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INTRODUCTION

AN EXERCISE: WHAT IS LIFE LIKE TODAY?

Think about some words that describe what life is like today. What words come to mind?

Did your words reflect the challenges of living in a complicated, distracting world? Did you think of words that describe feelings of being rushed, time starved, of having too much to do and not enough time to do it? Did you focus on the uncertainties, the changes that ricochet in our economic systems, or the volatility of relationships in a diverse and unpredictable world? Did you focus on the moments that give you pleasure, large and small?

Life today can be all of these things—complex, distracting, fast moving, 24-7, and stressful. It is also joyful and full of exciting possibilities. We know that if it is this way for us, it is only going to be more so for our children. We all want the best for our children, but how do we help them not only survive but thrive, today and in the future?

It is clear that there is information children need to learn—facts, figures, concepts, insights, and understandings. But we have neglected something that is equally essential—children need life skills.

What do I mean by skills? Take the words often used to describe the world: *complicated, distracting*. Or the words about time: *24-7, rushed, time starved, too much to do and not enough time to do it*. To navigate this world, children need to focus, to determine what is important and to pay attention to this, amid many distractions. Focus is one of the essential skills we need to promote in our children.

Or take the words used to describe the complexity of life in an uncertain, even volatile world. Another essential skill is the ability to understand others' perspectives—perspective taking—despite whether we end up agreeing or disagreeing with them.

There are three *essential* points about these life skills:

These skills are not only important for children; we as adults need them just as much as children do. And, in fact, we have to practice them ourselves to promote them in our children. That's why I call them life skills.

We don't need expensive programs, materials, or equipment to promote these skills. We can promote them in everyday ways through the everyday fun things we do with children.

It is *never* too late to help children learn these life skills, no matter what their ages.

So many books for parents make us feel guilty or that we have made mistakes. This is a different kind of book—not a guilt trip but a book that helps us understand children's development in new ways, with hundreds of to-do suggestions.

These are the conclusions I have drawn from my own research, from spending more than eight years interviewing more than seventy researchers on children, and from reading more than a thousand studies to write *Mind in the Making*.

AMAZING BABIES

One theme from the research on children and learning is that babies' brains appear to be wired to help them understand and know about the world in specific ways, and that this learning begins long before babies can be *taught* this kind of knowledge.

Babies four months short of their first birthdays already have what I call a *language sense*: they can detect statistical patterns in which sounds go together in their native language (or languages) to determine the beginnings and endings of words in a "sea of sounds," as the studies of Jenny Saffran of the University of Wisconsin show.

Since babies that young can't talk, how can researchers possibly know this? Babies—like all of us—are drawn to anything new. So the researcher

gives babies something to listen to or look at that is new to them and they look or listen until they get bored. At that point, the researcher presents them with other things to listen to or look at and can tell from the babies' reactions which things the babies view as new (measured by longer listening or looking times) and which they see as familiar (measured by shorter listening or looking times).

So when Jenny Saffran and her colleagues presented babies with a made-up language and, in subsequent studies, with a language they didn't know, they found that babies seem to use an almost statistical-like process to learn that certain sounds are likely to follow other sounds in that language. As a result, the babies became bored with and stopped listening to the made-up or the unfamiliar language after a while, but showed renewed interest when they were presented with *new* combinations of sounds.

Similar studies have shown that infants six months old and even younger have a *number sense*: they can detect the difference between large and small numbers of things—such as the difference between eight and sixteen dots, or the difference between a large and a small number of times that a puppet jumps or a car honks its horn, as seen in the studies of Elizabeth Spelke and her colleagues of Harvard University.

And they have what I call a *people sense*: they focus on people's intentions rather than seeing what people do as random movements in space, as shown by the studies of Amanda Woodward of the University of Maryland. By six months, they can tell the difference between who's helpful and who's not, which Kiley Hamlin, Karen Wynn, and Paul Bloom of Yale demonstrate by showing the children a puppetlike show where a round circle with big eyes tries to reach the top of a hill and is helped up to the top by a square but pushed down the hill by a triangle.

After the children view the show, an experimenter who doesn't know what has happened in the experiment (so as not to influence the babies) enters and places the triangle and the square on a tray in front of the baby to see which one he or she reaches for. Will the six-month-old reach for the character that helped the circle achieve its goal (the helper) or the character that prevented the circle from achieving its goal (the hinderer), or is there no pattern to the babies' choices? Of course, the researchers sometimes used the triangle as the helper and the square as the hinderer. Hamlin says:

We found impressively that almost one hundred percent of the babies in a number of different studies preferred the more positive character.

Yes, babies' capacities are truly amazing, but even more amazing is that we now know how to take advantage of these capacities to help babies and their older sisters and brothers develop the essential life skills that will serve them throughout their lives.

EXECUTIVE FUNCTIONS OF THE BRAIN

Another theme in the research is that the skills I see as crucial—based on reviewing the research on children and on my own research on the adult skills needed for the twenty-first century—all involve, in one way or another, the *prefrontal cortex* of the brain. Child development researchers call these *executive functions* of the brain.

Some people don't like the word *executive* because it conjures up an image of a boss in your brain ordering you around. Instead, think of executive brain functions as managing, not ordering. We use them to manage our attention, our emotions, and our behavior in order to reach our goals. Nor are they just intellectual skills—they involve weaving together our social, emotional, and intellectual capacities. They begin to emerge during the preschool years and don't mature until young adulthood. Here are some key aspects of executive functions:

They are always driven by goals.

They involve using our working memory to keep a number of different things in mind at the same time while paying attention, thinking flexibly, and inhibiting our tendency to go on automatic pilot. If you think that's easy, ask someone to say the word *joke* quickly fifteen times. Then ask, "Tell me quickly, what's the white of an egg called?" Chances are the person will be on automatic and say "yolk"—not "white."

Executive functions pull together our feelings and thinking so that we can reflect, analyze, plan, and evaluate.

Stanislas Dehaene of the Collège de France in Paris calls the prefrontal cortex and its functions a “neuronal workspace” whose main purpose is to “assemble, confront, recombine, and synthesize knowledge,” allowing “our behavior to be guided by any combination of information from past or present experience.”

Adele Diamond of the University of British Columbia believes that executive functions predict children’s achievements as well as IQ tests do or even better, because they go beyond what we know and tap our abilities to *use* what we know.

THE SEVEN ESSENTIAL LIFE SKILLS

SKILL ONE: FOCUS AND SELF CONTROL

I’ve already pointed out how important focus and self control are in today’s 24-7 world where we are flooded with information, tempted by multiple distractions, and need to multitask more than many of us would like. In many workforce studies I’ve conducted, it has become clear how important focus is to being all that we can be, both at work and at home.

Likewise, studies of children’s development have begun to uncover the importance of self control. For example, in the Marshmallow Test, a classic study conducted by Walter Mischel of Columbia University, when children were given a choice between one marshmallow now or two marshmallows later, some could wait for the larger treat and some just couldn’t. Those who could wait were more likely to do better in many ways as they grew up, including pursuing their academic and personal goals with less frustration and distraction. These correlations, he notes, “are clearly statistically significant” but in no way doom children.

Focus and self control involve many executive functions of the brain, such as *paying attention*, *remembering the rules*, and *inhibiting one’s initial response to achieve a larger goal*. And they can be taught, as shown by the studies of Michael Posner and his colleagues of the University of Oregon.

SKILL TWO: PERSPECTIVE TAKING

Think about something you bought that you didn't know you wanted until you saw it. The people who created that product could anticipate the needs and wants of customers like you. And the people who marketed that product could present it in a way that stood out, despite the clutter of everything else on the store shelves. The late Peter Drucker, known as the father of modern management, calls this an "outside-in perspective"—seeing things as a customer would see them—and deems it responsible for launching the most successful new businesses.

Or think about the latest conflict you've had with somebody—the person who shot off an e-mail in haste, who said something insensitive when you were going through a hard time, or simply couldn't understand what it's like to walk in your shoes. That person lacks the skill of what I call perspective taking.

Perspective taking calls on many of the executive functions of the brain. It requires *inhibitory control*, or inhibiting our own thoughts and feelings to consider the perspectives of others; *cognitive flexibility* to see a situation in different ways; and *reflection*, or the ability to consider someone else's thinking alongside our own.

Although perspective taking is rarely on lists of essential skills for children to acquire, research makes it clear that it should be. According to Ross Thompson of the University of California at Davis, this skill helps children by making the social world they live in more predictable and memorable. And Alison Gopnik of the University of California at Berkeley reports that studies show children who can understand others' perspectives do better in kindergarten because they're better able to understand what their teachers want and expect.

Perspective taking affects how we deal with conflict. Larry Aber of New York University found that decades of efforts to reduce aggression by teaching children problem-solving skills were only moderately successful because the children most likely to be aggressive interpreted ambiguous situations as hostile when there wasn't enough information to be certain—they jumped to false conclusions about others' intentions. But a curriculum aimed at teaching children to understand other

people's intentions and behaviors by using children's books, discussions, writing exercises, and role-play situations has had promising results: the children are less likely to jump to conclusions about the behavior of others, they get into fewer conflicts—and the reading scores of those who initially had the most substantial behavior problems have gone up, too!

SKILL THREE: COMMUNICATING

Kathy Hirsh-Pasek of Temple University says that observing children learning to communicate is observing the mind at work. Communicating well involves executive functions of the brain—for example, *reflecting* upon the goal of what we want to communicate and *inhibiting* our point of view so that we can understand the viewpoints of others. These are not simple tasks, as my workplace research reveals. When we surveyed a nationally representative group of employers, asking them to name the gaps in skills they found among new entrants to the workforce, by far the largest proportion cited spoken and written communication skills.

What we do as parents and teachers matters a great deal in developing children's communication skills. The studies of Anne Fernald of Stanford University show that the singsong way we talk with babies—slowing down our speech, stretching out and enunciating sounds melodically over two octaves, or what I call *parent-speak*—engages their attention and communicates emotion. She has also found that infants who hear more child-directed speech from their caregivers are able to learn new words more quickly and efficiently. Other research shows that even the sequence of our words and coupling our words with pointing and looking (what I call *parent-gesture* and *parent-look*) facilitate language development.

By taping parents interacting with their children at the dinner table and during story times and playtimes, as well as by interviewing parents, Catherine Snow, David Dickinson, and Patton Tabors of Harvard University found that families talk in many different ways with their children, but some ways promote future literacy more than others. Three attributes particularly stand out:

When reading books or talking at the dinner table, parents talked about issues that went beyond the “here and now.”

Parents used a sophisticated vocabulary.

There was support for children’s literacy.

SKILL FOUR: MAKING CONNECTIONS

Think about your most recent “aha” moment—when you suddenly understood something that you didn’t understand before. Chances are this “aha” moment involved seeing a new connection.

Making connections begins with sorting and categorizing—for example, young children can see that spoons and forks go together because both are used to eat. It also begins with an understanding that one thing can stand for or represent another—that a photograph of the family dog represents the real dog. This skill underlies an understanding of all the subjects we study in school, including math.

Robert Siegler of Carnegie Mellon University and Geetha Ramani of the University of Maryland noted that children entering kindergarten differed in their ability to understand mathematical ideas and wondered if it had anything to do with playing board games. They created a simple game based on Chutes and Ladders in which they asked children to spin a spinner and say the corresponding number names in order to advance on the game board. For example, if a child is on space number five and is going to advance two spaces, she has to say “six and seven.” This game proved effective in increasing children’s ability to count, to understand which numbers are bigger or smaller than others, and to read numbers. Children playing the same game—but with colors, not numbers—didn’t make the same advances in their ability to understand these mathematical ideas.

By playing this and similar board games, children are not only gaining information but also getting better at the skill of making connections. They’re learning, for example, that the number on the spinner stands for a rule—how many squares they can advance—and that there is a linear relationship between the numbers from one to ten, where each number in the sequence is one larger than the previous number.

Making multiple connections is a skill that becomes possible during the later preschool and early school-age years and beyond as the prefrontal cortex of children's brains matures. It calls on executive functions of the brain, including *working memory*, *inhibitory control*, and *cognitive flexibility*.

You can help children see connections in their everyday lives by playing matching games and asking how two things are the same or different. Researcher Philip David Zelazo of the University of Minnesota uses just such a task to assess executive functions, asking children to look at cards with three pictures of objects and to figure out how the objects go together in one way (for example, by color) and then in another way (for example, by shape or size).

Making unusual connections is the basis of creativity. Adele Diamond says:

The essence of creativity is to be able to disassemble and recombine elements in new ways.

In the information-overloaded world of today and tomorrow, creative thinkers have an edge, as Kathy Hirsh-Pasek points out:

In a Google generation, where there are facts at your fingertips, the person who will later be called boss will be the person who can put those facts together in new and innovative and creative ways.

SKILL FIVE: CRITICAL THINKING

At its core, critical thinking is the ongoing search for valid and reliable knowledge to guide beliefs, decisions, and actions. Like the other essential life skills, critical thinking develops on a set course throughout childhood and into adulthood, but its use must be promoted. And like the other skills, critical thinking draws on executive functions of the brain. It parallels the reasoning used in the scientific method because it involves developing, testing, and refining theories about “what causes what” to happen.

Even when you're watching television with your kids, opportunities abound for helping them learn to think critically. When they see an ad, ask them what they think the advertiser is trying to sell, whether the ad is effective (do they want to buy the product?), and how they can find out whether the advertiser's claims are true or false.

SKILL SIX: TAKING ON CHALLENGES

As we know far too well, life is filled with challenges. And challenges—even positive ones—can be stressful. The National Scientific Council on the Developing Child, directed by Jack P. Shonkoff of Harvard University, has reviewed the research on children and stress and has concluded that, while there are different types of stress, the key factors in whether these experiences ultimately have a positive or tolerable or toxic impact on children's development are how long the stress lasts and whether or not children have safe and dependable relationships with people to whom they can turn for support.

I think we should do more than help children cope with or tolerate challenges. We need to help them learn to *take on* challenges. Carol Dweck of Stanford University has found that children who avoid challenges have a *fixed mindset*: they see their intelligence as a fixed trait and therefore are reluctant to undertake challenges that “stretch” them. Children who are willing to take on challenges have a *growth mindset*, seeing their abilities as something they can develop. Children with a growth mindset do better in school. Dweck has also found that if adults praise children's efforts—“You are working hard!”—rather than their intelligence—“You are so smart!”—we can help our children learn to “love challenge.”

SKILL SEVEN: SELF-DIRECTED, ENGAGED LEARNING

Several years ago, I was invited to write a paper on three gold-standard early childhood programs that have been studied for decades as the models for profound and positive development, learning, and adulthood success in children from very challenging backgrounds. I did something unusual. I reached out directly to the people who had created and evaluated the im-

pact of these programs—Larry Schweinhart of the HighScope Perry Preschool Project, Craig and Sharon Ramey of the Abecedarian Project (they are now at Georgetown University), and Arthur Reynolds of the Chicago Child-Parent Centers (he is now at the University of Minnesota). I asked each of them what they thought they had done that mattered most.

Of course, these researchers talked about many things that made a difference, among them the importance of viewing social-emotional and intellectual learning as being linked and helping children find something they care about learning and then pursuing that. But I also heard another message that has not been communicated loudly or frequently enough. Each of these programs became a “community of learners,” a place where administrators were learning, teachers were learning, parents were learning, and children were learning. As Nobel Prize winner James Heckman of the University of Chicago puts it, “motivation begets motivation.” My interviews revealed that the adults fostered children’s motivation by being motivated themselves.

There is much in this research on children and learning that is inspiring and insightful. And there is much that is very practical. It shows us just how capable our children are, and it helps teach us how to build on these capacities. There are everyday simple things that you can do—whether you are getting your kids ready for school, dealing with a battle between them, taking them to the market, or just having a conversation. My purpose in writing *Mind in the Making* is to provide you with tools that are everyday, easy, and fun that you can use to promote these essential life skills. And my larger purpose is to enlist you in what has become a mission for me—to help children learn for life, and live to learn!