



Caught between Osmosis and Environments:
Mapping the Gap between the Expert and the Public Understandings of the Role of Executive
Function

A FrameWorks Research Report

Prepared for the FrameWorks Institute

by

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INTRODUCTION

The research presented here was sponsored by The Center on the Developing Child at Harvard University and represents the latest iteration of a larger body of FrameWorks research that seeks to advance more effective ways of communicating the core story of early childhood development. This report constitutes the beginning of a new phase of this research that seeks to introduce new ways of communicating a particularly important but complex part of the core story to the public — the concept of *executive function*.

From a scientific standpoint, the term *executive function* refers to a set of related cognitive abilities that develop early in childhood — abilities that control and regulate a broad range of important life-skills, competencies and behaviors. In short, executive functions are the abilities that allow individuals to “function” and complete a wide variety of tasks. Executive functions are abilities that make a wide range of critical skills possible — including attention, memory and motor skills. These skills are employed in the performance of almost every task we carry out and, when the development of these skills is muted in childhood, it can greatly impair successful adaptation, flexibility and performance in real-life situations far into adulthood. While scientists in the area of early childhood development understand the critical importance of proper development of executive function abilities, a notion of this concept and its constituent skills is largely absent from both the public consciousness and the policy debates around the material needs of young children. To make this abstract concept more palatable to these audiences, FrameWorks has deployed an extensive array of research dedicated to bringing the *science of communications* to the task of translating the *science of executive function*.

The first phase of this research on executive function is qualitative in nature and attempts to understand the differences between how experts explain the concept of executive function and the development of this set of abilities, and how the public understands these skills and their development. We divided this first line of inquiry into three phases that serve as the organizational structure of the report.

First, we explored and synthesized the, sometimes incongruent, *scientific discourse* on executive function. In a series of “expert interviews,” we examined both the substance of what scientists were discussing as well as the patterns in how scientists wrote about, explained and talked about this concept. More explicitly, we focused on the foundational themes and concepts in the science of executive function as well as on uncovering useful metaphors and analogies used by scientists when they attempt to convey this abstract concept to lay or policy-related audiences.

The second phase of this inquiry involved assessing the extent to which lay audiences understand the concepts underlying executive function — that is, how they understand what the basic competencies are that allow people to initiate and complete tasks required to function, and how these skills develop. In this part of our analyses, we specifically explored the cultural models that members of the general public access when they think about fundamental abilities and competencies, and how these abilities are attained. As such, in a series of “cultural models” interviews we conducted with ordinary (but civically engaged) members of the public, we were interested in uncovering *how* Americans understand these general concepts: the level of content knowledge of specific executive function abilities as well as *how* people reason about the

development of these abilities. In doing so, we focused on the *underlying patterns* that structured the way they expressed their understanding of these abilities in everyday conversation.

We focused these cultural models interviews on concepts such as “basic competencies,” “functioning,” and “foundational skills and abilities,” rather than explicitly on “executive function.” These more general concepts captured and served as proxies for the underlying tenets of the scientific concept of executive function. Because “executive function” is not a colloquial term or concept in the public discourse, explicitly exploring the patterns that Americans employ to think about this specific scientific idea would have been unproductive and possibly misleading. In other words, our interviews were designed to assess the models that non-scientists bring to thinking about the concept of executive function — to see how members of the general public process and understand discussions and explanations of this scientific concept, without asking directly about “executive function.”

Finally, we compared the two sets of interviews, “mapping” — or explaining the differences between — the ideas and principles that the experts discussed regarding the science of executive function versus what the public understood about the skills and abilities individuals need to function and the development of these basic competencies, as well as their more specific understandings of the components of executive function. As a part of this process, we were especially interested in identifying particularly crucial gaps in understanding on the part of the public (or “cognitive holes”) that, if filled with clarifying information, would greatly improve the public consciousness of executive function and their ability to understand the science in this area of child development. We also tried to identify a range of key reframing strategies, taken from the science of communication that could bridge the gap between scientific knowledge and public perception.

Overall, mapping expert knowledge against the cultural models used by the public to process information on social problems is an approach based on the analytic principles and data-gathering methods adapted over the last 15 years from within the fields of cognitive anthropology and cognitive linguistics. At FrameWorks, we use this methodology to inform the work of advocates interested in raising the salience of, and public support for, public solutions to social problems. In subsequent phases of this research, FrameWorks will continue to examine how the gaps between the science “story” of executive function and the cultural patterns applied by the public (identified in this report) affect advocate efforts to gain support for policies that address early childhood development and well-being. FrameWorks’ past research suggests that scientific concepts of child development are not well understood or easy to convey to lay audiences. However, FrameWorks’ research has shown that the use of strategically employed reframes and simplifying models for translating this science greatly improves the extent to which the public expresses support for important policy reforms in areas that matter greatly for children.

This report is therefore a foundation for subsequent research that develops and tests specific strategies to translate and reframe the executive function concept for lay consumption. The full scope of this project includes an array of methods associated with the Strategic Frame Analysis™ approach: cultural models interviews, focus groups, media content analysis, cognitive media content analysis, Simplifying Models development and empirical testing of our frames using experimental surveys.

SUMMARY OF FINDINGS

1. Experts offered a coherent explanation of what executive function is, and agreed unequivocally on the “basicness” of this skill set. They explained that executive function is acquired through “scaffolded” activities in *environments of experience* and that these experiences actually have the power to *change the physical structures of a child’s brain*. Experts also emphasized that developing these skills improves children’s performance in a wide variety of other areas. Discussions with experts also uncovered several areas of scientific consensus on executive function that have clear relevance to existing policy debates. Moreover, they used a number of metaphors in the interviews that are promising for the next phase of our research.
2. The most important finding from this research is that the lay public’s understanding of basic skills, abilities and competencies does not include anything that resembles the executive function skills scientists view as foundational. Put another way, the skills about which scientists want to communicate are not connected to or included in the public’s mental model of competency. Furthermore, people’s understanding of the acquisition of basic skills is largely void of process (i.e., how these skills develop), but powerfully dominant with regards to *where* these skills develop — the home.
3. Research revealed two sets of dominant models that informants used to think about basic skills, abilities and competency. In thinking about these concepts, informants assumed that the basis of adult and even child competence and functioning is a sense of moral responsibility, that self-confidence is fundamental to competency and functioning, and that communication is a key component of competency. When thinking about *where basic skills and competencies come from*, informants relied heavily on the dominant assumption that *home* is the sole site where children acquire and develop a wide range of competencies and the fundamental skills needed to function. Furthermore, research revealed that, for informants, the work of early education in providing basic skills and competencies is narrow and limited. The presence and dominance of these cultural models is challenging in communicating the science of executive function.
4. The recessive models (or less pervasive patterns for understanding what constitutes basic skills and their development) that emerged from the cultural models interviews represent more promising directions to explore in subsequent communications research. The assumptions that *focus* and *experience* figure into basic competency are promising strategies in translating the science of executive function and fitting this expert concept into existing, although clearly latent, cultural models. The assumptions regarding *focus* that a small group of participants made is consonant with the expert concept of executive function. This assumption is promising in shifting away from the less productive perspectives of moral responsibility and self-confidence that dominated informants’ thinking throughout most of the interviews. Research also revealed that, in addition to thinking that the ability to focus was a foundational competency, some informants saw this as a basic skill that could be *learned* and cultivated through *educational programs*. The importance of *experience* is promising, again because of its consonance with the scientific concept of executive function, but also because of the ability to use the importance of *experiences* to frame the integral role of context and environment that are

directly impacted by child and educational policies. If individuals realize that the experiences children have are important in the development of competencies, communications are better positioned to discuss the importance of the *environments* that structure and facilitate these experiences. The recessive pattern regarding the importance of early education in developing basic skills and competencies is significant in its opposition (or contradiction) to the more dominant assumption that early education is not a significant site of “real” learning. This recessive understanding of early education is therefore a promising direction for further exploration in upcoming FrameWorks research.

5. Four areas emerged where there seemed to be gaps between expert and public understandings. These areas represent promising locations for the development of simplifying models: (1) *what* the skills and abilities are that determine competency and are required for individuals to function; (2) *how* competencies are developed; (3) *where* basic skills and competencies developed — the contexts that figure prominently in the development of foundational abilities; and (4) the role and importance of early education.

The remainder of the report proceeds as follows: We first discuss the expert interviews, reviewing the methods employed to gather and analyze these data as well as the research results. Next we present the method, findings and implications of the cultural models interviews that were conducted with lay informants. We conclude with a more nuanced discussion of the specific gaps between the experts and lay audiences that includes a set of summary take-away points.

EXPERT INTERVIEWS

RESEARCH METHOD

Subjects

To locate appropriate experts who could articulate the latest scientific research on executive function, we first identified two scientists whose scholarship centers on executive function as a part of the field of early child development. Both of these scientists then helped us to identify more experts in the field who they thought could provide additional insights in the area of executive function research. We cross-referenced the two lists provided to us by these scientists and, based on overlap between these two lists, selected six experts to interview. In terms of the overall composition of the experts we interviewed, all six informants were white, half were women, and all currently hold research positions where they typically study issues related to executive function. A total of six one-on-one interviews were conducted with each expert via the telephone in December 2008. The interviews lasted approximately one hour and, with the participants’ permission, were recorded and subsequently transcribed.

Interviews

The basic format of the interviews consisted of a series of probing questions meant to capture the scientific understanding of executive function. In doing so, we guided the expert informants through a series of prompts and hypothetical scenarios designed to challenge them to explain their research, break down complicated relationships and simplify concepts, methods and findings from the research on executive function. For example, in one exercise, experts were asked to imagine that they were speaking to a room of policymakers and were tasked with explaining the concept of executive function and the implications of recent research in this area for “average” Americans. In addition to the preset questions, we also probed experts for additional information that members of a hypothetical audience might ask in response to the initial explanations offered by the informant. In this way, the interviews were semi-structured collaborative discussions with frequent requests for further clarification, elaboration and explanation.

In general, we view the expert interviews as a valuable opportunity to elicit the distilling and clarifying concepts and metaphors that scientists routinely use to present their research to various audiences. In FrameWorks’ past research on early child development more generally, the metaphors and concepts we were able to “mine” from experts have proven invaluable in terms of developing strategies to translate the scientific research into digestible and impacting messages for the public.

Analysis

Analysis of the expert interviews was conducted using a basic grounded theory approach.^{1,2} In this approach, common themes are pulled from each interview and categorized, negative cases are incorporated into the overall findings within each category, and the result is a refined set of themes (categorized appropriately) that effectively synthesizes the substance of the interview data in the broadest terms possible. In our use of this approach, the themes presented below explain and clarify foundational components of the core “story” of executive function. Consistent with this method, the themes we identified were then modified and appropriately categorized during each phase of the analysis in a way that accounted for disconfirming or negating research presented by other scientists.

As such, what we present here is the more refined set of themes that emerged from this process. These themes are organized in discrete categories that, together, tell the “story” of what executive function is and how executive function skills are acquired, as well as the relevance of this science to current policy debates.³

¹ Glaser, Barney G., and Anselm L. Strauss. *The discovery of grounded theory: Strategies for qualitative research*. Chicago: Aldine Pub. Co. 1967.

² Strauss, Anselm L., and J. Corbin. *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications. 1990.

³ In addition to synthesizing the basic themes in the science “story” of executive function, we also gave some attention to identifying particularly illuminating metaphors that scientists employed both implicitly and explicitly in their interviews. As explained above, these metaphors are invaluable to FrameWorks in terms of developing a more complete reframe of this “story” for public consumption and represent a starting point for the simplifying models portion of the

CORE THEMES

What is executive function?

Experts explained that executive function is a grouping of related and interdependent skills that control and regulate a broad range of important life skills, competencies and behaviors. They explained that you cannot talk about the skills that comprise the phenomenon individually because they are intertwined, interdependent and collectively required in performing tasks that “recruit” executive function. Additionally, experts agreed that it is difficult to talk about or isolate the skills that comprise executive function because of the extensive crossover between the constituent skills. In other words, what, on one level, might appear to be the application of one of the skills actually involves all the skills in the set. Executive function is a general proficiency that arises from a set of interrelated, interdependent and, in practice, virtually indistinguishable skills.

“The basic concept [is that] executive function is a domain of abilities; not a single ability, but *a domain of multiple abilities* ... that concept of activities directed toward a goal, and to accomplish a goal that involves multiple steps for completion means that you have to be able to sustain attention as you are carrying out the tasks. You have to properly sequence what you are doing. You have to monitor yourself to make sure you are staying on target in doing the steps in the correct order, or correcting a step if you’ve made a mistake to get back on track again.”

Experts explained that the skills that comprise and enable executive function abilities are: inhibitory control of attention and behaviors, working memory and cognitive flexibility.

Inhibitory control was discussed as the ability to “screen out interference” and in so doing sustain attention. Examples of the application of this skill were described as the ability to focus on one conversation partner at a cocktail party when presented with a wide variety of competing stimuli, “biting your tongue,” and keeping yourself from making inappropriate comments. More specifically,

“...the ability to inhibit actions. So sometimes you have to be able — rather than just acting on impulse, you have to think of the various choices that they had in order to make the most appropriate choice.”

“One of the three pillars or cores is ‘inhibitory control.’ And that has some subcomponents. So one is a subcomponent at the level of attention ... inhibition at the level of attention is my trying to listen to you as all this stuff is going on in the background behind me. It’s trying to focus on ... a computer screen when there’s lots of other things going on. It’s trying to inhibit your attention to distracters and hone in on what you want to listen to so a lot of people use the analogy of a cocktail party. So, here you are, you’re using inhibition to control your attention so that you focus on what you

Strategic Frame Analysis™ on executive function. We will outline these in future iterations of our research.

want to focus on. Then there is inhibition at the level of behavior. So, for example, it's resisting chocolate when you want to diet, or biting your tongue when you might say something inappropriate."

Working memory was described as the ability to keep information in an accessible mental "cache" and to use this information to maintain a sense of where you are in the completion of a task, in working towards a goal that requires the completion of "steps," or to hold information in mind and relate it to current decisions. Manifestations of working memory included the ability to mentally add a series of numbers (i.e., 35 plus 22 plus 82) or to play chess.

"And that would involve some sense of planning, but also of a concept that is referred to as ... 'working memory,' where you are juggling multiple balls in your mind at once just as you would in a simple way if you were driving a car and talking on a cell phone, where you have to do multitasking. You are doing *more than one thing at once*. So you have to keep track of several different aspects of the task and your position in the pathway toward completion of the goal."

"An example would be, you know, a waiter who remembers everybody's dinner, and puts it in the right place when it's brought out, and then soon forgets it and moves on to another table. That's working memory, which is part of executive function."

"You need to be able to keep in mind where you are in the task, and what the next step is. You have to be able to keep several things in your mind at once. That is what the goal is; where you are, what the appropriate step is, what in other situations have been appropriate steps to take in this particular circumstance."

Mental flexibility was the third component of executive function. Experts described mental flexibility as the ability to change plans or to formulate new solutions to a changing problem or a new contextual consideration. Manifestations of this ability include "rolling with the punches," thinking "outside of the box," and being able to apply different sets of rules to the same problem or to a changing set of criteria.

"You sometimes have to be able to take into account something that's going on in the setting in which you're carrying out the task that may change the direction that you take, so you have to be able to be flexible in making decisions about what the appropriate next step would be."

Experts expressed consensus about the "basicness" or foundational nature of executive function skills. They explained that these skills are the *building blocks* that individuals use to complete almost every task that they perform — they are "foundational" skills. In this way, executive function is a "low level" ability despite being discussed as "higher order" functions in the literature. Experts emphasized that these skills are "built upon" and employed in the performance of almost every task, large or small, complicated or uncomplicated, that we carry out. As a result, we should see these skills functionally as our most basic set of proficiencies.

“Out of the three cores get built up things like planning, and problem solving, and reasoning. So in order to plan, you need to be able to relate what was before to what is coming now. You need to be able to put it in sequence. You need to be able to inhibit going off on a tangent ... similarly for reasoning. So, there’s the three core executive functions, and then they’re other functions, which are built up from those.”

“So executive function is a skill that is pervasive in its effects on other mental functions; however, it’s also somewhat distinct from those functions.”

“I don’t approach executive function in such a top-down manner ... You very often talk about it in very lofty terms about ‘goal oriented behavior’ and ‘higher order,’ and fancy words like that, but when you’re dealing with children, you have to start *literally* with the brakes and point out that the very first bit of control ... That’s the first thing I’d try to get across to people [because] people tend to think of executive function as sort of like a capstone on *top* of all these other things they’ve heard about, like motor development, language development ... In fact, that’s really a faulty developmental perspective. It really starts with this baby step of inhibition.”

Analysis of expert discussions also revealed an implicit assumption that these skills are hard to define and describe and that they are best seen in an individual’s ability or inability to *perform a task*. Therefore, the phenomenon of executive function can be thought of as being *task based* — that is, executive function is most apparent when we think about the skills necessary to complete or perform a specific task. For example, working memory becomes most apparent and recognizable as a skill when we talk about the tasks that require proficiency in this skill. Likewise the concepts and importance of inhibitory control and mental flexibility are best seen in completing specific tasks (or in the *inability* to complete the task).

Expert attempts to define executive function were also characterized by a preoccupation with the point that these skills are “based in the brain.” The statement that “you can actually *see*” the presence or absence of executive function was a frequent feature in the interviews.

“There’s evidence from psychological testing of persons that shows those skills separate from other skills. There is evidence from studies of brain function that demonstrate specific brain areas or systems of the brain that sub-serve executive functions that are distinct from areas of the brain that underlie other types of behaviors.”

“By guiding younger persons through these kinds of skills or helping them develop these skills, we may in fact be changing the brain. I mean, it’s possible that, you know, repeated exposure and encouragement to use executive functions, and to be organized in your approach to tasks, and to try specifically to concentrate, and to resist outside distractions and to think about what you’re doing explicitly as you go through tasks, that all of those kinds of activities may in fact not only improve executive function, but in some way over time, and in a young child, change how their brain is organized so that it, you know, [is] sort of ... how would you say, ‘molded’ to achieve those kinds of functions, and in that case we may actually be changing their executive functions.”

Finally, in discussing the acquisition of executive function skills, experts stressed the fact that these skills “generalize” — when children acquire and develop these skills, their performance on a plethora of other, seemingly unrelated, tasks improves.

“If you teach a child to think through various choices of a skill — think ahead, plan in a planful way ... as a means of reaching a goal, and then you give a child a totally different task — it might be how to organize the kids on the playground to play a game of soccer — you find that they’re applying similar skills to organize the kids. They are thinking about, you know, they are mentioning various ways that they might do it, and what the pros and cons are, so they are thinking about the consequences — they are thinking through a plan, and shifting between one plan and another ... [which] would suggest that the skills are taught.”

“So by training up executive functions you really optimize the ability of the brain to acquire information and to develop optimally in *all* the different dimensions. Because they are central, right? They are central to the thought process.”

How is executive function acquired?

In discussing how individuals “get” executive function skills, each expert emphasized that the development of executive function skills is highly dependant on the *environments* in which kids are embedded and the types of *experiences* to which they are exposed within those environments (what we might deem, the *environments of experiences*). Experts agreed that children need to be in environments that afford them the types of experiences in which they can practice performing the tasks that recruit executive function skills. They explained that, to a certain degree, executive function skills are *innate* — some individuals *do just naturally have* better executive function skills than others.⁴ But experts emphasized that the genetic component of these skills should *not* undermine or obscure the direct, tangible and empirically demonstrated role of the environment in shaping these foundational skills.

“There is evidence, despite our conceptualization of executive function as essentially brain based or ... genetically determined, that they can be influenced by the environment. I mean there are studies that have *shown* that ... children from more advantaged environments do better in executive tasks. There are examples of studies of persons with brain injury that have used strategies to teach executive; to teach people ... how to think through tasks so that they are better organized.”

In addition to focusing on the importance of environments, experts emphasized the concept of “scaffolding” in discussing and explaining how these skills are acquired. The idea of scaffolding relied on the concepts of *experience* and *exposure*. Scaffolding was described as a pedagogical strategy in which kids are gradually exposed to tasks that recruit their executive function skills in

⁴ This is a particularly promising place to employ a simplifying model that clarifies the complex interaction between genes and environments. As a part of this research, FrameWorks is conducting research that will identify simplifying models that can be useful in communicating this science.

more and more challenging ways, while all the time having the support of an adult to manage failure and “match” the level of challenge to the child’s aptitudes and abilities. By scaffolding a child’s experience in tasks that recruit executive function skills, experts explained, kids can “practice” these skills, developing and refining their executive function abilities.

“But you could imagine that you’re building a building ... and you need scaffolding to build it, and you can’t build it without the scaffolding, but after it’s built you take the scaffolding away, and the building still stands without the scaffolding.”

“Yeah, so they scaffold kids’ memory and attention and impulse control through a set of really, really interesting ways of interacting, and developing social and communicative skill and cognitive processing skill, that involve pretend play and perspective-taking, and role-taking ... all that recruit executive functioning to let kids do better at those things [and] support kids doing better in those things, and that make kids’ performance and those things more fun.”

Experts also brought the physiological basis of executive function skills into their discussions of how these skills are acquired, explaining that, in young kids, “scaffolded” experiences that recruit executive function skills may actually *change* the organization of a child’s brain. In modifying the structure of the brain, these experiences can be *seen* to have a powerful effect on the performance of subsequent tasks that require executive function.⁵

What are the most important concepts scientists think policy makers ought to know?

Experts had a fairly standardized set of messages for policy makers and expressed a common set of themes regarding the policy significance of the science of executive function.

1. Executive function skills can be taught

An element of the science that all six experts thought was an essential message for policy makers was that executive function skills *can be taught*. This was, as one expert said, “the knock-out policy punch.” By participating in programs that work to develop executive function skills, children become more proficient in completing tasks that require the application of these skills. Furthermore, experts agreed that developing executive function skills doesn’t require a narrow or exclusive focus on executive function. Rather, programs can foster the development of these skills by teaching “normal” content with an executive function *approach*. In other words, a program can teach standard content — numbers and letters — in a way that allows a child to apply and practice executive function skills and have experiences completing tasks that recruit these abilities.

“Yeah, and ... if people ... look a little cross-eyed at you when you say that, it’s that practices that support executive function are the *approach*. It’s not executive function itself because people will say that executive function is a kid’s brain function. The teaching approach that support executive function are the approach ... not just the content. So yeah, and that’s just a really big ... that’s heavily under discussion right now among a lot of people in our field.”

⁵ See page 10 for an example of this point in expert discourse.

“There clearly is data to suggest that executive functions are influenced by environmental factors ... factors that they can be *changed*.”

2. Better school and “life” performance

Related to the discussion above about the foundational nature of executive function skills, all six experts emphasized that a primary message for policy makers is the integral nature and the “basicness” of executive function. Experts stressed the importance of getting policy makers to see that other skills, such as reading and basic math, are dependant on executive function skills. A recurring statement in the expert interviews was that kids are unable to learn to read — that a child can’t develop literacy skills — *without* executive function skills.

“Executive functions are *essential* to development of literacy skills and cognitive function. That is, executive functions is what allows you to *acquire* literacy skills efficiently, quickly, effectively. You know, the same with cognitive skills. You can’t — if you don’t have good control of attention, if you don’t have good control of decision processing, if you don’t have good inhibition of inappropriate behaviors, you’re just not gonna acquire the positive skills and cognitive capabilities that you could under other conditions. Again, it’s ... back to the same issue that executive functions are a core, are essential to brain development in all its different dimensions. So if you improve these executive functions, you are going to improve all of these aspects of capability, cognitive and social, emotional, literacy; all those things are vastly accelerated by well-formed executive function.”

Furthermore, experts explained that if executive function skills are not developed or are poorly developed in early childhood, individuals are *likely* to experience difficulties throughout their educational careers, and even into later life. However, experts cautioned that the longitudinal effects of either the presence or absence of executive function skills in young children has yet to be investigated.

Experts went on to pinpoint the *implication* of the foundational nature of executive function. If policy makers want students to be strong in the basics (reading, writing and arithmetic), they need to invest in programs and curricula that provide students with the *environment of experiences* that facilitate the development of executive function skills. According to experts, programs that encourage participation in activities that recruit and require the application of executive function skills need to be supported with public funds. In short, children need environments that allow them to practice using executive function skills. Practice completing “scaffolded” tasks in supportive environments, experts explained, is the key to the development of executive function skills. Experts emphasized that *the science is clear*; a child with well-developed executive function will do better in school than if they were less proficient with this constellation of skills. Quite simply, in developing executive function, children become stronger and more proficient in *everything* they do.

“I would say the *executive function skills are more important* [than literacy] *because they cut across everything the child does, not just schoolwork*. They cut across social relations,

and so every aspect of his existence ... practically requires some executive function skills.”

3. The importance of environment and policies to shape this environment

Experts emphasized a second policy message — the importance of *environments* in the acquisition and development of executive function skills. The scientifically proven importance of the environmental context in which kids have early learning experiences and the types of experiences that this environment facilitates was a piece of scientific knowledge that experts saw as having a direct and straightforward policy implication. If decisions are made to fund early education programs that are organized specifically around scaffolding the types of experiences that allow kids to develop executive function skills — to create environments conducive to executive function development — students will have an improved opportunity to achieve positive educational outcomes. Additional benefits would include improved proficiency in other abilities not directly related to, or measured, by academic success.

“I would say rather that there are *conditions* that would allow for those skills to be taught and those conditions have to prevail before, you know, one can appropriately teach those kinds of skills, but I do think that there is then the teaching of the executive skills themselves.”

“These executive function capacities are very much dependent upon experience and learning to shape them. In other words, they don’t just come out blown in their optimal form just as a natural consequence of aging of the child, but they are vastly accelerated and indeed their true performance depends upon them being practiced and used, and so, if you agree that they are essential to catalyze all other forms of cognitive development, you know, social and emotional development, and you understand that in order for them to be as good as they can be, that takes experience and practice.”

4. Cost effectiveness

A third policy implication that emerged in the expert interviews was the idea of “cost effectiveness.” Experts explained that incorporating a programmatic focus on executive function experiences is not a costly addition to current curricula, but that the payoff in raising academic achievement and success is likely to be extraordinary.

One expert went a step further with this logic and explained that programs focusing on executive function skills may actually be more efficient and effective uses of educational resources than programs focusing narrowly on early literacy. This expert explained that programs that focus on executive function tasks benefit all children in a classroom, irrespective of their particular developmental window. In contrast, programs and resources focused on early literacy only benefit the children who are at the appropriate developmental stage to take advantage of this more focused instruction. In other words, executive function programs benefit all kids in a classroom, and are therefore, according to one of our experts, cost effective uses of resources. Literacy programs, on the other hand, confer benefits only to those children in the class who are far enough along developmentally to take advantage of this focused type of instruction.

According to this logic, resources spent on literacy training only benefit some children while resources devoted to executive function have a wider, more universal impact.

“But the whole point is ... that because executive functions are domain general, ... not domain specific, you don’t have to be, you know, ready to read or ready to write. You can go do it with other systems, which are much more universally available, as I said, like singing and dancing are much more likely to be available [at an early age for a whole classroom] statistically than the systems for reading and writing.”

Experts thought that the ability of executive function skills to *improve the chances of academic success*, coupled with the fact that *programs can improve these skills*, should be a powerful message for policy makers. This message clearly points to the need to focus early learning funding on programs that incorporate an executive function *approach* to learning and could be easily incorporated into education policy reforms.

There were a number of policy questions that experts either did not address in interviews, or to which they indicated that the science has yet to answer. The following policy questions remain: Is there an age when these skills are “complete,” or do they continue to develop throughout our lifetimes; can these skills be acquired later if they are not developed in childhood; is there a cost to waiting until later in life to develop these skills; and how are these skills typically measured by scientists? Being able to speak to these questions would have a significant policy impact and would underscore the importance of addressing the development of executive function skills in early childhood.

CULTURAL MODELS INTERVIEWS

RESEARCH METHOD

To complete the other side of the “map,” we now turn to the cultural models interviews conducted among lay audiences. The cultural models findings presented below are based on 15 in-depth interviews with Americans in Dallas, Texas; Chicago, Illinois; and San Diego, California. The interviews were conducted by two FrameWorks Institute researchers in December of 2008.

Subjects

Informants were recruited by a professional marketing firm through a screening process developed and employed in past FrameWorks research. In each location, informants were selected to represent variation along the domains of ethnicity, gender, age, educational background and political ideology (as self-reported during the screening process). Previous FrameWorks research findings, as well as the cultural models literature more generally, have found education to be an important source of variation in the way people talk and think about social issues such as education and child development. For this reason, we were particularly sensitive to capturing variation in educational attainment in our sample.

Efforts were made to recruit a broad range of informants. However, the sample we selected is not meant to be nationally representative and the demographic categories that we use to identify the quotes of interviewees in the text should not be mistaken as a categorical reflection of the viewpoints of any particular groups.

Rather, these interviews require gathering what one cultural models researcher has referred to as a “big scoop of language.”⁶ Thus, a large enough amount of talk, taken from each of our informants, allows us to capture these broad cultural models. Recruiting a wide range of people allows us to ensure that the cultural models we identify truly represent shared patterns of thinking about this topic. And, although we are not concerned with the particular nuances in the cultural models across different groups at this level of the analyses, we recognize and do take up this interest in subsequent parts of this research (as discussed in the appendix).

Finally, we were careful to recruit a sample of civically engaged persons. We did so because cultural model interviews rely on the ability to see patterns of thinking — the expression of models through talk — and it is therefore important to recruit informants whom we have reason to believe actually *do* talk about these issues. Moreover, to ensure that participants were likely to have ready opinions about these issues without having to be overly primed, the screening procedure was designed to select informants who reported a strong interest in news and current events, and maintain an active involvement in their communities.

Interviews

Informants participated in one-on-one, semi-structured “cultural models interviews” lasting 1½ to 2½ hours. Consistent with the interview methods employed in psychological anthropology, cultural models interviews are designed to elicit ways of *thinking* and *talking* about issues — in this case, ideas of competency, skills and abilities as the core areas of the scientific concept of executive function. As the goal of these interviews was to examine the cultural models informants use to make sense of and understand these issues, a key to this methodology is giving informants the freedom to follow topics in the directions *they* deem relevant and not in the direction the interviewer believes most germane. Therefore, the interviewers approached each interview with a set of areas to be covered and left the order in which these topics were covered largely to the informant. Put another way, researchers were able to follow the informant’s train of thought, rather than interrupting to follow a pre-established course of questions.

We focused these interviews on concepts including “basic competencies,” “functioning,” and “foundational skills and abilities” rather than explicitly on “executive function” for several reasons. First, because “executive function” is not a colloquial term or concept in the public discourse, exploring the patterns that Americans employ to think about this term would have been unproductive and possibly misleading. Exploring cultural models requires that informants actually *have* patterns for thinking about the concept in question — that there is some shared knowledge, perception and understanding of the target issue or concept. This was simply not the

⁶Quinn, N. (2005). *Finding culture in talk: A collection of methods* (1st ed.). New York: Palgrave Macmillan. P. 16.

case with “executive function.” Initial research suggested that, because the term is not part of the public discourse, direct attempts to explore this concept would have accessed cognitive models having nothing to do with the concept of executive function. In short, we had to gather data from lay informants about the underlying ideas of executive function without asking them directly about “executive function.” We therefore took the fundamental tenets of the scientific concept of executive function as the basis of our cultural models interviews. We also asked informants more directly about the skills that constituted the expert concept of executive function. Therefore, our lay interviews were designed to assess how members of the general public talk and think about the concept of executive function through the proxy of “basic competencies,” “skills and abilities” and “functioning,” as well as by referring more directly to the component skills of executive function.

In addition, the interviews were designed to begin broadly and in as open-ended a way as possible to uncover the organizational mental models that informants used to understand “basic competency” — an inherently broad concept.⁷ Near the end of the interview, to avoid biasing subsequent data through the priming effects of these questions, informants were asked a series of questions about the specific skills that comprise the scientific concept of executive function. All interviews were recorded and transcribed. Quotes are provided in the report to illustrate major points but identifying information has been excluded to ensure informant anonymity.

We should also note that the strength of the cultural model interview method and the data it produces rests in its power to reveal *general patterns* of thinking (cultural models) that Americans commonly, repeatedly and implicitly employ in talking and thinking. In short, these interviews allow us to see the general patterns that implicitly structure the way Americans, broadly construed, think about a topic. Based on the use of these patterns by this wide range of informants, we say these implicit patterns constitute *American cultural models*.

Analysis

Analytical techniques employed in cognitive and linguistic anthropology were adapted to examine how informants understand issues related to the scientific concept of executive function. Elements of social discourse analysis were applied to identify larger, shared cultural models. First, patterns of *discourses*, or common, standardized ways of talking, were identified across the sample. These discourses, or patterns in talking, were analyzed to reveal tacit organizational assumptions, relationships, logical steps and connections that were commonly taken for granted throughout an individual’s transcript and across the sample. In short, our analysis looked at patterns both in what *was* said (how things were related, explained and understood) as well as what was *not* said (assumptions). Anthropologists refer to these patterns of tacit understandings and assumptions that underlie patterns in talk as cultural models.

⁷ The issue of basic competency was approached in the interviews in a variety of ways — from the perspective of basic skills, functioning, abilities and competency, and with respect to a variety of outcomes including becoming a successful adult, being healthy and happy, succeeding in school, and a host of other conceptions and articulations of outcomes.

I. DOMINANT MODELS

The central finding of this research is that informants overwhelmingly assumed that competency and basic skills are composed of a narrow set of components: a sense of moral responsibility, self-confidence and communication abilities. Informants shared the dominant assumption that these skills come primarily, in many cases exclusively, from the home and the child's parents, and that other settings have limited influence on the development of basic skills and abilities. These dominant cultural models are organized here into two broad themes: (1) What constitutes competency (as the basis for understanding executive function) and (2) from where do these skills and competencies emerge?

In general, many of the models that organized informants' thinking on competency were "nested" within a broad, foundational and powerful American cultural model (see the appendix for a discussion of the nested nature of cultural models). Past FrameWorks research on issues ranging from race to health care has uncovered a powerful model that Americans use to think about and make sense of information on an incredibly wide range of topics and issues. We call this model "mentalist thinking." According to the mentalist model, Americans tend to view outcomes and social problems as a result of individual concerns that reflect motivation and personal discipline. As such, the use of mentalist models by the public on issues related to early childhood development has a narrowing effect — it boils complex interactions between individuals, contextual determinants and systems down to either the presence or absence of individual motivation and internal fortitude. In short, Americans tend to understand events in their worlds as the product of individual drive and internal motivation. From a reform perspective, these ways of understanding skills and competency expressed by our interviewees present unique challenges in engaging the public to support systems-level policies that directly address the acquisition of executive function skills.

A second model typically discerned in a wide variety of cultural models interviews is the family bubble model. In this model, Americans tend to view the family and the household as the primary (if not the only) source of all expressed behavior, learning and development of life-skills. As will be discussed below, an exclusive focus on the family and the home as the site of learning basic skills and abilities, together with the narrowness of conceptions of what basic skills are, makes the policy implications of the science of executive function decidedly "hard to think." This is particularly problematic for developing a coherent communications strategy because before members of the general public can be engaged around the reforms that the science addresses, we must provide the public with new/different ways to think about the acquisition of skills, abilities and basic competencies. Moreover, policy support is likely the result of their ability to see the influence of a much wider context on how children acquire and develop fundamental life skills.

A. What constitutes competency?

1. The "competency is a moral sense of responsibility" model

In cultural models interviews, informants overwhelmingly assumed that "responsibility" was the basis for developing appropriate competency and functioning — encompassing respect for

others, respect for oneself, knowing “right from wrong,” doing what’s right, and a sense of obligation. Informants explained that “responsibility” is ultimately what explains why some individuals (adults and children) do well and others do not — an assumption consistent with a mentalist understanding of how the world works. In short, people saw *responsibility* as the most important and most basic “skill” required for an individual to function, and informants used the presence or absence of responsibility to understand a wide range of outcomes.

“I think people [who are competent] take responsibility for themselves, take responsibility for their neighborhood and their family, you know, I mean, you’ve got all kinds of dysfunctional people out there, but the big thing is being responsible and being accountable.”

White Independent Man, Age 56, Texas

“They are able to be honest, and they are able to tell the truth even when they have done something wrong.”

White Liberal Woman, Age 28, Texas

“So, a competent person is somebody who makes their own decision. So they think something through and they decide that’s the right thing to do, and they are going to stick to that decision because now their word is attached to that decision.”

White Independent Male, Age 36, California

“If you can help your kids make good sound judgments, because we are all going to make mistakes, you know, myself included, and God knows I’ve made a few, but if you can swing your kids, you know, making *sound ... good*, you know, judgments and decisions, that will help them become a responsible adult. So again, [competency is] responsibility.”

Hispanic Conservative Man, Age 49, California

2. *The “self-confidence is fundamental to competency and functioning” model*

Beginning in early childhood, the ability to feel good about oneself and have self-confidence was closely associated with individual competency and basic abilities. In short, self-esteem was assumed to be a key and basic skill in determining how well an individual functions. According to this model, a child “absorbs” a positive self-image through constructive interpersonal relations with parents.

“I think loving yourself is essential, absolutely 100% more important than anything else.”

White Liberal Woman, Age 28, Texas

“I think it starts as a child. I think your parents have to give you that self-confidence. And then you kind of develop it as you go. It’s the peers you select perhaps ... But I think it’s kind of in you.”

White Conservative Woman, Age 49, Illinois

Moderator: What are ways that they become well rounded? What does that mean for a child to learn that?

“It means having been guided and shown the tools that they’re going to need to be able to feel good about themselves and be productive, and not fail. And it goes back to pretty much everything we’ve talked about in my mind. *Parents ... role models, teachers, etc.*”

Hispanic Liberal Male, Age 47, Illinois

“I’ve got to say confidence [what it means to be competent]. You got to have confidence. Confidence and communication lead to being noticed in all things.”

African American Liberal Man, Age 38, Illinois

“So, you know, if a child has a low self-esteem, I would think just naturally [they are] going to be less competent. You know, I mean, depending on the level of low self-esteem, or high self-esteem. If they have low self-esteem, you know, they’re probably just gonna be less competent because maybe they think what I feel or say or do doesn’t matter.”

White Liberal Woman, Age 40, California

3. The “communication is key to competency” model

Communication was a pervasive theme in the interviews. All informants expressed an understanding of competency in which the ability to communicate is essential. This competency component encompassed the ability to effectively convey one’s own thoughts and feelings through words, as well as the ability to interpret and appreciate the thoughts of others. Many respondents considered this skill the lynchpin of functioning well in life.

“I think the ability to communicate ideas is a *big* one [a basis of functioning], you know?”

White Liberal Woman, Age 28, Texas

“I would say that communication is a lot of it [functioning well — being proficient]. If you can talk to somebody and have them understand what you are saying, and make a normal response back, that would certainly be it.”

White Conservative Woman, Age 61, Illinois

“You know, being able to communicate with all walks of life ... because we own a company, we’ve had a lot of people interview with some *impeccable* resumes, you know, *impeccable* grades, but you know what, very *poor* social skills, communication skills.”

Hispanic Conservative Man, Age 49, California

“They know how to place their words together and use it properly. And again, whatever the skills that they learn early on, it enhances their lifestyle.”

African American Liberal Woman, Age 40, Texas

“Well, I think number one is ability to communicate be it verbally or written. If you don’t have that, communication skills, you’re not going to function in society *period*.”

White Conservative Woman, Age 49, Illinois

Discussions of communication and probes for how and where this skill develops quickly devolved into a discussion about the apparently exclusive role that parents play in providing kids with basic competencies. While the cultural model used to understand school as the source of some competencies suggests that individuals might locate the acquisition of *communication* skills in the school (due to similarities between “socialization” and “communication”), the dominance of the parent/home model diverted attention *away* from schools during discussions of the acquisition of communication skills. According to this line of thought, communication skills are acquired through parental childrearing practices.

Informants also made a strong assumption that communication skills are acquired very early in life — making it even more difficult to see the role of school in the acquisition and development of these skills. Consistent with the more general finding that informants lacked a cultural model through which to understand how skills develop, discussions of communication skills were conspicuously devoid of process, even when the researcher probed for explanations and elaborations.

“I [a parent] just want to make sure that when they learn they can express themselves, no matter what they learn. No matter what they know: ‘I like this.’ ‘I don’t like this.’ ‘I want this.’ ‘I don’t want this.’ They need to be able to say that. They need to.”

Hispanic Independent Woman, Age 41, Texas

“I don’t know exactly when you’re supposed to start talking, but you should be able to communicate, even if, you know, even it’s just like, you know, parents knowing when it’s time to eat or, you know, miscommunication is going to happen. If they can’t do that, that’s probably a bad sign.”

Asian Conservative Man, Age 32, Illinois

B. Where do skills and competency come from?

1. The “Family Bubble” model

When asked about the skills that children need to function competently, informants focused narrowly, and in some cases exclusively, on the home and family’s role in instilling and developing fundamental character traits, values and life skills. These skills and traits were assumed to “lock in” the individual’s developmental trajectory for life — in either positive or negative directions.⁸ In short, informants assumed that basic competency comes narrowly from the home and parents. This belief was stated in an unmitigated, emphatic and absolute way — a manner consistent with the “common sense” nature of cultural models that the cognitive science literature describes as hallmarks of shared cultural models. While parents and families are

⁸ This is consistent with the dominant cultural models of *Family Bubble* as well as with that of *Determinism* that FrameWorks research has revealed in how Americans think about a wide variety of issues.

undeniably important in the development of competency, the effect of adopting this assumption in our interviews was to obscure *other influences in how children develop skills and abilities*.

Schools and teachers were infrequently attributed a secondary or supporting role in “maintaining” or “building on top of” these skills and abilities. Many informants adopted a defensive posture in stressing the importance of home/family: emphasizing the primacy of parenting to counter the alternative responsibility of schools and teachers in instilling basic competencies in children.

“Well, in the beginning it starts with the parents. It starts with the home. You cannot ask a president — you cannot ask a government to teach your children what you should have taught your children at home. And if you seriously do not believe [this] ... then I’m sorry. That starts with the home.”

Hispanic Independent Woman, Age 41, Texas

“I think it’s always from the parents. Always from the parents, 100%.”

African American Liberal Man, Age 38, Illinois

“I think there’s an absolute moral value that parents are the ultimate responsibility for raising their kids, you know. And obviously everybody — every parent has their different scale of moral values, but you know, I think that’s the kind of thing, like I say, schools are more the proficiency of operating in a world of doing *business*.”

White Conservative Man, Age 49, Texas

“The child that doesn’t scream and complain about everything, a screamer and a whiner is going to end up being a whiner in life ... That’s what usually happens ... I think it comes with the parents teaching. This is not something preschool can do ...”

White Conservative Woman, Age 49, Illinois

In the primacy of the home/family model, informants shared the assumption that parents do not *explicitly* or *intentionally* teach skills relating to character and values — elements that the previous section has shown to lay at the core of informants’ concept of competency. None of our informants described a specific parent-child interaction or childrearing practice as instilling or teaching these qualities, even after being repeatedly probed about *how* the skills develop at home. Rather than envisioning active parent-child engagements, informants either had no idea of how skills develop or, in some cases, expressed a vague and passive developmental process, whereby children simply absorb “by osmosis” the ability to function from their parents.

“Not that you say, ‘Okay, I am going to teach you how to be responsible today.’ But you just do it yourself as a parent and, again, I think that optimally it would come from a parent.

White Conservative Woman, Age 61, Illinois

“A child that has both parents in the home, and the parents are fairly happy, then that child comes out; they look better, they act better, they respond better because they have

an example. They have a structure at home that says, oh okay, life is good, you know, as opposed to a child that may be in a single parent home.”

African American Liberal Woman, Age 40, Texas

“So if you are around people that speak, if you are around intellectuals a lot, you’re going to speak intellectual. Just by osmosis, it has to [be]. It’s a fact. And so, people disagree with me, but I prove it time and time, that that’s the truth in life, so a kid — a competent kid, is going to be *around* competent people.”

White Independent Man, Age 36, California

2. The “benefits of early education are narrow and limited” model

Whereas home was seen as the incubator for skills fundamental to basic competency, schooling — especially early education — was assumed to play a secondary role in instilling a narrow set of skills relating to socialization and discipline. According to informants, the purposes of preschool and kindergarten were restricted to *socializing* and learning to follow the *rules* of the “real world.” Informant discussions revealed an assumption that social skills and following rules are cultivated through interactions with other children and non-parent authority figures.

This assumption regarding where competency comes from is again “nested” in the mentalist model. It assumes a primary, almost myopic, importance of children acquiring *discipline* as a primary determinant of a wide range of outcomes — obscuring the important effects of contextual considerations and determinants in shaping outcomes. This mentalist model, as applied to competencies, came to us in a variety of different flavors as evident in the following examples and especially in relationship to early education as a place for socialization and discipline:

“They are teaching them ... how to function in a group, and that’s really *all* daycares are for. I mean, if you think about it ... It’s in a group setting, and what’s good for the group is good for the person ... Everybody takes a nap at the same time, everybody goes to the bathroom at the same time, they go outside and play at the same time. So you learn the regimentation of following a schedule, and that’s good.”

White Independent Man, Age 56, Texas

“To me it all goes back to socialization skills. You’ve got to learn to get along in the world, and you do that by learning that sometimes you can get up and play, sometimes you can’t. Sometimes [clapping hands] you have to sit in your desk, and watch what your teacher is doing. Sometimes you can play over there in the blocks, but you can’t throw the blocks ... You can’t [take] from another child. All of those things just creates a person who knows how to give and take.”

White Conservative Woman, Age 61, Illinois

“*Being around other children* that age so they know how to *interact with other children*, and other people. I think that’s *important*, too. And then also education, I’m sure they are probably in preschool or something like that. Get them used to being around other

children. Being around another adult, [who] can lay the rules and laws down to them so they kind of get used to that kind of behavior.”

White Liberal Woman, Age 60, California

“What I guess I basically saw [when son went to preschool] was his *social skills* were developing correctly. Just having him around other children his age, outside of the structured program ... he was *sharing*. He was just, you know, acting right. Just *knowing his boundaries*. Not pushing to be the first in the line. Knowing, you know, you wait in line. Take turns, you know, just little things they don’t know about ...”

White Liberal Woman, Age 40, California

C. Broad implications of the dominant models used to understand competency, and by extension, executive function

1. Moral responsibility and self-confidence — assumed to be cornerstones of competency — are not traits that people think can or should be developed in the public sphere. They are, quite simply and clearly, not the public’s responsibility. These *characteristics* are assumed to be either natural elements of personality or passively absorbed from parents. From this perspective the role and ability of *public* policy to shape an individual’s responsibility and self-confidence is hard to think. Once individuals are thinking about competency as moral reasonability and self-confidence, the role of out-of-family context becomes difficult to see and the issue becomes firmly rooted in the family rather than the public sphere. This understanding of what constitutes competency further entrenches the dominant cultural model about the source of competency and puts basic skills solidly in the private and out of the public realm.
2. In general, the components of competency and basic functional skills presented above are not actually *skills*. With the exception of communication, the components that informants attributed to competency are clearly *attributes*. The difference, between skills as amenable to training and learning, and traits as innate, is significant and interferes with the ability to think about the importance of *programs* and *policies* in developing and improving competency and basic skills. Even communication, which at first glance appears to be a skill, was discussed in many places in interviews as an innate trait — individuals are either good or bad “communicators.” The danger of seeing the basics of competency as *attributes* is that they risk becoming *innate*. Once individuals make this assumption, there is limited ability to appreciate and understand information about *learning* competency and basic skills through intentional processes or programs. This is problematic in communicating the importance of early learning programs in helping kids develop basic skills.
3. The ability to see communication as a *skill* is more promising than both responsibility and self-esteem from a policy perspective. If communication skills as a component of competency can be framed clearly as a *learned* skill, not an innate attribute, communications may be able to convey the fact that children need to have a variety of social experiences outside of the home to learn, work on and develop basic skills, abilities and competencies. However, because of the power of the “basic competency comes from

the home” model, communication materials must discuss communication skills in the context of *school* to avoid inadvertently activating the parent/home model of understanding where competencies come from.

4. The model for thinking about basic competency as the exclusive product of the home limits thinking about how and where children learn and develop. This makes early education and child development policies, other than those that *directly* affect the behaviors of parents, hard to think and difficult to support. In short, the dominant patterns underlying thinking about where competency comes from narrow the scope of environments that affect children’s acquisition of basic skills and limit the early education and child development policies that Americans can see as relevant.
5. The dominant assumption shared by informants — that early education has the narrow and limited purposes of socializing and learning to follow rules — inhibits people’s understanding of the role of early education in providing children with the *experiences* required to develop a wide range of basic skills and competencies. This restricts the impacts that people attach to such programs, and interferes with abilities to see the importance of educational *policies* in supporting early learning programs.
6. During discussions of where kids “get” competency, there was a general lack of understanding of the *process* of acquisition and development. Informants were quick to recognize that kids acquire the ability to socialize and follow rules in part at school, or that vast majority of a child’s basic competency comes from the home, but no one in the sample was able to discuss or explain the *process* of this acquisition. In short, informants had clear and dominant cultural models for understanding *where* competency does and does not come from, but lacked models through which to think about and understand *how* kids develop these competencies.
7. The dominance of the models described above points to the need for reframing strategies that shift the assumptions that Americans use to understand *where* basic skills come from. Communications efforts must make cognitive “room” for people to think about the importance of early education as more than just a place to socialize and follow rules and provide the cognitive tools to understand the important “work” of early education in helping kids develop a wide range of basic skills. Communications must also make the link between the importance of these programs and the public’s role in supporting them through policy.

II. RECESSIVE MODELS

Several other models emerged from the cultural models interviews and, although these models were not as frequently employed and were not used with the same degree of automaticity as the dominant models, they are nonetheless important. We call these “recessive” models and most emerged at the end of interviews in the course of discussing the skills and abilities that comprise executive function. They can therefore be thought of as ways that are *available* to the public to

think about competency but that individuals don't *readily* or *automatically* employ in understanding skills, abilities, functioning and competency. Put another way, these recessive models require specific cuing to become active in the mind. We pursue these recessive models as promising avenues of thinking because they seem to help informants to envision a wider range of competencies that are relatively consonant with the scientific concept of executive function.

A. The "focus to achieve goals" model.

In discussing basic skills, a small number of informants assumed the importance of a child's ability to filter out distractions, maintain focus and follow steps in achieving a goal. These informants assumed that meeting goals was important and that a vital part of meeting goals was being able to *focus attention* on a task. Furthermore, this ability was seen to develop through *active, intentional* instruction and specific types of experiences. The intentionality of process here stands in stark contrast to the absence or passivity through which informants understood the more immediately accessed components of competency detailed above.

"You *put* them in situations where they have to develop it [ability to set and reach goals]. I mean some kids are natural, but the majority of kids aren't. They are totally distracted by the littlest noise, and you know, I just think that you need to work with them. I mean *it's a one-on-one thing*. You have to spend time; you've got to invest in their future."

White Independent Man, Age 56, Texas

"They definitely need the ability to focus basically. That is very important because distractions can detour a child from their goal or their focus."

African American Liberal Woman, Age 40, Texas

"When you know what you need to reach, now you've got to find a way to get there. So now it's understanding every step of your way to get to the ultimate goal, whatever that is. And so, there's goal setting."

White Independent Male, Age 36, California

B. The "experience is a part of learning" model

Informants were able to think about the importance of a child's ability to reason about cause-and-effect as well as to develop an appreciation of the *consequences* of their actions. This skill was assumed to hinge and depend upon experiences and interactions. In other words, some informants implicitly assumed that experiencing the results of actions was an important component in early learning and contributed to basic competency.

"We all make mistakes, but do we learn from them? You know, I mean, if you touch that fire; you going to do it again? Most likely not, but then other people kind of blow things off, and they go back and do it over and over and over, and they don't think about the consequences. They don't remember the problems."

White Independent Man, Age 56, Texas

"I think you start two people at the same place somewhere in kindergarten that you have the same family life, are given the same set of genetic predispositions, one has a little bit better

ability to learn through experience ... I mean, they are going to have a huge leg up in being and doing basically in every aspect of their life.”

Asian Conservative Man, Age 32, Illinois

C. The “early education builds a foundation for later learning” model

Several respondents talked about the importance of cultivating fundamental cognitive skills at an early, formative developmental stage, and employed a metaphor of building a “base” or structural “foundation” to explain this point. From this perspective, establishing a “solid foundation” in *early* childhood facilitates the acquisition of more complex skills *later*. In contrast to the dominant model described above, in which informants assumed limited benefits of preschool and kindergarten, this latent model is promising in its ability to help facilitate appreciation of a wider range of skills and developmental outcomes. In short, communications that can activate this recessive model — that early education is the *foundation* for later learning — may enable Americans to think about the science of executive function and the foundational role of the skills encapsulated in this concept.

“Once you get the basics down, everything else is kind of built on top of the basics. So, the sooner you learn — I am thinking even if you start them early I think it’s a good foundation that the earlier they are, the more that they learn, the more that they have a desire to learn as they get older, the easier it is for them to learn as they get older in my opinion.”

African American Liberal Woman, Age 40, Texas

“It’s where you start to learn skills that are supposed to, you know, that you end up building on to be able to read, and write, and do math, and learning about history, and all that kind of stuff.”

Asian Conservative Man, Age 32, Illinois

“How do they build the house? They build a foundation first, and then they build the rooms, and they build the foundation, then they build the first floor, the second floor, the third floor. If you don’t have a solid foundation, it’s gonna crumble. So the same thing in everything you do in life. You need to build the core foundation. The younger you are to build that foundation, the more successful you are going to be in life.”

White Independent Male, Age 36, California

However, it is important to note that even the informants who *did* see early education as an important site in developing basic skills assumed that a very narrow set of skills develop in this context — restricted to the “three R’s.” In other words, the foundation of early learning was narrowly conceptualized as the ability to work with letters and numbers, to the exclusion of other basic abilities that scientists saw as fundamental precedents to reading, writing and arithmetic skills. The assumption that early learning (in the infrequent cases in which it *was* conceptualized as a place to develop skills) is all about the three R’s is well documented in FrameWorks’ ongoing research on education. This assumption is an important consideration in light of the current project’s focus on communicating the science of executive function. If individuals assume that early education is exclusively for developing literacy, they will be ill equipped to realize and

think about the importance of the skills that scientists have found to precede the development of the three R's.

“They get the three R's together, then they pretty much can handle, you know, a lot. I mean, that kind of helps them in *life*. They've got to get that down pat. These are the skills that you learn, and you take through life with. And if you don't learn them as a kid, nobody is gonna take you by the hand and lead you to back down to the classroom again to relearn it again.”

White Liberal Woman, Age 60, California

“They're trying to teach them what they're going to learn in a kindergarten just a little earlier. I mean, they're trying to teach them their ABCs. A lot of books that I've read, you know, say read to your children, you know, from the day they are born because they say that reading to them does something with their brain and it makes them I don't even know, but anyway, it's good for them.”

White, Independent Woman, Age 40, California

“It's just like in math, just for an example, *the sooner you learn your addition and your subtraction*, the basics, the sooner you learn the basics — once you get the basics down, everything else is kind of built on top of the basics.”

African American Liberal Woman, Age 40, Texas

“I think they should have their verbal skills down, you know, know basic things about like basic ABCs, be able to write their name.”

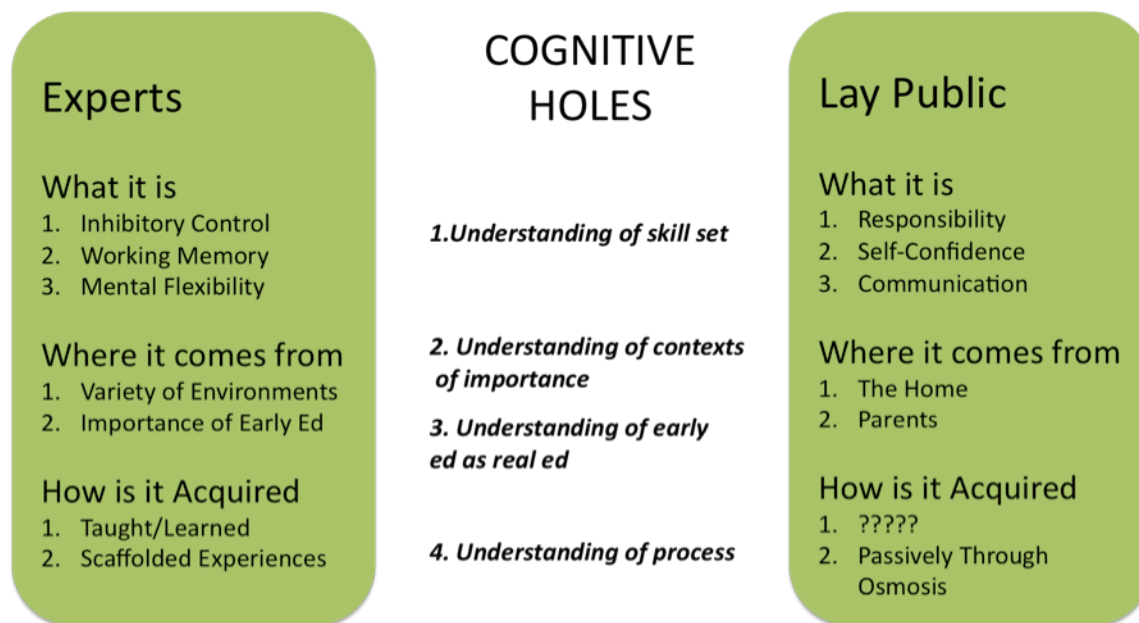
White Liberal Woman, Age 28, Texas

D. Broad implications of the recessive models used to understand competency, and by extension, executive function

1. The ability of some participants to think about competency through the lens of *focus* and *experience* is promising due to the consonance of these skills with the scientific concept of executive function discussed here. If communications can cue this recessive model, the public will likely be more receptive to information about executive function and the policy implications of the science on this issue. In the next phases of research, FrameWorks is prepared to explore specific strategies to cue this model.
2. The assumption that these skills, particularly the ability to focus, are amenable to active learning and instruction rather than passive acquisition or absorption is another promising element of these recessive models. The recessive models inform an understanding of *skills* rather than *attributes* with the implication that skills can be developed and learned, whereas attributes are assumed to be natural and innate — and not responsive to or appropriate as targets for programs and policies.
3. The third recessive model discussed here — that early education can build a foundation for later learning — is a promising strategy to shift thinking away from more dominant patterns discussed above. If early education can be framed as a place of “real” learning

and skill development, the public is more likely to support policies that fund and develop early education programs. However, the danger with this model of early education is that the foundation that early education confers is narrowly conceptualized as early literacy and numeracy skills. This narrow focus interferes with the ability to realize the importance of executive function skills. Additional research is required to explore possible strategies that would include a broader range of skills in early education (as a foundation for the learning model) and avoid the assumption that the only relevant skills at this stage are the three R's.

COGNITIVE HOLES



The primary goals of this analysis have been to: 1) document the way scientific experts talk about and explain the issue of executive function; 2) establish the way that the lay public understands the principles that underlie this topic; and 3) compare and “map” these explanations and understandings to reveal the gaps between these two groups. In doing so, we identify particular areas where “cognitive holes” on the part of the public impair a productive understanding of the science around an issue. The figure above represents the *map* of expert explanations, lay cultural models, and the gaps that exist between these two groups in understanding executive function and basic skills. An integral part of FrameWorks’ Strategic Frame Analysis™ is to first generate this map and then design simplifying models that fill these holes by cultivating clarifying metaphors that concretize key scientific concepts. Designing simplifying models relies on knowing the *locations* and *characteristics* of expert-lay cognitive holes — it requires a detailed, in-depth understanding of the map. Understanding the locations and features of the specific holes detailed below is therefore essential as we move from the largely descriptive research laid out in this report to more prescriptive reframing experiments.

1. The most glaring gap between expert and lay understandings is the fundamentally different set of skills and abilities that these groups attributed to competency. In cultural models interviews, informants assumed that competency was comprised of responsibility, communication and self-confidence, while the experts we spoke to emphasized the basic, foundational nature of inhibitory control, working memory and cognitive flexibility. Generally, lay informants implicitly understood the components of competency and functioning as *attributes* (responsibility, self-esteem, being a good “communicator”) whereas scientists understood the elements required to function as *skills*. This is a fundamental difference in perception and leads to different assumptions regarding acquisition. Scientists thought of skills that can be *trained* and *learned* while the general public thought more of innate personality characteristics that are less subject to improvement through training and lead strongly to determinist patterns of thinking about skills and outcomes. For the general public to be able to think and use the science of executive function, communication strategies must be developed to shift public perception and create space for the consideration of other fundamental competency skills.
2. Lay informants lacked models through which to understand the acquisition of skills and competencies. When they did try to explain a process of acquisition they assumed that the development of basic skills “just happens,” “like osmosis,” or that “something [happens] with their brain and it makes them ... I don’t even know, but anyway, it’s good for them.” In short, acquisition was poorly understood. Experts, on the other hand, had a well-formed explanation of how basic skills develop. For members of the general public to understand the policy significance of executive function, they must be able to think constructively and productively about how children learn and develop these skills. The “process piece” of the science is influential in allowing people not only to see that these skills are important, but also to view a solution — to realize the ability of policies and programs to improve the development of these skills. Considerable work is required to bridge this gap and fill the “process” hole in the general public’s understanding of how children develop competencies. We expect that filling this specific cognitive hole through the use of a simplifying model or causal sequence will have a dramatic effect on the public’s support of early education programs, specifically those incorporating, as experts said, an “executive function *approach*.”
3. Informants had a powerful underlying assumption in which the *only* context of relevance in basic skill development was the *home*. Scientists, on the other hand, had a wider concept of context, which included a variety of environments where children have scaffolded experiences that facilitate the development of basic skills. In short, informants and experts assumed fundamentally different perspectives of context relevant to a child’s development of basic skills and competencies.
4. A fourth gap that emerged from this research deals with assumptions the public brings to bear on *early education*. Lay informants held a dominant model in which early education serves a narrow set of purposes and has a limited role in learning and development. This cultural model has also emerged powerfully in FrameWorks’ on-going research on education more generally. This cultural pattern of understanding early education — that it

is largely a luxury and of limited “real” importance or value — stands in direct opposition to the science of early education in general, and executive function more specifically. This cognitive hole represents a promising cognitive “slot” to fill with a simplifying model.

CONCLUSION

This report describes and examines the implications of ways members of the scientific community and the general public think about skills, abilities and competencies in general and executive function more specifically. Thinking on these topics is examined through the analysis of interview data with members of both of these groups. The report considers the limitations of the dominant cultural models currently in place in the public’s thinking about the development of competency, basic skills and other concepts that access the underlying principles of the scientific notion of executive function. The report also locates specific gaps, or cognitive holes, in the way experts and the general public understand and talk about these issues. These holes are areas that must be addressed in communicating and translating the science of executive function and child development.

Ultimately, the report demonstrates the pressing need for scientists and reformers to work on providing Americans with alternative ways of thinking about basic skills, abilities and competencies. New communications strategies are required to shift public thinking away from the assumptions that basic competencies develop *automatically* and *exclusively* in the home and towards an appreciation of a wider range of skills and abilities and of the importance of context and early education in how children develop foundational skills and abilities. Subsequent phases of research will explore precisely how scientists can most successfully address the limitations in thinking that are presented here.

The experts interviewed for this research clearly feel that the science of executive function deserves the attention of both policy makers and the general public, and are actively working on ways to clarify the policy implications of their research. We will continue to work with them towards this goal.

APPENDIX

THEORETICAL FOUNDATIONS

The following are well-accepted characteristics of cognition and features of cultural models that figure prominently into the results presented in this report and in FrameWorks' research more generally.

1. Top-down nature of cognition

Individuals rely on a relatively small set of broad, *general* cultural models to organize and make sense of information about an incredibly wide range of *specific* issues and information. Put another way, members of a cultural group share a set of common general models that form the lens through which they think and make sense of information pertaining to many different issues. This feature of cognition explains why FrameWorks' research has revealed many of the same cultural models being used to think about seemingly unconnected and unrelated issues — from education to health to child development. For example, FrameWorks' research has found that people use the *mentalist* model to think about child development and food and fitness — seemingly unrelated issue areas. For this reason, we say that cognition is a “top-down” phenomenon. *Specific* information gets fitted into *general* categories that people share and carry around with them in their heads.

2. Cultural models come in many flavors but the basic ingredients are the same

At FrameWorks, we often get asked about the extent to which the cultural models that we identify in our research and that we use as the basis of our general approach to social messaging apply to ALL cultures. That is, people want to know how inclusive our cultural models are and to what extent we see/look for/find differences across race, class or other cultural categories. Because our aim is to create messaging for mass media communications, we seek out messages that resonate with the public more generally and, as such, seek to identify cultural models that are most broadly shared across society. We ensure the models are sufficiently broad by recruiting diverse groups of informants in our research who help us to confirm that the models we identify operate broadly across a wide range of groups. Recruiting diverse samples in our cultural models interviews often confuses people who then think we are interested in uncovering the nuanced ways in which the models take shape and get communicated across those groups, or that we are interested in identifying different models that different groups use. To the contrary, our aim is to locate the models at the broadest possible levels (i.e., those most commonly shared across *all* cultural groups) and to develop reframes and simplifying models that advance those models that catalyze systems-level thinking. The latter does not negate the fact that members of different cultural groups may respond more or less enthusiastically to the reframes, and this is one of the reasons why we subject the reframes that we recommend to our clients to rigorous experimental testing using randomized controls that more fully evaluate their mass appeal.

3. Dominant and recessive models

Some of the models that individuals use to understand the world around us are what we call “dominant” while others are more “recessive,” or latent, in shaping how we process information.

Dominant models are those that are very “easy to think.” They are activated and used with a high degree of immediacy and are persistent or “sticky” in their power to shape thinking and understanding — once a dominant model has been activated, it is difficult to shift to or employ another model to think about the issue. Because these models are used so readily to understand information, and because of their cognitive stickiness, they actually become easier to “think” each time they are activated — similar to how well worn and familiar paths through fields are when walking through a forest, and in so doing these paths become even more well-worn and familiar. There is therefore the tendency for dominant models to become increasingly dominant unless information is reframed to cue other cognitively available models (or, to continue the analogy here, other walking paths). Recessive models, on the other hand, are not characterized by the same immediacy or persistence. They lie further below the surface, and while they *can* be employed in making sense of a concept or processing information about an issue — they *are* present — their application requires specific cues or primes.

Mapping recessive models is an important part of the FrameWorks approach to communication science and a key step in reframing an issue. It is often these recessive patterns of thinking that hold the most promise in shifting thinking away from the existing dominant models that often inhibit a broader understanding of the role of policy and the *social* aspect of issues and problems. Because of the promise of these recessive models in shifting perception and patterns of thinking, we discuss them in this report and will bring these findings into the subsequent phases of FrameWorks’ iterative methodology. During focus group research in particular, we explore in greater detail *how* these recessive models can most effectively be cued or “primed,” as well as how these recessive models *interact* with and are *negotiated* vis-à-vis emergent dominant models.

4. The “nestedness” of cultural models

Within the broad foundational models that people use in “thinking” about a wide variety of issues lay models that, while still general, broad and shared, are *relatively* more issue-specific. We refer to these more issue-specific models as “nested.” For example, when informants thought about basic skills, they employed a model for understanding where these skills come from, but research revealed that this more specific model was nested into the more general *mentalist* cultural model that informants implicitly applied in thinking this issue. Nested models often compete in guiding or shaping the way we think about issues. Information may have very different effects if it is “thought” through one or another nested model. Therefore, knowing about which models are nested into which broader models helps us in reframing an issue.

About FrameWorks Institute:

The FrameWorks Institute is an independent nonprofit organization founded in 1999 to advance science-based communications research and practice. The Institute conducts original, multi-method research to identify the communications strategies that will advance public understanding of social problems and improve public support for remedial policies. The Institute's work also includes teaching the nonprofit sector how to apply these science-based communications strategies in their work for social change. The Institute publishes its research and recommendations, as well as toolkits and other products for the nonprofit sector, at www.frameworksinstitute.org.

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