

STRATEGIES FOR PROMOTING STUDENT GROWTH MINDSETS

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In the following report, Hanover Research explores strategies for promoting student growth mindsets, seeking applications of research on academic mindsets to identify ways that adults can encourage children to achieve their fullest potential.



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EXECUTIVE SUMMARY AND KEY FINDINGS

INTRODUCTION

In the following report, Hanover Research explores strategies for promoting student growth mindsets, seeking applications of research on academic mindsets to identify ways that teachers and administrators can encourage students to achieve their fullest potential.

The more than 40 years of work on this topic has been approached through a variety of terms, including *academic mindset*, *academic tenacity*, *achievement goal theory*, *grit*, *growth mindset*, *motivational research*, and *noncognitive factors*, among others. **Section I** addresses the evolution of both the terminology and the frameworks used to understand the socio-emotional belief systems that impact student growth and learning, adopting “academic mindsets” as a grounding phrase to provide consistency wherever possible.

Section II highlights strategies emerging from this field that support the work of teachers and administrators in promoting student achievement. It also reviews several vendor products that districts might use, focusing in particular on their aims and available research-based evidence of their impact on student outcomes.

Below we present key findings from this research.

KEY FINDINGS

- **An academic mindset is a personal belief system about learning that informs one’s behaviors and interactions within a larger socio-emotional educational system.** Researchers have demonstrated that student mindsets can be influenced through various interventions, but it is unclear if these effects are lasting. Effective interventions acknowledge both personal and systemic factors at play.
- **Appropriate feedback to encourage positive academic mindsets is specific and constructive, and comments on the *process of learning* rather than the individual.** Praising effort over innate qualities such as intelligence reinforces the idea that growth is continuous and flexible.
- **Direct instruction on academic mindsets allows students to identify their own ways to adopt a more flexible belief system.** Training for students can cover a range of topics, but interventions like this often cover basic brain anatomy, the malleability of intelligence, and application such as role-playing or sharing through essays or letters. Training for adults more specifically addresses the research behind academic mindsets and how they can influence mindsets in the classroom or through other interactions with students.
- **To further support positive academic mindsets, schools and classrooms should be built upon a foundation of community and collaboration** rather than competition. This requires adults to receive training in cultural sensitivity and trauma sensitivity

to reduce unconscious bias related to gender, race/ethnicity, income, and other experiences. In the classroom, students should be given opportunities to build skills in communication and trust within a safe space.

- **Mentoring networks help students build a personalized sense of worth and opportunity that supports a positive academic mindset.** Mentors should be trained in both basic mentoring skills as well as the malleability of intelligence. Adults, college students, and peers are all valuable as mentors.

SECTION I: ACADEMIC MINDSETS

This section examines the evolution of both the terminology and the frameworks used to understand the socio-emotional belief systems that impact student growth and learning; as previously noted, the report adopts “academic mindsets” as a grounding phrase to provide consistency wherever possible.

ACADEMIC MINDSETS

Carol Dweck and Andrew Elliot have historically been the two dominant contributors in the field of academic mindset research. Dweck has spent the past 40 years¹ working to illuminate the nuances and subtleties of student self-perception, and to advocate for the importance of accounting for noncognitive factors when creating an environment for achievement. Through her experimentation, she has crafted specific advice for those seeking to support students’ intellectual development,² which we review in Section II along with other strategies.

Elliot has focused primarily on codifying a strict, universal, and consistent framework to define various subsets of academic mindset, their manipulation, and their impact on students’ experiences. Given the variety of terminology found across the academic literature as well the popular reproduction of this knowledge as “grit” by Angela Duckworth and others,³ it appears his efforts have not produced the “consensual definition” desired. Nevertheless, his work has provided an important foundation for other researchers to replicate and expand upon his work, as well as the work of other key figures in the field.⁴

¹ Some of Dweck’s earliest contributions include Dweck, C.S., and Reppucci, N.D. “Learned helplessness and reinforcement responsibility in children.” *Journal of Personality and Social Psychology* 25, no. 1 (1973): pp. 109-116; Dweck, C.S. “The role of expectations and attributions in the alleviation of learned helplessness.” *Journal of Personality and Social Psychology* 31, no. 4 (1975): pp. 674-685.

² See, for example, Kamins, M.L., and Dweck, C.S. “Person Versus Process Praise and Criticism: Implications for Contingent Self-Worth and Coping.” *Developmental Psychology* 35, no. 3 (1999): pp. 835-847.
https://web.stanford.edu/dept/psychology/cgi-bin/drupal/system/files/Person%20vs%20process%20praise%20and%20criticism%20-%20Implications%20for%20contingent%20self%20worth%20and%20coping_0.pdf

³ See, for example, “Angela Lee Duckworth: The key to success? Grit.” TED. April 2013.
http://www.ted.com/talks/angela_lee_duckworth_the_key_to_success_grit
“Ken Robinson: How schools kill creativity.” TED. February 2006.
http://www.ted.com/talks/ken_robinson_says_schools_kill_creativity?language=en

⁴ See, for example, Elliot, A.J. “Approach and Avoidance Motivation and Achievement Goals.” *Educational Psychologist* 34, no. 3 (1999): pp. 169-189.
https://www.psych.rochester.edu/research/apav/publications/documents/1999_Elliot_Approachandavoidancemotivationandachievementgoals.pdf
Elliot, A.J., and Thrash, T.M. “Achievement Goals and the Hierarchical Model of Achievement Motivation.” *Educational Psychology Review* 13, no. 2 (2001): pp. 139-156. ProQuest Education.

The current appeal of academic mindsets centers on policies that urge schools to develop “career and college ready” graduates⁵ as they implement the Common Core State Standards.⁶ As such, the literature often hovers between a focus on secondary-level students and postsecondary-level students, although early work often focused on elementary grades. However, the common thread is that **observers see academic mindset as something that educators can influence without complicated, controversial, or costly changes to curriculum or pedagogy.** As Dweck, Walton, and Cohen wrote for the Bill and Melinda Gates Foundation (2014), “Most educational reforms focus on curriculum and pedagogy – *what* material is taught and *how* it is taught. [...] In our pursuit of educational reform, something essential has been missing: the psychology of the student.”⁷

Observers caution that “post-secondary performance and persistence depends not only on the readiness of the individual student, but also the context of the college and the extent to which there is a fit between a student’s needs and the college environment.” That is, while it is important to think about how to support development of healthy academic mindsets, we must remember that **students act in and are acted upon by an environment that cannot be ignored.**⁸ With this caveat in mind, this report will focus on identifying strategies that educators can use to manipulate the physical and mental learning environment toward positively impacting students’ academic mindsets.

FRAMEWORKS FOR UNDERSTANDING ACADEMIC MINDSETS

Academic mindsets are “precursors to or motivators for participation in deeper learning instructional activities.”⁹ Most frameworks for understanding academic mindsets seek to move from fine-grained examinations of single, low-impact characteristics to a broader, more holistic understanding of what it takes to achieve academically.¹⁰ “At the heart of cutting-edge approaches,” write Dweck and London (2004), “is the idea that people mentally represent their experiences (including their emotional experiences) and that studying these representations and their organization can illuminate the processes that we all seek to understand.”¹¹ Put differently by Midgley and colleagues (1998), “the focus is on **how students think about themselves, their tasks, and their performance.**”¹²

⁵ See, e.g., Nagoaka, J., et al. “Readiness for College: The Role of Noncognitive Factors and Context.” *Voices of Urban Education*. Fall 2013. p. 45.

<https://ccsr.uchicago.edu/sites/default/files/publications/VUE%20Noncognitive%20Factors.pdf>

⁶ Carrano, J. “Measuring Academic Tenacity: New Visions for Public Schools.” *Voices of Urban Education*. Fall 2013. p. 12. http://annenberginstitute.org/sites/default/files/VUE38_0.pdf

⁷ Dweck, C.S., Walton, G.M., and Cohen, G.L. “Academic Tenacity: Mindsets and Skills that Promote Long-Term Learning.” Paper prepared for the Bill & Melinda Gates Foundation. 2014. p. 2.

https://web.stanford.edu/~gwalton/home/Welcome_files/DweckWaltonCohen_2014.pdf

⁸ Nagoaka et al., “Readiness for College,” Op. cit., p. 46.

⁹ Farrington, C.A. “Academic Mindsets as a Critical Component of Deeper Learning.” White paper prepared for the William and Flora Hewlett Foundation. April 2013. p. 3.

¹⁰ Dweck, C.S., and London, B. “The Role of Mental Representation in Social Development.” *Merrill-Palmer Quarterly* 50, no. 4 (Oct 2004): p. 428. ProQuest Education.

¹¹ *Ibid.*, p. 430.

¹² Midgley, C., et al. “The Development and Validation of Scales Assessing Students’ Achievement Goal Orientations.” *Contemporary Educational Psychology* 23 (1998): p. 114. www.realtutoring.com/test/GoalOrientationMidgley.pdf

Academic mindsets have been discussed with a range of terminology and associated frameworks, but the two dominant frameworks are those of Dweck and Duckworth, respectively. Dweck’s noncognitive factors framework has guided attempts to study mindsets, motivations, attributes, and related factors for the past 40 years. Duckworth’s grit framework has guided attempts to reboot interest in academic mindsets in the new millennium. Each of these frameworks is described below.

NONCOGNITIVE FACTORS

One way of conceptualizing academic mindsets is that it (as a category of understanding) makes up one of several broader socio-environmental factors. For example, Nagoaka and colleagues (2013) placed it within a set of interrelated influences upon performance:

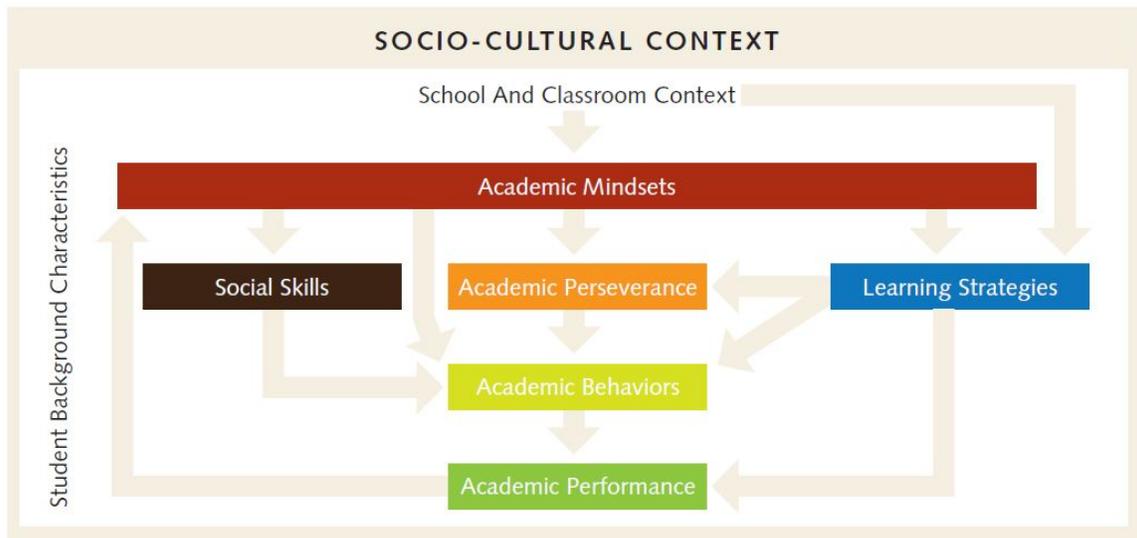
- **Academic behaviors:** those behaviors commonly associated with being a ‘good student,’ such as attendance, engagement, studying, and completing assignments.
- **Academic perseverance:** the ability to remain focused and engaged in work despite distractions, setbacks, or obstacles.
- **Social skills:** interpersonal qualities such as cooperation, assertion, responsibility, and empathy.
- **Learning strategies:** processes and tactics to aid the cognitive work of thinking, remembering, or learning.
- **Academic mindsets:** beliefs, attitudes, or ways of perceiving oneself in relation to learning and intellectual work that promote academic performance.¹³

Combinations of these as well as school and classroom contexts are thought to make the difference between successful schools and so-called “dropout factories.”¹⁴ Figure 1.1 illustrates the suggested relationships among these factors and contexts.

¹³ Nagoaka et al., “Readiness for College,” Op. cit., pp. 47-50.

¹⁴ Snipes, J., Fancsali, C., and Stoker, G. “Student Academic Mindset Interventions: A Review of the Current Landscape.” Impaq International and the Stupski Foundation. August 2012. p. 1.
https://www.impaqint.com/sites/default/files/project-reports/impaq%20student%20academic%20mindset%20interventions%20report%20august%202012_0.pdf

Figure 1.1. Noncognitive Factors Framework



Source: Nagoaka et al., “Readiness for College,” Op. cit., p. 47.

The research is clear that **the ability to impact students’ mindsets is limited, but not impossible**. Nagoaka and colleagues (2013) separate the noncognitive factors into those that can and those that cannot be directly influenced (Figure 1.2). Of these, the authors note that “academic mindsets strongly influence the degree to which students engage in academic behaviors, persevere at difficult tasks, and employ available learning strategies.”¹⁵

Figure 1.2. Relative Malleability of Noncognitive Factors

DIRECT INFLUENCE POSSIBLE	INDIRECT INFLUENCE ONLY
Academic mindset	Perseverance
Learning strategies	Academic behaviors

Source: Adapted from Nagoaka et al., “Readiness for College,” Op. cit., p. 50.
 NB: Social skills were not discussed, as research on their impact on academic outcomes is limited (p. 48).

The goal of influencing academic mindset is to help students understand and achieve their fullest potential by assuring them that they can, in a sense, control their own minds. Midgley and colleagues summarize the divergence between fixed and growth mindsets as one of perception: those who view an “achievement situation” as a challenge will rise to it, while those who view an achievement situation as a threat will resist the growth necessary to overcome it.¹⁶ Put more simply, **those with a flexible academic mindset will grow while those with fixed mindsets are likely to stagnate, regardless of innate skills and abilities.**¹⁷ The crux of the matter is stated thus: if you *believe* you can learn, then you will constantly

¹⁵ Nagoaka et al., “Readiness for College,” Op. cit., p. 50.

¹⁶ Midgley et al., “The Development and Validation,” Op. cit., p. 115.

¹⁷ Dweck, C. “Who Will the 21st-Century Learners Be?” *Knowledge Quest* 38, no. 2 (Nov-Dec 2009).
http://www.ala.org/aasl/sites/ala.org.aasl/files/content/aaslissues/toolkits/bldnglvl/09_NovDec_Dweck.pdf

expand your knowledge and abilities.¹⁸ Dweck's model argues that students with a growth mindset will model four beliefs and behaviors:

- I belong in this learning community
- I can change my abilities through effort (a growth mindset)
- I can succeed
- This work has value and purpose for me¹⁹

Snipes, Fancsali, and Stoker (2012) offer a slightly different summary of academic mindsets within this noncognitive framework, offered in Figure 1.3 below. The introduction of "grit" serves as a particularly interesting bridge between Dweck's work and Duckworth's.

¹⁸ Dweck and London, "The Role of...Development," Op. cit., p. 433.

¹⁹ "Academic Mindsets for Learner Success." MindsetWorks. Accessed June 10, 2015.
<http://www.mindsetworks.com/go/academic-mindsets/>

Figure 1.3. Key Components of Student Academic Mindsets



Source: Snipes, Fancsali, and Stoker, "Student Academic Mindset Interventions," Op. cit., p. 5.

GRIT

While noncognitive factors are concerned with influencing academic mindsets, grit offers a more concentrated framework for influencing a student’s **perseverance and tenacity**. Grounded in studies of “exceptional” and “successful” individuals,²⁰ Duckworth and colleagues “developed and validated a self-report questionnaire called the Grit Scale,” illustrated in Figure 1.4 below.

Figure 1.4. Grit Scale

Consistency of Interests
I often set a goal but later choose to pursue a different one New ideas and new projects sometimes distract me from previous ones I become interested in new pursuits every few months My interests change from year to year I have been obsessed with a certain idea of project for a short time but later lost interest I have difficulty maintaining my focus on projects that take me more than a few months to complete
Perseverance of Effort
I have achieved a goal that took me years of work I have overcome setbacks to conquer an important challenge I finish whatever I begin Setbacks don’t discourage me I am a hard worker I am diligent

Source: Duckworth et al., “Grit,” Op. cit., p. 1090.

Interestingly, this framework seeks to directly influence an area which Nagoaka and colleagues (2013) have argued cannot be directly manipulated. Indeed, this is one of the critical questions that observers are aiming at Duckworth. Duckworth is a 2013 recipient of a “Genius Grant,” a \$650,000 MacArthur fellowship to continue her work on grit and attempt to answer these and other paths of inquiry.²¹ She has also shared the message about grit through popular forums such as TED.²² Once popularized, a much larger audience has pushed and tested the concept. Writing for *Forbes*, Margaret Perlis discussed other aspects like courage, dependability, luck, resilience, and excellence that might better define the idea Duckworth is aiming at.²³

There are also issues of application: “How do you increase grit and self-control, not just in children but also in teachers and people in general, beyond just exhorting them to grin and bear it?” poses Marguerite Del Guidice for *National Geographic*. The answer may be in

²⁰ The authors specifically reference William James’ 1907 work *The energies of men*, but these concepts can be witnessed in more modern and popular works such as Malcolm Gladwell’s *Outliers: The Story of Success*. Little, Brown and Company. 2008.

²¹ “Angela Duckworth.” MacArthur Foundation. September 25, 2013. <http://www.macfound.org/fellows/889/>

²² “Angela Duckworth,” TED, Op. cit.

²³ Perlis, M.M. “5 Characteristics of Grit – How Many Do You Have?” *Forbes*. October 29, 2013. <http://www.forbes.com/sites/margaretperlis/2013/10/29/5-characteristics-of-grit-what-it-is-why-you-need-it-and-do-you-have-it/>

small, personalized touches such as “having a better light in the room” or “eating a healthful breakfast.”²⁴ This muddles the distinction between academic mindset and grit.

“Grit overlaps with achievement aspects of conscientiousness,” Duckworth and colleagues concede, “but differs in its emphasis on long-term stamina rather than short-term intensity.”²⁵ Here they are primarily concerned with a body of work called the Big Five model, which seeks to identify a parsimonious set of traits that predict success in life, considered broadly.²⁶ Duckworth and colleagues’ criticism of this prior work does emphasize an important aspect of the experimental designs of many supporting projects, in that they generally measure in-the-moment feedback and their immediate impacts on the subjects studied. However, to caution against treating academic mindset and grit as radically different frameworks, the purpose of Dweck’s work was not to measure “short-term intensity” but rather to identify the moments in which mindsets are shaped and, in the long term, fixed.²⁷

²⁴ Del Guidice, M. “Grit Trumps Talent and IQ: A Story Every Parent (and Educator) Should Read.” *National Geographic*. October 14, 2014. <http://news.nationalgeographic.com/news/2014/10/141015-angela-duckworth-success-grit-psychology-self-control-science-nginnovators/>

²⁵ Duckworth, A.L., et al. “Grit: Perseverance and Passion for Long-Term Goals.” *Journal of Personality and Social Psychology* 92, no. 6 (2007): p. 1089. www.sas.upenn.edu/~duckwort/images/Grit%20JPSP.pdf

²⁶ See, for example, Barrick, M.R., and Mount, M.K. “The Big Five Personality Dimensions and Job Performance: A Meta-Analysis.” *Personnel Psychology* 44, no. 1 (Spring 1991): pp. 1-25. www.researchgate.net/profile/Sebastiaan_Rothmann/publication/47739408_The_big_five_personality_dimensions_and_job_performance/links/00b7d5193952e3cc52000000.pdf

²⁷ See, for example, Kamins and Dweck, “Person Versus Process,” *Op. cit.*, p. 846.

SECTION II: STRATEGIES TO PROMOTE STUDENT GROWTH MINDSETS

This section identifies and describes specific research-based strategies to promote student growth mindsets. It also reviews several vendor products that districts might use, focusing in particular on their aims and available evidence of their impact on student outcomes.

STRATEGIES TO PROMOTE STUDENT GROWTH MINDSETS

Strategies to promote student growth mindsets are varied, but focus on **two major tasks: manipulating the curriculum, and manipulating the socio-emotional environment**. Snipes, Fancsali, and Stoker (2012) identified eight categories of strategies including:

- Instruction that teaches students that intelligence grows with effort
- Shifting students' explanations for academic and social challenges from stable internal causes to temporary external causes
- Affirmation and visualization exercises
- Exercises that help students relate coursework to their lives
- Progress monitoring and support interventions
- Support to improve students' learning strategies
- Programs that integrate content-specific instruction with mindset development
- Approaches that have not yet been codified into tools and practices²⁸

Dweck, Walton, and Cohen (2014) summarized the options into just four categories:

- Teaching students that intelligence can be developed (a growth mindset)
- Helping students to feel that they belong or are valued in school
- Helping students to see how the curriculum is relevant to their own lives
- Helping students to set goals, identify obstacles, and learn self-control strategies²⁹

More popularly, parents and other caring adults have suggested a variety of related options, such as having “daily learning discussions” with questions that focus on the process (“What did you try hard at today?”), encouraging risk and failure and learning from mistakes, and modeling positive self-talk.³⁰ Others summarize the research in “Zen” terminology (“to become better at being themselves”) and offer similarly Zen-like recommendations: be

²⁸ Snipes, Fancsali, and Stoker, “Student Academic Mindset Interventions,” Op. cit., p. 10.

²⁹ Dweck, Walton, and Cohen, “Academic Tenacity,” Op. cit., p. 15.

³⁰ Taylor, M. “5 Parenting Strategies to Develop a Growth Mindset.” Imagination Soup blog. September 17, 2014. <http://imaginationsoup.net/2014/09/help-child-unmotivated-growth-fixed-mindset/>

humble, value constructive critique, treat setbacks as formative struggles, be flexible.³¹ The Youth Development Executives of King County and The Road Map Project (2014) developed a holistic scheme based upon these principles to support children’s development through foundational practices, deepening relationships, transforming discipline, developing skills, and leveraging partnerships (see Figure 2.1 below).³²

Figure 2.1. Student Motivation, Engagement, and 21st Century Skills



Source: Adapted from “Skills & Dispositions,” Op. cit.

The sub-sections to follow explore some of these recommendations in further detail, drawing out the available research that supports their use in general or more limited settings. Additionally, **research cautions that timing is important.** For example, “the developmental literature suggests that it is not until adolescence that stereotyped students should regularly experience the stress and underperformance that accompanies explicit evaluations of ability.”³³ Therefore **a continuum or menu of interventions may be best suited to target specific demographic- or situation-associated issues in meaningful ways.**

³¹ Hochheiser, D. “Growth Mindset: A Driving Philosophy, Not Just a Tool.” Edutopia. September 16, 2014. <http://www.edutopia.org/blog/growth-mindset-driving-philosophy-david-hochheiser>

³² “Skills & Dispositions That Support Youth Success in School.” Youth Development Executives of King County and The Road Map Project. May 2014. <http://www.roadmapproject.org/wp-content/uploads/2012/07/Skills-Dispositions-Part-Two-Strategies-May-2014-Final.pdf>

³³ Good, C., Aronson, J., and Inzlicht, M. “Improving adolescents’ standardized test performance: An intervention to reduce the effects of stereotype threat.” *Applied Developmental Psychology* 24 (2003): p. 648. www.michaelinzlicht.com/research/research_articles/Good,%20Aronson,%20Inzlicht,%202003.pdf

APPROPRIATE FEEDBACK

At the individual level, one of the most important and effective strategies for promoting growth mindsets is to **offer specific feedback that comments on the process of learning** rather than fixed individual attributes such as skill or intelligence. “When students are praised for the process they engage in – their effort, strategy, concentration, or persistence –,” Dweck writes, “this promotes a growth mindset with its emphasis on learning and its [sic] resilience.”³⁴

Decades of research have demonstrated that providing “person-focused feedback (such as the intelligence praise)” contributes to the development of “more fixed self-theories, more global self-attributions for failure, and more academic difficulties across the transition to junior high school (controlling for entering achievement.)”³⁵ Kamins and Dweck (2001) used role-playing to study the effects of different types of feedback (process- versus person-oriented) among kindergarteners:

Children chose dolls to represent themselves and were given a period of time to practice role-playing with the dolls. The experimenter then narrated four different scenarios for the child to act out using the dolls. The scenarios all followed the same basic theme: The child worked hard on something, either creating a product or completing a task, but made an error in the process. [...] Pretend stories were used so that no judgments or criticism was given directly to the child, but the scenarios were vivid, and all children felt, at some level, as though they were performing the task and receiving the feedback.³⁶

The researchers found that “children receiving person feedback gave lowered ratings of their product and self, indicating by the latter that after an error they believed themselves to be less good, less nice, and less smart than the children in the process-feedback groups.”³⁷

Elsewhere, teachers have recommended that appropriate feedback should include **explicit encouragement of risk, failure, and making mistakes**. Bromley explains, “they must foster a safe and secure environment in which falling over is not only accepted without criticism or humiliation, but in which it is actively encouraged as evidence of effective learning and of getting better at something.”³⁸ Such culture-building is explored in a later sub-section.

DIRECT INSTRUCTION

Another important strategy for the individual level – which permeates all the other recommendations – is direct instruction about the malleability of intelligence. That is, **students who have been taught that they *can* learn new things *will* learn new things**.

³⁴ Dweck, “Who Will...Be,” Op. cit., p. 9; Dweck and London, “The Role of...Development,” Op. cit., p. 436.

³⁵ Dweck and London, “The Role of...Development,” Op. cit., p. 436.

³⁶ Kamins and Dweck, “Person Versus Process,” Op. cit., p. 837.

³⁷ Ibid., p. 844.

³⁸ Bromley, M. “Teaching strategies to create ‘growth’ mindsets.” SecEd. May 8, 2014. <http://www.sec-ed.co.uk/best-practice/teaching-strategies-to-create-growth-mindsets>

Walton and Cohen (2011) demonstrated clear gains for African-American students who received an intervention during their transition to college involving “a narrative that framed social adversity in school as shared and short-lived.” Participants in this treatment group additionally wrote and delivered a video-taped speech espousing this philosophy. Three years later, few participants remembered the content of the intervention but “treated” African-American students had clear advantages over race-group peers in terms of their self-assessed general health and subjective happiness. The authors caution that “[t]he subtle nature of this intervention, with its influence occurring outside conscious awareness, may contribute to its efficacy. [...] **More overt interventions risk sending the stigmatizing message that the beneficiaries are seen as in need of help.**”³⁹

However, the exact method of direct instruction can vary. Snipes, Fancsali, and Stoker (2013) reviewed studies that used the following methods:

- A workshop teaching the basic anatomy of the brain, the malleability of intelligence, and problems of stereotyping oneself and others
- An interactive computer-based workshop
- Trained college mentors teaching students about the malleability of intelligence
- Freshmen in college receiving “film clips about how the brain grows like a muscle” before participating as pen-pal mentors to “young students from an impoverished community”⁴⁰

Other studies have included units on how to identify and respond to intent, as well as how to emulate ideal behaviors in social situations:

Both the experimental group and the control group received an **eight-session multifaceted intervention that, among other things, taught them study skills, discussed their academic problems, and delivered strong anti-stereotyping messages.** This message taught the students – mostly minority group members – not to let stereotypes and labels limit them. However, in addition, the experimental group received several sessions on the malleable theory of intelligence, learning how the brain grows new connections and makes them smarter every time they learn, and learning how to apply this lesson to their schoolwork. **At the end of the semester, the intervention group had earned significantly higher grades than the control group and were reported by their teachers (who were blind to their experimental condition) to have shown marked changes in motivation.**⁴¹

Such anti-stereotyping efforts were in vogue in the 1990s in particular, and were aimed at reducing aggression among students especially in minority students and at the elementary

³⁹ Walton, G.M., and Cohen, G.L. “A Brief Social-Belonging Intervention Improves Academic and Health Outcomes of Minority Students.” *Science* 331 (March 18, 2011): p. 1450.

https://web.stanford.edu/~gwalton/home/Publications_files/Walton_Cohen_2011_Science.pdf

⁴⁰ Snipes, Fancsali, and Stoker, “Student Academic Mindset Interventions,” Op. cit.

⁴¹ Dweck and London, “The Role of...Development,” Op. cit., p. 437.

school level. Others have since extended this work, examining how students develop biases in (mis)perceiving others' intents, and how to correct this bias. Hudley and colleagues (1998) examined the effects of a specific intervention, the BrainPower Program, with the hypothesis that "[a]ggressive children can learn to recognize accidental causes in interactions with peers, and when negative outcomes are attributed to accidental (i.e., nonhostile[]) causes, anger and aggression will become unlikely."⁴² The researchers found that the program reduced aggression through training students in how to perceive others, using school site staff to deliver the training and support.⁴³

Two of the ready-made interventions resulting from this work to develop direct instruction are reviewed later in this section.

BUILD COMMUNITY IN THE SCHOOL AND CLASSROOM

Much of the academic mindset research implies the importance of feeling supported by those with whom one interacts. As such, one strategy for promoting student growth mindsets is to build community in the school and the classroom. This involves **developing a culture of cooperation rather than of competition,⁴⁴ and a culture of inclusion and respect.**⁴⁵ Johnson and Johnson (2009) reiterate the "[m]ore than 1,200 research studies [...] in the past 11 decades" that have shown the value of cooperative learning. The philosophy espouses:

- **Positive interdependence:** knowing that one's performance affects the success of group mates seems to create responsibility forces that increase one's efforts to achieve.⁴⁶
- **Individual accountability and personal responsibility:** group size and individual accountability (e.g., a personal grade) influence the kinds and frequency of communication, thus the end results of their work.⁴⁷
- **Promotive interaction:** individuals encourage and facilitate each other's efforts to accomplish the group's goals by
 - acting in trusting and trustworthy ways
 - exchanging needed resources, such as information and materials, and processing information more efficiently and effectively
 - providing efficient and effective help and assistance to group mates

⁴² Hudley, C., et al. "An Attribution Retraining Program to Reduce Aggression in Elementary School Students." *Psychology in the Schools* 35, no. 3 (1998): p. 273. http://stopyouthviolence.ucr.edu/pubs_by_topic/3.%20Attribution%20retraining%20program%20to%20reduce.pdf

⁴³ Ibid., pp. 279-281.

⁴⁴ Dweck, Walton, and Cohen, "Academic Tenacity," Op. cit., p. 8.

⁴⁵ Ibid., p. 17.

⁴⁶ Johnson, D. W., & Johnson, R. T. "An educational psychology success story: Social interdependence theory and cooperative learning." *Educational Researcher* 38, no. 5 (2009): p. 367. <http://www.co-operation.org/wp-content/uploads/2011/01/ER.CL-Success-Story-Pub-Version-09.pdf>

⁴⁷ Ibid., p. 368.

- being motivated to strive for mutual benefit
 - advocating exerting effort to achieve mutual goals
 - having a moderate level of arousal, characterized by low anxiety and stress
 - influencing each other's efforts to achieve the group's goals
 - providing group mates with feedback in order to improve their performance
 - challenging each other's reasoning and conclusions in order to promote higher quality decision making and greater creativity
 - taking the perspectives of others more accurately and thus being better able to explore different points of view⁴⁸
- **Appropriate use of social skills:** group members are taught and use skills to (a) get to know and trust each other, (b) communicate accurately and unambiguously, (c) accept and support each other, and (d) resolve conflicts constructively.⁴⁹
 - **Group processing:** group members express respect for each other's contributions to the group efforts and for each other as persons, and use this feedback to make decisions about which actions to continue or change.⁵⁰

For Benjamin Zander, acclaimed conductor and author of *The Art of Possibility* (2002),⁵¹ this reflects the idea that “ordinary things in life can be transformed if you challenge your assumptions about them.” It is about focusing on one’s “contribution to the world, not just [one’s] achievements.”⁵² In the classroom, this philosophy can be expressed through offering students an “unconditional A,” or rather allowing students to define their own investment in their learning and to support that learning whole-heartedly:

In his graduate class at the New England Conservatory, Zander gives each of his students an “A” at the beginning of the year and asks them to write a letter describing who they will have become by the following May when the class ends. [...] [I]t makes the students and the teacher **committed partners on a fascinating and joyful journey**, where, for the time being, standards are in the background, and there is no striving — just engagement, participation, and expression. [...] When Zander’s musicians make a mistake, **he teaches them not to give in to the voice of doubt or self-recrimination**. Instead, he has instructed his students to say “How fascinating!” whenever they make a mistake. To Zander, this means throwing up one’s arms and exclaiming “How fascinating!” at top volume. His point: Every setback is an opportunity to learn.⁵³

⁴⁸ Ibid., pp. 368-369.

⁴⁹ Ibid., p. 370.

⁵⁰ Ibid., p. 370.

⁵¹ Zander, B. *The Art of Possibility: Transforming Professional and Personal Life*. Penguin Books, 2002.

⁵² “Boston Philharmonic’s Benjamin Zander: Tapping into ‘The Art of Possibility.’” Knowledge@Wharton. July 7, 2010. <http://knowledge.wharton.upenn.edu/article/boston-philharmonics-benjamin-zander-tapping-into-the-art-of-possibility/>

⁵³ Ibid.

Putting this theory into practice can be challenging, as some researchers point out.⁵⁴ Subtle social cues termed “microaggressions” can send constant signals about the relative expectations of certain students, especially to students of color, female students, and other marginalized groups.⁵⁵ Broadly, then, for this style of cooperative learning to be effective, teachers must be able to make critical decisions about what constitutes a “group-worthy task” and to promote cultural sensitivity and cultural diversity.⁵⁶

MENTORING

An extension of the community-building effort, mentoring provides an opportunity for individualized experiences and networking among students, faculty, parents, and/or the broader community, depending on the mentorship program. Laursen (2015) noted that the greatest way to help students in his life was to “become grittier [oneself] and to share your experiences with the youth you encounter in your work.”⁵⁷ New Visions for Public School, a nonprofit organization that serves New York City Public Schools, has found considerable value in its iMentor program,

a school-based mentoring program that matches public high school students with college-educated mentors in one-on-one relationships. **Each student receives a mentor who augments existing guidance and college counseling programs at their school.** Mentor-mentee pairs at New Visions schools are matched for all four years of high school, over which time they exchange weekly emails and meet in person on a monthly basis.

The iMentor program seeks to develop **seven core noncognitive skills**: social capital development, utilizing a growth mindset, perseverance, critical thinking, help-seeking and self-advocacy, optimism and excitement about the future, and curiosity and love of learning. Mentors also help their mentees develop college knowledge, such as how to identify the best college match, apply for financial aid, meet application deadlines, write effective essays, and integrate into college life [...]⁵⁸

Annual evaluations of the program, which has operated since 1999, have shown “promising initial results” such as:

- 85 percent of mentees say that their mentor is someone they can trust
- 86 percent of mentees report that their mentor has helped them feel they can do/say things to improve as a student or further their education

⁵⁴ Sharan, Y. “Cooperative Learning for Academic and Social Gains: valued pedagogy, problematic practice.” *European Journal of Education* 45, no. 2 (June 2010): pp. 300-313.

http://www.researchgate.net/profile/Yael_Sharon/publication/230245801_Cooperative_Learning_for_Academic_and_Social_Gains_valued_pedagogy_problematic_practice/links/55142d610cf23203199cf2c4.pdf

⁵⁵ See, for example, Sue, D.W., et al. “Racial microaggressions in everyday life: Implications for clinical practice.” *American Psychologist* 62, no. 4 (May-June 2007): pp. 271-286. Booth, A.L., and Nolen, P. “Gender differences in risk behavior: does nurture matter?” *The Economic Journal* 122, no. 558 (Feb 2012): pp. 56-78.

⁵⁶ Sharan, “Cooperative Learning,” Op. cit., pp. 309-310.

⁵⁷ Laursen, E.K. “The Power of Grit, Perseverance, and Tenacity.” *Reclaiming Children and Youth* 23, no. 4 (Winter 2015): p. 23. ProQuest Education.

⁵⁸ Carrano, “Measuring Academic Tenacity,” Op. cit., p. 14.

- 78 percent of mentors helped their mentees prepare for the SATs, Regents exams, or other standardized tests
- 78 percent of mentors report that they helped their mentee create a college plan and set goals to achieve it⁵⁹

The program will pursue a more targeted evaluation of the impacts of iMentor on its more than 11,000 past and current mentees through a partnership with the Research Alliance for New York City Schools.⁶⁰

In a program tested by Good, Aronson, and Inzlicht (2003), college student mentors participated in a standard three-hour “mentor-training course designed by the school district” that was supplemented by training on the “four experimental messages” with mentors told that “students in all conditions [would] benefit academically from the mentoring program,” thus keeping them “blind to the specific hypotheses of the study.” The four experimental messages were:

- Incremental: the expandable nature of intelligence
- Attribution: the tendency for all students to initially experience difficulty but then to improve
- Combination: the expandable nature of intelligence and the temporarily difficult transition
- Antidrug: the perils of drug use⁶¹

The gender and minority achievement gaps common in math and reading, respectively, “disappeared” among the experimental groups that were exposed to incremental theory of intelligence.⁶² The authors emphasize that achievement was not improved by more hours of learning or studying, but “by learning attitudes that helped [students] contend with the anxieties that research has shown develop in part from their social identities,” that is, stereotypes about gender or minority status.⁶³

PREPARED INTERVENTIONS

Out of this research, several products have been developed to facilitate the implementation of the principles in schools and classrooms. We review two of these products below: Brainology, BrainPower/Best Foot Forward. Additional options are summarized by Snipes, Fancsali, and Stoker (2012).⁶⁴

⁵⁹ Voloch, D. “Supporting College Readiness Through Mentoring in New York City: iMentor.” *Voices of Urban Education*. Fall 2013. p. 18. http://annenberginstitute.org/sites/default/files/VUE38_0.pdf

⁶⁰ Carrano, “Measuring Academic Tenacity,” Op. cit.; Voloch, “Supporting College Readiness,” Op. cit.

⁶¹ Good, Aronson, and Inzlicht, “Improving adolescents’...threat,” Op. cit., p. 652.

⁶² Ibid., pp. 657-658.

⁶³ Ibid., p. 659.

⁶⁴ Snipes, Fancsali, and Stoker, “Student Academic Mindset Interventions,” Op. cit.

BRAINOLGY

Dweck and colleague Lisa Sorich Blackwell used the work on academic mindsets to create a tool for schools called Brainology, which is “a challenge-based, interactive multimedia instructional program” in which students role-play through the

characters Chris and Dahlia as they tackle various problems in their most difficult subjects. They visit the lab of eccentric brain scientist Dr. Cerebrus and learn about the basic structure and function of the brain: how thinking occurs, how learning and memory work, how to develop and change the brain, and how to improve their study habits and skills in light of this knowledge.⁶⁵

Teachers use a guide to help students prepare for and reflect on their participation, and which further elaborates on the “research-based principals [sic] underlying these recommendations.”⁶⁶

Brainology has the support of the U.S. Department of Education Institute of Education Sciences through its SBIR Program,⁶⁷ “a highly competitive program that encourages domestic small businesses to engage in [research and development] that has the potential for commercialization.”⁶⁸ Testimonials from teachers who have used the program with their students repeat several key mindset shifts:

- Feeling like they can succeed in school
- Feeling like they are smarter or have learned something (e.g., study skills)
- Feeling less stressed (or more excited) about challenges
- Feeling like they have ownership over their learning
- Feeling like the process is more important than the grade⁶⁹

However, in a rare independent study of the program, researchers Donohoe, Topping, and Hannah (2012) suggest that the effects of Brainology on students are short-lived: “There were no significant changes in resiliency or sense of mastery.”⁷⁰

⁶⁵ “Curriculum Guide for Parents.” Brainology. 2008. p. 3.

http://www.fcps.edu/southcountymys/docs/parents/mindset/brainology_parents.pdf

⁶⁶ “GO! Part III. Lessons & Material Guide for Teachers Introductory Unit.” Brainology. 2009. p. 4.

<http://www.jcsd.k12.or.us/sites/jcsd.k12.or.us/files/files/Introductory%20Unit.pdf>

⁶⁷ Home page. Mindset Works. Accessed June 9, 2015. <http://www.mindsetworks.com/>

⁶⁸ “About SBIR.” SBIR/STTR. Accessed June 9, 2015. <https://www.sbir.gov/about/about-sbir>

⁶⁹ “Experiences.” Brainology. Accessed June 9, 2015. <http://www.mindsetworks.com/webnav/experiences.aspx>

⁷⁰ Donohoe, C., Topping, K., and Hanna, E. “The impact of an online intervention (Brainology) on the mindset and resiliency of secondary school pupils: a preliminary mixed methods study.” *Educational Psychology* 32, no. 5 (2012): pp. 641-655. <http://www.tandfonline.com/doi/abs/10.1080/01443410.2012.675646>

BRAINPOWER/BEST FOOT FORWARD

Cynthia Hudley and Sandra Graham developed The BrainPower Program in the early 1990s as an extension of mindset work on attribution-driven behaviors of young African-American males in Southern California.⁷¹ The figure below outlines the structure of this program.

Figure 2.2. BrainPower Program

The BrainPower Program is a 12-lesson intervention with materials and activities appropriate for grades three to six. Lesson 1 provided an introduction to the program; an icebreaker was also included to build group cohesion. Lessons 2–11 comprised the three training components. The **first component** (Lessons 2–6) was designed to strengthen aggressive boys' ability to accurately detect others' intentions. A variety of instructional activities trained subjects to search for, interpret, and properly categorize the verbal, physical, and behavioral cues exhibited by others in social situations.

After the subjects gained some skills in the interpretation of social cues, the **second component** (Lessons 7–9) was designed to increase the likelihood that aggressive boys would first attribute negative outcomes to accidental causes. Students were taught to associate inconsistent or uninterpretable social cues with attributions to "uncontrollable" or "accidental" causes.

The **third component** (Lessons 10–11) linked appropriate, nonaggressive behavioral responses to ambiguously caused, negative social outcomes. Participants applied these newly acquired interpretive skills by making the connection between unbiased thinking and less verbally and physically aggressive behavioral responses. Students generated decision rules about when to enact particular responses (e.g., "When I can't really tell why he did that, I should act as if it were an accident"). Such decision rules enhance maintenance and generalization of newly acquired processing skills beyond the treatment setting.

Lesson 12 presented a review of the concepts presented in the program and provided an informal social setting for the group's interaction.

Source: Hudley et al., "Attribution Retraining," Op. cit., pp. 274-275.

The National Registry of Evidence-based Programs and Practices (NREPP) counts BrainPower as a "legacy program," meaning that it was reviewed "only under the previous National Registry of Effective Prevention Programs system" in 2002 and "is intended to be used for historical reference only."⁷² However, Hudley and Graham's work continues to support the intervention — later rebranded as Best Foot Forward — as best practice for resolving aggression issues among minority male students.⁷³

The current program structure for Best Foot Forward involves "a 32-lesson curriculum with two separate but interrelated components,"⁷⁴ compared to BrainPower's shorter 12-lesson program.⁷⁵ The components are described in Figure 2.3 below.

⁷¹ "BrainPower." Child Trends. December 15, 2008. <http://www.childtrends.org/?programs=brainpower>

⁷² "Brain Power." SAMHSA's National Registry of Evidence-based Programs and Practices. June 5, 2015. <http://www.nrepp.samhsa.gov/ViewLegacy.aspx?id=3>

⁷³ See, for example, Graham, S., Taylor, A., and Hudley, C. "A Motivational Intervention for African American Boys Labeled as Aggressive." *Urban Education* 50, no. 2 (Mar 2015): 194-224. <http://uex.sagepub.com/content/50/2/194.full.pdf>

⁷⁴ From Thorkildsen, T.A., and Walberg, H.J., eds. *Nurturing Morality*. Springer Science & Business Media. 2011 (2004).

⁷⁵ "BrainPower," Child Trends, Op. cit.

Figure 2.3. Overview of the Best Foot Forward Curriculum

TOPIC	PRIMARY GOALS/OBJECTIVES	HOW ACHIEVED
Introduction	Introduce program Develop group guidelines Introduce trainers to students	As a group deciding on guidelines for the program Completing student questionnaire
Account giving	Recognize the use of various accounts and their emotional and interpersonal consequences	Generating accounts, analyzing their emotional responses, considering the pros and cons of various accounts, practicing using and honoring through role-play and modeling throughout the program
Inferring intent	Accurately infer intentionality/responsibility in others	Recognizing different intents, analyzing stories/video scenes for intent, recognizing various intent “cues,” role-playing adaptive behavioral responses to provocation
Intermediate risk	Encourage intermediate risk taking	Identifying <i>own</i> intermediate level and practicing monitoring own progress
Goal setting	Learn to set realistic proximal goals	Defining and breaking down own goals, look at the pros and cons of decisions that affect your goals, learn how to gather more information before making a decision
Mastery focus	Focus on improvement rather than performance Be effective help-seekers (demonstrating effort)	Rewarding effort on achievement tasks, role-playing good and bad help-seeking, practicing help-seeking with challenging tasks
Attribution retraining	Recognize control on effecting change and the role of effort in achieving change Attribute outcomes to effort	Determining areas requiring effort to achieve goals, identify reasons for failure and the adaptiveness of focusing on effort, practicing persistence

Source: Graham, Taylor, and Hudley, “A Motivational Intervention,” Op. cit., p. 202.

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