SKILLS FOR LIFE

A **Review** of **Life Skills** and their **Measurability, Malleability,** and **Meaningfulness**

IDB Inter-American Development Bank

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Authors

Robert E. McGrath, Ph.D.
is a Professor of Psychology at Fairleigh Dickinson University, and a Senior Scientist for the VIA Institute on Character. He has authored a number of publications on the measurement of character and character-based interventions.

Alejandro Adler, Ph.D.
is Dean of Student Life and Wellbeing at Upper Canada College. He has previously held academic positions at Columbia University and the University of Pennsylvania.

Abstract

It is widely accepted that schools and other settings catering to youth can play an essential role in offering education in life skills and character. However, there exists a broad array of potential targets for such programs, suggesting the need for guidance on which targets are most likely to result in demonstrable and valuable results. This report attempts to integrate a broad literature addressing the universe of targets for skills development programs for youth. After identifying a set of 30 candidate skills to investigate further, research literature was reviewed to evaluate each skill on three dimensions. Measurability had to do with the extent to which adequate measurement tools were available for evaluating skill level, with emphasis on those tools specifically used for younger populations and available in multiple languages, particularly in Spanish. Malleability had to do with the extent to which there is evidence that interventions have the potential to modify skill level, with emphasis on those that have been extensively evaluated through randomized controlled trials. Finally, meaningfulness had to do with the extent to which evidence exists demonstrating that the higher levels of skill can result in consequential outcomes. Based on these criteria, 10 skills were selected for further review as having the most compelling evidence to date that they are life skills that matter: Mindfulness, Empathy and compassion, Self-efficacy/ Self-determination, Problem solving, Critical thinking, Goal orientation and goal completion, Resilience/Stress resistance, Self-awareness, Purposefulness, and Self-regulation/Self-control/Emotion regulation. The evidence for each is summarized. We finish with a review of key issues to consider in the design, implementation, and evaluation of life skills that matter.

Keywords: life skills, education policy, measurability, malleability, meaningfulness

Executive Summary

In the midst of the third decade of the 21st century, work and life increasingly demand skills for generally effective functioning that most education systems around the world do not yet teach. Students around the world graduate having mastered an academic curriculum that is relatively standardized across countries and cultures, but enter the workforce and their adult lives with little consistency in the development of life skills that are needed to flourish fully on professional and personal levels.

Fortunately, a growing number of governments and multi-lateral organizations are recognizing this gap in skills-based education systems, with the result that and they are beginning to design, implement, and evaluate such programs and related policies.

The purpose of this policy brief is to review the extensive research evidence for a broad spectrum of potential skills for programs in Latin America and the Caribbean that are intended to enhance personal, academic, and professional development in youth and young adults.

Initially, we used multiple sources from the Organization of Economic and Cooperative Development, the IADB, the European Union, and positive psychology to establish **a set of 30 life skills that could serve as goals for enhancement through such programs.** These skills reflect important domains of adaptive cognitive, emotional, behavioral, and social functioning. The initial list included the following:

1. Active constructive responding
2. Adaptability/Flexibility/Adjustment/Agility
3. Conflict resolution
4. Creativity/Creative thinking/Inventive thinking
5. Critical thinking
6. Decision making
7. Empathy and compassion
8. Engagement/Communication skills/Collaboration skills
9. Equality/Equity
10. Global mindset development
11. Goal orientation and goal completion (e.g., grit, persistence)
12. Growth mindset
13. Development of healthy social relationships
14. Purpose/meaning development
15. Intrinsic motivation
16. Justice and ethical reasoning
17. Meta-learning skills (including learning to learn skills)
18. Mindfulness
19. Openness to experience
20. Perspective-taking and cognitive flexibility
21. Pro-activeness
22. Problem solving (cognitive, teamwork, and interpersonal)
23. Purposefulness
24. Reflective thinking/Evaluating/Monitoring
25. Resilience/Stress resistance
26. Responsibility (including locus of control)
27. Risk management
28. Self-awareness
29. Self-regulation/Self-control/Emotion regulation
30. Self-efficacy/self- determination

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We evaluated each in terms of its contribution to three domains of effective personal functioning: relational skills, self-management skills, and intellectual skills. We then conducted 90 literature reviews, and rated the extent of existing empirical evidence for each of the 30 skills on three criteria:

- **Measurability,** having to do with whether in that validated measures of the skill existed relevant to the youth populations of the Western Hemisphere, with an emphasis on Spanish-speaking adolescents.

- **Malleability,** the extent to which evidence exists confirming there is a capacity for that skill to grow – that the skill is teachable and modifiable.

- **Meaningfulness,** demonstrated by the degree to which higher levels of that skill have been associated with desirable consequential life outcomes.

Further details on the rating systems are included in the policy brief. Based on these criteria, which have been called "the 3Ms" in skills program evaluations, we identified 10 skills for which the current research base offers the strongest support, the 10 skills that had the highest aggregated scores across combining measurability, malleability, and meaningfulness scores:

1. Mindfulness

2. Empathy and compassion

3. Self-efficacy/Self-determination

4. Problem solving (cognitive, teamwork, and interpersonal)

5. Critical thinking

6. Goal orientation and goal completion (e.g., grit,persistence)

7. Resilience/Stress resistance

8. Self-awareness

9. Purposefulness

10. Self-regulation/Self-control/Emotion regulation

We provide a clear, approachable, evidence-based, and practical definition for each of the 10 skills. We also provide exemplary results illustrating the present state of evidence for the measurability, malleability, and meaningfulness of each of the 10 skills. These sections are intended as a guide to informing policy makers, multi-lateral organizations, and educators about their current state of evidence.

Additionally, for the purpose of making this brief as practically useful as possible, we offer guidance on the design, implementation, evaluation, and scaling of intervention programs and associated policies intended to support the growth of these skills in students. A summary of the recommendations provided in this section includes the following:

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Best Practices in Program Design
→ **1.** Consider Contextual and Cultural Contexts
→ **2.** Engage with Multiple Stakeholders
→ **3.** Assess Local Needs and Goals
→ **4.** Consider Participant Developmental Level
→ **5.** Develop a Study Design
→ **6.** Develop a Skills-Based Curriculum Adapted to Local Needs and Goals

Best Practices in Program Implementation
→ **1.** Train Educators
→ **2.** Consider Varying Parameters of Delivery
→ **3.** Safeguard Treatment Fidelity

Best Practices in Program Evaluation
→ **1.** Use Well-Established Measures
→ **2.** Measure Both Targeted Skill(s) and Consequential Outcomes
→ **3.** Describe the Program in Deep Detail
→ **4.** Correct for Attrition in Analysis
→ **5.** Correct for Cluster Effects in Analysis
→ **6.** Consider Allegiance Effects
→ **7.** Evaluate Moderators of Effect
→ **8.** Collect Follow-Up Data

Best Practices in Program Sustainability
→ **1.** Grow the Program
→ **2.** Institutionalize the Program

Given a potentially dizzying universe of skills worth considering for intervention by key education decision makers, the ultimate objective of this policy brief is to provide a concise, manageable, and evidence-based guide to those skills most worthy of targeting based on existing evidence. The goal is to prepare students to leave their education with the necessary knowledge and skills that their professional and personal pursuits will require for them to thrive and achieve. Of course, key decision makers will need to consider the empirical evidence we present in this policy brief and the specifics of their local context and culture to reach the best possible decisions for their students.

1. Introduction

The Americas have a long history of using formal educational systems to promote personal and academic development. The earliest universities in the Hemisphere, founded within a few decades of Columbus' voyages, were managed by Spanish clergy interested in both the intellectual and moral lives of their charges. What may be the first law in the Americas establishing a public education system was that enacted in the colony of Massachusetts barely 20 years after its founding. It was called the Old Deluder Satan Law, surely one of the better nicknames ever awarded a piece of legislation. It declared that "it being one chief project of that old deluder, Satan, to keep men [sic] from the knowledge of the Scriptures," public schools would be founded to spread literacy, so that the citizenry of Massachusetts would be able to read the Bible as the best path to moral illumination. The connection between academic development and personal development came early to the post-Columbian New World.

With the advent of modern public education beginning in the 19th century, secular programs targeting personal youth development also began to emerge. For example, Horace Mann, one of the founders of public education in the United States, conceived general moral education as a central component of that system. John Dewey, one of the earliest theoreticians of public education, wrote extensively on the need for schools to prepare youth as ethical members of the larger society (e.g., Dewey, 1916/2013).

Such programs may be of even greater importance today than ever. The world has become more complicated, interconnected, and mutable than at any time in human history. The nature of work, our expectations of personal relationships, the options available for personal identity, and our capacity for accessing information, all of these are being transformed in unparalleled ways. It is increasingly difficult to predict what social norms and conventions will predominate in next 20 years. The best preparation for this future is not to learn fixed action patterns that have been successful in the past, but to encourage the development of flexible strategies for navigating the future of new and complex worlds.

Recognition of these changing social conditions has resulted in an explosion of interest in educational programs that contribute to personal growth (Brown et al., in press; CASEL, 2021), with a concomitant expansion in the set of targets they address. Programs are available that are intended to enhance students' moral reasoning, social and emotional skills, grit and diligence, sense of citizenship, self-esteem, emotional self-regulation, resilience, intellectual virtues, and overall character; the list goes on and on.

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The proliferation of potential education programs for personal growth suggests the need for some guidance in terms of what targets for such programs should be considered to have the strongest support. The purpose of this brief is to compare the research evidence for a broad spectrum of potential targets for such programs intended to enhance personal development in youth. Specifically, we identified a set of 30 skills that could serve as goals for enhancement through such programs:

1. Active constructive responding
2. Adaptability/Flexibility/Adjustment/Agility
3. Conflict resolution
4. Creativity/Creative thinking/Inventive thinking
5. Critical thinking
6. Decision making
7. Empathy and compassion
8. Engagement/Communication skills/ Collaboration skills
9. Equality/Equity
10. Global mindset development
11. Goal orientation and goal completion (e.g., grit, persistence)
12. Growth mindset
13. Development of healthy social relationships
14. Purpose/meaning development
15. Intrinsic motivation
16. Justice and ethical reasoning
17. Meta-learning skills (including learning to learn skills)
18. Mindfulness
19. Openness to experience
20. Perspective-taking and cognitive flexibility
21. Pro-activeness
22. Problem solving (cognitive, teamwork, and interpersonal)
23. Purposefulness
24. Reflective thinking/Evaluating/Monitoring
25. Resilience/Stress resistance
26. Responsibility (including locus of control)
27. Risk management
28. Self-awareness
29. Self-regulation/Self-control/Emotion regulation
30. Self-efficacy/self- determination

These skills reflect important domains of adaptive and social functioning. For each, we then conducted reviews of the research literature with the goal of evaluating the extent to which evidence exists for each that they were:

- **Measurable,** in that validated measures of the skill existed relevant to the youth populations of the Western Hemisphere.

- **Malleable,** in that evidence confirms there is a capacity for that skill to grow.

- **Meaningful,** in that higher levels of that skill are associated with important outcomes.

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Based on these criteria, we identified 10 skills for which the current research base offers the strongest support, listed here in the order from most to least compelling research evidence:

1. Mindfulness

2. Empathy and compassion

3. Self-efficacy/Self-determination

4. Problem solving (cognitive, teamwork, and interpersonal)

5. Critical thinking

6. Goal orientation and goal completion (e.g., grit, persistence)

7. Resilience/Stress resistance

8. Self-awareness

9. Purposefulness

10. Self-regulation/Self-control/Emotion regulation

It is important to recognize that the conclusions of this brief are only as accurate as the current state of research on the measurement, encouragement, and implications of skills development in youth allows. Future research may expand or reduce the pool of program goals for which the evidence is strongest. The overarching theme we have adopted to organize this evaluation of the current state of research we have called life skills that matter. In the following pages, we will describe the process by which we selected these 30 skills as candidates, identified the domains of adaptive functioning they reflect, evaluated each on the basis of current research evidence, and settled on this final group of 10. We will finish with recommendations about the design and evaluation of personal development programs in general, as well as how to use the results of our analysis in particular.

2. Life Skills that Matter

2.1. Life Skills

A skill can be defined as anything a person does well (Heckman & Kautz, 2013). More specifically, a skill has to do with the degree to which a person effectively engages in behaviors and practices associated with achieving a certain set of goals.

Related terms include ability and competency, but the concept of a skill varies in subtle but important ways from those alternatives. The term ability sometimes carries with it the implication of an innate feature of the individual. This implication is problematic for the present purposes in two ways. Given the diversity of skills we will be discussing, we expect heterogeneity in the degree to which observed performance reflects biological heritage. Second, in the context of universal educational programs, the degree to which skills are responsive to environmental factors (malleable) is an important consideration.

The term competency is often used in contexts where performance will be dichotomized based on comparison to some baseline standard for mastery, often referred to as minimum competence. This introduces an element of judgment that may not be optimal for many educational contexts. Skill is a more general term, referring to the underlying dimension that in some contexts may be the basis for judgments of minimum competence.

Life skills, sometimes referred to as soft skills or deeper learning, are skills that have broad implications for the individual, in that they contribute to the individual's overall social, emotional, productive, and/or intellectual functioning. These skills contribute to the success of individuals as members of a social community, by contributing to well-being, use of information, and goal pursuit. They represent general approaches to dealing with conflict, stress, and/or life obstacles. They also tend to contribute to the common good, by enhancing social cohesion, group productivity, and/or effective information processing. Accordingly, social groups tend to value and admire evidence of these skills in members of the community.

2.2. Life Skills Clusters

Several sources of evidence suggest that life skills that matter tend to fall into three clusters, reflecting broad domains of adaptive and social functioning associated with those skills. We will call these three clusters relational skills, self-management skills, and intellectual skills. For example, variations of this organizing system can be found across the two perspectives that tend to dominate in non-academic educational programs: skills education and character or virtue education. Examples of skills education include the social-emotional model that has been fostered by the Collaborative for Academic, Social, and Emotional Learning (CASEL, 2021) and programs focused on a growth mindset (Dweck, 2007). Character or virtue education is a more heterogeneous perspective on youth development (McGrath, 2018; McGrath et al., in press). In its current form, it emerged from the work of Lawrence Kohlberg and his successors on moral education (Lickona, 1991), but it has since expanded to encompass a variety of strategies that encourage the development of the youth's personality and/or identity in prosocial directions. It, therefore, often has more global or holistic goals than skills development, extending as far as restructuring the school environment to embed student personal growth throughout the curriculum (Power et al., 1989).

Despite conceptual differences, attempts to generate a comprehensive taxonomy for targets of intervention from both skills and character perspectives have settled on similar frameworks to that we present here. In 2012, the U.S. National Academy of Sciences generated a report identifying what they considered the skills or competencies that would best prepare youth for the challenges of the 21st century (National Research Council, 2012). They settled on three clusters of skills that they called the interpersonal skills such as communication and collaboration; the intrapersonal skills, which includes self-management concepts such as initiative and flexibility; and cognitive skills such as critical thinking. Conversely, from the character perspective, researchers at Character Lab at the University of Pennsylvania analyzed teachers' and students' ratings of student character, and empirically generated three clusters they called interpersonal, intrapersonal, and intellectual (Park et al., 2017). Thought leaders in the character education movement have also focused on what has been referred to as moral, productive, and intellectual elements of character (e.g., Berkowitz et al., 2016). For example, the U.S. Military Academy at West Point has built a character education into its curriculum that focuses on moral virtues, civic virtues (which can be seen as an aspect of moral virtue), intellectual virtues, and performance virtues (Hamel, 2022).

Outside the academic context, there are several lines of inquiry that suggest variants of these three clusters represent key dimensions in social and personal functioning. Research suggests our initial evaluations of others tend to be based on two factors, one of which has to do with warmth or morality. The second has to do with competence, a dimension that combines elements of the self-management and intellectual domains (Fiske et al., 2007; Goodwin et al., 2014). Some philosophical discussions of the concept of a life well-lived discuss three key clusters of personal virtues that have been referred to as the moral, productive, and intellectual (DeGrazia, 2014; Stichter, 2018; Wright, 1907). Finally, extensive research on the clustering of elements of personal character in adults and youth has consistently generated solutions that are consistent with these three clusters (Feraco et al., 2022; McGrath et al., 2018).

Our conceptualization of these domains (i.e., relational skills, self-management skills, and intellectual skills) is consistent with all this literature, although we have introduced some minor changes in wording. We use the term relational because we believe it more clearly expresses an emphasis on concepts such as positive relationships and empathy than does terms such as interpersonal, which can imply social facility. The term relational also encompasses a broader set of skills than the term moral. We have also introduced the term self-management as an umbrella term for the skills that involve managing emotions and behavior, including the more familiar but more specific concepts of self-control and self-regulation.

2.3. Life Skills that Matter

Given the diversity of potential targets for life skills programs, it is important to identify targets that both reflect all three clusters of skills and that have the greatest potential as targets for educational programs. The effort began with materials from three organizations that have published lists of key skills contributing to well-being and to success at both the personal and communal levels. The Inter-American Development Bank has generated a list of 21st Century Skills (https://clic-skills.iadb.org/en/skills). Their list includes 20 entries. Second, as part of the Organization for Economic Cooperation and Development's (OECD) Future of Education and Skills 2030 initiative (https://www.oecd.org/education/2030-project/curriculum-analysis), an attempt was made to generate an exhaustive set of physical, cognitive, emotional, behavioral, and social skills and competencies for the 21st Century. The resulting set includes 35 candidates they considered worth considering (OECD, 2018). Third, the Joint Research Centre for the European Union has generated a list of Key Competencies for Lifelong Learning (Sala et al., 2020). It consists of three classes of such competencies – social, personal, and learning to learn – with three core competencies in each class. Finally, we reviewed research emerging from positive psychology literature on contributors to happiness and well-being for additional concepts not covered in the preceding lists (e.g., Seligman, 2012).

The next step was an extensive review of each to evaluate its appropriateness for consideration as a life skill. Candidates were eliminated for several reasons. Several such as Gratitude were seen as more of an orientation or disposition than a skill. Others were excluded because they seemed to involve the application of a combination of discrete skills to a specific context rather than a discrete skill. An example of this group was Leadership, which requires persistence, goal pursuit, and other skills. Third, some referenced a specific body of knowledge that is potentially already being offered as part of the academic curriculum in many settings rather than a general approach to life situations. Examples here included Manual and Computer Skills. Finally, we considered Well-Being on the European Union list more an outcome of skills development rather than a competency or skill in itself.

This process of elimination resulted in a final list of 30 candidate life skills. Though there were differences in terminology, the bulk of entries in each of the three skill sets reviewed was retained. As indicated in Table 1, the list includes 17 of 20 skills identified by the Inter-American Development Bank, 25 of 35 from the OECD list, and eight of nine from the European Union.

Table 1. List of Skills and Taxonomy.

Skill	Skills domain	IDB 21st Century Skills	OECD	EU Key Competencies for Lifelong Learning
Active constructive responding	R			S
Adaptability/Flexibility/Adjustment/Agility	S	X	X	P
Conflict resolution	R	X	X	
Creativity/Creative thinking/Inventive thinking	I	X	X	
Critical thinking	I	X	X	L
Decision making	I			
Empathy and compassion	R	X	X	S
Engagement/Communication skills/Collaboration skills	R	X	X	S
Equality/Equity	R/I	X	X	
Global mindset development	R/I	X	X	
Goal orientation and goal completion (e.g., grit, persistence)	S	X	X	
Growth mindset	S	X	X	L
Development of healthy social relationships	R			
Purpose/meaning development	R/I			
Intrinsic motivation	I/S	X		
Justice and ethical reasoning	R/I		X	
Meta-learning skills (including learning to learn skills)	I	X	X	L
Mindfulness	R/I/S	X	X	
Openness to experience	I		X	
Perspective-taking and cognitive flexibility	I		X	
Pro-activeness	S		X	

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Problem solving (cognitive, teamwork, and interpersonal)	R/I	X	X	
Purposefulness	S		X	
Reflective thinking/Evaluating/ Monitoring	I		X	
Resilience/Stress resistance	S	X	X	
Responsibility (including locus of control)	R		X	
Risk management	I		X	
Self-awareness	I	X	X	
Self-regulation/Self-control/ Emotion regulation	S	X	X	P
Self-efficacy/self-determination	S		X	

Note: EU = European Union; IDB = Inter-American Development Bank. For skills domain, I = Intellectual; R = Relational; S = Self-management. For EU competencies, L = Learning to Learn; P = Personal; S = Social.

Table 2 indicates how well the final list of 30 reflects the three major domains of adaptive skills (relational skills, self-management skills, and intellectual skills). The three-cluster framework described above does not assume a one-to-one correspondence between cluster and skill. There is no reason to expect life skills that matter are only relevant to one domain of effective living. It is instead reasonable that particularly important life skills are in part important because of their implications for multiple domains of operating in the world. The final list includes 15 candidates that involve intellectual skills, 12 with relational elements, and 10 that involve the enhancement of self-management.

Table 2. Distribution of 30 Skills Across Skill Domains.

Domain	IDB 21st Century Skills	OECD	EU Key Competencies for Lifelong Learning Competencies for	All Skills
I	4	8	2	9
I/S	1			1
R	3	4	3	6
R/I	3	4		5
R/I/S	1	1		1
S	5	8	3	8
Total	17	25	8	30

Note: I = Intellectual; R = Relational; S = Self-management.

So far, the process was purely a conceptual analysis of existing skill lists. At this point, we moved to a more purely empirical analysis of each life skill. Specifically, a framework has emerged suggesting three criteria must be met before a youth development program is likely to be successful (e.g., McKown, 2017). This framework has been widely adopted, particularly among social-emotional learning programs, and has come to be known as the "3Ms" (e.g., https://transformingeducation.org/three-m-s). The three criteria are:

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Measurability:
A skill was considered potentially measurable if there was reason to believe:

 • It would be sufficiently stable within individuals to allow for temporally reliable measurement.

 • It could be defined with sufficient specificity to allow the development of a measurement tool.

 • It was sufficiently coherent to allow measurement with a single scale or a small set of scales. For example, though many programs target both social and emotional skills, we treated these separately so we could gauge each as a potential target for intervention.

Measurability is essential for the task of evaluating whether intervention programs are having the intended effect on life skills.

Malleability:
A skill was considered malleable if it was thought to be open to change over time. Candidates that seemed largely impervious to change were excluded. Program success will be difficult to achieve for skills that are resistant to change.

Meaningfulness:
A skill was considered meaningful if there was reason to believe the presence or growth of that skill would enhance what has been referred to as consequential outcomes in a person's life – physical health, mental health, overall well-being, academic performance, to name a few (Ozer & Benet-Martinez, 2006). Meaningfulness is associated with the likelihood that skill development will result in positive life benefits for program participants. It is what makes a skill a life skill that matters.

The next section addresses the empirical status of each of the 30 skills remaining.

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3. A Method for Identifying Life Skills that Matter

To identify life skills that could be considered the best candidates for education programs and education policies, the empirical evidence associated with the 30 skills was reviewed for evidence of each skill's measurability, malleability, and meaningfulness. Given the size of this task, the review was not intended to be exhaustive. Instead, the goal was to identify whether any reasonable evidence base existed for the measurability, malleability, and meaningfulness of the particular skill, especially for school-age youth.

Research assistants conducted initial reviews, with oversight, input, additions, and modifications from the two authors of this report. The authors then reviewed the state of evidence for each of the three criteria, and rated each skill using the scales found in Tables 3 to 5.

Table 3. The Rating Scale for Skill Measurability.

0	**No scales found**
1	**No scales found that were considered applicable to youth**
2	**At least one scale applicable to youth, no validity evidence available beyond substantive validity**
3	**At least one scale applicable to youth, and evidence of substantive validity and at least one relevant form of reliability**
4	**At least one scale applicable to youth; and evidence of substantive validity, at least one relevant form of reliability, and criterion-related validity**
5	**At least one scale applicable to youth; and evidence of substantive validity, at least one relevant form of reliability, criterion-related validity, and measurement invariance across age groups**
6	**At least one scale applicable to youth; and evidence of substantive validity, at least one relevant form of reliability, criterion-related validity, measurement invariance across age groups, and either discriminant validity or heterogeneity in item difficulty statistics.**
	The rating is increased by one point if the instrument has been formally translated into Spanish using an explicit methodology that includes back-translation, two points if it has been evaluated for reliability and validity in Spanish.

Table 4. The Rating Scale for Skill Malleability.

0	**No evidence of responsiveness to other variables/interventions**
1	**One or more cross-sectional correlational study or studies demonstrating relationship with variables likely to be causal change agents**
2	**Meta-analysis of cross-sectional correlational studies demonstrating relationship with variables likely to be causal change agents**
3	**One or more longitudinal study or studies demonstrating prediction of change in the skill by variables likely to be causal change agents**
4	**One or more RCT(s) or quasi-experiment(s) demonstrating a direct effect on the skill**
5	**Meta-analysis of longitudinal studies demonstrating prediction of change in the skill by variables likely to be causal change agents**
6	**Meta-analysis of RCTs (may include quasi-experimental studies) demonstrating a direct effect on the skill.**
	The rating is increased by one point if there is evidence from at least one Spanish-speaking country or from a Spanish-speaking population.

Table 5. The Rating Scale for Skill Meaningfulness.

0	**No evidence of responsiveness of desirable life outcome(s) as dependent variable, with skill as independent variable**
1	**One or more cross-sectional correlational study or studies demonstrating relationship with variables likely to be causal change agents, with desirable life outcome(s) as dependent variable and with skill as independent variable**
2	**Meta-analysis of cross-sectional correlational studies demonstrating relationship with variables likely to be causal change agents, with desirable life outcome(s) as dependent variable and with skill as independent variable**
3	**One or more longitudinal study or studies demonstrating prediction of change in the desirable life outcome(s) (as dependent variable) by skill (independent variable) likely to be causal change agents**
4	**One or more RCT(s) or quasi-experiment(s) demonstrating a direct effect on the desirable life outcome(s), with desirable life outcome(s) as dependent variable and with skill as independent variable**
5	**Meta-analysis of longitudinal studies demonstrating prediction of change in the desirable life outcome by independent variable(s) (skill) likely to be causal change agents, with desirable life outcome(s) as dependent variable and with skill as independent variable**
6	**Meta-analysis of RCTs (may include quasi-experimental studies) demonstrating a direct effect on the desirable life outcome(s), with desirable life outcome(s) as dependent variable and with skill as independent variable.**
	The rating is increased by one point if there is evidence from at least one Spanish-speaking country or from a Spanish-speaking population

We reviewed evidence for the measurability, malleability, and meaningfulness of each of the 30 skills. It is important to reiterate that these literature reviews are not intended to be exhaustive. Given time constraints and the desire to keep the presentation simple, we have provided exemplary evidence concerning each skills' current measurability, malleability, and meaningfulness. For example, there are multiple instruments available for measuring many of these skills. We generally focus on a single instrument that demonstrated the highest level of evidence we found for measures of that skill. We also note that given the scope of the project we were not in a position to conduct more than a cursory evaluation of the quality of intervention studies used as the basis for judgments of malleability.

It is our expectation that any organization interested in establishing a well-functioning youth development program will need to develop a more complete understanding of the literature addressing the target skill's measurement, malleability, and meaningfulness than was possible for us to provide in conjunction with the writing of this brief. That obligation will only increase over time as new empirical literature renders the contents of the associated spreadsheets out-of-date.

The final step involved summing the ratings for each skill, producing an aggregate score reflecting the current state of evidence for the skill in terms of measurability, malleability, and meaningfulness. Table 6 provides these ratings as well as their sum for each candidate skill. The possible range for these totals varied from 0 to 22 though the observed range was 1 to 20. They are ordered in the table from highest to lowest aggregate score. After further discussion, we elected to focus for the remainder of this brief on those 10 skills that achieved total scores of 14 or higher.

Table 6. Ratings for Each Life Skill.

No.	Skill	Measurability	Malleability	Meaningfulness	Aggregate Score
1	Mindfulness	8	6	6	20
2	Empathy and compassion	8	6	5	19
3	Self-efficacy/Self-determination	6	4	7	17
4	Problem solving (cognitive, teamwork, and interpersonal)	6	5	5	16
5	Critical thinking	5	6	4	15
6	Goal orientation and goal completion (e.g., grit, persistence)	5	4	6	15
7	Resilience/Stress resistance	5	6	4	15
8	Self-awareness	4	4.5	6	14.5
9	Purposefulness	4	4	6	14
10	Self-regulation/Self-control/ Emotion regulation	6	4	4	14
11	Openness to experience	8	4	1	13
12	Purpose/meaning development	4	4	4	12
13	Intrinsic motivation	4	4	4	12
14	Creativity/Creative thinking/ Inventive thinking	6	4	1	11
15	Conflict resolution	3	4	3	10
16	Responsibility (including locus of control)	4	3	3	10
17	Risk management	2	4	4	10
18	Global mindset development	1	4	4	9

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19	Justice and ethical reasoning	6	3	0	9
20	Meta-learning skills (including learning to learn skills)	0	3	6	9
21	Decision making	4	4	0	8
22	Growth mindset	3	4	1	8
23	Development of healthy social relationships	3	4	1	8
24	Perspective-taking and cognitive flexibility	3	4	1	8
25	Engagement/Communication skills/Collaboration skills	4	0	3	7
26	Reflective thinking/Evaluating/ Monitoring	1	1	4	6
27	Active constructive responding	1	0	4	5
28	Pro-activeness	1	0	4	5
29	Equality/Equity	1	3	0	4
30	Adaptability/Flexibility/ Adjustment/Agility	1	0	0	1

Note: Skills are sorted by aggregate score.

4. Results: The Top 10 Skills

In this section, we summarize the measurability, malleability, and meaningfulness evidence for each of the top 10 skills:

1. Mindfulness

2. Empathy and compassion

3. Self-efficacy/Self-determination

4. Problem solving (cognitive, teamwork, and interpersonal)

5. Critical thinking

6. Goal orientation and goal completion (e.g., grit, persistence)

7. Resilience/Stress resistance

8. Self-awareness

9. Purposefulness

10. Self-regulation/Self-control/Emotion regulation

As previously noted, these are not intended as exhaustive literature reviews. Rather, we focus our attention on the strongest sources of evidence for each criterion. It is the responsibility of program developers to expand and update literature reviews for those life skills that matter they select as the foci for their programs. We strongly encourage the development of new measurement and intervention strategies, as well as the identification of additional consequential outcomes worth evaluating, so long as program developers and evaluators can justify their innovations.

4.1. Mindfulness

Definition

Mindfulness can be defined as a process by which an individual brings quantity and quality of attention to moment-by-moment experiences (Kabat-Zinn & Hanh, 2009). Although mindfulness emerges from perennial practices, particularly those of Eastern traditions, it has increasingly been used to increase cognitive, emotional, behavioral, and environmental awareness so that individuals can more skillfully respond to psychological processes that can potentially cause emotional stress and maladaptive behaviors (Bishop et al., 2004). As the next section shows, there is robust evidence that mindfulness practice increases empathy and compassion (Cheang et al., 2019). Mindfulness received an aggregate score of 20 – with 8 in measurability, 6 in malleability, and 6 in meaningfulness.

Measurability

We identified two measurement instruments that adequately measure mindfulness: the Five Factors Mindfulness Questionnaire and the Mindful Attention Awareness Scale (Baer et al., 2008; Brown & Ryan, 2003). We use the Mindful Attention Awareness Scale to illustrate measurement of mindfulness here because it assesses both mindfulness and self-awareness, and because it has been used and validated both with adolescents (Black et al., 2012) and in Spanish-speaking countries (Soler et al., 2012).

The Mindful Attention Awareness Scale

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1. I could be experiencing some emotion and not be conscious of it until some time later.
2. I break or spill things because of carelessness, not paying attention, or thinking of something else.
3. I find it difficult to stay focused on what's happening in the present.
4. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.
5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention.
6. I forget a person's name almost as soon as I've been told it for the first time.
7. It seems I am "running on automatic," without much awareness of what I'm doing.
8. I rush through activities without being really attentive to them.
9. I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.
10. I do jobs or tasks automatically, without being aware of what I'm doing.
11. I find myself listening to someone with one ear, doing something else at the same time.
12. I drive places on 'automatic pilot' and then wonder why I went there.
13. I find myself preoccupied with the future or the past.
14. I find myself doing things without paying attention.
15. I snack without being aware that I'm eating.

Response options: Almost Always (1), Very Frequently (2), Somewhat Frequently (3), Somewhat Infrequently (4), Very Infrequently (5), Almost Never (6)

Scoring: Average the 15 items.
Source: Brown and Ryan (2003)

Malleability

Khoury and colleagues (2015) conducted a meta-analysis of 29 randomized controlled trials (RCTs) with a total of over 2,600 participants. The effect-size estimates suggested that mindfulness-based stress reduction (MBSR) was effective for increasing mindfulness in pre-post analyses (mean Hedge's g = .55) and in between-group analyses (g = .53). The obtained results were maintained at an average of 19 weeks of follow-up. A significant moderator for follow-up results was whether participants were still practicing MBSR or not 19 weeks after the end of the intervention.

Sample Modules from a Mindfulness-Based Stress Reduction Curriculum

Week 1: This 2.5-hour session includes a review of the intervention and the establishment of a learning contract with the participant. The theoretical underpinnings of Mind-Body Medicine and the application of self-regulatory skills as related to the participant's individual referring diagnosis are also established. The participant is experientially introduced to mindful eating, mindfulness of breathing and the body scan. Home practice is assigned using the first guided recording (body scan meditation) as a means of beginning to learn to become familiar with mindful awareness of the body.

Week 2: This 2.5-hour session includes one hour of experiential mindfulness training and skill development, and one hour or more of focused dialogue and reflection concerning the role of perception and conditioning in the appraisal and assessment of stress. The pivotal role of self-responsibility in the positive development of short and long-term changes in health and health-enhancing behaviors is introduced. Home practice is assigned with an emphasis on the regular daily practice of the body scan for a second week, plus introduction of short periods of sitting meditation, and the application and integration of mindfulness into the participant's everyday life.

Week 8: In this final 2.5-hour session, experiential mindfulness practice continues, and participants are given ample opportunity to inquire into and clarify any lingering questions about the various practices and their applications in everyday life. A review of the program is included with an emphasis on daily strategies for maintaining and deepening the skills developed during the course of the program. Creating a satisfying closure for participants by honoring both the end of the program and the beginning of the rest of their lives.

Source: Blacker et al. (2015)

Meaningfulness

RCTs have shown that beyond a direct effect on mindfulness, MBSR showed significant effects on decreasing anxiety ($g = 1.07$) and depression ($g = 0.68$), reducing stress ($g = 0.72$) and burnout ($g = 0.65$), increasing quality of life ($g = 0.71$), improving sleep quality ($d = 0.58$), bolstering immunity ($d = 0.43$), and increased frequency of positive emotions and decreased frequency of negative emotions ($g = 0.31$), with effects found in both adults and youth (Biegel et al., 2009; R. J. Davidson et al., 2003; Khoury et al., 2015).

4.2. Empathy and Compassion

Definition

A recent review of definitions that have been provided for empathy concluded it is best understood as an emotional response to the perception of a stimulus emotion in others (Cuff et al., 2016). Put less formally, it refers to our ability to recognize and understand the presence of an emotion in another person or other people, and to experience a similar emotion as a result. The concept therefore has both emotional and cognitive elements. Compassion is a related concept, having to do with concern for the pain and suffering of another, without necessarily the implication of sharing that emotion (Strauss et al., 2016). Empathy is widely seen as an essential contributor to our tendency as humans to care for and avoid harming others (Gilbert, 2015). Empathy and Compassion received a total score of 19 – 8 for measurability, 6 for malleability, and 5 for meaningfulness.

Measurability

A number of measures have been developed for the measurement of empathy (Baldner & McGinley, 2014; Teding van Berkhout & Malouff, 2016). We use the Basic Empathy Scale (Jolliffe & Farrington, 2006) to illustrate the measurement of empathy for several reasons. First, it is a well-established indicator of empathy developed specifically for adolescents. It is widely used, and has been called "probably the most popular instrument to measure empathy worldwide" (Zych et al., 2022, p. 1958). It includes scales of cognitive empathy (awareness of other's feelings) and affective empathy (reacting emotionally to others' feelings), which is consistent with the consensus definition of empathy provided above. Finally, it has been extensively validated in English (e.g., Jolliffe & Farrington, 2006), Spanish (e.g., Villadangos et al., 2016), and Portuguese (Anastácio et al., 2016).

Basic Empathy Scale

Instructions: For each statement below, please indicate your agreement or disagreement. Do so by filling in the blank in front of each item with the appropriate number from the following rating scale:

1	**2**	**3**	**4**	**5**
Strongly disagree		Neutral	Strongly agree	

Items:
1. My friend's emotions don't affect me much.
2. After being with a friend who is sad about something, I usually feel sad.
3. I can understand my friend's happiness when she/he does well at something.
4. I get frightened when I watch characters in a good scary movie.
5. I get caught up in other people's feelings easily.
6. I find it hard to know when my friends are frightened.
7. I don't become sad when I see other people crying.
8. Other people's feelings don't bother me at all.
9. When someone is feeling 'down' I can usually understand how they feel.
10. I can usually work out when my friends are scared.
11. I often become sad when watching sad things on TV or in films.
12. I can often understand how people are feeling even before they tell me.
13. Seeing a person who has been angered has no effect on my feelings.
14. I can usually work out when people are cheerful.
15. I tend to feel scared when I am with friends who are afraid.
16. I can usually realize quickly when a friend is angry.
17. I often get swept up in my friend's feelings.
18. My friend's unhappiness doesn't make me feel anything.
19. I am not usually aware of my friend's feelings.
20. I have trouble figuring out when my friends are happy.

Scoring: The affective scale consists of items 1, 2, 4, 5, 7, 8, 11, 13, 15, 17, 18.
The cognitive scale consists of items 3, 5, 9, 10, 12, 14, 16, 19, 20. Items 1, 6, 7, 8, 13, 18, 19 20 are reverse-keyed.

Source: Joliffe and Farrington (2006)

Malleability

Empathy has been one of the consequential outcomes examined in the literature on mindfulness. There is some evidence to suggest that mindfulness meditation can enhance empathy, though the case for empathy training in youth is not completely established yet (Cheang et al., 2019). Teding van Berkhout and Malouff (2016) conducted a meta-analysis on empathy training in general. The mean difference between treatment and control conditions was one-half a standard deviation (g = 0.51) even after correcting for publication bias. They identified several important moderators relevant to optimizing program design. Specifically, they concluded empathy training studies were associated with larger effects when:

1. They incorporated behavioral training in addition to cognitive and affective training
2. The behavioral training included all four components of behavioral skills training (instruction, modeling, practice, and feedback). This effect was not significant, but that may be due to the small number of studies in this analysis.

Meaningfulness

There is also extensive evidence available to indicate that greater empathy results in more prosocial behaviors. A recent meta-analysis of 62 studies found both cognitive and emotional empathy predict prosocial behaviors. Mean effects were medium-sized (r = .30-.32), though effects varied across cultures (Yin & Wang, in press). Relationships between empathy and other variables may not have been studied as extensively in non-English-speaking settings as would be desired, however.

4.3. Self-Efficacy and Self-Determination

Definition

Self-efficacy is fundamentally about individuals' beliefs regarding their abilities to produce effects in their lives and the world (Bandura, 1994). Self-determination, a related construct, is rooted in a person's perceived and real ability to determine her future and her courses of action without constraints (Wehmeyer, 1998). Intrinsic motivation and autonomous motivation – being driven by internal rather than external reward mechanisms – are underlying mechanisms for both self-efficacy and self-determination (Di Domenico & Ryan, 2017). Self-efficacy and self-determination received an aggregated score of 17 – 6 on measurability, 4 on malleability, and 7 on meaningfulness.

Measurability

There are other measures of self-efficacy available (e.g., Chen et al., 2001), but the General Self-Efficacy Scale developed by Schwarzer and Jerusalem (1995) has been identified as the most commonly used (Lei et al., 2020). It has been translated into more than 30 languages, and has been validated in Spanish and in youth (e.g., Luszczynska, 2005).

General Self-Efficacy Scale

Items:
1. I can always manage to solve difficult problems if I try hard enough.
2. If someone opposes me, I can find the means and ways to get what I want.
3. It is easy for me to stick to my aims and accomplish my goals.
4. I am confident that I could deal efficiently with unexpected events.
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.
6. I can solve most problems if I invest the necessary effort.
7. I can remain calm when facing difficulties because I can rely on my coping abilities.
8. When I am confronted with a problem, I can usually find several solutions.
9. If I am in trouble, I can usually think of a solution.
10. I can usually handle whatever comes my way.

Response options: Not at all true, Hardly true, Moderately true, Exactly true

Scoring: Sum the 1-4 score from each item.
Source: Schwarzer and Jerusalem (1995)

Malleability

Two RCTs revealed effective interventions that produced significant increases in self-determination and self-efficacy for youth (Beauchamp et al., 2011; Fortier et al., 2007). In the first, students in the intervention condition were significantly more intrinsically motivated than those in the control condition, and they reported higher levels of self-efficacy. In the second RCT, participants in the experimental condition scored significantly higher than participants in the control condition on autonomous motivation.

Self-Determination Intervention: Transformational Teaching

Underlying self-determination and self-efficacy are the constructs of intrinsic motivation (e.g., Dweck & Yeager, 2019) and psychological passion (e.g., Vallerand, 2010). The psychological literature has identified two types of passions. Harmonious passion refers to a strong interest that is psychologically stable over time, while obsessive passion is defined by an obsessive interest that is exhausting and psychologically unsustainable (Vallerand, 2015).

The Transformational Teaching Intervention trains physical education teachers and coaches to identify students' strengths and harmonious passions in a task-involving environment. When harmonious passion in a task-involving environment was promoted, encouraging students to identify and use their individual strengths, students reported higher levels of self-determination. In contrast, when obsessive passion was encouraged in students, and in addition students are not taught to identify and use their individual strengths, lower self-determination scores emerged.

Source: Castillo et al. (2020)

Meaningfulness

A meta-analysis of 53 studies, including in Spanish-speaking populations, demonstrated that self-determination and self-efficacy interventions had significant effects on enhanced academic performance (mean r = .25; Teixeira et al., 2012). Zajacova and colleagues (2005) found that stress was a significant negative moderator between self-efficacy and academic performance as measured by grade point average.

4.4. Problem Solving

Definition

Problem solving – which includes cognitive, teamwork, and interpersonal components – involves the process of finding solutions to difficult or complex issues (J. E. Davidson et al., 2003). Problem solving is a process that involves discovering, analyzing, and solving problems. The ultimate goal of problem solving is to overcome obstacles and find a solution that best resolves an issue. Problem solving received an aggregate score of 16 – 6 on measurability, 5 on malleability, and 5 on meaningfulness.

Measurability

The Social Problem Solving Inventory Revised (SPSI-R; D'Zurilla & Maydeu-Olivares, 1995; D'Zurilla et al., 2002) stands out from other measures in that it was developed specifically in conjunction with a problem solving intervention. It assesses an individual's cognitive, affective, behavioral, and social responses to real-life problem solving situations. It has been validated for both adolescents and Spanish-speaking populations (Maydeu-Olivares et al., 2000). The measure is comprised of five subscales designed to tap the following five constructs:

- Positive problem orientation involves problem definition and formulation, generation of alternative solutions, decision-making, and solution implementation and verification.

- Negative problem orientation is a tendency not to define or analyze problems, generate different solutions, or make decisions. It also involves feeling helpless when faced with problems.

- Rational problem-solving style comprises rational, deliberate, and efficient application of effective or adaptive problem solving skills and techniques.

- Impulsive/carelessness style is a tendency to respond to problems impulsively, carelessly, hastily, and incompletely.

- Avoidance style is characterized by procrastination, passivity, and dependency for others on problem solving (Maydeu-Olivares et al., 2000).

The Social Problem Solving Inventory Revised – Short Form Sample Items

Below are some ways that you might think, feel, and act when faced with problems in everyday living. We are not talking about the common hassles and pressures that you handle successfully every day. In this questionnaire, a problem is something about yourself (such as your thoughts, feelings, behavior, appearance, or health), your relationships with other people (such as your family, friends, teachers, or boss), or your environment and the things that you own (such as your house, care property, money). Please read each statement carefully and indicate which number below (0 to 4) best shows how much the statement is true of you. See yourself as you usually think, feel, and act when you are faced with important problems in your life these days.

1. I feel threatened and afraid when I have an important problem to solve.
2. When making decisions, I do not evaluate all my options carefully enough.
3. I feel nervous and unsure of myself when I have an important decision to make.
4. When my first efforts to solve a problem fail, I know if I persist and do not give up too easily, I will be able to eventually find a good solution.
5. When I have a problem, I try to see it as a challenge or opportunity to benefit in some positive way from having the problem.
6. I wait to see if a problem will resolve itself first, before trying to solve it myself.
7. When my efforts to solve a problem fail, I get very frustrated.
8. When I am faced with a difficult problem, I doubt that I will be able to solve it on my own no matter how hard I try.
9. Whenever I have a problem, I believe that it can be solved.
10. I go out of my way to avoid having to deal with problems in my life.
11. Difficult problems make me very upset.

Response options: Not at all true of me (0), Slightly true of me (1), Moderately true of me (2), Very true of me (3), Extremely true of me (4)

Source: D'Zurilla et al. (2002)

Malleability

Numerous RCTs, a systematic review, and observational studies have all demonstrated that problem solving (including the enhancement of cognitive, teamwork, and interpersonal skills used in problem solving) is learnable across developmental age groups, starting from age four, including in Spanish-speaking countries (Bird et al., 2018; McGoldrick et al., 2013; Polyzois et al., 2010; Seymour, 2013; Webster-Stratton et al., 2001). Bird and colleagues (2018), for instance, reported that their Manage your Life Online (MYLO) intervention had a significant effect on increasing problem solving accuracy and on decreasing time to solve problems. Webster-Stratton and colleagues (2001) also reported that their Incredible Years intervention for children had a significant effect on finding a greater number and variety of prosocial solutions to social problems and on finding solutions to hypothetical conflict situations. How well participants engaged with the intervention emerged as moderators in both studies.

The Incredible Years Problem-Solving Intervention for Children – Sample Modules

Program component: Detective Wally teaches problem-solving steps

Objectives:
• Learning to identify a problem
• Thinking of solutions to hypothetical problems
• Learning verbal assertive skills
• Learning to inhibit impulsive reactions
• Understanding what an apology means
• Thinking of alternative solutions to problematic situations, such as being teased or hit
• Learning to understand that solutions have consequences
• Learning to critically evaluate solutions

Program component: Dina teaches how to do your best in school

Objectives:
• Learning to listen, wait, avoid interruptions, and quietly put up a hand to ask questions in class
• Learning to handle other children who tease or interfere with the child's ability to work at school
• Learning to stop, think, and check work
• Learning the importance of cooperation with the teacher and other children
• Practicing concentrating on good classroom skills

Source: Webster-Stratton and Reid (2008)

Manage Your Life Online (MYLO): A Computer-Based Problem Solving Intervention

The Manage Your Life Online (MYLO) online training program functions at different problem-solving levels. A sample global problem to solve within the MYLO modules is "How do I lead a good life?" Within this module, there are two systemic, conceptual problems to solve to address this global problem:

1. How do I fulfill my own ambitions and goals?
2. How do I best help and serve others?

Underlying each of these two systemic, conceptual problems, problem solving at the level of "principles" emerges with concrete examples:

1.1 How do I best concentrate on my preparation for my university studies?
2.2 How can I make time to be at home and help my mother who is ill?
2.3 How do I accept that I cannot do anything to help my mother?

MYLO signals there is a conflict between the two problems 2.2 and 2.3.

Underlying each of these principled problem-solving questions, MYLO introduces problem solving at the "program control" level (i.e., components of the problem to solve that the user can actually control and choose):

1.1.1 Avoid thinking about the situation with my mother and drown myself in my studies
1.1.2 Concentrate on my studies in a balanced manner so that I also have time to care for my mother
2.2.1 Imagine my mother in pain (or call her to see how she is doing) so as to motivate me to help her and to help me reach a balance between my studies and my care for my mother.
2.3.1 Suppress thoughts about my mother and "bottle them up" so that I can solve other problems in my life.

MYLO involves ongoing feedback and training so that users can become increasingly better problem solvers.

Source: Zurilla et al. (2002); *Gaffney et al. (2014)*

Meaningfulness
Beyond enhancing problem solving as a skill, two RCTs, one with children and one with adolescents, revealed that increasing problem solving had significant effects on decreased depression and aggression, and enhanced academic performance and prosocial behaviors (Webster-Stratton et al., 2001; Young et al., 2006). Young and colleagues (2006) found gender and ethnicity to be significant moderators of the effects of their intervention on both decreased depression and on overall healthier psychological functioning.

4.5. Critical Thinking

Definition

Critical thinking has to do with the skillful evaluation and drawing of inferences from all information, whether that information is generated via observation, experience, reflection, or reasoning, or comes from information sources (Facione, 1990). Critical thinking requires an objective analysis of the quality of information and its implications. Judgments about the integrity of an information source can be considered an increasingly important component of critical thinking. It also requires evaluating one's own assumptions objectively, and considering alternative viewpoints that could lead to different conclusions. It therefore is an important skill in all activities requiring the use of information, and when drawing conclusions from evidence (Organization of American States, 2015). It has a particularly key role to play in scientific thinking. In our review, critical thinking achieved a total score of 15 – 5 for measurability, 6 for malleability, and 4 for meaningfulness.

Measurability

Literature review revealed the two most widely cited measures of critical thinking are the Watson-Glaser Critical Thinking Appraisal (Watson & Glaser, 1980) and the Cornell Critical Thinking Test Level X (CCTTX; Ennis et al., 1985). We focus here on the latter as Level X was specifically designed to measure critical thinking skills in youth. As described in the manual, the CCTTX consists of 71 multiple choice items tapping four key elements of critical thinking:

• Induction: using facts to draw general conclusions
• Deduction: drawing specific conclusions from general rules
• Credibility: evaluating the source of information
• Identification of assumptions: recognition of unstated assumptions in thinking

The CCTTX requires 50 minutes to complete. It has been extensively studied in multiple countries, and a Spanish version is available.

Cornell Critical Thinking Test Level X

The following are sample questions from the CCTTX. They are not used in the scoring, and the correct answers are provided to orient the youth to the task:

2. Suppose you know that the sparrow is over the hawk. Then would this be true? The hawk is over the sparrow.
5. Suppose you know that the pit is inside of the mouth of the fox. The cherry is inside the mouth of the fox. Then would this be true? The pit is inside the cherry.

Response options: YES, NO, and MAYBE (for conclusions that are possibly but not definitely true)

Source: Javed et al. (2015)

SKILLS
FOR LIFE

Malleability

Abrami et al. (2008) conducted a meta-analysis of 117 studies evaluating programs intended to enhance critical thinking skills. They found a mean effect of $g = 0.34$ (one-third of a standard deviation) typical for educational interventions. In terms of key moderators, the most effective programs were those in which students received both general instruction in critical thinking and applied use in one or more school subjects. Providing teachers with advanced training in teaching critical thinking skills and extensive observation of critical thinking teaching practices were also predictive of larger effects.

The Biology Critical Thinking Project

As the Abrami et al. (2008) meta-analysis attests, many programs have been developed for purposes of enhancing critical thinking. We focus here on the Biology Critical Thinking Project as our illustration because it provides an example of the infusion of critical thinking skills into the general curriculum, in this case a biology course, for adolescent youth. The developers began by reviewing the textbook for the course, looking for points at which they could organically address seven skills:

1. Recognizing logical fallacies, such as drawing conclusions from too small a sample;
2. Distinguishing between findings of an experiment and conclusions;
3. Identifying explicit and tacit assumptions;
4. Avoiding tautologous logic;
5. Isolating variables;
6. Testing if-then hypotheses; and,
7. Identifying relevant information for solving problems.

This intervention did not include general training in critical thinking, just its applied use. Even so, all differences at posttest between treatment and control conditions were 2 standard deviations or larger.

Source: Zohar et al. (1994)

Meaningfulness

We did not find any meta-analyses summarizing the influence of critical thinking on consequential outcomes in adolescents, which is why critical thinking achieved only an intermediate score for meaningfulness. We suspect this surprising gap may reflect a widespread assumption that the ability to process information effectively is so intuitively obvious an essential skill in education and life that it need not be tested extensively. That said, critical thinking has been associated in older populations with various outcomes, including higher levels of academic achievement and job performance (Follman, 2002; Fong et al., 2017).

4.6. Goal Orientation and Goal Completion

Definition

Goal orientation involves both the adoption and the pursuit of specific objectives in achievement contexts (DeShon & Gillespie, 2005). Goal completion is the actual accomplishment of such objectives. Goal orientation and goal completion are closely related to constructs such as grit and perseverance (Duckworth et al., 2007). Goal orientation and goal completion received an aggregate score of 15 – 5 for measurability, 4 for malleability, and 6 for meaningfulness.

Measurability

Various scales exist to measure constructs related to goal orientation and goal completion, such as Duckworth and Quinn's (2009) Short Grit Scale. We use the Goal Adjustment Scale (GAS; Wrosch et al., 2003) to exemplify the measurement of goal orientation for several reasons. First, it directly measures both goal engagement and goal engagement. Second, the Spanish version of this instrument has demonstrated adequate criterion-related validity, internal consistency, and stability, as well as a factor structure that is in line with the original English version (Soubrier et al., 2017).

The Goal Adjustment Scale

During their lives, people cannot always attain what they want and are sometimes forced to stop pursuing goals they have set. We are interested in understanding how you usually react when this happens to you. Please indicate the extent to which you agree or disagree with each of the following statements, as it usually applies to you.

If I have to stop pursuing an important goal in my life...

1. It's easy for me to reduce my effort towards the goal.
2. I convince myself that I have other meaningful goals to pursue.
3. I stay committed to the goal for a long time; I can't let it go.
4. I start working on other new goals.
5. I think about other new goals to pursue.
6. I find it difficult to stop trying to achieve the goal.
7. I seek other meaningful goals.
8. It's easy for me to stop thinking about the goal and let it go.
9. I tell myself that I have a number of other new goals to draw upon.
10. I put effort toward other meaningful goals.

Response options: Strongly disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly agree (5)

Scoring: For the Goal Disengagement Scale, sum items 1, 3, 6, and 8. Items 3 and 6 need to be reversed prior to scale computation. For the Goal Reengagement Scale, sum items 2, 4, 5, 7, 9, and 10.

Source: Wrosch et al. (2003)

Malleability

A quasi-experimental study and an RCT demonstrated that patterns of adaptive learning (i.e., learning to learn) and grit (i.e., passion and perseverance for long-term goals) are teachable, learnable skills through project-based, student-centered learning paradigms (Alan et al., 2019; Mupira & Ramnarain, 2018). Mupira and Ramnarain (2018) found a significant correlation between an adaptive learning intervention and goal orientation and goal completion ($r = .31$), with participants in the experimental condition more willing and able to attempt difficult tasks and succeed at completing them. Alan and colleagues (2019) found a significant correlation between their goal orientation and goal completion intervention and participants in the experimental condition actively choosing more difficult tasks ($r = .12$). They also found those participants tended to choose a more difficult task after they initially failed at a difficult task ($r = .15$), suggesting an increase in grit. Furthermore, one week after the end of the intervention, the correlation between participants in the experimental condition and their choosing a more difficult task was significantly higher ($r = .18$), indicating cumulative effects of their intervention.

An Example Model of Adaptive Learning Designs for Goal Orientation

1. Students are asked to write a position paper about environmental sustainability goals for the classroom or for the school.

2. Students are randomly assigned to either (1) read each other's position papers or (2) verbally debate about environmental sustainability goals.

3. The first group then debates with the second group, with the trained teacher as a facilitator.

4. Students from the first group pair-up with students from the second group to debate one-on-one.

5. The trained teacher oversees this "crossfire" to ensure active, constructive dialogues.

6. The trained teacher facilitates a debriefing session between all students.

7. Synthesized goals are reached through a democratic dialogue process, facilitated by the trained teacher, with explicit, public roles and responsibilities for each student.

8. The trained teacher facilitates a writing synthesis where explicitly shared goals are recorded.

9. The democratically selected goals, roles, and responsibilities are publicly printed and displayed in the classroom or in the school.

Source: Miao and Hoppe (2005)

Meaningfulness

Multiple experimental and non-experimental studies on goal orientation and goal completion – particularly on their underlying mechanisms of grit, self-control, and perseverance – have demonstrated that they contribute to various desirable life outcomes, particularly increased academic performance (Alan et al., 2019; Chang, 2014; Duckworth et al., 2007). For instance, Alan and colleagues (2019) found that 2.5 years after their goal orientation and goal completion intervention, students in the experimental condition scored significantly higher on standardized mathematics exams, compared to students in the control condition ($d = 0.20$). Duckworth and colleagues (2007) found that grit accounted for an average of 4% of the variance in various success outcomes, including educational attainment in over 2,200 adolescents and adults, grades among Ivy League undergraduates, retention in two classes of United States Military Academy West Point cadets, and ranking in the National Spelling Bee. Furthermore, grit outperformed intellectual quotient in predicting these success outcomes. Finally, goal orientation and goal completion interventions have also been shown to significantly decrease depression ($r = .40$) and anxiety ($r = .19$; Rogers et al., 2021).

4.7. Resilience/Stress Resistance

Definition

Resilience can be defined as the extent to which an individual can adapt positively to experiences of significant adversity or trauma (Luthar & Cichetti, 2000). This definition highlights a paradoxical quality to the concept. On the one hand, it is considered an important element of coping, and worthy of measurement and intervention. On the other hand, resilience is inherently a reaction to certain kinds of events that can occur with markedly different frequency across individuals. In some cases where significant adverse experiences are absent, a person's capacity for resilience can remain latent and potentially unobserved. For some people, then, resilience can be only an unobserved construct. Given general recognition of the stressors common in adolescence, there has been particular interest in the study of resilience and stress resistance in youth. This interest is reflected in resilience's high overall score of 15 – 5 for measurability, 6 for malleability, and 4 for meaningfulness.

Measurability

A number of measures of resilience and coping have been developed, including multiple measures specifically intended for use with youth. Satapathy et al. (2022) summarized information on 12 measures, of which 10 were specific to resilience. More thorough details are provided in their article, but a summary of those 10 follows. Of these 10, Joyce et al.'s (2018) review of intervention research suggests the most popular are the Connor-Davidson Resilience Scale (Connor & Davidson, 2003) and the Resilience Scale by Wagnild and Young (1993). The 10 measures are quite different in content, but some themes recur. These include protective social relationships, feelings of competence or mastery, and reactivity to previous negative experiences.

Resilience Measures

Scale Title	# Items	Targeted Concepts
Resilience Scale	35	Rapid responsivity to danger, precocious maturity, disassociation of affect, information seeking, formation and utilization of relationships for survival, positive projective anticipation, decisive risk-taking, conviction of being loved, idealization of aggressor's competence, cognitive restructuring of painful events, altruism and optimism and hope
Healthy Kids Resilience Questionnaire	68	External assets (protective factors) and internal assets (resilience traits)
Resiliency Attitude and Skills Profile	34	Insight, independence, creativity, humor, initiative, relationships, and values orientation
Resilience Scale for Children & Adolescents	64	Sense of Mastery Scale, Sense of Relatedness Scale, and Emotional Reactivity Scale. The three scales can be administered individually or in combination.
Resilience Scale for Adolescents	28	Personal competence, social competence, structured style, family cohesion, and social resources
Adolescent Resilience Questionnaire–Revised	74	Self, family, peers, school, and community
Child and Youth Resilience Measure	58	Resources: individual, relational, communal, and cultural
Connor-Davidson Resilience Scale	25	Personal competence, high standards, and tenacity. Trust in one's instinct, tolerance of negative affect, and strengthening effects of stress. Positive acceptance of change and secure relationships, Control, and Spiritual influences
The Bharathiar University Resilience Scale, Form-A and B	30	The time needed to return to normalcy, reaction to negative events, risk factors in life, perception of the effect of past negative events, defining problems, hope and confidence in coping with the future, and openness to experience and flexibility
Resilience Scale	25	Equanimity, perseverance, self-reliance, meaningfulness, and existential aloneness

Source: Satapathy et al. (2022)

Meaningfulness

Joyce et al. (2018) conducted a meta-analysis of 11 RCTs in which mindfulness training or therapy was used to enhance resilience. The mean effect size was d = 0.44, even when limited to studies of better quality. Studies in which both mindfulness and cognitive-behavioral therapy were employed demonstrated the largest mean effects. This finding suggests that mindfulness training has some capacity to enhance resilience, most probably by creating a greater sense of emotional distance from stressful events. However, the authors noted a fair amount of diversity in the treatment models across studies. They also raised the issue of the difficulties in measuring resilience mentioned above: the reliance on self-report when prior experience with stress is uncertain, and the paucity of studies looking at actual responses to aversive events.

The Penn Resiliency Program

The Penn Resiliency Program is a multidimensional group intervention based on the principle that resilience in youth is best enhanced by targeting multiple elements of response to life stressors. Cognitively, the program emphasizes the principle that negative reactions stem from beliefs about events rather than events themselves, so that more optimistic and flexible thinking can reduce negative consequences. Second, the program teaches several key elements of effective social problem-solving, such as goal setting, information gathering, and generating alternatives for action. Finally, the program incorporates a variety of coping strategies that include distancing oneself from stressful situations and relaxation training. Consistent with the previous speculation on the value of mindfulness training for resilience, it is hypothesized that these tools enhance a person's capacity to modulate reactions to stressful event.

Source: Gillham et al. (2007)

Meaningfulness

Brunwasser et al. (2009) conducted a meta-analysis of 17 studies looking at the relationship between participation in the Penn Resiliency Program and depression, and found that the program was associated with less depression at one-year follow-up. Though the mean effects were significant they were small: g = 0.11 at outcome and 0.21 at follow-up. A program based on the Penn Resilience Program also found the treatment effective for depression compared to control in a pilot study involving Spanish-speaking youth (Sanchez et al., 2016). Another source of evidence comes from longitudinal research that has demonstrated self-reported resilience predicts the development of mental health problems in high-stress work situations (Wild et al., 2016). These findings suggest resilience is an important protective factor for mental health.

4.8. Self-Awareness

Definition

The classic definition of self-awareness is quite simple, having to do with the capacity to become the object of one's own attention (Morin, 2011). This is such a basic human capacity as to raise questions about its characterization as a skill. The literature on measures of self-awareness (described in the next section on measurability) indicates there are meaningful individual differences in the tendency to examine one's own thoughts, feelings, and behaviors. Particularly important to the development of self-awareness as a skill is the reflection on these aspects of self in an objective manner (Duval & Wicklund, 1972). Self-awareness achieved an aggregated score of 14.5 – 4 for measurability, 4.5 for malleability, and 6 for meaningfulness.

Measurability

A number of measures of self-awareness have been developed, in part because measures have been developed focusing on different aspects of self-awareness (Ashley & Reiter-Palmon, 2012). For example, there are self-awareness measures that focus on bodily sensations or on self-awareness deficits in certain diagnostic conditions (e.g., Hughes et al., 2019; Sherer et al., 2003). Here we focus on the Self-Consciousness Scale (Chen et al., 1998) as a scale developed specifically for use in longitudinal research on adolescents.

Self-Consciousness Scale

We are interested in your thoughts and feelings. How much do you...

1. Think about yourself?
2. Pay attention to your feelings?
3. Try to figure yourself out?
4. Pay attention to your own thoughts?
5. Think about what you are like as a person?
6. Think about why your life is the way it is?
7. Wonder about the real reason you behave the way you do?
8. Think about yourself when you are alone?
9. Picture in your mind what your life is like?
10. Think about how you feel?
11. Think about why you do the things you do?
12. Think about who you are?

Response options: very little, a little, some, much, very much

Scoring: Sum 1-5 scores for each item
Source: Chen et al. (1998)

Malleability

No meta-analyses were identified focusing on interventions for self-awareness, but several RCTs have demonstrated increases in self-awareness. One study found an app was effective at increasing time self-awareness among beginning college students (Runyan et al., 2013), an example of the point made in the previous section that measurement has often focused on specific aspects of self-awareness. Though time usage is not commonly considered a central component of self-awareness, this study raises the intriguing idea that an app intermittently requesting users turn their attention to aspects of their personal functioning can enhance self-awareness. More directly relevant to general self-awareness in adolescents was a study that used a five-session self-awareness training program embedded in a painting class to enhance self-reported self-awareness in Iranian orphans (Hatami et al., 2016).

Meaningfulness

As noted previously, self-awareness is one of the defining characteristics of human experience. In fact, Leary and Buttermore (2003) went so far as to suggest the development of the capacity for cognitive self-reflection may have been one of essential contributors to the birth of human civilization around 40,000 years ago. Individual differences in self-awareness are important in their own right. Differences in self-awareness have been associated with increased empathy in adolesents (Trentini et al., 2022). Eurich (2018) found both clear awareness of self and clear awareness of how others perceive self were associated with a number of positive outcomes, including job and relationship satisfaction, empathy, and happiness. It is noteworthy that some studies have found greater self-awareness can be associated with higher levels of negative affect (e.g., Chen et al., 1998), but there is reason to believe this is a phenomenon of individuals demonstrating factors that place them at risk for emotional difficulties such as low self-esteem (e.g., Cheng et al., 2012). Accordingly, programs intending to enhance self-awareness should be sensitive to the possibility of increased negativity in certain individuals.

4.9. Purposefulness 🎯

Definition

Purposefulness has to do with finding a meaningful and significant direction in life. This construct has been associated with three underlying domains: goal-directedness, personal meaning, and beyond-the-self orientation (Bronk et al., 2018). These authors concluded children usually lack the deductive abilities to develop purposefulness in their lives, but from adolescence onwards purposefulness is a skill that can be significantly developed. Essential for developing meaning and purpose in life is the psychological construct of a growth mindset (the belief that our cognitive, emotional, and behavioral abilities or talents are malleable over time) as opposed to a fixed mindset (the belief that our cognitive, emotional, and behavioral abilities or talents are static over time; Hecht et al., 2021). The aggregate score for Purposefulness was 14 – 4 for measurability, 4 for malleability, and 6 for meaningfulness.

Measurability

The Claremont Purpose Scale is used as our exemplar here because it has been validated for use with adolescents (Bronk et al., 2018). Each item is completed on a five-point scale, though the response options vary across items.

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The Claremont Purpose Scale

Meaningfulness items:

1. How clear is your sense of purpose in your life?
Not at all clear, A little bit clear, Somewhat clear, Quite clear, Extremely clear

2. How well do you understand what gives your life meaning?
Do not understand at all, Understand a little bit, Understand somewhat, Understand quite well, Understand extremely well

3. How confident are you that you have discovered a satisfying purpose for your life?
Not at all confident, Slightly confident, Somewhat confident, Quite confident, Extremely confident

4. How clearly do you understand what it is that makes your life feel worthwhile?
Not at all clearly, A little bit clearly, Somewhat clearly, Quite clearly, Extremely clearly

Goal orientation items:

5. How hard are you working to make your long-term aims a reality?
Not at all hard, Slightly hard, Somewhat hard, Quite hard, Extremely hard

6. How much effort are you putting into making your goals a reality?
Almost no effort, A little bit of effort, Some effort, Quite a bit of effort, A tremendous amount of effort

7. How engaged are you in carrying out the plans that you set for yourself?
Not at all engaged, Slightly engaged, Somewhat engaged, Quite engaged, Extremely engaged

8. What portion of your daily activities move you closer to your long-term aims?
None of my daily activities, A few of my daily activities, Some of my daily activities, Most of my daily activities, All of my daily activities

Beyond-the-self items:

9. How often do you hope to leave the world better than you found it?
Almost never, Once in a while, Sometimes, Frequently, Almost all the time

10. How often do you find yourself hoping that you will make a meaningful contribution to the broader world?
Almost never, Once in a while, Sometimes, Frequently, Almost all the time

11. How important is it for you to make the world a better place in some way?
Not at all important, Slightly important, Somewhat important, Quite important, Extremely important

12. How often do you hope that the work that you do positively influences others?
Almost never, Once in a while, Sometimes, Frequently, Almost all the time

Source: Bronk et al. (2018)

Malleability

The Meaning Making intervention (Mmi) has been found to be effective as a means of developing purposefulness in both clinical and non-clinical populations (Henry et al., 2010; Lee et al., 2006; Lund et al., 2019). The Mmi can be delivered either on an individual basis or in group settings. It consists of three core components: (1) identifying and assessing the impact of a setback or a challenge in an individual's life; (2) examining and recognizing past important life events and successful coping mechanisms; and (3) determining a core life priority and the respective goal adjustments that will give meaning and purpose to the individual's life, considering the limitations of the setback or challenge and discovering the new opportunities it presents. RCTs from the cited studies have found Mmi had significant effects on purposefulness and meaning in life (d = 0.42). The extent to which participants practice the skills they learn during Mmi sessions after the intervention has ended has been found to be a significant moderator of the relationship between Mmi and these outcomes.

Meaningfulness

Purposefulness interventions have been found to have significant effects on desirable psychological constructs and positive life outcomes. RCTs have demonstrated that increasing purposefulness can lead to increases in growth mindset in youth (d = 0.56) and to enhanced academic performance in adolescents (d = 0.19; Bettinger et al., 2018; Yeager et al., 2016).

4.10. Self-Regulation/Self-Control/Emotion Regulation

Definition

The common element to self-regulation, self-control, and emotion regulation is the management of impulsive behaviors. This skill is particularly related to the skill labeled goal orientation in this document in that both are associated with behavioral control. However, where goal pursuit is about the activation of behavior, or start control, self-regulation is used here to refer to the inhibition of behavior, or stop control (de Boer et al., 2011). Self-regulation tied with purposefulness in achieving an aggregated score of 14 – 6 for measurability, 4 for malleability, and 4 for meaningfulness.

Measurability

Emotional self-regulation and behavioral self-regulation can be distinguished conceptually though there is evidence to support treating them as a single dimension, at least among youth (e.g., Raffaelli et al., 2005). Measures tend to treat then separately, so that a complete evaluation of stop control will generally require two instruments.

A number of measures have been suggested for evaluating emotion regulation in youth, with one review covering 35 years of such efforts (Adrian et al., 2011). Perhaps the most useful emotion regulation instrument for youth is the Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA; Gullone & Taffe, 2012), which has been extensively validated for both English- and Spanish-speaking populations (e.g., Gullone & Taffe, 2012; Pastor et al., 2019) as well as others. The most commonly used measure of impulsivity regulation in both youth and adults, with over 1,000 citations, is the Brief Self-Control Scale (Tangney et al., 2004), which has also been translated into Spanish (Rodríguez-Menchón et al., 2022).

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Emotion Regulation Questionnaire for Children and Adolescents

Items:

1. When I want to feel happier, I think about something different.
2. I keep my feelings to myself.
3. When I want to feel less bad (e.g., sad, angry or worried), I think about something different.
4. When I am feeling happy, I am careful not to show it.
5. When I am worried about something, I make myself think about it in a way that helps me feel better.
6. I control my feelings by not showing them.
7. When I want to feel happier about something, I change the way I am thinking about it.
8. I control my feelings about things by changing the way I think about them.
9. When I am feeling bad (e.g., sad, angry, or worried), I am careful not to show it.
10. When I want to feel less bad (e.g., sad, angry, or worried) about something, I change the way I am thinking about it.

Response options: strongly disagree, disagree, half and half, agree, 5 strongly agree

Scoring: Reappraisal: items 1, 3, 5, 7, 8, 10; Suppression: items 2, 4, 6, 9.
Source: Gullone and Taffe (2012)

Brief Self-Control Scale

Instructions: Using the scale provided, please indicate how much each of the following statements reflects how you typically are.

Items:
1. I am good at resisting temptation.
2. I have a hard time breaking bad habits.
3. I am lazy.
4. I say inappropriate things.
5. I do certain things that are bad for me, if they are fun.
6. I refuse things that are bad for me.
7. I wish I had more self-discipline.
8. People would say that I have iron self-discipline.
9. Pleasure and fun sometimes keep me from getting work done
10. I have trouble concentrating.
11. I am able to work effectively toward long-term goals.
12. Sometimes I can't stop myself from doing something, even if I know it is wrong.
13. I often act without thinking through all the alternatives.

Response options: 1 (Not at all) to 5 (Very much)

Scoring: Reverse items 2, 3, 4, 5, 7, 9, 10, 12, 13. Sum all scores.

Source: Tangney et al. (2004)

Malleability

Several meta-analyses have identified factors that can contribute to greater self-control in adolescence. One evaluation of 191 articles (Li et al., 2019) found that parenting effectiveness predicted self-control in youth both cross-sectionally (mean r = .20) and longitudinally (.16). Another synthesis of 68 articles indicated school environments demonstrating better structure, support, and teacher-student relationships were associated with greater self-control (mean r = .19), with the relationship stronger for older students (Li et al., 2021). While all these effects were significant, all are also small. Studies that have looked at self-control in adolescence often focus on specific goals such as reduced consumption of sweetened drinks (e.g., Ames et al., 2016), but Schnitker et al. (2017) conducted a test of interventions to enhance patience and self-control in general. They found in an RCT that fairly simple interventions were effective at enhancing perceived self-control, though only in participants who did not find the task burdensome.

Meaningfulness

Robson et al. (2020) conducted a meta-analysis of 150 studies on the longitudinal correlates of self-regulation. They found that greater self-regulation at age 4 predicted more social competency, more school engagement, better academic performance, fewer internalizing and externalizing problems, and less victimization at age 8. Self-regulation at age 8 predicted greater academic achievement and fewer psychological and behavioral problems at age 13. It also predicted less unemployment, aggressive and criminal behavior, depression and anxiety, obesity, cigarette smoking, alcohol and substance abuse, and symptoms of physical illness in adulthood. In some cases these relationships were quite substantial. Correlations varied across consequential outcomes, but most were in the range of .15 to .30. The value of self-regulation as a contributor to later life success may well be one of the best-established findings in this review of the skills literature. Interestingly, objective measures and teacher reports were better predictors of outcomes than parent reports.

5. Designing, Implementing, Evaluating, and Sustaining Intervention Programs

The evidence we have presented so far has focused on the best targets for skills development in youth, at least as suggested by the presently available research, based on three criteria of adequate measurement tools (measurability), the potential for effective intervention (malleability), and reason to suspect the training will have consequential desirable life outcomes (meaningfulness). From our initial list of 30 skills, we identified 10 key skills with the highest levels of measurability, malleability, and meaningfulness (listed below in order from highest to lowest empirical evidence for measurability, malleability, and meaningfulness):

1. **Mindfulness:** the process by which an individual brings quantity and quality of attention to moment-by-moment experiences;
2. **Empathy and compassion:** the ability to recognize, understand, and share the presence of an emotion or the suffering in another person or other people;
3. **Self-efficacy/Self-determination:** individuals' beliefs and facts regarding their perceived and real abilities to produce effects in their lives and the world without constraints;
4. **Problem solving (cognitive, teamwork, and interpersonal):** the process of finding solutions to difficult or complex issues;
5. **Critical thinking:** the skillful evaluation and drawing of inferences from all available information;
6. **Goal orientation and goal completion (e.g., grit, persistence):** the adoption and the pursuit of specific objectives in achievement contexts and the accomplishment of such objectives;
7. **Resilience/Stress resistance:** the extent to which an individual can adapt positively to experiences of significant adversity or trauma;
8. **Self-awareness:** the capacity to become the object of one's own attention;
9. **Purposefulness:** finding a meaningful and significant direction in life;
10. **Self-regulation/Self-control/Emotion regulation:** the management of impulsive feelings and behaviors.

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The selection of targets is only the first step in the process of designing, implementing, evaluating, and sustaining such programs, however. In this section we use lessons learned in the process of reviewing evidence for the life skills addressed in this brief, as well as case studies and prior experience in the fields of positive youth development and skills development, to outline some key considerations in each of these areas – design, implementation, evaluation, and scaling.

A number of these recommendations come from case studies of the large-scale, whole-country implementation of skills-based programs in Bhutan, Mexico, and Peru (Adler, 2016; Seligman & Adler, 2018, 2019), as well as multiple meta-analyses on youth development programs in educational settings (Abrami et al., 2008; Brown et al., in press; Diggs & Akos, 2016; Durlak et al., 2011; Jeynes, 2019; Johnson et al., in press; Taylor et al., 2017)). We recommend similar methods to policymakers as the one described below while recognizing local contextual and cultural needs and aspirations. This balance provides the strongest foundation for program success.

5.1. Best Practices in Program Design

To achieve the highest possible impact on desired skills and on consequential life outcomes for students, it is essential to strike a delicate balance between scientific rigor and contextual and cultural needs and goals. The six steps below delineate an approach to program design that combines the best existing scientific design principles with local needs and goals towards shaping a shared vision, thus enabling education program implementers to arrive at the best possible program design for each situationally specific educational ecosystem.

1. Consider Contextual and Cultural Contexts

The first step requires sensitivity to educational and social traditions specific to the culture in which the education program and/or policy is to be implemented. Programs cannot be directly imported from one culture to another. For example, researchers from the University of Pennsylvania spent nine immersive months in Bhutan learning about local knowledge, skills, attitudes, and values (Adler, 2016) before introducing the Gross National Happiness curriculum. They interacted with and learned from the 10 stakeholder groups listed in recommendation #2 to understand the local context and culture to the best of their abilities.

2. Engage with Multiple Stakeholders

Durlak et al. (2011) found programs where there were no problems reported in the implementation, which meant that stakeholder groups collaborated fully with the enterprise, were associated with larger effects. If and when education programs are co-designed with as many stakeholder groups as are feasibly possible, those groups' sense of ownership of education initiatives will be greater. This creates the enabling conditions for educational programs to be implemented effectively. For example, in the Bhutan, Mexico, and Peru projects (Adler, 2016), the following stakeholder groups were brought into the design process:

- Policymakers at the local, regional, and national levels
- Teachers
- Principals
- School faculty and staff
- Students
- Parents and caretakers
- Academic researchers
- Private-sector employers
- University leaders
- Non-profit and independent education organizations

3. Assess Local Needs and Goals

An important element of collaboration with key stakeholder groups is allowing them to voice their needs and goals as a pathway to establishing a shared vision for the program. Facilitating efficient, sometimes complex, dialogues (in-person and via technology) to achieve consensus is essential to crafting a shared vision for all prongs of a life skills based education transformation that includes curriculum development, pedagogy, educator professional development, considering the role of technology in education, measurement and evaluation, program management, financing, and legal protection.

In the cases of Bhutan, Mexico, and Peru (Seligman & Adler, 2018), these assessments involved informal conversations, structured interviews with focus groups, and quantitative demographic and anthropological data compilation and collection, to identify Bhutanese, Mexican, and Peruvian values, beliefs, attitudes, moral structures, and cultural practices. These assessments were conducted using the Appreciative Inquiry approach (Cooperrider et al., 2008) when working with members of the 10 stakeholder groups. This approach has four stages (the four Ds):

1. Discover existing strengths in the education ecosystem;
2. Dream or imagine what the education system can and should be;
3. Design (or co-design) a multi-stakeholder strategic plan that integrates the different domains of the education system to achieve the desired outcomes; and,
4. Deliver the strategic plan through programs with the necessary resources.

4. Consider Participant Developmental Level

Programs must be designed in a way to be developmentally appropriate. Some of the life skills that matter are particularly sensitive to cognitive growth, such as purposefulness and critical thinking (e.g., Bronk et al., 2018). Programs for older youth should assume the ability to evaluate situations in more complex terms and recognize the growing cognitive capacity for balancing competing considerations in effective living. The importance of developmental level to model design suggests that the intended age range for participants should not be overly broad unless variations of the model are developed specific to different age ranges.

5. Develop a Study Design

We care about what we quantitatively measure. The measurement design should reflect the key needs and goals identified in the previous steps. This is also the point at which program developers need to consider the scope of the program, including the number of participants and schools involved, the length of the program, its implementation method. In large-scale interventions, a cluster randomized design with random assignment to treatment and control conditions at the whole-school level offers the best option in terms of minimizing contamination between conditions. Ideally, this also makes it possible to keep school personnel, students, and potentially data gatherers blind to condition. The use of an active placebo program is considered desirable to control for various expectations for improvement (Murphy et al., 1999; Sedgwick & Greenwood, 2015).

6. Develop a Skills-Based Curriculum Adapted to Local Needs and Goals

When choosing which skills to embed in an education system, it is vital to consider the right balance between empirically grounded research (for which most of this brief can serve as a starting point) and the needs and goals of the local context and culture. Often, the research and the local culture are aligned, but at other times they are not, and program designers have to be sensitive to this possibility.

The implementation method is an important consideration at this point. There are at least three models available (Abrami et al. 2008; Adler, 2016; Power et al., 1989), and ideally one would like to see all three used. One is a distinct curriculum in the subject matter of the program, e.g., a weekly class devoted to teaching mindfulness. A second is integration into existing academics. The Biology Critical Thinking Project described earlier (Zohar et al., 1994) provides an example where one course was redesigned for the purpose of focusing on critical thinking skills, but ideally this would be done across the curriculum. This approach is perhaps more easily pursued for skills in the intellectual cluster. The third approach is whole-school modification where, for example, principles of empathy are integrated into all school operations. Whole-school randomized clustering lends itself most effectively to this approach.

Many programs focus on a single skill, but more full-spectrum programs are also possible, for example, the Bhutan program was built around the goal of enhancing well-being, but it targeted 10 non-academic life skills that included mindfulness, self-regulation, and several other elements of our life skills that matter list (Seligman & Adler, 2019). These were chosen because the stakeholders agreed to their value as contributors to the key national goal of Gross National Happiness, which Bhutan uses as its metric for national progress rather than Gross National/Domestic Product. The placebo program focused on teaching nutrition, psychology, and human anatomy. This more didactic form of placebo is particularly useful for creating expectations without necessarily enhancing life skills.

5.2. Best Practices in Program Implementation

After a successful program design has been developed, it is fundamental for education program implementers to addressed at least three mechanisms of a multi-faceted effective program implementation. These include training the educators, considering efficacious delivery mechanisms, and ensuring treatment fidelity.

1. Train Educators

Implementation must begin with training those who are responsible for delivery within the educational system. This includes administrators, teachers, and even school staff (particularly in cases of whole-school implementation). This training must be sensitive to the demands on school personnel. For example, the Bhutan, Mexico, and Peru programs (Seligman & Adler, 2018) were implemented over 15 months, so extensive training was deemed necessary. Governmental investment in the project meant that 10 days of educator training was possible for schools in the active condition. This level of preparation is unusual in practice, and highlights the value of policymakers as stakeholders engaged in the project.

2. Consider Varying Parameters of Delivery

Little is known about the relative efficacy of alternative program delivery models for skills training. Durlak et al. (2011) found programs designed using the SAFE framework (a Sequenced program that involves Active learning, Focused on a specific time for skills development, with Explicit goals for intervention) were more effective. However, Taylor et al. (2017) failed to replicate this finding. Brown et al. (in press) tested the moderation of character education outcomes by various program elements. They only found that shorter programs were associated with larger effects. In contrast, Jeynes (2019) found that programs lasting more than a year were associated with larger effects than shorter programs. Diggs and Akos (2016) found programs that were incorporated into the curriculum were more effective than those that were extracurricular, a finding consistent with meta-analytic results reported earlier for critical thinking programs (Abrami et al., 2008), but it should be noted the Diggs and Akos review only included 11 studies.

One implication of this lack of information is that little is known about what parameters of program design work best, or even whether those parameters are consistently valuable. Optimally, direct comparisons of alternate delivery models have the potential to contribute in important ways to the knowledge base for youth development programs. Unfortunately, there can be significant practical obstacles to conducting such comparisons.

3. Safeguard Treatment Fidelity

An important element of the optimal evaluation is on-going assessment of the degree to which program providers adhere to or deviate from the protocol that applies to them. This can be difficult to achieve in practice. However, it becomes increasingly important for longer programs where intervention drift can occur over time, particularly if training only occurs at program onset. Practices that can help safeguard fidelity include lengthier training programs for providers, additional in-service trainings, and/or intermittent observation of treatment delivery.

5.3. Best Practices in Program Evaluation

Though programs intended to contribute to the personal development of students have existed for centuries, only recently has the expectation become widespread that such programs must be evaluated for their effectiveness. The belief that a program will work creates the potential for a tremendous investment of time, money, and effort with little or no payoff. As the following recommendations demonstrate, commitment to program evaluation by itself is just the starting point. That evaluation must be conducted in such a manner as to avoid practices that can exaggerate the effectiveness of an intervention.

1. Use Well-Established Measures

In evaluating the measurability of the skills reviewed in this brief, we were struck by how many measures have been insufficiently validated. In particular, tests of measurement invariance across age groups is an important consideration in test validation. This has to do with demonstrating that the latent structure of scales are roughly equivalent at different ages. Failure to find age invariance means scores can have different meanings at different developmental stages (e.g., Pagliaccio et al., 2016). However, many of the instruments commonly used to evaluate skills and consequential outcomes in youth have never been tested for measurement invariance. To the extent possible, age invariance should be considered a key consideration in choosing scales, similar in importance to validity and reliability.

2. Measure Both Targeted Skill(s) and Consequential Outcomes

The development of malleable skills is conceptualized as the mediating variable that makes these programs meaningful. Well-designed evaluations will include at least two classes of outcome variables. The first class consists of direct measurements of the skill(s) targeted by the program, to evaluate whether any changes observed in other aspects of student life are due to the putative causal effect of the skill. The second class includes measures of what we have been referring to as consequential outcomes, aspects of the students' life where change as a result of the intervention is anticipated, such as academic achievement, life satisfaction, and relationship quality.

3. Describe the Program in Deep Detail

As the earlier discussions of the evidence for our 10 life skills that matter will attest, meta-analysis is an essential tool for advancing a science of skills development. The effectiveness of meta-analysis is amplified when deep details are provided about the program. A good example is Durlak et al.'s (2011) finding that articles reporting obstacles to program implementation also reported smaller effect sizes on average. A full discussion of what should be included in published reports of intervention programs is beyond the scope of this document, but we recommend that authors of such reports read earlier meta-analyses and systematic reviews to get a sense of the dimensions that are worth revealing.

4. Correct for Attrition in Analysis

Differential attrition between conditions can by itself produce significant effects unless attrition is considered in the analysis. The optimal approach to dealing with attrition is the intention-to-treat analysis (DeMets & Cook, 2019), which involves following people even after their withdrawal from treatment so that final results reflect the true effectiveness of the intervention. Unfortunately, this can be difficult to achieve in practice. Under such circumstances, program evaluators can conduct sensitivity analyses, analyses based on varying assumptions about the degree to which withdrawal was due to treatment versus random or extraneous factors such as school transfer. We found very few of the studies of malleability considered the potential impact of condition-based attrition. We do note this could be a justifiable choice if participation is mandated for students, so that attrition is unlikely to occur based on the condition assigned.

5. Correct for Cluster Effects in Analysis

There is a second factor that can contribute to the exaggeration of program effectiveness. Meta-analyses of both character education and social-emotional learning programs have noted a common error in the analysis of intervention studies (Brown et al., in press; Durlak et al., 2011). Youth development programs are typically administered to groups of students, particularly if classes or whole schools are assigned to condition. This results in clusters of participants who potentially influence each other. However, the results of these studies are often analyzed using statistics that assume complete independence across participants such as the traditional t-test or analysis of variance. Brown et al. (in press) reported that 70% of studies administering treatment in groups ignored this clustering or nesting effect in the analysis. When these authors corrected significance test results for this error, t values were reduced on average by 44%. The failure to correct for group administration of treatment can therefore generate too many significant differences. Evaluations of youth intervention programs should consistently control for the clustering effect, including providing an estimate of the effect in the form of an intraclass correlation coefficient.

6. Consider Allegiance Effects

The paucity of replication studies in positive youth development programs also means that many such programs have never been evaluated by any team beyond that responsible for their development. Even where programs had been the focus of more than one study, Brown et al. (in press) found many programs where every study was generated by the same research team. The lack of replication across settings beyond its initial instance can result in the exaggeration of effect sizes due to what is known as the allegiance effect (Dragioti et al., 2015; Munder et al., 2012). This confounding factor has been most extensively studied in the context of psychotherapy, but there is good reason to expect the concept

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is applicable to youth development programs where a single group of individuals is responsible both for the program's implementation and evaluation. At a minimum, expectations of program participants concerning outcomes can be measured. We also believe the funding of cross-setting replications focusing on the most promising treatment skill targets and methods is an important next step in the study of programs intended to foster life skills.

7. Evaluate Moderators of Effect

Skills programs are often administered universally in school settings, so that any student is likely to be eligible for participation. However, an important element of any good evaluation of such programs includes the measurement of participant variables to evaluate them as possible moderators of treatment effects. Particularly important examples include age, gender, at-risk status, intellectual capacity, and baseline psychological health.

8. Collect Follow-Up Data

In addition to pretest and posttest evaluations, follow-up data is an important contributor to gauging program success. Changes in consequential outcomes such as well-being or academic achievement can take time to reach their full expression. Brown et al. (in press) found a median follow-up date of one year post-treatment, which is a reasonable time frame both for allowing changes in consequential outcomes to occur, and for demonstrating persistence of effects or lack thereof. In contrast, many studies conducted follow-up at 1-2 months, which would seem insufficient for demonstrating persistence of effects.

5.4. Best Practices in Program Sustainability

Programs that have been successfully designed and implemented, and for which there is evidence of their effectiveness, can still be fragile. Changes in the delivery setting can easily lead to its ultimate termination despite the good it has done. Given the significant investment needed to create, deliver, and evaluate a program, program developers should be thinking about how to establish its persistence throughout the process.

1. Grow the Program

Governmentally sanctioned youth development programs offer an additional opportunity not available in many contexts. Programs that are privately funded or implemented often reach a peak of implementation, but with changing priorities or personnel can potentially fade over time. Assuming positive or at least promising results from the initial administration, the next goal for publicly endorsed programs is continuing evolution, including increases in scale. This requires continuing interaction with key stakeholders. Particularly important is the continuing involvement of policymakers. Continuing dialog with stakeholders in the schools is also important for evaluating how the program might be expanded further. Finally, expansion to new settings contributes to the long-term viability of the program. For example, based on the initial positive results, the Bhutanese Ministry of Education decided to incorporate the GNH Program into every primary and secondary school in the country, a process they expected to be completed by 2025. At this point the control condition may be discontinued, replaced by on-going comparison of the program's effectiveness across settings (Seligman & Adler, 2019).

2. Institutionalize the Program

At this point, policies of governmental agencies responsible for educational systems can be revised so that the program is formally integrated into regulation and perhaps even law. Achieving this level of institutionalization can ensure the long-term viability of such programs (Seligman & Adler, 2018, 2019).

6. Discussion and Conclusion

There is a long tradition of integrating personal as well as academic development into education. The growing complexity of the modern world perhaps makes these efforts more important than ever. Even though material standards have improved across most of the world over the last 50 years, overall well-being and satisfaction with life have remained roughly unchanged in most countries (Easterlin, 2013; Helliwell et al., 2022). There is also evidence of growing rates of depression, particularly among adolescents, since the turn of the millennium (e.g., Twenge et al., 2019). Mental illness contributes to lower grades, higher absenteeism, lower self-control, and higher dropout rates (McLeod & Fettes, 2007). These findings suggest a need for an education that builds life skills at the same time it teaches academic competencies.

Previous meta-analyses demonstrate that skills-based and character education programs are effective methods of influencing the lives of youth in positive ways (Brown et al., in press; Diggs & Akos, 2016; Durlak et al., 2011; Jeynes, 2019; Johnson et al., in press; Taylor et al., 2017). This influence has been demonstrated across a variety of outcomes, including improved positive behaviors, academic performance, attitudes towards school, self-perceptions; reduced conduct problems, emotional distress, risky behaviors; and many others. Moreover, some studies have demonstrated positive outcomes from greater life skills 5-20 years later (De Neve & Oswald, 2012; Hawkins et al., 1999; Hill et al., 2014).

This obligation to helping youth grow raises the key question of which elements of positive life functioning most merit attention. To date, several multinational organizations have developed valuable skill lists summarizing potential targets for intervention, including the Inter-American Development Bank, the OECD, and the European Union. This policy brief builds on their work in several ways. First, a conceptual framework is offered for targets of positive youth development programs, a framework that conceptualizes different skills as contributors to relational, intellectual, and self-management elements of youth's lives. Second, after winnowing their lists on several grounds, 90 literature reviews were conducted to evaluate the remaining 30 candidates on three well-established criteria for worthwhile targets in youth development: the skill's measurability, malleability, and meaningfulness, the so-called 3Ms. Based on these literature reviews, 10 skills were highlighted as having the strongest available evidence for their potential value as targets for such programs:

1. Mindfulness

2. Empathy and compassion

3. Self-efficacy/Self-determination

4. Problem solving (cognitive, teamwork, and interpersonal)

5. Critical thinking

6. Goal orientation and goal completion (e.g., grit, persistence)

7. Resilience/Stress resistance

8. Self-awareness

9. Purposefulness

10. Self-regulation/Self-control/Emotion regulation

We reiterate an important point here, which is that our findings reflect the current state of empirical investigations into life skills that matter rather than the potential for any skill as a basis for youth development programs. It is possible that future research will reveal others besides the recommended 10 skills as practically justifiable targets for intervention, and it would be a loss if the present review were to constrict the range of program types that are being tested. However, in cases where program developers choose to look at options inconsistent with those recommended in this document, it falls to the applicant organization to justify such choices.

Finally, we note that the development of life skills can have intrinsic value to youth. Skills such as resilience, the ability to problem-solve, or the capacity for positive relationships have tremendous potential for enhancing self-image and quality of life in general, in addition to the more specific consequential outcomes noted already. To help people better navigate their lives, we need to realize the full potential of education for building life skills that matter as well as academic effectiveness. We believe education systems that build both life skills that matter and academic skills hand-in-hand are feasible and desirable. This combination can sow the seeds for sustainably enhancing the human condition.

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