw parallels between the characteristics of coaching used in early childhood intervention and deliberative decision-making. Understanding the brain science of decision-making is beneficial for practitioners as they consider the long-term impact of using a capacity-building coaching interaction style in their work with families, with specific consideration to families experiencing stressful situations.

### Introduction

Supporting parents as they make decisions for their families is an integral part of early childhood intervention and required by special education law (IDEA, 2004). This process can be effectively and efficiently achieved through the use of evidence-based, capacity-building coaching characteristics. Coaching has become a widely accepted approach for supporting family priorities within early childhood intervention (Douglas et al., 2020; Lorio et al., 2020; Schertz et al., 2018; Swanson et al., 2011). The use of the characteristics of a coaching interaction style as part of early intervention services has been shown to increase family resources and parent capacity to provide for their family's health and well-being and support child learning (Dunst et al., 2014; Espe-Sherwindt, 2008; Margolis et al., 2017). With increased resources and caregiver responsiveness, children are more likely to make developmental gains (Douglas et al., 2020; Dunst, 2010; Mahoney, 2014; Rush & Shelden, 2020). A coaching interaction style uses a systematic means of structuring a capacity-building conversation (Rush & Shelden, 2020) that supports the deliberative decision-making process.

Deliberative decision-making is a process that requires an individual to use systematic procedures to analyze options and determine how to act based on anticipated outcomes associated with the available options (Rilling, 2011; Tversky & Kahneman, 1981). Individuals make decisions based on their accumulation of facts and associated emotions (Ratliff et al., 1999), creating physiological changes in the brain specifically when engaging in deliberative decision-making. Coaching as an inter-

action style is characterized by features that engage in deliberative decision-making. Existing literature shows that coaching builds a coachee's capacity for decision-making and implementing informed decisions when specific characteristics are used: joint planning, practice, observation, reflection, and feedback (Douglas et al., 2020; Dunst, 2010; Rush & Shelden, 2020; Schertz et al., 2018). Early childhood intervention service providers and service coordinators can improve their practice by understanding the brain science of decision-making and the potential long-lasting impacts of early intervention when brain science is used to guide practitioner-parent interaction.

This *CASEmaker* provides sources of information about decision-making, physiological and psychological responses to decision-making, and how the use of evidence-based, capacity-building coaching characteristics scaffold the decision-making process and help individuals internalize a deliberative decision-making process. This *CASEmaker* also highlights the impact of stress on

*CASEmakers* is an electronic publication of the Center for the Advanced Study of Excellence in Early Childhood and Family Support Practices, Family, Infant and Preschool Program, J. Iverson Riddle Developmental Center, Morganton, NC. CASE is an applied research center focusing on the characteristics of evidence-based practices and methods for promoting utilization of practices informed by research.

Copyright © 2021  
Center for the Advanced Study of Excellence  
in Early Childhood and Family Support Practices

the brain and the benefits of the decision-making process. The sources of information included are beneficial for practitioners who support families through their decision-making process.

### Types of Decision-Making

Many types of decisions exist across various fields of literature with varying names and contexts. This CASEmaker focuses on three common types of decisions: (1) unconscious (e.g., responding to a falling child), (2) procedural (e.g., picking up the child when the child reaches arms upward), and (3) deliberative (e.g., selecting a pediatric specialist for a child with spina bifida). Unconscious decisions occur within the brain stem and cerebellum and occur nearly automatically and with little deliberation. Procedural decisions are made within the limbic system (Polister, 2008; Wood & Barker, 2015) and are a form of expedited decision-making (Redish, 2015) whereby the individual strongly associates a situation with a specific action. Each time the condition occurs, the individual reflexively performs the associated action (Glimcher & Fehr, 2014). Deliberative decisions are made within the brain's cortex system (Wood & Barker, 2015); this brain system is responsible for perceiving, thinking, and processing (Pittman & Karle, 2015). In deliberative decision-making, the individual takes time to recollect past experiences, develop and identify options, and analyze the options against each option's anticipated outcomes (Glimcher, 2010; Rilling, 2011). The following resources provide additional information about the decision-making process:

#### Rx Prescription for Practice Rx

The prescription for practice lists four references especially important in the ongoing research of the use of coaching in early intervention, decision-making, and neuroeconomics.

- Glimcher, P. W., & Fehr, E. (Eds.). (2014). *Neuroeconomics decision-making and the brain* (2nd ed.). Academic Press.
- Glimcher, P. (2010). *Decisions, uncertainty, and the brain: The science of neuroeconomics*. MIT Press.
- Rush, D., & Shelden, M. (2020). *The early childhood coaching handbook* (2nd ed.). Paul H. Brookes.
- Sanfey, A., Loewenstein, G., McClure, S., & Cohen, J. (2006). Neuroeconomics: Cross-currents in research on decision-making. *Trends in Cognitive Sciences*, 10(3), 108-116. <https://doi:10.1016/j.tics.2006.01.009>

- Brewer, J. (2018). *Craving mind: From cigarettes to smartphones to love*. Yale University Press.
- Glimcher, P. W., & Fehr, E. (Eds.). (2014). *Neuroeconomics: Decision-making and the brain* (2nd ed.). Academic Press. <https://doi.org/10.1093/acprof:oso/9780199659890.003.0009>
- Pham, L., & Taylor, S. (1999). From thought to action: Effects of process versus outcome-based mental simulations on performance. *Personality and Social Psychology Bulletin*, 25(2), 250-260. <https://doi.org/10.1177/0146167299025002010>
- Salgado, S., & Berntsen, D. (2018). My future is brighter than yours: The positivity bias in episodic future thinking and future images. *Psychological Research*, 84, 1829-1845. <https://doi:10.1007/s00426-019-01189z>

### The Physiology of Decision-Making

When a decision is made, the individual undergoes physiological changes within the brain as multiple areas engage and respond to chemicals being released (Politser, 2008). Four primary neurotransmitters release chemicals in the brain and are commonly discussed in the literature with dopamine being the most commonly associated with making decisions that end positively (i.e., "I can do it.", "I did it.") (Breuning, 2016).

Chemical changes in the brain have a long-lasting impact as they later influence individuals to draw on past experiences to guide future decision-making opportunities. Individuals tend to prefer situations and decisions that produce more dopamine release. The changes that occur within the brain when an individual deems the decision successful have longer-lasting impacts than those perceived as unfavorable (Gloy et al., 2020 ; Klein, 2008). The release of dopamine typically results in individuals repeating the action or creating the plan of action that resulted in the release. The resources below provide more information about common physiological changes in the brain during the decision-making process:

- Breuning, L. (2016). *Habits of a happy brain: Retrain your brain to boost your serotonin, dopamine, oxytocin, & endorphin levels*. Adams Media.
- Glimcher, P. (2010). *Decisions, uncertainty, and the brain: The science of neuroeconomics*. MIT Press. <https://doi.org/10.7551/mitpress/2302.001.0001>
- Gloy, K., Herrmann, M., & Fehr, T. (2020). Decision-making under uncertainty in a quasi-realistic binary decision task – An fMRI study. *Brain and*

*Cognition*, 140, 105549. <https://doi.org/10.1016/j.bandc.2020.105549>

Sanfey, A., Loewenstein, G., McClure, S., & Cohen, J. (2006). Neuroeconomics: Cross-currents in research on decision-making. *Trends in Cognitive Sciences*, 10(3), 108-116. <https://doi:10.1016/j.tics.2006.01.009>

### Coaching as a Guide to Deliberative Decision-Making

Evidence-based, capacity-building coaching characteristics provide a familiar and predictable systematic process (joint planning, action/practice, observation, reflection, and feedback) for engaging with the caregiver (Rush & Shelden, 2020; Snyder et al., 2015). The characteristics of coaching intentionally facilitate the engagement of a deliberative decision-making process. A predictable coaching interaction process stimulates the brain to recall past decisions, build upon favorable experiences, and use those contexts to guide new choices. The coaching characteristics of reflection mirrors episodic future thinking as the coach facilitates the identification and analysis of potential options and outcomes with the caregiver. Action/practice creates opportunities for the caregiver to try different options and learn the skills needed to implement them successfully. Observation allows the coach to determine the caregiver's level of knowledge and skill and provide more support if needed. Feedback provides the caregiver with encouragement and information that can further inform decision-making. Joint planning helps the caregiver use the reflections and feedback from the coaching conversation to develop a plan for implementing the decisions (Rush & Shelden, 2020).

By helping families learn new ways to process their current situations, recollect previous successes, and imagine possible outcomes, the coach facilitates long-lasting physiological changes in the brain that remain present after the intervention. (Rush & Shelden, 2020; Sanfey et al., 2006; Talbott, 2007). Coaching moves the coachee from unconscious or procedural decisions to deliberate decisions. The practitioner's use of the research-based coaching characteristics provides a decision-making framework for families participating in early intervention programs. (Glimcher & Fehr, 2014; Trivette et al., 2009). This replicable system of examining decisions influences future decision-making even after the intervention has ended (Gloy et al., 2020; Klein, 2008).

The resources below provide in-depth information about the brain science of decision-making and evidenced-based coaching characteristics:

Glimcher, P. (2010). *Decisions, uncertainty, and the brain: The science of neuroeconomics*. MIT Press.

Klein, G. (2008). Naturalistic decision-making. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 50(3), 456-460. <https://doi.org/10.1518/001872008x288385>

Rush, D., & Shelden, M. (2020). *The early childhood coaching handbook* (2nd ed.). Paul H. Brookes.

Talbott, S. (2007). *The cortisol connection: Why stress makes you fat and ruins your health - and what you can do about it*. Hunter House.

### Decision-making and Stress

Stress, fatigue, and lack of resources impact the brain and result in lesser quality functioning (Glimcher & Fehr, 2014; Huijsmans et al., 2019; Schilbach et al., 2016; Talbott, 2007) and less engagement in deliberative decision-making (Huijsmans et al., 2019; Schilbach et al., 2016; Sheehy-Skeffington, 2020). In stressful situations, individuals tend to rely more heavily on unconscious and procedural decisions. While these decisions are often expedient, they typically result in more errors than deliberate decisions. The cognitive load of those burdened or experiencing a lack of resources negatively impacts decisions and judgment (Glimcher & Fehr, 2014; Huijsmans et al., 2019; Schilbach et al., 2016; Sheehy-Skeffington, 2020). Coaching can have a positive impact on families by supporting parents to feel more in control of their situations (Rush & Shelden, 2020), reduce stress, and open pathways to a deliberate decision-making process. The resources below highlight the impact of stress on the brain and the benefits of the decision-making process:

Huijsmans, I., Ma, I., Micheli, L., Civai, C., Stallen, M., & Sanfey, A. (2019). A scarcity mindset alters neural processing underlying consumer decision-making. *Proceedings of the National Academy of Sciences*, 116(24), 11699-11704. <https://doi.org/10.1073/pnas.1818572116>

Kolk, B. (2015). *The body keeps the score: Brain, mind, and body in the healing of trauma*. Penguin Books. <https://doi.org/10.7748/en.23.3.11.s11>

Sheehy-Skeffington, J. (2020). The effects of low socioeconomic status on decision-making processes. *Current Opinion in Psychology*, 33, 183-188.

<https://doi:10.1016/j.copsyc.2019.07.043>  
 Schilbach, F., Schofield, H., & Mullainathan, S. (2016). The psychological lives of the poor. *American Economic Review*, 106(5), 435–440. <https://doi-org.proxy006.nclive.org/10.1257/aer.p20161101>

### Conclusion

This CASEmaker delineates some commonalities between two previously siloed bodies of literature – the brain science of decision-making and the evidence-based characteristics of coaching used in early childhood intervention. When viewed through the lens of decision-making and brain science, the coaching characteristics are parallel to and compatible with the chemical, physiological, and behavioral characteristics known to contribute to long-term behavioral change. The literature on the brain science of decision-making emphasizes systematic planning, evaluating potential outcomes, and identifying options as critical drivers of behavior change. These components of the decision-making process are directly compatible with the evidence-based characteristics of coaching. Practitioners can benefit from understanding how brain science and the decision-making process operationalized through a coaching interaction style can bolster capacity-building outcomes for families.

### References

Breuning, L. (2016). *Habits of a happy brain: Retrain your brain to boost your serotonin, dopamine, oxytocin, & endorphin levels*. Adams Media.

Brewer, J. (2018). *Craving mind: From cigarettes to smartphones to love*. Yale University Press.

Douglas, S., Meadan, H., & Kammes, R. (2020). Early interventionists' caregiver coaching: A mixed-methods approach exploring experiences and practices. *Topics in Early Childhood Special Education*, 40(2), 84–96. <https://doi.org/10.1177/0271121419829899>

Dunst, C., Bruder, M., & Espe-Sherwindt, M. (2014). Family capacity-building in early childhood intervention: Do context and setting matter? *School Community Journal*, 24(1), 37–48. <http://www.puckett.org/family-capacity-building-eco-context-setting.pdf>

Dunst, C. (2010, November 12). *Family capacity-building in early childhood intervention: Effects on parent and child competence and confidence* [Conference session]. Eighth National Congress on Early Intervention with Young Children and their Families, Aveiro, Portugal. [<https://doi:10.1016/j.copsyc.2019.07.043>  
 sentations/FamilyCapBuildEarlyChildInt\\_11\\_2010.pdf

Espe-Sherwindt, M. \(2008\). Family-centered practice: Collaboration, competency, and evidence. \*Support for Learning\*, 23\(3\), 136–143. <https://doi:10.1111/j.1467-9604.2008.00384.x>

Glimcher, P. \(2010\). \*Decisions, uncertainty, and the brain: The science of neuroeconomics\*. MIT Press.

Glimcher, P. W., & Fehr, E. \(Eds.\). \(2014\). \*Neuroeconomics: Decision-making and the brain\* \(2nd ed.\). Academic Press.

Gloy, K., Herrmann, M., & Fehr, T. \(2020\). Decision making under uncertainty in a quasi realistic binary decision task – An fMRI study. \*Brain and Cognition\*, 140, 105549. <https://doi.org/10.1016/j.bandc.2020.105549>

Individuals with Disabilities Education Act of 2004, Pub. L. No. 108–446, 118 Stat. 2647. \(2004\). <https://sites.ed.gov/idea/regs/c/a/303.13>

Huijsmans, I., Ma, I., Micheli, L., Civai, C., Stallen, M., & Sanfey, A. \(2019\). A scarcity mindset alters neural processing underlying consumer decision-making. \*Proceedings of the National Academy of Sciences\*, 116\(24\), 11699–11704. <https://doi.org/10.1073/pnas.1818572116>

Klein, G. \(2008\). Naturalistic decision-making. \*Human Factors: The Journal of the Human Factors and Ergonomics Society\*, 50\(3\), 456–460. <https://doi.org/10.1518/001872008x288385>

Lorio, C., Romano, M., Woods, J., & Brown, J. \(2020\). A review of problem solving and reflection as caregiver coaching strategies in early intervention. \*Infants & Young Children\*, 33\(1\), 35–70. <https://doi:10.1097/IYC.0000000000000156>

Mahoney, G. \(2014\). Relationship-focused intervention \(RFI\): Enhancing the role of parents in children's developmental intervention. \*International Journal of Early Childhood Special Education\*, 1\(8\), 79–94. <https://doi:10.20489/intjces.107978>

Margolis, L., Steber, K., Rosenberg, A., Palmer, A., Rounds, K., & Wells, M. \(2017\). Partnering with parents in interprofessional leadership graduate education to promote family–professional partnerships. \*Journal of Interprofessional Care\*, 31\(4\), 497–504. <https://doi:10.1080/13561820.2017.1296418>

Pittman, C. M., & Karle, E. M. \(2015\). \*Rewire your anxious brain: How to use the neuroscience of fear to end anxiety, panic, and worry\*. New Harbinger Publications.

Politzer, P. \(2008\). \*Neuroeconomics: A guide to the new science of making choices\*. Oxford. University](http://www.puckett.org/pre-</a></p>
</div>
<div data-bbox=)

- Press.
- Ratliff, A., Angell, M., Dow, R., Kuppermann, M., Nease, R., Jr, Fisher, R., Fisher, E., Redelmeier, D., Faughnan, M., Rimer, B., Pauker, S., Pauker, S., & Sox, H. (1999). What is a good decision? *Effective Clinical Practice*, 2(4), 185–197. <https://access.portico.org/stable?au=phwwtrq275>
- Redish, A. (2015). *The mind within the brain: How we make decisions and how those decisions go wrong*. Oxford University Press.
- Rilling, J. (2011). The neuroscience of social decision-making. *Annual Review of Psychology*, 62(1), 23–48. <https://www.annualreviews.org/doi/10.1146/annurev.psych.121208.131647>
- Rush, D., & Shelden, M. (2020). *The early childhood coaching handbook* (2nd ed.). Paul H. Brookes.
- Sanfey, A., Loewenstein, G., McClure, S., & Cohen, J. (2006). Neuroeconomics: Cross-currents in research on decision-making. *Trends in Cognitive Sciences*, 10(3), 108–116. <https://doi:10.1016/j.tics.2006.01.009>
- Schertz H., Odom S., Baggett K., & Sideris J. (2018). Mediating parent learning to promote social communication for toddlers with autism: Effects from a randomized controlled trial. *Journal of Autism and Developmental Disorders*, 48(3), 853–867. <https://doi:10.1007/s10803-017-3386-8>
- Schilbach, F., Schofield, H., & Mullanathan, S. (2016). The psychological lives of the poor. *American Economic Review*, 106(5), 435–440. <https://doi.org/10.1257/aer.p20161101>
- Sheehy-Skeffington, J. (2020). The effects of low socioeconomic status on decision-making processes. *Current Opinion in Psychology*, 33, 183–188. <https://doi:10.1016/j.copsyc.2019.07.043>
- Snyder, P., Hemmeter, M., & Fox, L. (2015). Supporting implementation of evidence-based practices through practice-based coaching. *Grantee Submission*, 35(3), 133–143. <https://doi.org/10.1177/0271121415594925>
- Swanson J., Raab M., & Dunst C. (2011). Strengthening family capacity to provide young children everyday natural learning opportunities. *Journal of Early Childhood Research*, 9(1), 66–80. <https://doi.org/10.1177%2F1476718X10368588>
- Talbott, S. (2007). *The cortisol connection: Why stress makes you fat and ruins your health - and what you can do about it*. Hunter House.
- Trivette C., Dunst C., Hamby D., & O’Herin C. (2009). Characteristics and consequences of adult learning methods and strategies. *Research Brief*, 3(1), 1–33. <https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED565253>
- Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211(4481), 453–458. <https://doi.org/10.1126/science.7455683>
- Wood, R., & Barker, P. (2015). This is your brain: A decision-making machine. *Defense Acquisition Research Journal: A Publication of the Defense Acquisition University*, 15(3), 61–63. <https://apps.dtic.mil/sti/pdfs/AD1023270.pdf>

### Author

Amber Halliburton is a Researcher at the Family, Infant, and Preschool Program, and Investigator at the Center for Advanced Study of Early Childhood and Family Support Practices, J. Iverson Riddle Developmental Center, Morganton, North Carolina.