The Impact of Noncognitive Skill Deficits on Academic Performance

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Where We Will Go Today

• What are cognitive skills
• What is noncognitive skills
• What affects noncognitive learning
• Poverty and its affect on learning
• How do noncognitive skills affect achievement
• Can you teach it?
• What works?
What Inspired this Presentation

• My experience with struggling 6th and 7th grade students from poverty who had strong cognitive abilities; not so strong noncognitive abilities.
• Studies that show that noncognitive skills may be as important as cognitive skills in predicting a variety of outcomes, ranging from educational attainment to income to incarceration.
• We need to identify and explicitly target noncognitive abilities as much as cognitive abilities.
Academic Performance

• How well a student meets grade based standards
• Scores on district/state level standardized tests
• Teacher evaluation (letter or number grades) in literacy, math, and academic content
• Presentations and projects (individual and cooperative)
• Turning in homework and assignments
• Participating in class activities and discussions
• Academic behaviors
Cognitive Skills; Thinking and Learning

- Abilities used to learn, understand and integrate information in a meaningful way.
- Verbal skills; receptive/expressive
- Problem solving and critical thinking
- Processing speed; quickly and accurately
- Memory-STM and LTM
- Predictions using prior knowledge
- Inductive and deductive reasoning
- Attention-sustained; selective; divided
Noncognitive Skills

• Not directly represented by cognitive skills or by formal conceptual understanding.
• Socio-emotional or behavioral characteristics that are not fixed traits.
• Behaviors, attitudes, and strategies that are critical for success in school.
• Noncognitive skills support cognitive development; these skills are interdependent.
Examples of Noncognitive Skills

• Motivation
• Effort
• Academic Behaviors
• Academic Mindset
• Learning Strategies
• Academic Self Concept
• Social Skills and Behavior
• Coping and Resilience
Cognitive Development

• Cognitive skills undergo the greatest amount of growth and change in early childhood (6-8 yrs.)
• Although there might be an underlying hardwired capacity, cognitive abilities can be enriched or impoverished by experience
• Students in poverty often have fewer opportunities at home for enrichment.
• Higher SES students have opportunities for sports, dance, gymnastics, tutoring, etc. Summer is often camps, trips, classes, etc.
Cognitive Development

- Children from lower SES often come to kindergarten with limited readiness skills including noncognitive skills (might be motivated).
- Children from higher SES already have the high-quality preschools and extra activities that enhance cognitive and noncognitive abilities and are ready to learn.
Noncognitive Development

- Noncognitive skills continue to undergo changes throughout childhood and into young adulthood.
- Noncognitive skills are malleable. They can be taught.
- Because they are later developing, noncognitive skills are more affected by SES in the school years.
- Socio-cultural context is a factor; cultivation and direct teaching of the importance of noncognitive skills or not.
Noncognitive Skills

• There can be some volitional aspect and some effort is required to learn and use noncognitive skills.
• You need a skill set to be motivated.
• Poor noncognitive skill development can lead to poor academic outcomes and poor economic (employment) outcomes.
Poverty and Academic Achievement

- A large, robust, consistent literature indicates that poverty is a strong predictor of a child’s language development and level of academic readiness and achievement.
Children in Poverty are Less Likely To:

• Receive regular medical care (doctor or dentist).
• Have books and magazines in the house.
• To be read to each day.
• Hear a diverse, complex vocabulary (Hart and Risley).
• Live in a safe neighborhood.
• Go to the library, museums, family trips, shows, or do other extracurricular activities.
Children in Poverty are More Likely To:

• To have insufficient housing, move frequently (home and school) or be homeless.
• Have higher stress levels
• More likely to have asthma, allergies and other illnesses with little medical care.
• Have a poor diet or be hungry.
• Be chronically absent from school.
• Be substantially behind others on the first day of school.
Poverty Predicts Academic Performance

• The percent of students on Free or Reduced Lunch predicts the percent of students who are proficient and above on the state reading assessment.

• \((\% \ F/R) + (\% \ Prof \ or \ Adv) = 100\%\)
Free and Reduced Lunch added to Percent Proficient or Above

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Brain scan images from birth to age 6 years. The brain develops very rapidly in the first years of life, and in this period of rapid development is likely vulnerable to the adverse effects of poverty.
Effects of Poverty on Brain Response

Berkley study showed 9-10 year olds from lower SES had lower response (EEG) in frontal lobe than students from mid/high SES when presented with novel stimuli.

• “...the fact that we see functional differences in prefrontal cortex response in lower socioeconomic status kids is definitive.”

• "Kids from lower socioeconomic levels show brain physiology patterns similar to someone who actually had damage in the frontal lobe as an adult."  (Robert Knight UC Berkeley professor of psychology)
Activity in Prefrontal Cortex

High SES

256 ms

Low SES

240 ms
Brain Growth and Poverty

• UW-Madison (2013): Measured gray matter longitudinally of children from 5-37 months.
• All infants started with same volume of gray matter
• By 3, significant difference in gray matter volume between mid/upper income and families in poverty.
Total Gray Matter

- HighSES
- MidSES
- LowSES

Volume (cm³) vs. Age (in months)
Less Gray Matter in Areas that Matter

- Differences Found in Frontal and Parietal Lobes
- Frontal lobe; executive function; noncognitive skills
  - Attention
  - Planning
  - Impulse control
  - Judgment
- Parietal lobe; connectivity between brain regions
  - Sensory integration
  - Visual attention
Brain Growth and Poverty

The physiology of the developing brain is affected by:

- Poor prenatal care
- Poor Nutrition
- lack of sleep
- lack of enriching environment and interactions
- limited language stimulation
- parental and child stress levels, (cortisol) etc.
“Poverty hurts children and our nation’s future. This stark statement is backed by years of scientific research and the more we learn about the brain and its development the more devastatingly true we know this to be. Childhood poverty can and does scar children for life.”

Marian Wright Edelman
President, Children's Defense Fund
01/28/2015
The Sequence of Events

• Students from poverty often do not come from an enriched environment.

• They come to kindergarten with minimal academic readiness and noncognitive skills for learning (how to sit, listen, attend, start, finish, organize, transition, take turns, participate, etc.)

• During this same period, high-SES families enhance children’s math/verbal/cultural development through preschool, sports, dance, music, etc. These experiences go on to positively influence children’s educational attainment.
The Sequence

• High SES families are more likely to “cultivate” the cognitive and noncognitive traits that foster academic achievement.

• In a diverse school, students from poverty eventually learn that they are far behind the other students.

• With the best of adult intentions, the gap grows as the student gets to 1st and 2nd grade.
The Sequence

• The student might looks for other outlets to get his or her reinforcement and save face (e.g. detached from academics, unmotivated, disrupting and distracting, etc.)

• By 5\textsuperscript{th} and 6\textsuperscript{th} grade many student do not demonstrate the noncognitive skills necessary for learning. They are done. Academic success is not a goal.

• The downward spiral of academic failure takes hold.
Noncognitive Skills
Motivation

• A desire to accomplish academic activities successfully
• Interest and enjoyment; external rewards for completing task (grades, social comparison)
• The desire to master a skill
• Performance to demonstrate competence to another (teacher/peers)
Effort and Academic Behaviors

• The extent to which students take an active role in learning
• Energy, enthusiasm, cognitive focus, positive attitude
• Attending school/class, on time, ready to work (with all materials), not in the halls
• Completing a task; complying with classroom rules
• Studying and doing homework outside of school
Self Regulated Learning

• Evaluating a task, selecting and applying problem solving strategies and revising when necessary

• Goal setting, planning, self monitoring, asking for help.

• Emotional regulation (manage, modulate, inhibit) relates to achievement scores. Students with less emotional control have less focused time to learn.
Learning Strategies

• Strategies a student uses to facilitate thinking, remembering and learning
• Study skills
• Note taking skills
• Research skills
• Knowing when you need help and asking
• Use of mnemonics
• Planning
• Goal setting
• Time management
Academic Perseverance

• Completing tasks in a timely manner despite obstacles, distractions or challenges.

• Grit and persistence even when it is difficult

• Delaying gratification; staying focused when other preferred activities are available
Academic Self Concept

- Students' self-perceived competence in school
- Strong academic self concept promotes motivation, effort, engagement and achievement
- Can be set early with minimal change (or worsen)
- Adult feedback and comparison with other students affects academic self concept
Academic Mindset

• The belief one has about his or her academic work
• The belief one has about his or her ability to complete the task
• Can be subject specific or global
• The belief that:
  – I belong here. I am a valued member of the class.
  – The harder I try the better I do
  – I can do this task/project/class
  – I value this work; I am interested, I like good grades
Antisocial and Prosocial Behavior

- Antisocial - Verbal and physical aggression; dismissal or exclusionary behavior (inflicting physical or emotional pain on others)
- Prosocial - cooperation, sharing, encouraging, providing leadership, empathy, support
- Antisocial behavior is associated with poor academic achievement and visa versa
- Prosocial behavior predict positive academic and occupational status
Coping and Resilience

• Academic success in spite of various risk factors including family, neighborhood, poor school, poverty, academic, learning or psychological factors.

• Coping; set of skills in purposeful responses to stress

• Resilience; positive adaptation in response to stress

• Protective factors included family support, SES, adult relationships, mentors, self concept, appropriate use of time
From University of Chicago, Consortium on Chicago School Research
How Does Poverty Affect The Development and Use of Noncognitive Skills?
Remember, we are talking about children.
Motivated?

• How long will you stay motivated if your work is too difficult or your product is consistently substandard?

• How long will you stay motivated if day in, day out, month after month, year after year, you are not successful?

• Motivationally rich become richer; motivationally poor become poorer

• Some students will keep going; make progress; some will quit.
Academic Behavior

• Attendance and tardiness often has to do with parents
• Wandering the halls. “When the going gets tough, the tough go to the bathroom.”
• Many students do not have a place to do homework.
• No computer or internet!
• Many do not have the supplies to get projects done.
Self Regulated Learning

• These are skill sets that many students have not seen and have not done before.
• There might be no one at home who can help them with projects.
• In middle and high school, there is little allowable variation for what is acceptable.
• Why put in the effort if you know you are going to fail?
Academic Self Concept

• I have seen children quit by 3rd grade. Everyday, you go to your job (school) and you feel incompetent.
• The only way they received attention was to be disruptive, distracting or resistant.
• Many students will make it through elementary only to be slammed in middle school.
• Many students do not feel part of the class, do not feel that working harder will get them a better grade, do not see the benefit of applying themselves in school.
Learning Strategies

• The use of learning strategies is related to other noncognitive skills and beliefs.
  – What are learning strategies?
  – How can I learn how to learn (metacognitive)?
  – Will I do better if I use these strategies?
Social Skills

• Students who are uncooperative, disruptive, resistant, aggressive might be motivated by non-academic reinforcers;
  – Peer acceptance
  – Avoiding work
  – Escaping
  – Saving face
How Do We Improve Noncognitive Skills?
High Quality Early Childhood Education for All

• Professional, licensed early childhood teachers.

• Well prepared and informed teachers (social interactions, behavior, learning how to learn, persevere, enjoy learning, world knowledge)

• Explicit instruction on noncognitive skills

• Parental involvement, training and home visits.
Early Childhood Education

- “The longer society waits to intervene in the life cycle of a disadvantaged child, the more costly it is to remediate disadvantage.”

- “Skills beget skills, motivation begets motivation.”
  
  • James Heckman, Nobel Prize Winning Economist.
    – Early Childhood Education Advocate
Improving Academic Behavior

• Classroom context and systems affect academic behaviors; i.e. what systems are being taught and in place to insure materials are brought to class?

• Close monitoring with immediate feedback about attendance, tardiness, grades, homework.

• Outside adult mentors/advocates/teachers to monitor/support students (non-punitive, supportive).
Academic Mindset

• Mindset is developed through the interaction between the student and the educational setting.
• Level of challenge, teacher expectations, student/teacher relationship, connections of academics to life, relevance of learning goals, support, feedback, classroom norms, fairness, safety, etc.
• Direct explicit information about how academic ability is changeable, not fixed.
“Culture Eats Strategy for Lunch”
Brett Peiser

• Strategies change every few years with no change in scores; the culture must change.
• What is the culture of your school around learning? Are students invested in learning?
• What is the subculture? Is smart cool? Is disruptive and distracting cool?
• Are students honored or shamed for doing better, working harder or being smarter by their peers?
Culture of a School

• Most schools have “Core Values” as part of positive behavior program (respect, kindness, etc). Do they mean anything?
• Address noncognitive skills through your values
• Make the values meaningful, explicit and tangible
• The values must weave into the fabric of the school.
Values That Mean Something

• Academic acceleration; demonstrate progress
• Best work on every project
• Be there, be on time and ready
• Politeness, register
• Treat everyone like you would want to be treated
• Make mistakes and learn from them
• Be honest
• Share your time and talent
• Take ownership of your behavior
“Why do I need to learn how to read?”

• Make the path to success explicit (for students and parents). What is success? What are the possible outcomes of an education?
• Many students (and parents) see no one who is using reading to succeed. Is success a minimum wage job?
• Mentors, role models from very early.
Bottom Line

• Attendance, being in class (biggest factor)
• Mentors and monitors early on
• Relationships with teachers
• Focus on explicit instruction of noncognitive skills with outcome information (from day one).
• Noncognitive skill development is malleable but the student has to be receptive.
• Explicit critical feedback with remediation.
Final Comment

• You, the SLP, often have the time and the skill to explicitly teach noncognitive skills.
• Don’t chase assignments with students; plan, teach test taking, note taking, scheduling, etc.
• Give explicit feedback and support around assignments and tests.
• Discuss choices and opportunities in life.
• Make the not so interesting, interesting.
• Success breeds success
References


• The Need to Address Noncognitive Skills in the Education Policy Agenda http://www.epi.org/publication/the-need-to-address-noncognitive-skills-in-the-education-policy-agenda/

• Inequality at the starting gate: Social background differences in achievement as children begin school http://www.epi.org/publication/books_starting_gate/

• Teaching Adolescents To Become Learners https://ccsr.uchicago.edu/sites/default/files/publications/Non-cognitive%20Report.pdf
Books


• M. Night Shyamalan. *I Got Schooled*: The Unlikely Story of How a Moonlighting Movie Maker Learned the Five Keys to Closing America's Education Gap

• Diane Ravitch. *Reign of Error. The Death and Life of the Great American School System*

• Barbara Ehrenreich. *Nickel and Dimed*: On (Not) Getting By in America

• Doug Lemov. *Teach Like a Champion* (Lemov’s Taxonomy)