What is the Same and What is Different?

Making Sense of the "Non-Cognitive"[1] Domain: Helping Educators Translate Research into Practice

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INTRODUCTION

With increasing attention being paid to the importance of "non-cognitive" factors in educational settings, many in the field have expressed concern about the lack of precision with which we discuss and measure them (e.g., Zernike, 2016; Engber, 2016). As is clear from a recent piece from Brookings (Whitehurst, 2016), the field is beset by dilemmas about what should be included in this broad domain, and even disagreements about what it should be called (Gelbach, 2015). There are indeed deep-seated terminological issues that underlie our inability to define and communicate about skills in a unified, coherent way. What does this mean for efforts to translate research into practice in ways that effectively support whole child development in schools? Without greater clarity and a mechanism for making connections between the many perspectives on the field, we risk creating and implementing ineffective standards and strategies, and conducting research that is imprecise and inconclusive, wasting time, money, and effort while imperiling the status and value of the domain as a whole.

Over the past year, our team at the Harvard Graduate School of Education (HGSE) has begun the process of creating a nomological network[2] that is designed to organize, describe, and connect the different frameworks and terms used to describe non-cognitive skills across a variety of disciplines. This "Taxonomy Project" has been informed by our ongoing work with schools, which has made apparent not only the importance of greater precision in the field, but also an urgent need for greater transparency about the information that is already being used. The Taxonomy Project seeks to build such clarity in order to foster and maintain fundamental and essential links between research and practice.

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[1] We use the term "non-cognitive" because it is frequently used by educators, policy makers, researchers, and journalists to refer to a broad set of skills that matter to student learning but that are not typically part of academic content areas such as math and literacy. We think the term is problematic because it suggests these skills are separate from cognition. In fact, many skills in this domain (including those described as social or emotional) involve cognitive tasks such as focus, reflection, perspective taking, mental problem-solving, etc.

[2] A nomological network is a representation of the concepts (constructs) of interest in an area of study, their observable manifestations, and the interrelationships among and between them.

SINGLE KITCHEN, MULTIPLE COOKS: THE STATE OF THE "NON-COGNITIVE" DOMAIN

There are a large number of fields and disciplines that care about, specialize in, and contribute to what we know about this broad area. Fields that target the domain go by many names – character education, social-emotional learning, personality, 21st century skills, and soft skills, to name just a few. While this diversity has contributed positively to research and practice in many ways, it has also complicated our understanding of the domain. Each discipline has its own perspective and refers to various aspects of the non-cognitive domain using frameworks, language, and terminology informed by and specific to its own tradition and goals, which often confuses our attempts to translate research into practice. For example, frameworks from different disciplines might refer to the same skill or competency with different names, or use the same name to refer to two conceptually distinct skills (Reeves & Venator, 2014). Frameworks might further vary in the type of construct they address – from skills, behaviors, and attitudes to strengths and abilities to virtues and traits – making it difficult to compare discrete concepts across them (see table below).

As things stand now, there exists a real hazard of translating research and theory into practice in ways that mislabel skills and misrepresent how they are best supported, taught, and measured.

WHAT'S IN A NAME?

Researchers, policy makers, and practitioners have used many names to describe various parts of the non-cognitive domain. These are often rooted in different applications, but the underlying constructs are similar. A selection of relevant fields include:

- Social and Emotional Learning
- Non-Cognitive Skills
- 21st Century Skills
- Deeper Learning
- College and Career Readiness
- Soft Skills
- Academic Mindsets
- Character
- Student Agency
- Emotional Intelligence
- Nonacademic Skills
- Employability Skills

Furthermore, the non-cognitive constructs within each field are described using a wide range of terms, including:

- Skills
- Mindsets
- Attributes
- Competencies
- Traits
- Strengths
- Behaviors
- Progressions
- Virtues
- Constructs
- Abilities
- Dimensions
- Feelings
- Attitudes
- Strategies
- Strands
- Habits

Each of these areas often work in their own silo, but there are fundamental similarities between social-emotional learning, character, 21st century skills, and each of the rest. However, nothing exists to show how they are related to each other, or just as importantly, where specifically they differ. The Taxonomy Project aims to make these connections clear for researchers, policy makers, and practitioners.

WORDS MATTER: TRANSLATING RESEARCH TO PRACTICE

In a well-functioning relationship between research and practice (see figure to the right), there is a clear link between what research suggests about how the outcome we hope to influence is related to a particular construct (the **evidence**), how we plan to develop that construct in students (the **strategy**), and how we will measure it to determine if our efforts were successful (the **evaluation**). The relationship is iterative, forming a research-to-practice cycle that both facilitates evidence-based practice and enables us to learn from our efforts and add to what we know about the field as a whole.

Importantly, however, it is the *words* we use – the specific terms and the meaning, or definitions, we ascribe to them – that maintain those connections. When constructs have multiple names and definitions as they do in the non-cognitive field, it becomes much harder to sort through such an extensive body of research to determine where the links between evidence, strategy, and evaluation really exist. In the example above for the term *self-control*, a single clear definition and consistent use of terminology and this definition supports smooth links through the cycle.

Building on this example, consider what might happen when we must sort through the actual multiple possible conceptualizations of self-control that exist within the non-cognitive domain. While almost everyone agrees that it has something to do with controlling impulses, depending on who you ask, that might include anything from managing emotions, to paying attention, to sticking with a task, to resisting temptation, and so on. Someone referencing self-control might be referring to all of those areas, just a few of them, or perhaps only one. In other cases, someone might use a different term all together to describe these same abilities, such as self-management or conscientiousness, and while those terms might be similar and related, they are not the *same*.

In either case, the outcomes, strategies, and measurement tools associated with one "definition" of self-control may not be appropriate for other definitions. In the figure to the right, multiple and
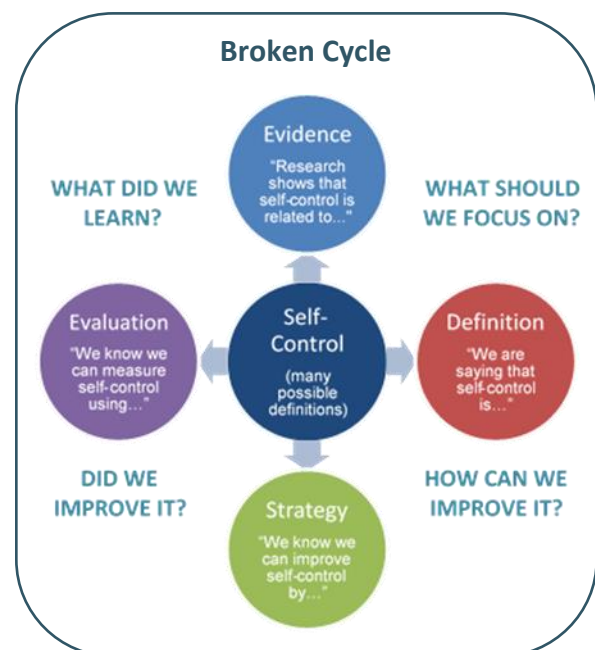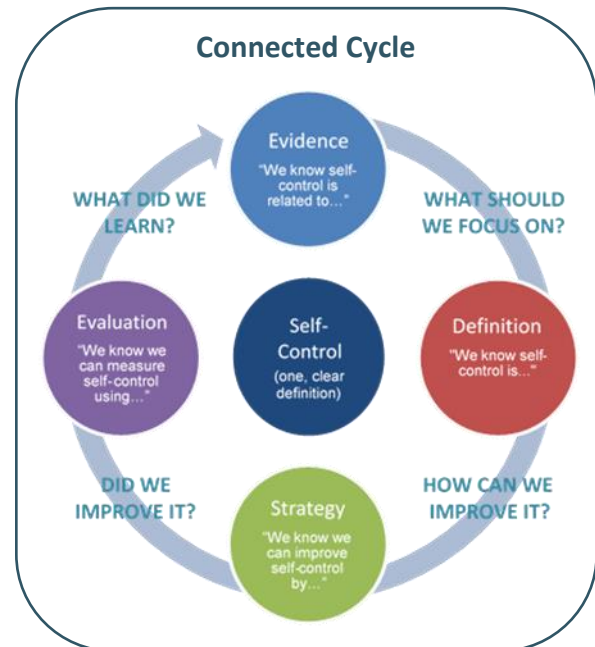
varying definitions of self-control (at center) might drive the use of different conceptualizations at any point in the cycle, breaking links between concept, evidence, definition, strategy, and evaluation.

Continuing with this example, the use of the term self-control in the literature on social and emotional development provides a good case example of this core issue. In an important and much cited paper, Moffitt and colleagues report self-control in childhood to be a strong predictor of a variety of life outcomes (Moffitt et al., 2011). In their paper, they describe self-control as **"an umbrella construct that bridges concepts and measurements from different disciplines (e.g., impulsivity, conscientiousness, self-regulation, delay of gratification, inattention, hyperactivity, executive function, willpower, intertemporal choice)"** (Moffitt et al., 2011, p. 2693).

Each of the concepts and constructs under this umbrella holds its own distinct set of definitions, operationalizations, and measurement tools (Jones et al., 2016). Importantly, however, in the actual study used to link self-control to life outcomes, child self-control was measured using observational ratings of lack of control; parent and teacher reports of impulsive aggression; and parent, teacher, and self-reports of hyperactivity, lack of persistence, inattention, and impulsivity. While these measures reflect several of the definitions of self-control offered by Moffitt above, they do not capture every aspect of every definition. To which definitions of self-control, then, do the results apply? And what does this mean for those using this research on self-control to inform specific standards, teaching strategies, or interventions? Would we design interventions to target hyperactivity or aggression? If we did, what measures should we employ to test their efficacy?

Without a way to make sense of the words, it is easy to misinterpret, over-generalize, or overlook the hard science that links evidence to strategies, and strategies to measurement and evaluation. The result could be cherry-picking teaching practices, interventions, and assessments that may or may not actually be related to each other, or to our desired outcomes. When this happens, the scientific links that connect different points along the research-to-practice cycle become lost or obscured, and the cycle breaks down.

IMPLICATIONS FOR EDUCATIONAL SETTINGS

As efforts to build non-cognitive skills are introduced into schools, practitioners and policy-makers need to know what skills and strategies best meet the needs of their students, but the demand being placed on schools to address them is growing faster than the rate at which the field is able, or willing, to generate a unifying framework. This presents real challenges for educators seeking to navigate the domain and put evidence-based strategies into action.

Consider, for example, a school that wants to help students develop the aforementioned self-control. There are several places where definitional issues impede a clear research-to-practice cycle.

> The principal of Example Academy attends a leadership conference at which she learns that students with higher self-control tend to have better academic outcomes. She knows that this idea is supported by strong *EVIDENCE* – the conference cited multiple studies showing that students with better self-control performed better in reading and math. She decides that she will make developing self-control a priority at Example Academy.

But what should they focus on?

How is self-control defined in research? Which aspects of it are most salient to academic performance? Do you need to influence all of them? If not, what does research say you should focus on? As things stand now, there is no easy way to sort through the literature to answer those questions and use that knowledge to inform an approach. As such, most educators cobble together an understanding of self-control, very likely unaware they have made a consequential choice about definition, let alone one that should inform which specific strategies and measures they put into practice, and which outcomes they should hope to see.

For example, if conference attendees were provided with a copy of Walter Mischel's popular book, "The Marshmallow Test: Mastering Self-Control," they might be inclined to think about, or ***DEFINE***, self-control as willpower, or being able to resist temptation and delay gratification – two related, but not always identical constructs. Alternatively, maybe their school already uses Character Lab strengths as part of a school climate initiative, so perhaps they adopt a broader definition of self-control that aligns with that framework, such as sticking with long-term goals, staying focused on a task, maintaining your temper, and controlling how you respond to others. How will these two choices differently shape how Example Academy approaches building and measuring self-control?

How can they improve it?

Having formed an idea about what self-control means, Example Academy begins to research ***STRATEGIES*** that build it. Their search returns a variety of options, including brain games, calm breathing techniques, self-talk, and goal-setting strategies. Importantly, each of these practices target different aspects of self-control. Self-talk, for example, is a well-supported strategy for delaying gratification, while the popular WOOP method helps students stick with their goals. Without a way to determine which strategies align with their definition of self-control, Example Academy risks selecting a strategy that does not actually align with their goal and may or may not be connected to the same outcomes. For example, what happens if they want to target delay of gratification, but select the WOOP method? Or what if they want to target self-control more broadly, but choose to only teach self-talk? How will their choice impact the results they hope to see and their ability to interpret them?

Did they improve it?

Example Academy understands the importance of using data to inform practice, so they decide to ***EVALUATE*** whether their strategy is working. They research self-control measures and again find a wide variety, including questionnaires that target one specific aspect of self-control, broad surveys that measure multiple aspects of self-control, and behavior-based measures like the academic diligence task (i.e., a digital version of the infamous marshmallow test). Again, each represents a different way of thinking about self-control and captures information relevant to that particular approach. How will Example Academy know which type of assessment to pick? How will they know if it is a good fit with their strategy? For example, what happens if they select a strategy that improves delay of gratification, but attempt to measure it with a broad survey that contains only one or two items that target delay specifically? Will that survey accurately capture the extent to

which their strategy has impacted delay of gratification? What will that mean for Example Academy's ability to accurately evaluate and adapt their approach?

What did they learn?

Example Academy puts their strategy into action and checks for results at the end of the year. What might they see? Perhaps they were successful, but perhaps they were not. What went wrong? With the misalignments described above (see Figure 1 in the Appendix), there is no reliable way to pinpoint where the process failed. In the end, the school might simply come to the conclusion that self-control isn't not actually worth focusing on at all.

In short, the research tradition or framework on which the approach is based will necessarily inform which definitions to align with, which skills to target, and which outcomes result. Importantly, the non-cognitive frameworks available to educators vary in how specific and inclusive their definitions are. This is not in and of itself a problem; different frameworks are designed to serve different purposes (see Figure 2 in the Appendix for an illustration of self-control in a selection of frameworks). The lack of transparency *about* these differences, however, is a problem. Right now, there is no easy way for practitioners and policymakers to determine to which empirical definition the term in their chosen framework corresponds, and that makes it difficult to sort through next steps determine with any accuracy where those terms appear in the literature and where they are supported by hard evidence.

WHAT IS THE SOLUTION?

To address the array of challenges detailed above, we believe we need a system or mechanism for addressing the following question: **What are the skills, terms, and definitions employed in each non-cognitive framework, and how are they related those of other frameworks?**

Others in the field have suggested various ways to do this, which typically fall into one of two categories: (1) aligning all constructs against a single *existing* framework, or (2) creating a *new* framework or set of umbrella terms that better reflects the entire domain and organizes it under one system. For example, some argue that the non-cognitive field should be organized around the "Big Five" personality factors of openness, conscientiousness, agreeableness, emotional stability, and extraversion (e.g., Martin, 2015). This doesn't work for three reasons.

First, many personality factors are understood to be biologically-based dispositions or trait-like features that are relatively stable throughout an individual's life. "Extraversion" is not a developmental skill like self-regulation or problem-solving; we have no evidence it emerges in certain times of development and then follows universal patterns of growth and change which can be used to develop lessons, strategies, or teaching practices. Focusing substantial effort and educational dollars on trying to change something that science suggests is relatively stable does not make a lot of sense, especially when we have science indicating that other skills are significantly more malleable or responsive to intervention (Robert Wood Johnson, 2015).

Second, suggesting that teachers should universally promote "extraversion" or "agreeableness" is akin to telling children that their natural dispositions are inherently wrong, and that something central to

their personality or identity needs to be changed. This may undermine children's developing self-concept and their self-efficacy, motivation, and sense of belonging – all of which research suggests are important contributors to positive adjustment and success in school.

Third, these authors wrongly assume that various social-emotional, 21st century, and other non-cognitive skills are adequately captured by re-naming and re-grouping under the personality framework. However, key skills such as executive function and working memory, the ability to correctly identify emotions in the self, or understand the social cues of others, are missing from the Big Five personality framework, as are many other skills. Other attempts to organize the non-cognitive field under existing frameworks, such as those produced by CASEL, the Chicago Consortium on School Research, and others, are flawed in similar ways.

Attempts to generate a new framework or new umbrella term (e.g., NPR, 2015; EdWeek, 2015) while well-intentioned, are not designed to address what we see as the real problem: they do not clarify the specific terms, meanings, and definitions currently being used in the non-cognitive domain, in order to make transparent whether or not, and how, terms are related to one another, thereby facilitating accurate interpretation of scientific findings and close links between research and practice.

We argue instead that the real need is not for a better name or framework, but a tool that connects frameworks to each other, one that allows users to navigate between existing frameworks in a manner that drives transparency and precision, keeping the links between evidence, strategy development and implementation, and measurement and evaluation tight. Such a tool would serve as a bridge between intellectual communities rather than privileging one over another.

CREATING A SLIDE RULE FOR THE FIELD: A MOVE TOWARD CONNECTIVITY AND TRANSPARENCY

Our response to the issue is somewhat different. Instead of narrowing our understanding of the domain to a single framework or seeking to create a new one altogether, the Taxonomy Project seeks to create a coherent and scientifically-grounded taxonomy of non-cognitive skills that is designed to link terms across frameworks. A nomological network of this type would illustrate both how non-cognitive constructs are related to one another across disciplines, as well as when and how science supports them. Importantly, such a system would preserve the integrity of each framework without obscuring nuances in meaning and links to evidence. The resulting catalogue of terms, rather than seeking to redefine the domain, will serve as a practical resource that makes it easier for individuals in the field of education to search across multiple frameworks, evaluate similarities and differences between them, and make judgments about what to focus on based on their needs and context.

Last summer, with support from the Einhorn Family Charitable Trust, our team at the HGSE began to use a carefully constructed coding system to map non-cognitive constructs within commonly used frameworks onto one another in order to identify areas of similarity and difference. This work has resulted in a series of visual displays that enable stakeholders to easily compare and contrast frameworks in a way that makes sense of the varying terminology that appears across them.
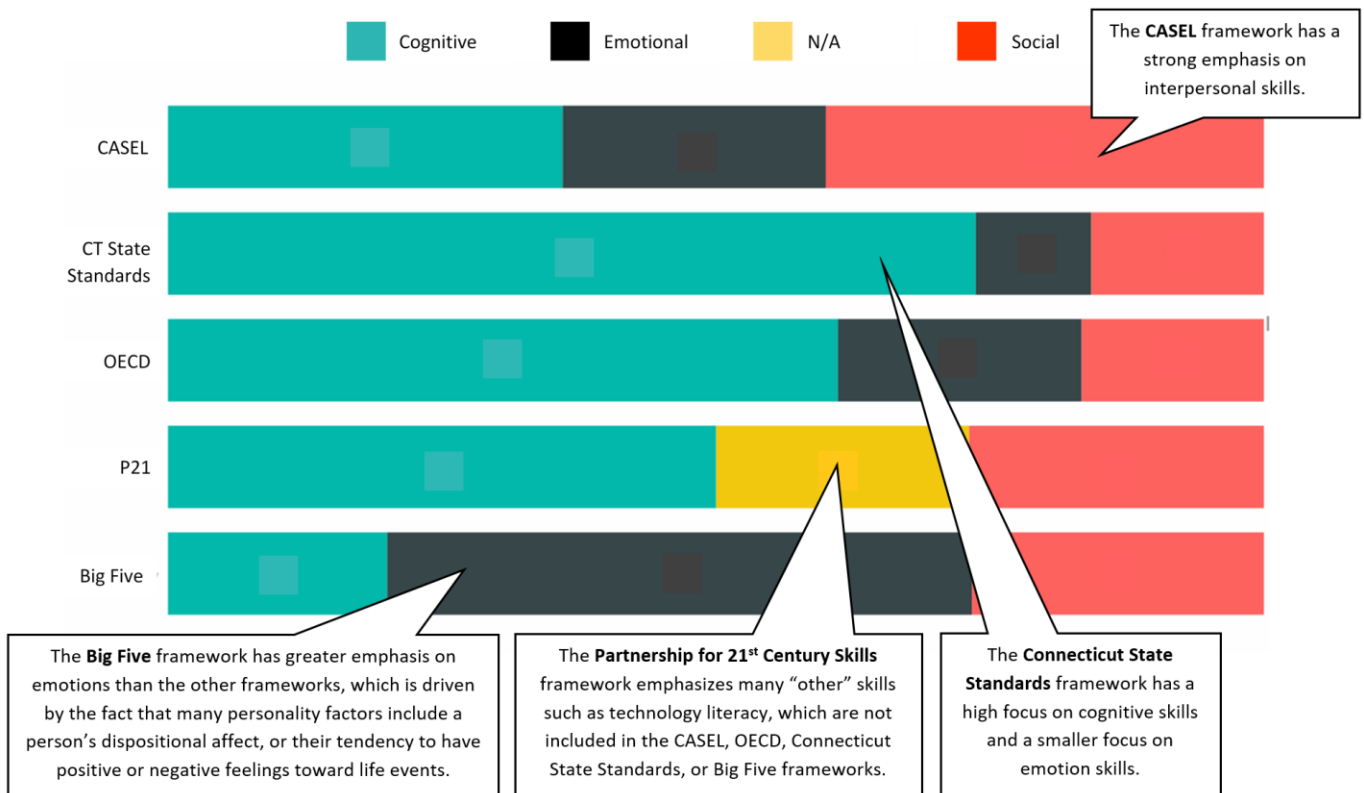
For example, by illustrating the relative emphasis of different frameworks on social and interpersonal skills vs. internal or intrapersonal skills (see figure above[3]); and by highlighting how a concept like "self-control" is operationalized in different frameworks (as shown in Figure 2 of the Appendix), programs or strategies – in some cases as executive function, other cases as emotion management and coping skills, and other cases as compliance with care-giver requests.

Ultimately, we envision creating an interactive dashboard of these visuals that are connected to a thesaurus of terms fed by a robust database of frameworks and constructs. Such tools will not only make it possible for stakeholders to see how the frameworks line up, but to gain deeper insight into the constructs within them and in what ways they are – or are not – grounded in evidence, as well as to identify strategies and practices that build them.

WHAT DOES THIS MEAN FOR PRACTITIONERS, POLICYMAKERS, AND PROGRAM EVALUATORS?

What can a slide rule offer researchers, policy-makers, and practitioners in this field? At its core, a slide rule enables translation from one system to another. In a broad sense, it supports clarity as to which skills are the same, which are different, and which overlap across the disciplines. Importantly, this can provide decision-makers in the field of education with practical tools to sort through non-cognitive

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[3] This figure illustrates an initial heuristic example.

frameworks and terminology to make sense of existing information, allowing them to better align strategies and goals to achieve real impact.

For example, the taxonomy and its related tools could be used in the following ways to create clarity around the problems faced by leaders, policy-makers, and program evaluators.

School/District Leaders—*How Do Different Constructs Appear in the Frameworks?*

School and district leaders looking for ways to address the non-academic domain in their schools and classrooms need a way to select strategies and programs that address skills shown to be tied to the school phenomena (e.g., bullying) or outcomes (e.g., improved classroom behavior) they care about. Without a way to compare skills across frameworks, there is the risk of selecting a framework that focuses on too narrow or broad a set of constructs.

For example, perhaps a school is tasked with leading an anti-bullying initiative and school leadership is familiar with research that says promoting empathy among students is one way to reduce bullying and improve positive climate. By looking across different frameworks, the school can identify that which aligns with their goals.

Policymakers—*What's the Same and What's Different Across Frameworks?*

Without a way to compare skills across frameworks, state-policy makers risk designing state standards for the non-cognitive domain that too narrowly focus on a particular skill area while missing others that we know matter for children's success. Currently, with such an array of frameworks to choose from and no way to easily compare the extent to which they differently emphasize important skills, it has been the efficient practice of many policy-makers to default to a single framework. In many cases, it is then this single framework that dictates which skills will be considered most important. When this happens, however, we risk leaving out important skills that might not be addressed in that particular framework.

For example, CASEL and KIPP both have frameworks that include non-cognitive skills that are shown to influence academic and life outcomes. These frameworks overlap in some ways but are also different in some ways; understanding these differences may help school leaders or policy-makers to select the best framework or approach to meet their needs. As illustrated in Figure 3 of the Appendix, CASEL includes more substantial emphasis on social-emotional development and social interaction skills (such as conflict resolution, teamwork and collaboration) whereas KIPP is more individually-focused and draws heavily on personality factors and character values, as well as the growth mindset literature.

Program Evaluators – *What programs or approaches work for whom and under what conditions?*

Effective evaluation is essential to moving the field forward and understanding the impact of various programs, policies, and school practices. Without transparency about the specific skills that are targeted within a framework, program or policy, evaluators are not likely to select assessments that most accurately measure the skill and proximal outcomes of interest. In many cases, the measurement of non-cognitive factors lags behind our attempts to promote it or embed it in new

programs and policy efforts (e.g., Zernike, 2016). This doesn't have to keep us from moving forward (Willingham, 2013), but it means we must take extra care in describing and interpreting findings. By increasing transparency, precision, and consistency in how specific non-cognitive skills and frameworks are described, the Taxonomy Project will help evaluators align assessment strategies more closely to the skill or skills being targeted in a program or policy.

Finally, this precision and transparency can improve communication between researchers, educators, and the general public: program evaluators studying specific programs with particular emphases (i.e., grit vs. empathy vs. cooperation) will hopefully share their findings using specific terms, rather than the broad umbrella term non-cognitive; and researchers conducting and sharing results of meta-analyses can group programs or policies based on similarities in skills targeted, rather than lumping them all under the non-cognitive header and assuming that findings tied to one set of skills are true for programs that build a different set of skills. Such increased precision will aid our growing understanding of what works, and for whom, within the broad non-cognitive domain.

MOVING FORWARD

With this type of information at their fingertips, it becomes easier for educators to determine which skills matter in relation to the issue they care about or the outcome they desire, to locate those skills within different frameworks, programs or strategies, and to compare and contrast frameworks and approaches at various levels of specificity. In this way, the Taxonomy Project offers a promising tool in response to an urgent need in the field.

This is an important moment for the non-cognitive domain: interest is high, and promising approaches abound. But skepticism, confusion, and poorly communicated findings threaten to undermine good work in the field. We must take advantage of the current energy to drive forward more precise, careful, and transparent work, in order to maximize the likelihood of identifying and understanding approaches that have the biggest impact on children's learning and life outcomes.

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Figure 1. Mapping the cycle: Evidence to definition, strategy, evaluation, and results
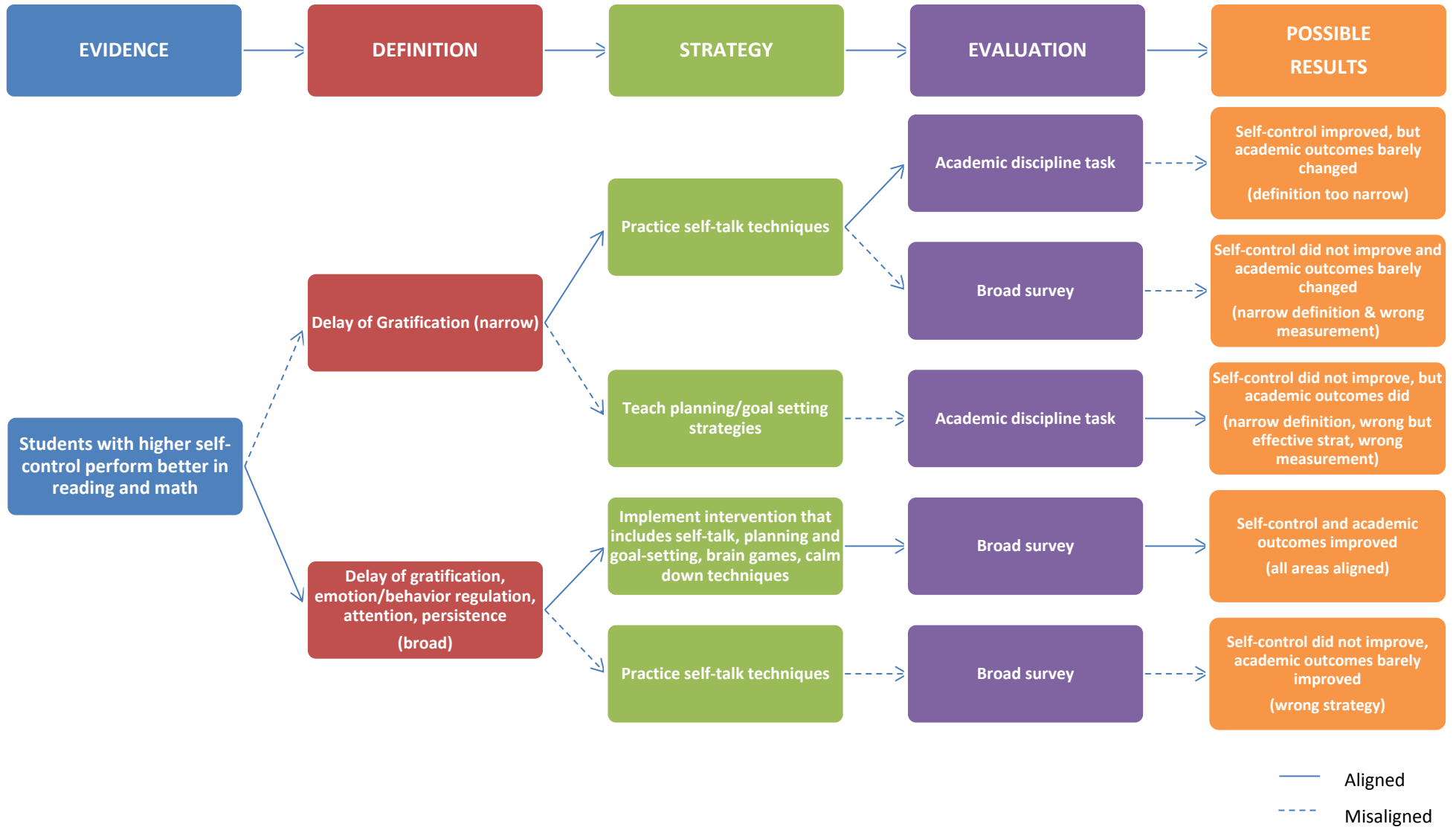
Figure 2. Self-control as it is identified and defined in four different frameworks[4]

SEL
Individual and interpersonal focus; Strong developmental aspect; Emphasis on knowledge, skills, and strategies

CASEL

SELF-MANAGEMENT
- The ability to regulate emotions, thoughts, and behavior in different situations
- Managing stress, controlling impulses, motivating

OECD

SELF-CONTROL

SELF-CONTROL?

KIPP

SELF-CONTROL
- The capacity to regulate thoughts, feelings, or behaviors when they conflict with valued goals

CHARACTER
Individual focus; cultural influence; internal qualities

CONNECTICUT STATE STANDARDS

STATE STANDARDS
Tends to reflect less emotion

SELF-REGULATION
- Embedded within Executive Function, alongside working memory and meta-cognition, cognitive flexibility, and managing attention and behavior
- Cognitive-focused

CONSCIENTIOUSNESS
- The tendency to be organized, responsible, and hardworking
- Sub-parts include competence, order, dutifulness, achievement striving, self-discipline, and deliberation

BIG FIVE

PERSONALITY
Individual focus, trait-like dispositions; stable over time; outward appearance

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[4] This figure illustrates an initial heuristic example.

Figure 3. Similarities and differences between the KIPP and CASEL frameworks[5]

"The ability to accurately recognize one's emotions and thoughts and their influence on behavior. This includes accurately assessing one's strengths and limitations and possessing a well-grounded sense of confidence and **optimism**."

Optimism in KIPP's Character Strengths contains an element of Growth Mindset, which is not represented in the definitions of CASEL's competencies.

Believed that effort would improve his/her future.

When bad things happened, s/he thought about things they could do better next time.

Believed that s/he could improve on things they weren't good at.

Even though the definition for CASEL's Self-Awareness competency includes the word "optimism," the behaviors within KIPP's Character Strength of Optimism relates to CASEL's Self-Management and Relationship Skills.

Grit

Curiosity   Zest

Self-control   Optimism

Gratitude   Social Intell.

KIPP Character Strengths

Growth Mind-set
Intelligence can be developed

Leads to a desire to learn and therefore a tendency to...

SELF-MANAGEMENT   SELF-AWARENESS

Social & Emotional Learning

SOCIAL AWARENESS   RESPONSIBLE DECISION-MAKING

RELATIONSHIP SKILLS

CASEL Competencies

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[5] This figure illustrates an initial heuristic example.