United Nations
Educational, Scientific and
Cultural Organization

Mahatma Gandhi Institute
of Education for Peace
and Sustainable Development

WORKING PAPER 2018 | SEPTEMBER 2018

HOW MINDFUL COMPASSION PRACTICES CAN CULTIVATE SOCIAL AND EMOTIONAL LEARNING

Marilee Bresciani Ludvik, Ph.D.,
Professor, San Diego State University

and

Tonya Lea Eberhart, Ph.D.,
SEL Program Coordinator,
University of Kansas

UNESCO Mahatma Gandhi Institute of Education
for Peace and Sustainable Development
Working Paper: How Mindful Compassion Practices can Cultivate Social and Emotional Learning

WORKING PAPER:
How Mindful Compassion Practices can Cultivate Social and Emotional Learning

United Nations
Educational, Scientific and
Cultural Organization

Mahatma Gandhi Institute
of Education for Peace
and Sustainable Development

UNESCO MGIEP
United Nations Educational, Scientific and Cultural Organization | Mahatma Gandhi Institute of Education for Peace and Sustainable Development

35 Ferozshah Road, ICSSR Building,1st Floor, New Delhi- 110001, INDIA.

September 2018

Authors
Marilee Bresciani Ludvik
Ph.D., Professor, San Diego State University
and
Tonya Lea Eberhart, Ph.D.,
SEL Program Coordinator, University of Kansas

ISBN 978-81-89218-49-2

Any communication concerning this publication may be addressed to:
UNESCO MGIEP
mgiep@unesco.org

Printed in India

HOW MINDFUL COMPASSION PRACTICES CAN CULTIVATE SOCIAL AND EMOTIONAL LEARNING

Marilee Bresciani Ludvik, Ph.D.,
Professor, San Diego State University;
mbrescia@sdsu.edu

and

Tonya Lea Eberhart, Ph.D.,
SEL Program Coordinator,
University of Kansas;
teberhart@ku.edu

Abstract

A fundamental purpose of social-emotional learning (SEL) is to provide students with opportunities to develop self-awareness, self-management, and social awareness, which in turn would lead to positive goal-oriented behaviors and the cultivation of collaborative relationships. While scholarly literature lists several strategies to foster SEL skills, there is little evidence of their effectiveness. There is research to support that mindful compassion practices (MCPs) cultivate specific outcomes that align with SEL outcomes. However, questions as to how much of each of these practices and how long they need to be practiced in order to realize effective integration into school curricula remain unanswered. Nevertheless, it has been determined that in order for these approaches to have a positive effect, schools need support to define, implement, evaluate, and modify SEL curriculum according to their needs.

Introduction

There is increasing understanding worldwide that schools and youth learning environments must address students' social and emotional needs in order for them to learn and attain their highest potential (CASEL, 2018a). Determining what students' specific needs are remains a challenge for educators and educational systems. In this article, we describe practical ways to integrate an experiential training program – Mindful Compassion – into any existing mandatory curriculum or teacher education program, with the aim to instill specific social and emotional competencies in students worldwide.

Within this manuscript, definitions, descriptions and competencies of SEL have been given, along with definitions of 'crystallized intelligence', 'executive functions' and other related terms. Similarities and differences in how these are conceptualized and practiced have been articulated; these and associated terms are explained within the context of neuroscience. Outcomes related to these terms and the practices known to cultivate them have also been articulated.

What makes this work challenging is that SEL definitions, along with the skills and competencies that fall under the SEL umbrella, are often broad; some are conceptual, at best. Some programs focus narrowly on specific skills, such as regulating attention or emotions. Others are broad and directed toward positive youth competencies that include lifelong learning and positive future self. Regardless of whether lifelong success is an employer-desired set of skills to indicate the ability to work will with others or a set of skills that describe global citizenship, in order for SEL to be defined, intentionally cultivated, and then assessed, specificity is needed. In this manuscript, the way in which SEL is defined allowed us to introduce a specific set of SEL skills and then illustrate how they align with Mindful Compassion outcomes. The importance of obtaining SEL skills has been explained in terms of present and future student success, and potential effects on our communities and on our world. Practical ways to cultivate SEL skills through Mindful Compassion Practices (MCP) are described and the ways that these can be assessed are expressed.

Context

For some time, the United Nations has been focusing on Education for Sustainable Development (ESD) and Global Citizenship Education (GCED) as mutually reinforcing educational approaches to be promoted in the context of Sustainable Development Goal (SDG) 4.7, which reads, "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development." (Retrieved from https://en.unesco.org/gced/sdg47progress?language=en on February 18, 2018). In a report published by UNESCO in 2016 (Evoy, 2016), evidence revealed that ESD and GCED were being implemented in the following ways: 1) Part of national educational policy, 2) Mandatory curricula, 3) Mandatory teacher education, and 4) Mandatory student assessment. This manuscript seeks to reveal a fifth way in which ESD and GCED competencies may be attained by introducing an experiential training program called Mindful Compassion, which may be integrated into existing mandatory curricula

or teacher education programs. However, before we explain what mindful compassion is, we first provide an educational framework to build upon – that of social and emotional learning, relating it to GCED and ESD.

What is Global Citizenship (GCED) and Education for Sustainable Development (ESD)? UNESCO has argued that there is "no widely agreed definition of global citizenship. In all cases, global citizenship does not entail a legal status. It refers more to a sense of belonging to the global community and a common sense of humanity, with its presumed members experiencing solidarity and collective identity among themselves and collective responsibility at the global level" (UNESCO, 2016). Furthermore, UNESCO has determined two aspects of global citizenship education. There is "the cognitive dimension, which concerns the learners' acquisition of knowledge, understanding and critical thinking. The socio-emotional dimension relates to the learners' sense of belonging to a common humanity, sharing values and responsibilities, empathy, solidarity and respect for differences and diversity" (UNESCO, 2016).

In examining what UNESCO means by ESD, simplifying the complexity of ESD for the purposes of this paper becomes more difficult. ESD involves providing learning content as well as opportunities for personal and societal transformation. Specifically, UNESCO seeks to "Stimulate learning and promote core competencies, such as critical and systemic thinking, collaborative decision-making, and taking responsibility for present and future generations" (UNESCO, n.d.)

As we examine the intersection of GCED and ESD, we begin to see an overlap of desired competencies. Cognitive neuroscientists would argue that in order to achieve SDG 4.7, we need to provide students and educators with opportunities to acquire crystallized intelligence in the form of facts and concrete knowledge, as well as executive functions or fluid intelligence in the form of cultivating skills such as reflection, conscientiousness, openness, and compassion (Zelazo, Blair, & Willoughby, 2016). In this way, we may be able to see the transformed behavior that is desired for both GCED and ESD in the demonstration of executive functions or fluid intelligence skills (often called social and emotional learning or abbreviated as SEL). Since executive functions and fluid intelligence are not terms that many educators are familiar with, we will provide some additional context through terms that have been around for quite some time – social and emotional learning (SEL).

SEL and the Future Workplace

Some readers of this manuscript may not consider it relevant to prepare their students for the global workplace. However, if you read this section in the context of the skills needed to work collaboratively among diverse environments, SEL may appear to be more relevant to you. The 21st-century workplace is changing and evolving rapidly. Young adults will need to have not only technical and cognitive knowledge, but also another set of skills in order to have access to the jobs they seek. Students will need to have "21st Century skills" or "Social Emotional skills" (Brackett, Rivers, & Salovey, 2011; Fischer, 2013; Lopes, Grewal, Kadis, Gall, & Salovey, 2006; Goleman, 1995; Brackett, 2011). Students will need to be able to problem-solve independently and in groups, make good ethical decisions, weigh and analyze consequences, and manage their behavior and emotions when stressed or angry (Fischer, 2013; Forbes, 2014, 2017). They must be able to communicate in a clear manner, both face-to-face and virtually, verbally, and in

writing (CNBC.com, 2017; Fischer, 2013; Kuh, et al., 2014).

A Forbes report (2014) on "The 10 Skills Employers Most Want in 2015 Graduates" ranked these four skills at the top: (1) The ability to work in a team, (2) The ability to solve problems, (3) The ability to make decisions, and (4) The ability to communicate verbally with people inside and outside an organization. In a more recent report by Forbes (2017), "Top Employers Say Millennials Need These 4 Skills in 2017", responses were similar. Although technical skills are valued, when more than 100 top CEOs, HR managers, and recruiters were asked what was of greater importance in entry-level job seekers, almost all said the most important is social and emotional skills. Similarly, in a 2018 survey by the Chronicle of Higher Education and American Public Media's Marketplace (Fischer, 2013), employers stated that they did value employees with a four-year degree. However, half of the employers surveyed stated they had a difficult time finding new graduates that were qualified for the positions at their companies. Almost one-third of the employers assessed colleges as being fair to poor at turning out graduates that can be successful in the workplace. Additionally, they thought college graduates lacked the basic abilities necessary for the work environment, such as adaptability, the skills to problem-solve, and communication skills (Fischer, 2013). There is agreement among most that our students need to be taught social-emotional skills in order to live fulfilling lives and contribute to a productive and peaceful society.

There is an increasingly strong case for teaching SEL in and out of the classroom. SEL skills are known to provide our future workforce with the tools to succeed (Fischer, 2013; Fander et al., 2018) and allow students to work toward postive goals amidst a diverse group. Educators have observed that teaching SEL provides immediate benefits in the form of a positive learning environment and greater academic success (Bradshaw, Zmuda, Kellam, & Ialongo, 2009; Linares et al., 2005; Smith & Low, 2013; Twemlow et al., 2001). Students who engage in SEL education are able to explain and express their emotions, manage relationships, and problem-solve (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Greenberg, Domitrovich, Graczyk, & Zins, 2005; Guide, 2013). To illustrate, Alfred Binet, whose work was the basis for today's intelligence quotient (IQ) tests, admitted in 1916 that "other things than intelligence [are needed] to succeed in [academic] studies; one must have qualities which depend on attention, will, and character" (Binet & Simon, 1916, p. 254). Although Binet made the point in 1916 that cultivating what we call social emotional learning (or executive functions/fluid intelligence) today is important, education policies have remained stagnant and have not kept up with the 21st-century workplace demands. Conversely, policies have emphasized cognitive skills and memorization in subject areas such as math and science over fostering SEL.

Schools as well as state and local educational departments are now recognizing that it is not enough to simply teach knowledge and facts. In order to thrive in an ever-changing world, students need many other skills outside the realm of reading, writing, and arithmetic. Students need to be prepared for 21st-century careers that might not even currently exist and solve problems brought about by a lack of global citizenship and sustainable living. If students are to attain success in school, in their future careers, and in their personal lives, they need opportunities to gain social and emotional skills (Heckman & Masterov, 2007; Goleman, 1995; Brackett, 2011) Why?

Social-emotional skills and abilities are important because they affect how and what we learn, and the way in which we apply that knowledge to our relationships, our work, and our navigation through our world. A plethora of research over the past few decades describes the positive effects of SEL on academic outcomes, interpersonal skills, and mental health. When students are able to pay attention, manage and regulate their emotions,

manage relationships with other students and their teachers, and exhibit resilience through difficulty, positive student academic outcomes are increased (Ladd, Birch, & Buhs, 1999; Raver, 2005). Additionally, students who are able to manage their thoughts, focus, and regulate behavior are able to apply these skills to obtain better grades and higher scores on standardized tests (Blair & Razza, 2007; Bull, Espy, & Wiebe, 2008; McClelland et al., 2007; Ponitz et al., 2008). When youth are able to make and keep friends, and create positive relationships with their teachers, they feel more positive about and engage more in school, as well as achieve more than those who do not have these skills (Denham, 2006). Conversely, a lack of SEL skills can become problematic. For example, youth who have been bullied or exhibit aggressive behaviors are at risk of a variety of problems, including drug use, skipping school, and academic challenges (Gagnon, Craig, Tremblay, Zhou, & Vitaro, 1995; Haapasalo & Tremblay, 1994; Kochenderfer & Ladd, 1996).

Employers are actively seeking graduates who have SEL competencies and this point has clearly been made in the Committee for Children article by Joan Cole Duffell (2018). Reed Koch, who was previously a senior-level executive at Microsoft and is currently President of the Committee for Children Board, has contributed to Duffell's article. In the article, he says that, "Companies know that the route to success today depends in large part on a workforce with as much emotional intelligence as possible. This is a key driver for increased productivity, innovation, and growth." Also contributing to Duffell's article is Alonda Williams, who has worked with several large companies, including Verizon and Qualcom, and is currently at Microsoft as Senior Director of Education. Williams argues that, "We need social-emotional learning (SEL) now more than ever" and sums up her assertions by stating that, "The bottom line is that SEL improves academic outcomes, graduation rates, test scores, and overall quality of life for those touched by it. With research continuing to show the benefits of SEL, government officials should include SEL as a key component of their education agenda". Consequently, educators know these skills are the foundation for their students to be successful and are calling for SEL skills to be taught in schools (Bridgeland, Bruce, & Hariharan, 2013).

For instance, many SEL programs have been shown to have immediate positive student academic outcomes, including better social problem-solving, greater academic focus, more attentiveness, and less disruptiveness (Durlak et al., 2011; Jones & Kahn, 2017; Linares et al., 2005; Miyamoto, Huerta, Kubacka, Ikesako, & Oliveira, 2015). Relatedly, students were more compassionate towards others, and worked more cooperatively in the classroom (Linares et al., 2005; Twemlow et al., 2001). Furthermore, the positive, immediate effects of SEL programming cannot be emphasized enough when it comes to creating safe and peaceful learning environments, and ultimately a safer society (Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2004). Learning takes place better in an environment where students feel safe, and SEL can provide students with the tools to appropriately manage emotions and give them the ability to stay safe in possibly dangerous circumstances (Jones, 2017; Jones & Kahn, 2017).

According to CDC's Youth Risk Behavior Surveillance Survey (YRBSS) that samples all public and private school students in grades 9-12 within the USA, almost 8% of students had been in a physical fight one or more times on school property during the 12 months prior to the survey. Nearly 6% students skipped school one or more days during the 30-day period prior to the survey because they felt unsafe going to or from school or during the school day (Kann, McManus, Harris, Shanklin, & Flint, 2016). The good news is that SEL programming has been shown to lessen the behaviors that contribute to students' feelings of being unsafe in their learning environments (Jones, 2017; Jones & Kahn, 2017). Students' ability to understand and identify their own and others' feelings can provide a basis for behavior

that is helpful, socially responsible, friendly, cooperative and academically successful. In other words, students who have greater empathy are typically less aggressive, have better social skills, are liked more, and are more successful academically (Arsenio, Cooperman, & Lover, 2000; Denham, 2006; Izard, 2002). In one study, middle school students received 15 weekly SEL skills programming lessons for 50 minutes each in the classroom. These students reported 42% less physical aggression than students in the control group. The SEL program included impulse control, anger management, instruction on problem solving, bully prevention, empathy, and drug and alcohol prevention (Espelage, Low, Polanin, & Brown, 2013).

Not only are there notable immediate positive effects of SEL programming in schools as well as in after-school programs, a meta-analysis of follow-up effects found that numerous positive effects remained long after the SEL programming ended (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). Research showed that in follow-up time periods, students who were exposed to SEL programming continued to exhibit increased pro-social attitudes while also experiencing lower stress levels, lower drug use, and fewer conduct problems. Additionally, 3.5 years after SEL programming, academic performance increased an average of 11 percentile points compared to peers without SEL programming (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011).

In addition to evaluating the impacts of school SEL programing on student academic success and employment success, researchers from Columbia University performed a benefit-cost analysis and found that the benefits of SEL programming outweighed the financial costs of implementing those programs, and most often by substantial amounts. The average benefit-cost ratio among the six interventions in the study was nearly 11-1. At the same time, researchers admitted to challenges in the research. For example, there is little consistency in terms of evaluations of SEL programs. Additionally, it is not easy to determine how enduring SEL outcomes are. However, it is of note that these challenges apply to most cost-benefit analysis and to most research studies that endeavor to make comparisons of interventions. Even so, this study suggests that the return on investment of most SEL programs would be positive if given adequate data (Zander et al., 2018). These positive benefits certainly make the argument that SEL programming is a justifiable undertaking in our schools. So, how can it be defined more specifically in order to integrate it and evaluate it?

Defining SEL

According to the Collaborative for Social and Emotional Learning (CASEL) and accepted by many (Committee for Children, 2018; Empowering Education, 2017), social and emotional learning is defined as "the process through which children and adults acquire and effectively apply the knowledge, attitudes, and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions" (2018).

The primary goal of SEL programs is to build and develop five affective, behavioral and cognitive inter-related competencies that include self-awareness, self-management, social awareness, relationship skills and responsible decision-making skills (Durlak et al., 2011). According to CASEL (2018a), there are five primary competencies related to SEL skills and they are:

- Self-awareness (the ability to identify one's own emotions, have an objective self-perception, and have confidence)

- Self-management (able to manage one's emotions and behaviors, manage stress and set goals)
- Social awareness (able to have an accurate perspective, empathize, and comprehends social norms)
- Relationship skills (can gain healthy relationships and communicate and listen actively)
- Decision-making skills (able to determine, examine and problem-solve, reflect and evaluate (CASEL, 2018c)

While CASEL is able to define SEL with some specificity, it mentions that SEL can be fostered in multiple ways. It suggests that the objectives of SEL programs are best achieved when evidence-based practices are used (Payton et al., 2008). Programs that cultivate SEL skills can use lessons developed to specifically address SEL competencies or can be integrated into classroom subject-area instruction (CASEL, 2018a). Teaching strategies that inherently promote SEL, such as project-based learning (PBL), can be utilized to promote SEL. Additionally, school- and community-wide programs can be established. These approaches are often used in isolation or in combination. For example, the Responsive Classroom (RC) program ("Responsive Classroom: Principles & Practices," 2018) might include a "morning meeting" in which students are brought together to greet, share, participate in an activity, and receive a morning message. These steps are done sequentially based on the RC program ("Responsive Classroom: Principles & Practices," 2018). Another RC program activity example might include a "quiet time" that consists of a "purposeful and relaxed time of transition." Bouffard and colleagues (2009) describe research-based approaches from leading SEL programs that included activities to understand SEL vocabulary (such as defining social-emotional related words or discovering synonyms for emotion words) and writing about a particular SEL theme (for example, writing about a time they were angry and how it felt, or writing a poem). To summarize, for SEL programs to demonstrate long-term impact, they should include everyone in the school – students to adults. There should be staff professional development, strategies that encompass the entire school, and the SEL needs of all should be considered (Jones, 2016).

CASEL has reported that while they can define what SEL is and point to the many ways in which SEL can be cultivated, in terms of measurement, it is often difficult to gather evidence of how these approaches cultivate specific SEL outcomes (CASEL, 2018b). At the time of this manuscript's publication, the assessment guide for SEL had not been released. As such, we return to cognitive neuroscience for guidance on how we might specifically foster and then measure the effectiveness of SEL.

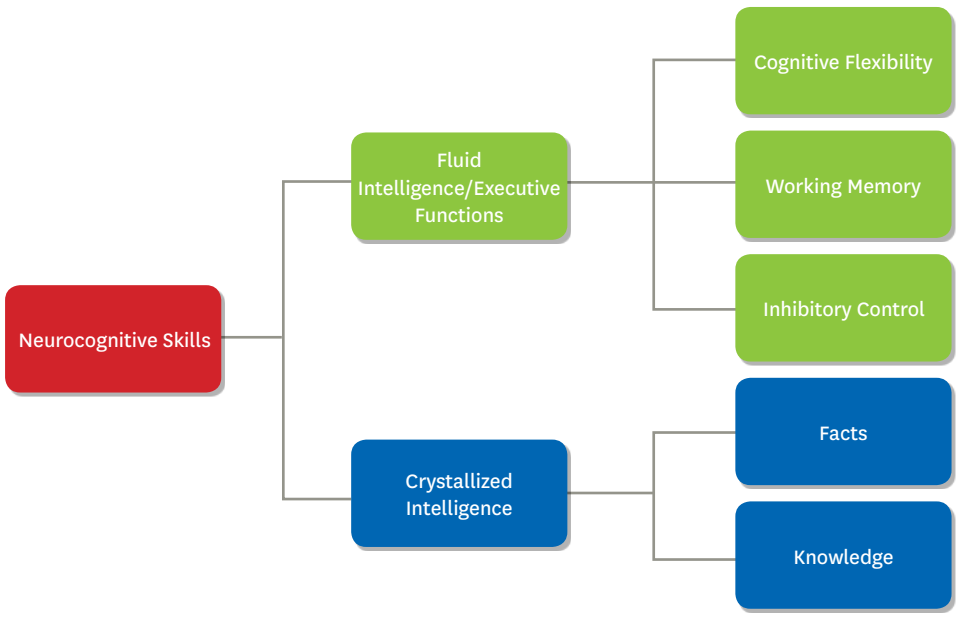
Connecting SEL to Cognitive Neuroscience

In order to provide specific opportunities for students to learn SEL and then assess the effectiveness of those opportunities, we need to more specifically illustrate what we mean by SEL skills. Borrowing from *Positively Transforming Minds within Educational Systems* (Bresciani Ludvik & Eberhart, 2018), "We note that Zelazo, Blair, and Willoughby (2016) explained how learning and development are inextricably intertwined (ACPA, 1996) and as such, can be referred to as neurocognitive skills (NCS) that can be intentionally nurtured. We mentioned earlier that these NCS can further be divided into two categories: 1) Fluid intelligence or executive functions and 2) Crystallized intelligence. *Crystallized intelligence* represents facts and

knowledge that we can easily identify. We often use tests or some types of questionnaires that determine right or wrong responses when identifying whether this kind of learning is present. *Fluid intelligence* or *executive functions* are the learning and development that may appear different based on the context in which they are assessed. In other words, this type of learning and development is not easily identifiable.

In order to make these malleable skills more identifiable, Zelazo, Blair, and Willoughby (2016) further subdivided fluid intelligence or executive functions into three areas – cognitive flexibility, working memory, and inhibitory control. *Cognitive flexibility* involves a person's ability to think about any idea or circumstance in multiple ways; this would include taking into account someone else's perspective or knowing how to solve a given problem through multiple approaches. This would be useful, for instance, in demonstrating an openness towards learning about others' cultures or ideas when collaboratively problem-solving. *Working memory* involves both being able to recall known information in a relevant context and applying it in a workable, meaningful, and appropriate method that is relevant to the task at hand. *Inhibitory control* is the process of intentionally directing attention away from a distraction, stopping an impulsive behavior, or not acting on a highly learned or engrained habit" (Bresciani Ludvik & Eberhart, 2018, p. 17-20). See Figure 1 for an illustration of this conceptual alignment.

FIGURE 1. LEARNING AND DEVELOPMENT AS NEUROCOGNITIVE SKILLS
(Adapted for Zelazo, Blair, & Willoughby, 2016)

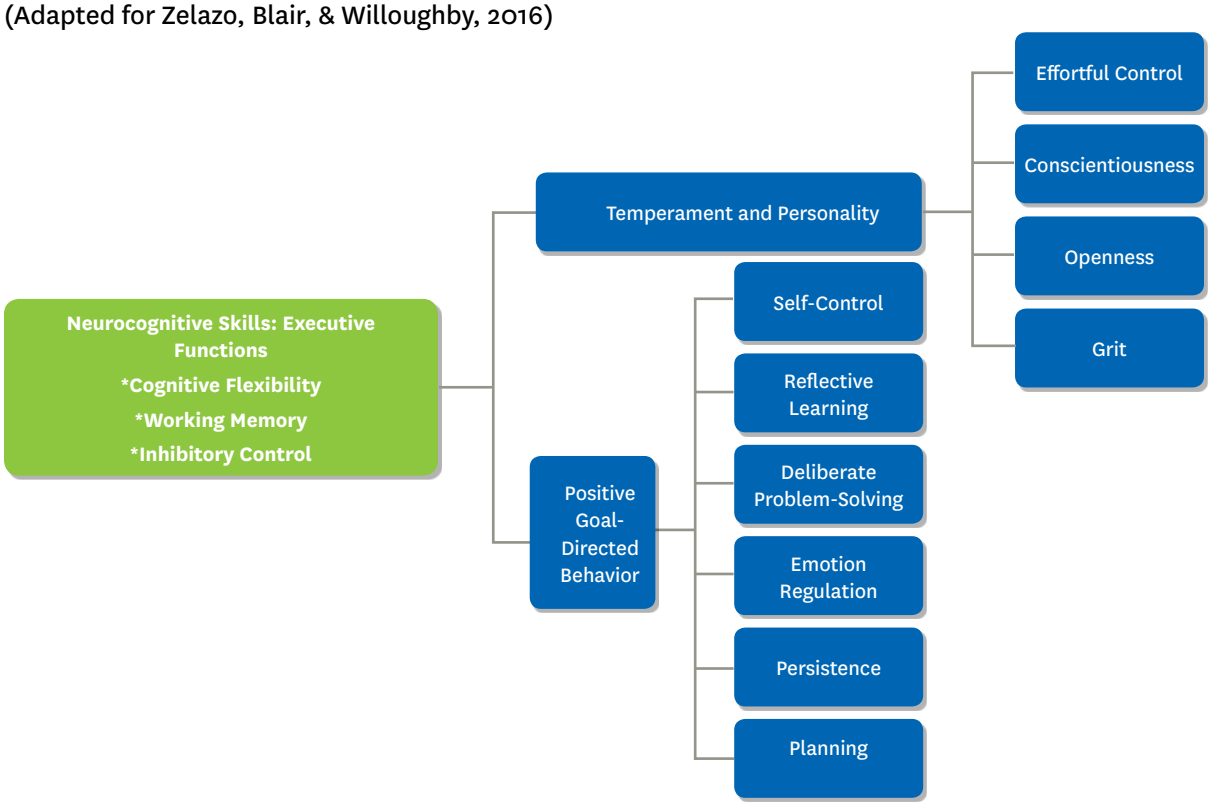


So, when we think of SEL skills and abilities as defined by CASEL, one can see the importance of gathering evidence about both crystallized intelligence (facts, knowledge) as well as the multiple contexts in which that crystallized intelligence is applied (e.g., fluid intelligence/executive functions) to determine whether a student has learned what is needed to succeed as an employee or socially emotionally intelligent student. To further assist in the de-conceptualization of SEL, we return to cognitive neuroscience summary findings.

In Figure 2, the terminology that perhaps educators are more familiar with begins to appear. You will also notice similarities with the terms that CASEL uses to describe SEL. Here, you see how neuroscientists are contextualizing

fluid intelligence/executive functions into two categories – temperament and personality on one hand, and positive goal-directed behavior on the other. It is important to note here that even while neuroscientists have separated these neurocognitive skills into two categories, the underlying assumption is that all of the neurocognitive skills associated with these two categories are malleable. This means that we, as educators, with a thoughtfully designed SEL curriculum and assessment measures, can identify how these measures provided to students help them attain crystallized intelligence (facts and knowledge) as well as fluid intelligence/ executive functions in a variety of contexts where SEL could be taught. Again, we emphasize that this is not a process of labeling something as an SEL experience and then counting how many students engage in that experience. Rather, this process requires a thoughtful inquiry that will help us better understand whether SEL is taking place (Kuh et al, 2018).

FIGURE 2. SEMANTIC MAP OF EXECUTIVE FUNCTIONS AND RELATED TERMS
(Adapted for Zelazo, Blair, & Willoughby, 2016)

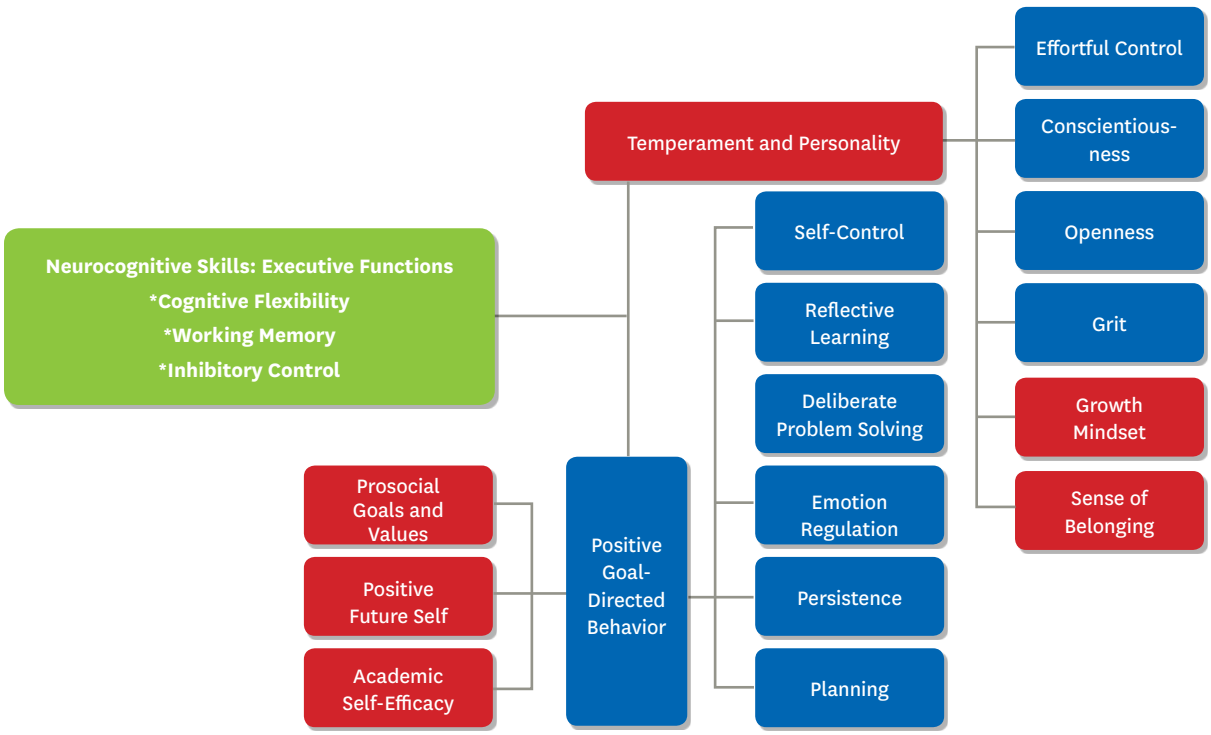


To further emphasize how complex SEL might be, we considered it useful to provide one more way to look at it. As such, we introduce a body of work that was recently released. Herman and Hilton (2017) edited a compilation of research by a committee charged by the National Academies of Sciences (NAS) to gather "relevant research to more clearly define interpersonal and intrapersonal competencies, to examine whether and to what extent a range of these competencies may be related to each other and to persistence and success in undergraduate education …and to examine the extent to which these competencies can be enhanced through intervention" (p.18). The summary of this research, which explored primarily student self-report generated published data on large populations, resulted in these definitions: *Intra-personal competencies* "involve self-management and the ability to regulate one's behavior and emotions to reach goals" and *Inter-personal competencies* "involve expressing information to others, as well as interpreting others' messages and responding appropriately" (Herman & Hilton, 2017, p.22).

These definitions can be viewed as synonymous with social and emotional learning.

To help the reader understand what the NAS committee was able to identify as inter- and intra-personal skills and to align those skills with what we have already discussed, we offer Figure 3. In this figure, you may find some additional terms with which you are even more familiar; further, you will notice more CASEL SEL terms coming to life. For example, grit, growth mindset, self-efficacy, goal setting, and reflection are all terms associated with SEL (in red and blue below). Also, in this figure, you will note that the Zelazo, Blair, and Willloughby (2016) terminology is represented in green and blue and the Herman and Hilton (2017) terminology is represented in red.

FIGURE 3. MAP OF EXECUTIVE FUNCTION AND RELATED TERMS TO INTRA- AND INTER-PERSONAL SKILLS (Adapted for Zelazo, Blair, & Willoughby, 2016, p.4; and Herman & Hilton, 2017, p.6)



Now that you have a better understanding of the variety of ways in which social and emotional learning can be de-conceptualized and contextualized, you may now be able to identify a variety of pre- and post-assessment inventories that already exist. These could be used to evaluate whether desired SEL outcomes are being cultivated in the compilation of the in-class and out-of-class curriculum that you are already offering. Such standardized inventories would include Dweck's (2006) Growth Mindset Scale, Duckworth and team's (2007) Grit Scale, Jazaieri and team's (2014) compassion scale to assess pro-sociality, and Hoffman and team's (2002) Sense of Belonging Scale. You can find more ideas of these types of measures in Appendix A (Bresciani Ludvik, 2018), used by permission from Stylus Publishing. We could easily add to that list the ways to examine these scales and how they might be used in SEL processes in a variety of in-class and out-of-class offerings at schools. That, however, is not the focus of this manuscript.

SEL programs seek to promote self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (CASEL,

2018a). Many of these terms can be found in Figure 3. We may need to slightly modify some of these terms in a way that allows cognitive neuroscientists to evaluate them rigorously and to identify ways in which they can consistently be cultivated. As such, in Table 1, we add some NCS terminology to the SEL terminology we previously introduced. In addition, we point out that the social and emotional core competencies that are the defining focus of SEL programs are conceptually aligned with many of the outcomes of interest within mindful compassion practices (MCP) (Bresciani Ludvik, 2016; Bresciani Ludvik & Eberhart; 2018) - all of which overlap and intermingle with the mindful compassion practice (MCP) outcomes . Before we explain the connection of MCP to SEL, let us first explore how SEL connects back to the desired learning goals of SDG 4.7. The following table illustrates this connection and also interjects some NCS terminology.

TABLE 1. ALIGNMENT OF SDG 4.7 LEARNING GOALS TO SEL OUTCOMES AND ATTRIBUTES

SDG 4.7 Learning Goals	SEL Outcome	CASEL SEL Attributes
Sense of belonging to a common humanity; Sharing values and responsibilities; Empathy; Critical and systemic thinking; Collaborative decision-making; and Taking responsibility for present and future generations	Self-awareness or Conscientiousness	• Identifying emotions • Accurate self-perception • Recognizing strengths • Self-confidence • Self-efficacy
Critical and systemic thinking; Collaborative decision-making; and Taking responsibility for present and future generations	Self-management or Effortful control; Self-control; Emotion regulation	• Impulse control • Stress management • Self-discipline • Self-motivation • Goal-setting • Organizational skills
Sense of belonging to a common humanity; Sharing values and responsibilities; Empathy; Solidarity and respect for differences and diversity	Social awareness or Conscientiousness; Openness; Pro-social goals and values; Sense of belonging	• Perspective-taking • Empathy • Appreciating diversity • Respect for others
Sense of belonging to a common humanity; Sharing values and responsibilities; Empathy; Solidarity and respect for differences and diversity	Relationship skills or Conscientiousness; Openness; Pro-social goals and values; Sense of belonging or Emotion regulation	• Communication • Social engagement • Relationship building • Teamwork
Critical and systemic thinking, collaborative decision-making, and taking responsibility for present and future generations	Responsible decision-making or Deliberate problem-solving; Grit; Growth mindset; Reflective learning; Emotion regulation; Self-control; Effortful control; or Positive future self	• Identifying problems • Analyzing situations • Solving problems • Evaluating • Reflecting • Ethical responsibility

Methodology to Intentionally Cultivate SEL

Having established a connection between SDG 4.7, SEL, and what we understand from cognitive neuroscience, how might we be able to foster SEL while also having reliable and valid ways in which to measure it? Mindful compassion practices (MCPs) are not new to many world cultures. However, they are new to many schools that are exploring how to best integrate them into existing curriculum in a secular manner (Bresciani Ludvik, 2016). In this section, we define what mindful compassion practices are, articulate their related outcomes, align those outcomes with SEL, share specific Mindful Compassion Curricula (MCC) that can be implemented in- and out-of-class, and point to assessment measures that can be used to evaluate the effectiveness of these practices.

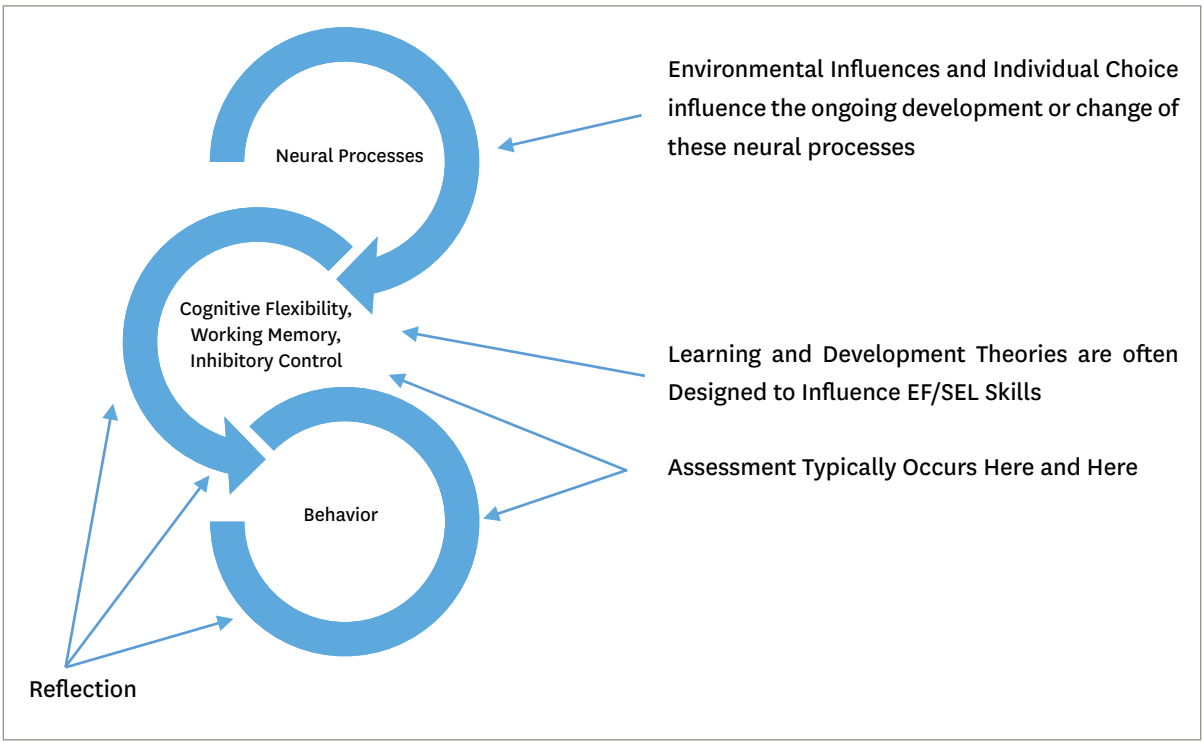
Mindful compassion is the awareness that arises from paying attention in a particular way to the present inner experience as it relates to what is being observed by all of the human senses. This way of paying attention to the inner experience is kind, gentle, and is not attached to judgment of what is sensed. This process also involves intuiting a connection to what is being sensed. Such processes allow access to empathy as well as opportunities for choosing pro-social and positive goal-oriented behaviors (Singer & Klimecki, 2014). Many practices are used in MCC; in this manuscript, we present only a few of them. Before we delve further into these practices and how they can cultivate SEL, we first posit some questions that, if remain unanswered, create challenges for SEL curriculum developers.

Citing Bresciani Ludvik & Eberhart (2018), the questions for educators designing curriculum intended to influence the cultivation of SEL skills include, 1) How many types of opportunities and for how long do educators need to provide their students with exposure to the kinds of activities understood to influence development of these skill sets in order to measure a significant difference? 2) How do age, culture, gender, and neurological conditions influence the design and therefore the acquisition of these skills? 3) What kind of training do educators need in order to design the curriculum and provide students with the activities that cultivate these skill sets? All of this is further complicated by the fact that we have limited research on the actual ways to intentionally influence the intentional cultivation of SEL skill sets (Bresciani Ludvik, 2016; Bresciani Ludvik, 2017; Bresciani Ludvik & Eberhart, 2018; Herman & Hilton, 2017; Zelazo, Blair, & Willoughby, 2016). Nonetheless, we do have some clues from research that has been conducted to date and those clues point us to specific mindful compassion practices. As such, these questions and the research we do possess require us, as educators and cognitive neuroscientists, to re-examine the ways in which we design and evaluate SEL. How difficult could that be?

In addition to synthesizing the research emerging from the aforementioned questions, one challenge we experience is that students' varying levels of effortful control, conscientiousness, openness, grit, self-control, reflective learning, deliberate problem-solving, emotion regulation, persistence, and planning all interact with their ability to demonstrate social emotional competencies (Zelazo, Blair, & Willoughby, 2016). These skills are relevant to how human beings adjust their behavior and, as such, influence desired SEL behaviors, or behavior often referred to as self-regulation or self-control. As such, cultivating reflection – which refers to one's ability to "notice challenges, pause, consider options, and put things into context prior to responding" (p. 6) is important when cultivating SEL. We'll discuss this in greater detail later. Before that, Figure 4 offers a diagrammatic representation of the relationships among all the concepts that have been introduced thus far. In this figure, note the assumption that students' individual neural

processes influence their ability to cultivate SEL skill sets. When reflection is introduced, students are able to exercise their SEL skills more effectively (Zelazo, Blair, & Willoughby, 2016). If, as educators, we begin to intentionally design opportunities for students to cultivate SEL skills using reflection and then provide appropriate measurement, we may be able to influence more positive educational outcomes that employers and citizens desire.

FIGURE 4. THEORETICAL CHARACTERIZATIONS OF EXECUTIVE FUNCTION/SEL



The Role of Emotion in SEL

A challenge to designing a social and emotional learning curriculum is that emotion plays a significant role in influencing executive functions (EF), fluid intelligence, and obviously SEL (Demasio & Carvalho, 2013; Damasio, Damasio, & Tranel, 2013; Goldin & Gross, 2010; Gross, 1998; Gross & Thompson, 2007; Peterson & Welsh, 2014; Zelazo & Müller, 2002; Goleman, 1995; Brackett, 2011). In other words, the presence or absence of high levels of emotion within students interacts with a student's ability to learn and demonstrate their learning. While avoiding and suppressing emotion is not conducive to one's overall well-being (Barlow, 2014; Boswell et al., 2013; Carl et al., 2014), cultivating emotion regulation skills or the intentional top-down regulation of the brain (top = pre-frontal cortex – known as the central brain processor for EF to bottom = limbic system – the emotional center of the brain) has been shown to be effective for fostering EF (Zelazo, Blair, & Willoughby, 2016). In order for emotion regulation to take place,

the student must employ *reflection*. Applying the earlier definition of reflection to this context means that the student must be able to a) notice the challenge or absence of challenge that their current emotional level posits (awareness), b) demonstrate inhibitory control by pausing and not reacting to the stimulus of the emotion, c) access working memory to consider viable options, and d) engage in cognitive flexibility to put things into context prior to e) respond in a self-regulated manner observed in their chosen behavior.

The good news is that the brain is highly plastic (e.g., neuroplasticity) and as such, the brain develops from experience (Zelazo, Blair, & Willoughby, 2016). In other words, what one pays attention to and focuses upon changes certain portions of the brain and thus, the related primary functions also change. This means that the portions of the brain associated with SEL are malleable (Posner & Rothbart, 2007; Schaie 1994; Zelazo et al., 2013, 2014). This assumes that we can intentionally provide students with the opportunity to learn how to regulate their emotions and potentially optimize their executive functions (Bresciani Ludvik, 2016), thus influencing SEL outcomes.

One effective way to improve performance of EF and emotion regulation is to provide students with the opportunity to engage in MCP (Baer, 2003; Chambers, Yee Lo, & Allan, 2007; Grossmann et al., 2004; Heeren, Van Broeck, & Philippot, 2009; Tang et al., 2007; Zeidan et al., 2010; Zylowska et al., 2008). MCPs involve a series of exercises designed to cultivate students' awareness of a) where their attention resides, b) how emotions are experienced in the body, and c) how thought may influence one's ability to pay attention and regulate emotion. The MCPs that have been researched the most use a specific series of exercises that require participants to consistently set aside time each day to engage in focused breathing or meditation or movement with breath practices such as yoga, Thai Chi, or QiGong. Engaging in non-movement exercises such as a body scan allow students to identify where emotions may reside in the body. The practice of active listening or mindful listening allow particpants to share their experience with each other. In addition, MCP invites participants to practice noticing whatever they are experiencing from moment to moment with playful curiosity and with kindness. This methodology also encourages an inquiry process that invites non-attachment to initial judgment that often forms as soon as one determines whether a particular experience is welcomed (liked) or unwelcomed (disliked).

While we have access to emerging research related to the efficacy of teaching adult students how to regulate their emotions effectively and potentially optimize EF using the mindfulness methodology, research on school-aged children is still nascent. Research on ages where students are especially susceptible to environmental influences (e.g., potential emotional triggers influencing development of EF) – such as between two and six years of age as well as adolescence (Huttenlocher, 2002; Karbach & Unger, 2014; Klingberg et al., 2005; Olesen, Westerberg, & Klingberg, 2003) – is compelling for educational designers and evaluators to consider, as is the methodology that can better equip students to regulate these emotional triggers. Nonetheless, we need to conduct more research to determine exactly what is effective (Melby-Lervag, Redick, & Hulme, 2016).

The fact that such a wealth of available research does not offer conclusive results made us ponder what we too may be missing in our current understanding of how neural processes influence the cultivation of SEL, particularly with regard to emotionally intelligent behavior that may be desired and valued by employers and citizens alike. Of specific interest is the notion of cultivating humane or compassionate behavior. While we understand that students' ability to regulate their emotions influences their behavior, we also understand that in a learning environment, students are often not isolated. By this, we mean

that students are engaged in learning in a social setting. The process of education often involves complex human beings attempting to cultivate the learning and development of other complex human beings (Bresciani Ludvik, 2016).

We need to understand that this learning and development process is made more complicated by the fact that each human being undergoes a unique experience each moment and their perception of that experience is true for them (Bresciani Ludvik, 2016). That means that each person reading this manuscript – even if they do so at the same time and within the same environment – has their own unique experience and they believe it is true for them. If we add to this the diversity of the human population in any educational or work environment, the possibility of each person achieving the exact same achievement level for each shared outcome is immediately diminished – even if we could control all environmental variables (and we can't). As such, some might argue that the best approach to educating human beings or designing work environments is to group like with like. While this may seem to be an easier way to achieve shared outcomes, Macrina (1995) argues that collaborations among diverse thoughts and opinions becomes necessary whenever one wishes to take a new direction. Referencing Einstein's quote that, "We cannot solve our problems with the same kind of thinking that created them," regardless of which problem you want to focus upon, we must understand that we need collaboration among diverse approaches and thoughts to resolve our current world problems. This means that we will likely experience misunderstandings and conflict along the way.

Even though much more research is needed, there is increasing consensus that today's complex problems "are more likely to be answered through collaborative efforts of people who have different backgrounds, knowledge, perspectives, and expertise" (Derrick, Falk-Krzesinski & Roberts, 2011, p. 4). Indeed, Heuer (1999) as well as Kerr and Tindale (2004) assert that those who experience the benefits and challenges of team problem-solving activities, [also report that] the more diverse the team is, the more effective the team is in making decisions to resolve problems while also producing new knowledge. However, they assert that this will only occur if team members can collaborate well. This may be why employer surveys continually seek to hire graduates who can collaborate well within a diverse team make-up.

While effectively collaborating among diverse teams can lead to creative problem-solving, research indicates that educational structures can enhance students' socialization ability, which enables them to effectively collaborate with each other(Boden, Borrego, & Newswander, 2011; Coppola, Banaszak Holl, & Karbstein, 2007; Derrick, Falk-Krzesinski & Roberts, 2011; Feller, 2006; Gardner, 2011; Goleman, 1995). Among research that identifies characteristics of students drawn to engaging in collaborative work as well as the traits that make them successful (Boden, Borrego, & Newswander, 2011; Gardner, 2011), common traits (contextualized in the previous SEL conversation), appear to be those of a) crystalized intelligence, b) cognitive flexibility, c) teamwork, d) communication, and e) reflection/critical awareness (Borrego & Newswander, 2010). So, the question for us now is – how do we cultivate the kind of traits that lead to effective collaborative teamwork and communication across diverse students?

Emphasizing the Compassion Component of MCPs

Building on the foundation of mindfulness methodology is compassion cultivation training. Before describing compassion cultivation training, we first define compassion. Compassion is a complex multidimensional construct that comprises four key components: 1) An awareness of suffering (cognitive component), 2) A sympathetic concern related to being emotionally moved by suffering (affective component or often referred to as empathy), 3) A wish to see relief from that suffering (intentional component), and 4) A responsiveness or readiness to help relieve that suffering (action component) (Jazaieri et al., 2012; Jazaieri et al., 2013; Jazaieri et al., 2014).

As you can see from this definition of compassion, cultivating students' awareness is a first step; thus, the mindfulness methodology is needed. The next step is building empathy, which is known to foster social connection. We understand that empathy includes both sharing another's emotional state (often referred to as feeling for another) as well as accessing executive control in order to regulate the emotional experience that comes with this connection (Decety & Jackson, 2004; Decety & Meyer, 2008; Decety & Lamm, 2006; Denzinger, Faukkenot & Peyron, 2009; Harris, 2003; Singer & Lamm, 2009). Executive control or cognitive perspective-taking is important in order to differentiate self from other in the emotional resonance process (Decety & Jackson, 2004; Decety & Meyer, 2008; Decety & Lamm, 2006; Denzinger, Faukkenot & Peyron, 2009; Harris, 2003; Singer & Lamm, 2009). Note the importance of awareness again in this step, not only in being aware of the emotion that is being experienced, but also in adopting a cognitive perspective so that one's emotional experience is not being confused as another's.

The role of cognitive perspective-taking can be helpful in the avoidance of empathetic distress (e.g., feeling too much for another and becoming exhausted). However, executive control can also potentially "turn off" empathetic resonance (Mohr, Leyendecker, & Helmchen, 2008; Mohr et al., 2005), which can result in manipulation or bullying. Nonetheless, mindful compassion training has been known to activate empathy (Hein et al., 2010; Hutcherson, Seppala & Gross, 2014; Hoffman, Grossman & Hinton, 2011; Klimecki, Leiberg, Lamm, & Singer, 2013 a, 2013b). Exercises in perceiving other human beings as "just like me", as well as offering love and kindness to others, have been shown to be effective in activating empathy as well as stimulating the desire to alleviate people from their pain and suffering (Jazairi et al., 2012; Jazaieri et al., 2013; Jazaieri et al., 2014). To reiterate, empathy without kindness can be harmful; thus, the offering of kindness which is embedded within the mindful compassion training is important (Singer & Klimecki, 2014) not only to avoid emotional contagion but to also avoid using empathy to manipulate another.

Several studies have been conducted with regard to the correlation of mindful compassion training and participants' altruistic and pro-social behavior (Leiberg, Klimecki, & Singer, 2011), as well as their ability to deepen relationships and social connection (Frederickson, et al, 2008; Hein et al., 2010; Hutcherson, Seppala, & Gross, 2008; Klimecki et al., 2013 a,b; Leiberg et al., 2011). Referencing the earlier discussion about promoting collaboration among diverse teams, this kind of training could prove fruitful. Furthermore, compassion cultivation training has been known to reduce implicit bias (Kang, Gray, & Dovidio, 2014; Lueke & Gibson, 2014), stereotype threat (Weger et al., In Press), and racial bias (Stell & Farsides, 2016).

MCPs and their Relationship to SEL

As we bring this manuscript to a close, it is important for us to connect SDG 4.7 outcomes with MCPs and SEL outcomes, as well as offer specific ways in which specific MCPs may be assessed in and out of the classroom. As such, in Table 2, we illustrate this alignment. In Table 2, you will see SEL outcomes (as defined by CASEL) that are cultivated by specific MCPs. In addition, you will note the outcomes for these MCPs, the related SDG 4.7 outcomes, and the assessment tools that can be used to analyze the effectiveness of each MCP outcome and corresponding SEL outcome. Aligned with neurocognitive research, this table allows for the actual assessment of SEL outcomes that are intentionally cultivated by research-informed mindful compassion practices. This is a missing link to many SEL curricula.

TABLE 2. TABLE OF MINDFUL COMPASSION PRACTICES (MCP) MAPPED TO SEL AND SDG 4.7 OUTCOMES

SEL Outcome	Specific MCPs	Related SDG 4.7 Outcomes	MCP Assessment Measures/Tools
Self-awareness	Focused breathing; Meta-attention; Open attention; Mindful meditation; Mindful listening; Who am I Meditation	Develop intrapersonal and interpersonal skills	Pre- and Post-FFMQ; Pre- and Post-MAAS; Observation; Interview; Journaling
Self-Awareness; Self-Management	All of the above plus: Empathetic listening; Focused movement with breath; Body scan; Movement in nature; Journaling; SBNRR meditation	All of the above plus: Cultivate good relationships with diverse individuals and groups	Pre- and Post-FFMQ; Pre- and Post-MAAS; Observation; Interview; Journaling Pre- and Post-Beck; Pre- and Post-PSS
Self-Awareness; Self-Management; Social Awareness; Relationship Skills	All of the above plus: Is this true reflection; Cognitive reappraisal; Task-switching; Just like me/Common humanity meditation; Unwelcomed and welcomed emotions meditation; Loving kindness meditation; Generating goodness meditation; Resilience meditation; Who would I be reflection; Compassion journaling	All of the Above plus: Distinguish between sameness and difference and recognize that everyone has rights and responsibilities; Recognize how we fit into and interact with the world around us	Pre- and Post-FFMQ; Pre- and Post-MAAS; Observation; Interview; Journaling Pre- and Post-Beck; Pre- and Post-PSS; Pre- and Post-PECTDI; Problem solving case study analysis; Action planning; Communication planning; 360-degree evaluations

SEL Outcome	Specific MCPs	Related SDG 4.7 Outcomes	MCP Assessment Measures/Tools
Self-Awareness; Self-Management; Social Awareness; Relationship Skills; Responsible Decision-making	All of the above plus: Dyad dialogue; Group discussion; Alignment of experience with personal and professional goals and values; Insight meditation; Creative expression; Nature encounters; Nutrition encounters; Well-being exploration; Difficult conversation exercises	Develop and apply values, attitudes, and skills to manage and engage with diverse groups and perspectives; Examine different levels of identity and their implications for managing relationships with others; Critically examine ways in which different levels of identity interact and live peacefully with different social groups; (replace "debate on" with "explain") Benefits and challenges of difference and diversity	Pre- and Post-FFMQ; Pre- and Post-MAAS; Observation; Interview; Journaling Pre- and Post-Beck; Pre- and Post-PSS; Pre- and Post-PECTDI; Problem solving case study analysis; Action planning; Communication planning; 360-degree evaluations; Portfolio; Brief Resilience Scale; Strategic planning; Change planning; Professional development planning; Vision statement
Self-Awareness; Self-Management; Social Awareness; Relationship Skills; Responsible Decision-making	All of the related category goals plus: Self-compassion letter writing; Self-compassion non-verbal reflection; Compassion journaling	Illustrated differences and connections between different social groups; Compare and contrast shared and different social, cultural, and legal norms; Using compassion – demonstrate appreciation and respect for difference and diversity, cultivate empathy (replace "offering kindness" for "solidarity" as we don't teach that compassion means agreement with) towards other individuals and social groups; Critically assess connectedness between different groups, communities and countries; Distinguish between personal and collective identity and various social groups and cultivate a sense of belonging to a common humanity	All of the related category goals plus: Neff SCS; Jazaieri Compassion Scale

In Summary

In addition to UNESCO MGIEP's commitment to SEL, employers desire these skills in their college-graduate employees. In addition, these skills can have a positive effect on the learning environment itself, potentially contributing to a more compassionate and collaborative community mindful of making sustainable choices. Mindful compassion practice outcomes are linked to SEL and to SDG 4.7 outcomes; MCPs can be integrated into any current mandatory curricula or teacher education training program.

A fundamental purpose of SEL is to provide students with opportunities to develop self-awareness, self-management, social awareness, relationships and decision-making (Durlak et al., 2011). While there are a variety of strategies in literature describing how to foster SEL skills in practice, there is little evidence of their effectiveness. Mindful Compassion Practice outcomes align with SEL outcomes. And while there is research to support the efficacy of mindful compassion practices cultivating specific outcomes, questions remain as to how much of each practice needs to be integrated into school curricula, as well as for how long and how frequently each must be practiced. What is understood is that in order for these approaches to have a positive effect, schools need support to implement, evaluate, and modify according to their own needs (Taylor, Oberle, Durlak, & Weissberg, 2017).

Using cognitive neuroscience as a basis for understanding how SEL can be cultivated, MCPs show great promise. This promise can come to fruition only if they are implemented within environments that can also monitor the practices, along with their duration and frequency. Without this kind of monitoring, schools won't be able to calibrate the implementation of MCPs for optimal SEL outcome success.

Appendix A:
High Performance for All Students

Learning and Development Outcome Measures and Performance Indicators

This Appendix is extracted from Bresciani Ludvik, M. J. (2018). *Outcomes-Based Program Review: Closing Achievement Gaps in and Outside the Classroom With Alignment to Predictive Analytics and Performance Metrics*. Sterling, VA: Stylus.

Adapted from a National Institute for Learning Outcomes Assessment (NILOA) Occasional Paper (Kuh, Gambino, Bresciani Ludvik, & O'Donnell, 2018)

This is an example of how learning outcomes can be used as comparable performance indicators and/or used in predictive analytics when used consistently, ethically, and with integrity. There are many other measures that could be used. This table simply serves to provide some examples for your organization to discuss, consider, and then responsibly choose and implement.

Note that these learning outcomes/performance indicators become more meaningful when the data are aggregated by groupings of student self-identifiers (e.g., race, ethnicity, gender, sexual orientation, religious affiliation, disability, veteran, first-generation, foster youth, commuter, Pell-eligible, number of hours/week working off-campus, etc.). It is also useful to aggregate data by the intersections of these identifiers (e.g., comparing female Muslim first-generation commuters with African American and Black male commuters). Knowing which intersections to aggregate the data by is a topic for another conversation and may require a more sophisticated random forest tree analysis on your campus in order to determine which students need your attention most.

Learning Outcome/ Performance Indicator	Data Collection Instrument	Purpose
Term-to-term persistence rates	IPEDS Definition extracted from student transactional system	To determine whether there are gaps among groups of students or types of institutional experiences among students who are persisting from term-to-term to be able to refine OBPR implementation and organizational decision-making
Graduation rates	IPEDS Definition; Data extracted from student transactional system	To determine whether there are gaps among groups of students or types of institutional experiences among students who are graduating to be able to refine OBPR implementation and organizational decision-making

Learning Outcome/ Performance Indicator	Data Collection Instrument	Purpose
Cumulative Grade Point Average (GPA)	IPEDS Definition; Data extracted from student transactional system	To determine whether there are gaps among groups of students or types of institutional experiences among students who are earning below "high achievement" expectations to be able to refine OBPR implementation and organizational decision-making
Learning Outcome Rubrics Scores	AAC&U LEAP rubric scores; data extracted from student transactional system	To determine whether there are gaps among groups of students or types of institutional experiences among students who are earning below "high achievement" expectations of specific learning outcomes to refine OBPR implementation and organizational decision-making
Time to Degree	IPEDS Definition; Data extracted from student transactional system	To determine whether there are gaps among groups of students or types of institutional experiences among students who are not achieving expected time-to-degree expectations for specific degrees in order to refine OBPR implementation and organizational decision-making
Pass rates of Gate-Keeping Courses	Campus definition of Gate-Keeping Courses; Data extracted from student transactional system	To determine whether there are gaps among groups of students or types of institutional experiences among students who are not achieving expected time-to-degree expectations for specific degrees in order to refine OBPR implementation and organizational decision-making
Job Placement Rates	Data collected at graduation or in a 6-month alumni follow-up survey	To determine whether there are gaps among groups of students or types of institutional experiences among students who are not securing meaningful or gainful employment for specific degree areas in order to refine OBPR implementation and organizational decision-making
Progress Toward Degree	Campus definition of Progress toward Degree; Data extracted from student transactional system	To determine whether there are gaps among groups of students or types of institutional experiences among students who are not achieving expected progress-toward-degree expectations for specific degrees in order to refine OBPR implementation and organizational decision-making

Learning Outcome/ Performance Indicator	Data Collection Instrument	Purpose
Discipline Competency Exam Scores	Campus definition; Data extracted from student transactional system	To determine whether there are gaps among groups of students or types of institutional experiences among students who are earning below "high achievement" expectations of specific discipline competencies in order to refine OBPR implementation and organizational decision-making
Licensure and Certification Exam Pass rates	Data extracted from student transactional system	To determine whether there are gaps among groups of students or types of institutional experiences among students who are earning below "high achievement" expectations of specific discipline competencies in order to refine OBPR implementation and organizational decision-making
Number of Major Changes and Hours Accumulated when Change was Made	Campus definition of student activities; Data extracted from student transactional system	To determine whether there are gaps among groups of students or types of institutional experiences among students who are not achieving expected progress-toward-degree expectations for specific degrees in order to refine OBPR implementation and organizational decision-making
Participation Rates in Campus Approved Student Activities and Organizations	Campus definition of student activities; Data extracted from student transactional system	To determine whether there are gaps among groups of students or types of institutional experiences among students who are engaging in college/university community life in order to refine OBPR implementation and organizational decision-making
Participation Rates in High Impact Practices (HIPs)	AAC&U definition of HIPs; Data extracted from student transactional system	To determine whether there are gaps among groups of students who are engaging in HIPs or types of HIPs in order to refine OBPR implementation and organizational decision-making
Academic Self-Efficacy	Academic Self-Efficacy Scale (Chemers, Hu, & Garcia, 2001)	Measures confidence in abilities.
Attention and Emotion Regulation	Five Facet Mindfulness Questionnaire (FFMQ) (Baer et al., 2008)	Measures five facets of mindfulness: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience.

Learning Outcome/ Performance Indicator	Data Collection Instrument	Purpose
Compassion/Pro-Social Behavior	Multidimensional Compassion Scale (MCS) (Jazaieri et al., 2014)	Measures four components: awareness of suffering (cognitive component); sympathetic concern (empathy) triggered by suffering (affective component); desire to relieve suffering (intentional component); and readiness to help relieve suffering (action component).
Conscientiousness	Chernyshenko Conscientiousness Scales (CCS) (Green et al., 2015)	Measures industriousness, order, self-control, traditionalism, virtue, and responsibility.
Engagement	National Survey of Student Engagement (NSSE)	Measures engagement of higher-order learning, reflective and integrative learning, learning strategies, quantitative reasoning, collaborative learning, discussions with diverse others, student-faculty interactions, effective teaching practices, quality of interactions, and supportive environment.
Grit	Grit Scale (Duckworth & Quinn, 2009)	Measures perseverance in achieving goals and consistency of interests over time.
Growth Mindset	Growth Mindset Intelligence Scale (Dweck, 1999)	Measures self-perceptions of abilities.
Mental Well-Being	Warwick-Edinburgh Mental Well-being Scale (WEMWBS) (2006).	Measures overall mental well-being and the effects of participation in programs and projects on mental well-being.
Personal and Social Responsibility	Personal and Social Responsibility Inventory (Reason, 2013)	Measures five dimensions: striving for excellence; cultivating academic integrity; contributing to larger community; taking seriously the perspectives of others; and ethical and moral reasoning.
Psychological Well-Being	Psychological Well-Being (Ryff & Keyes, 1995)	Measures autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance
Resilience	Brief Resilience Scale (Smith et al., 2008)	Measures ability to "bounce back" following an adverse experience.

Learning Outcome/ Performance Indicator	Data Collection Instrument	Purpose
Self-Control	Self-Control Scale (Tsukayama, Duckworth, & Kim, 2013)	Measures ability to regulate interpersonal and social impulsivity.
Self-Regulation	Self-Regulation Scale (Schwarzer, Diehl, & Schmitz, 1999)	Measures attentional control in goal pursuit.
Sense of Belonging	Sense of Belonging Scale (Hoffman et al., 2002)	Measures perceived peer support, faculty support/comfort, classroom comfort, isolation, and empathetic faculty understanding.

References

Ackerman, P.L., Beier, M.E., & Boyle, M.O. (2005). Working memory and intelligence: The same or different constructs? *Psychological Bulletin, 131* (1): 30-60.

About NSSE. (n.d.). National Survey of Student Engagement (NSSE). Retrieved from http://nsse.indiana.edu/html/about.cfm

ACPA. (1996). *The student learning imperative: Implications for student affairs*. Washington DC: ACPA.

Adams, S. (2014). The 10 skills employers most want in 2015 graduates. *Forbes*. Retrieved from https://www.forbes.com/sites/susanadams/2014/11/12/the-10-skills-employers-most-want-in-2015-graduates/#81e282925116

Baer, R.A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice, 10*: 125-143.

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., . . . Williams, J. M. G. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment, 15*(3), 329–342.

Barlow, D. H. (2014). The neuroscience of psychological treatments. *Behaviour Research and Therapy, 62* (0), 143-145.

Beaton, C. (2017). Top employers say millennials need these 4 skills in 2017. *Forbes*. Retrieved from https://www.forbes.com/sites/carolinebeaton/2017/01/06/top-employers-say-millennials-need-these-4-skills-in-2017/#3562ed527fe4

Belfield, C., Bowden A.B., Klapp A., Levin H., Shand R., & Zander S. (2015). The economic value of social and emotional learning. *Journal of Benefit-Cost Analysis, 6*, 508-544 doi:10.1017/bca.2015.55

Blair, C. (2006). How similar are fluid cognition and general intelligence? A developmental neuroscience perspective on fluid cognition as an aspect of human cognitive ability. *Behavioral and Brain Sciences, 29*(2): 109-125.

Blair, C., & Razza, R. P. (2007). Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten. *Child Development, 78* (2); 647-663.

Blair, C., & Diamond, A. (2008). Biological processes in prevention and intervention: Promotion of self-regulation and the prevention of early school failure. *Development and Psychopathology, 20* (3): 899-911. doi: 10.1017/S0954579408000436

Boden, D., Borrego, M., & Newswander, L.K. (2011). Student specialization in interdisciplinary doctoral education. *Journal of Higher Education, 62,* 741-755.

Borrego, M., Newswander, L. (2010). Definitions of interdisciplinary research: Toward graduate-level interdisciplinary learning outcomes. *The Review of Higher Education, 34*(1), 61-84.

Boswell, J. F., Thompson-Holland, J., Farchione, T. J., & Barlow, D. H., (2013). Intolerance of uncertainty: A common change factor in the treatment of emotional disorders. *Journal of Clinical Psychology, 69*(6), 630-645.

Bouffard, S., Parkinson, J., Jacob, R., & Jones, S. M. (2009). Designing SECURe: A summary of literature and SEL programs reviewed in preparation for the development of SECURe.

Harvard Graduate School of Education, Harvard University, Cambridge MA.

Brackett, M. A., Rivers, S. E., & Salovey, P. (2011). Emotional intelligence: Implications for personal, social, academic, and workplace success. *Social and Personality Psychology Compass, 5*(1), 88-103.

Bradshaw, C. P., Zmuda, J. H., Kellam, S. G., & Ialongo, N. S. (2009). Longitudinal impact of two universal preventive interventions in first grade on educational outcomes in high school. *Journal of Educational Psychology, 101*(4), 926-937. doi:10.1037/a0016586

Bresciani Ludvik, M. J. (2018). Outcomes-Based Program Review: Closing Achievement Gaps in and Outside the Classroom With Alignment to Predictive Analytics and Performance Metrics. Sterling, VA: Stylus.

Bresciani Ludvik, M.J. (2017). Leveraging neuroscience and education to prevent youth aggression and violence. *US-China Education Review B, 7*(9), 401-433.

Bresciani Ludvik, M.J. (Ed.) (2016). *The Neuroscience of learning and development: Enhancing creativity, compassion, critical thinking, and peace in higher education*. Stylus Publishing: VA.

Bresciani Ludvik, M.J. with Eberhart, T.L. (2018). *Positively transforming minds within educational systems: An inner-directed inquiry process for educators and the students they serve*. ISBN 978-0-692-09663-5. PublishDrive Free e-books. Retrieved from http://rushingtoyoga.org/?page_id=286

Bridgeland, J., Bruce, M., & Hariharan, A. (2013). The missing piece: A national teacher survey on how social and emotional learning can empower children and transform schools. A report for CASEL. *Civic Enterprises*.

Bull, R., Espy, K. A., & Wiebe, S. A. (2008). Short-term memory, working memory, and executive functioning in preschoolers: Longitudinal predictors of mathematical achievement at age 7 years. *Developmental neuropsychology, 33*(3), 205-228.

CASEL. (2018a). Approaches. Retrieved from https://casel.org/what-is-sel/approaches/

CASEL. (2018b). Assessment work group. Retrieved from https://casel.org/assessment-work-group/

CASEL. (2018c). Core SEL competencies. Retrieved from https://casel.org/core-competencies/

Catalano, R. F., Berglund, M. L., Ryan, J. A., Lonczak, H. S., & Hawkins, J. D. (2004). Positive youth development in the United States: Research findings on evaluations of positive youth development programs. *The Annals of the American Academy of Political and Social Science, 591*(1), 98-124.

CNBC.com. (2017). The 5 soft skills that will get you hired — and how to learn them. Retrieved from https://www.cnbc.com/2017/04/26/the-5-soft-skills-that-will-get-you-hired--and-how-to-learn-them.html

Carl, J. R., Fairholme, C. P., Gallagher, M. W., Thompson-Hollands, J., & Barlow, D. H. (2014). The effects of anxiety and depressive symptoms on daily positive emotion regulation. *Journal of Psychopathology and Behavioral Assessment, 36*(2), 224-236.

Carlson, S.M., Zelazo, P.D., & Faja, S. (2013). Executive Function. *Oxford Handbook of Developmental Psychology, Vol. 1*, 706-742. doi: 10.1093/oxfordhb/9780199958450.013.0025

Casey, B.J. Jones, R.M. & Hare, T. A. (2008). The adolescent brain. *Annals of the New York Academic of Sciences*, (1124): 111-126.

Chambers, R., Lo, B.C.Y., & Allen, N.B. (2007). The impact of intensive mindfulness training on attentional control, cognitive style, and affect. *Cognitive Therapy and Research, 32*(3): 303-322.

Chemers, M. M., Hu, L., & Garcia, B. F. (2001). Academic self-efficacy and first-year college student performance and adjustment. *Journal of Educational Psychology, 93*, 55–64. doi:10.1037//0022-0663.93.1.55

Coppola, B. P., Banaszak Holl, M.M., & Karbstein, K. (2007). Closing the gap between interdisciplinary research and disciplinary teaching. *ACS Chemical Biology, 2*(8), 518-520.

Damasio, A., and Carvalho, G. (2013). The nature of feelings: Evolutionary and neurobiological origins. *Nature Reviews. Neuroscience, 14*(2), 143–152.

Damasio, A., Damasio, H., & Tranel, D. (2013). Persistence of feelings and sentience after bilateral damage of the insula. *Cerebral Cortex, 23*(4), 833–846.

Deal, J., Stawiski, S., Wilson, M., & Cullen, K. (2014). What makes an effective leader: Generations in India weigh in. *Center for Creative Leadership*. Retrieved from http://www.ccl.org/wp-content/uploads/2015/04/WhatMakesEffectiveLeaderIndia.pdf

Denham, S. A. (2006). Social-emotional competence as support for school readiness: What is it and how do we assess it? *Early Education and Development, 17*(1), 57-89.

Denzinger, N., Faillenot, I., & Peyron, R. (2009). Can we share a pain we never felt? Neural correlates of empathy in patients with congenital insensitivity to pain. *Neuron, 61*(2), 203-212.

Derrick, E.G., Falk-Krzesinski, H. J., & Roberts, M. R. (Eds.) (2011). American Association for the Advancement of Science. *Facilitating Interdisciplinary Research and Education: A Practical Guide*.

Diamond, A. (2013). Executive Functions. *Annual Review of Psychology, 64*, 135-168.

Decety J. & Jackson, P.L. (2004). The functional architecture of human empathy. *Behavioral and Cognitive Neurosciences Review, 3*(2), 71-100.

Decety, J, & Meyer, M. (2008). From emotion resonance to empathic understanding: A social developmental neuroscience account. *Development and Psychopathology, 20*(4), 1053-80.

Decety, J, & Lamm, C. (2006). Human empathy through the lens of social neuroscience. *Scientific World Journal, 6*, 1146-63.

Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the short grit scale (Grit-S). *Journal of Personality Assessment, 91*, 166–174.

Duffell, J. C. (2018). Global greatness: How social-emotional learning helps children succeed in school, the workplace, and life. *Committee for Children* . Retrieved from http://www.cfchildren.org/mission-vision/what-is-sel/joan-cole-duffell/

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta analysis of school based universal interventions. *Child development, 82*(1), 405-432.

Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality and development*. Philadelphia, PA: Taylor & Francis/Psychology Press.

Eisenberg, N. (1989). Empathy and sympathy. In W. Damon (Ed.), *The Jossey-Bass social and behavioral science series. Child development today and tomorrow*. San Francisco: Jossey-Bass.

Evoy, C. M. (2016). Historical efforts to implement the UNESCO 1974 recommendation on Education in light of 3 SDGs targets. Retrieved from http://unesdoc.unesco.org/images/0024/002472/247275E.pdf

Feller, I. (2006). Multiple actors, multiple settings, multiple criteria: issues in assessing interdisciplinary research. *Research Evaluation 15*(1), 5-15.

Fischer, K. (2013). The employment mismatch. *Chronicle of Higher Education*.

Fredrickson, B.L., Cohn, M.A., Coffey, K.A., Pek, J., & Finkel, S.M. (2008). Open hearts build lives: Positive emotions, induced through loving-kindness meditation, build consequential personal resources. *Journal of Personal Social Psychology,95*, 1045–1062.

Gagnon, C., Craig, W. M., Tremblay, R. E., Zhou, R., & Vitaro, F. (1995). Kindergarten predictors of boys' stable behavior problems at the end of elementary school. *Journal of Abnormal Child Psychology, 23*(6), 751-766.

Gardner, S. K. (2011). A jack-of-all-trades and a master of some of them: Successful students in interdisciplinary Ph.D. programs. *Issues in Integrative Studies, 29*, 84-117.

Garon, N., Bryson, S.E., & Smith, I.M. (2008). Executive function in preschoolers: A review using an integrative framework. *Psychological Bulletin, 134*(1), 31-60.

Gerdes, K. E. (2011). Empathy, sympathy, and pity: 21st-century definitions and implications for practice and research. *Journal of Social Service Research, 37,* 230-241. doi:10.1080/01488376.2011.564027

Goldin, P., & Gross, J. (2010). Effects of mindfulness-based stress reduction (MBSR) on emotion regulation in social anxiety disorder. *Emotion, 10*(1), 83–91.

Goleman, D. (1995). *Emotional intelligence: Why it can matter more than IQ.* NY: Bantam Books.

Greenberg, M. T., Domitrovich, C. E., Graczyk, P. A., & Zins, J. (2005). The study of implementation in school-based preventive interventions: Theory, research, and practice. *Promotion of Mental Health and Prevention of Mental and Behavioral Disorders 2005 Series V3*.

Green, J. A., O'Connor, D. B., Gartland, N., & Roberts, B. W. (2015). The Chernyshenko Conscientiousness Scales: A new facet measure of conscientiousness. *Assessment, 23*(3), 374–385.

Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology, 2*, 271.

Gross, J. J., & Thompson, R. A. (2007). Emotion regulation: Conceptual foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 3–24). New York, Guilford Press.

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits. A meta-analysis. *Journal of Psychosomatic Research*. *57*(1): 35-43.

Guide, C. (2013). Effective social and emotional learning programs. *Preschool and Elementary School Edition (9/12)*. Retrieved from https://casel.org/guide/

Haapasalo, J., & Tremblay, R. E. (1994). Physically aggressive boys from ages 6 to 12: Family background, parenting behavior, and prediction of delinquency. *Journal of Consulting and Clinical Psychology, 62*(5), 1044.

Haber, S.N. & Knutson, B. (2010). The reward circuit: linking primate anatomy and human imaging. *Neuropsychopharmacology*, 35, 4-26.

Harris, J.C. (2003). Social neuroscience, empathy, brain integration, and neurodevelopmental disorders. *Physiology & Behavior, 79*(3), 525-31.

Hart Research Associates (2013). *It takes more than a major: Employer priorities for college learning and student*. Retrieved from https://www.aacu.org/leap/ documents/2013_EmployerSurvey.pdf

Heckman, J. J., & Masterov, D. V. (2007). The productivity argument for investing in young children. *Applied Economic Perspectives and Policy, 29*(3), 446-493.

Heeren, A., Van Broeck, N., and Philippot, P. (2009). The effects of mindfulness on executive processes and autobiographical memory specificity. *Behaviour Research and Therapy, 47*(5): 403-409.

Hein, G., Silani, G., Preuschoff, K., Batson, C.D., & Singer, T. (2010). Neural responses to ingroup and outgroup members' suffering predict individual differences in costly helping. *Neuron, 68*, 149–160.

Herman, J., & Hilton, M. (Eds). (2017). *Supporting students' college success: The role of assessment of intrapersonal and interpersonal competencies*. Washington, DC: The National Academies Press. doi: https://doi.org/10.17226/24697

Heuer, R.J. (1999). *Psychology of Intelligence Analysis*. Commissioned by the Central Intelligence Agency, Center for the Study of Intelligence.

Hoffman, M., Richmond, J., Morrow, J., & Salomone, K. (2002). Investigating sense of belonging in first year college students. *Journal of College Student Retention, 4*(3), 227–256.

Hoffman, S.G., Grossman, P., & Hinton, D.E. (2011). Loving-kindness and compassion meditation: Potential for psychological interventions. *Clinical Psychology Review, 31*(7), 1126-32.

Hughes, C., & Ensor, R. (2011). Individual differences in growth in executive function across the transition to school predict externalizing and internalizing behaviors and self-perceived academic success at 6 years of age. *Journal of Experimental Child Psychology, 108*(3), 663-676.

Hutcherson, C.A., Seppala, E.M., & Gross, J.J. (2015). The neural correlates of social connection. *Cognitive, Affective, and Behavioral Neuroscience,15*(1),1-14.

Hutcherson, C. A., Seppala, E. M., & Gross, J. J. (2008). Loving-kindness meditation increases social connectedness. *Emotion, 8*(5), 720–724.

Huttenlocher, P.R. (2002). *Neural plasticity: The effects of environment on the development of the cerebral cortex*. Cambridge, MA: Harvard University Press.

Jacques, S., & Marcovitch, S. (2010). Development of executive function across the life span. In W. Overton (Ed.), *Handbook of Lifespan Development* (online). New York: Wiley. doi: 10.1002/9780470880166.hlsd001013

Jazaieri, H., Jinpa, T. G., McGonigal, K., Rosenberg, E., Finkelstein, J., Simon-Thomas, E., & Goldin, P. R. (2012). Enhancing compassion: A randomized controlled trial of a compassion cultivation training program. *Journal of Happiness Studies*.

Jazaieri, H., McGonigal, K., Jinpa, T., Doty, J. R., Gross, J. J., & Goldin, P. R. (2014). A randomized controlled trial of compassion cultivation training: Effects on mindfulness, affect, and emotion regulation. *Motivation and Emotion, 38*(1), 23–35.

Jazaieri, H., Jinpa, G., McGonigal, K., Rosenberg, E., and Finkelstein, J., (2013). Enhancing

compassion: A randomized controlled trial of a compassion cultivation training program. *Journal of Happiness Studies, 14*(4), 1113–1126.

Jazaieri, H., McGonigal, K., Jinpa, T., Doty, J. R., Gross, J. J., and Goldin, P. R. (2014). A randomized controlled trial of compassion cultivation training: Effects on mindfulness, affect, and emotion regulation. *Motivation and Emotion, 38*(1), 23–35.

Jones, S. M. (2016). What Makes SEL Work? *Harvard Graduate School of Education*. Retrieved from https://www.gse.harvard.edu/news/uk/16/07/what-makes-sel-work

Jones, S. M. (2017). Navigating SEL from the inside out: Looking inside and across 25 leading SEL programs. *A Practical Resource for Schools and OST Providers*.

Jones, S. M., & Kahn, J. (2017). The evidence base for how we learn: Supporting students' social, emotional, and academic development. *The WERA Educational Journal*, 5.

Kane, M.J., & Engle, R.W. (2002). The role of prefrontal cortex in working-memory capacity, executive attention, and general Fluid intelligence: An individual-differences perspective. *Psychonomic Bulletin and Review, 9*(4): 637-671.

Kane, M.J., Hambrick, D.Z., & Conway, A.R. (2005). Working memory capacity and fluid intelligence are strongly related constructs: Comment on Ackerman, Beier, and Boyle (2005). *Psychological Bulletin, 131*(1): 66-71.

Kang, Y., Gray, J.R. & Dovidio, J.F. (2014). The nondiscriminating heart: Lovingkindness meditation training decreases implicit intergroup bias. *Journal of Experimental Psychology: General,143*(3),1306-13.

Karbach, J., & Unger, K. (2014) Executive control training from middle childhood to adolescence. *Frontiers in Psychology, 5*, 390. doi: 10.3389/fpsyg.2014.00390

Kerr, N.L., & Tindale, R.S. (2004). Group performance and decision making. *Annual Review of Psychology*, 55(1), 623–655.

Klimecki, O.M., Leiberg, S., Lamm, C., & Singer, T. (2013a). Functional neural plasticity and associated changes in positive affect after compassion training. *Cerebral Cortex,23*(7), 1552-61.

Klimecki, O.M., Leiberg, S., Ricard, M., and Singer, T. (2013b). Differential pattern of functional brain plasticity after compassion and empathy training. *Social Cognitive and Affective Neuroscience,* 9(6), 873-879. doi: 10.1093/scan/nst060

Klingberg, T., Fernell, E., Olesen, P.J., Johnson, M., Gustafsson, P., Dahlstrom, K., Gillberg, C.G., Forssberg, H., & Westerberg, H. (2005). Computerized training of working memory in children with ADHD – A randomized, controlled trial. *Journal of the American Academy of Child and Adolescent Psychiatry, 44*(2): 177-186. doi: 10.1097/00004583-200502000-00010

Kochenderfer, B. J., & Ladd, G. W. (1996). Peer victimization: Cause or consequence of school maladjustment? *Child Development, 67*(4), 1305-1317.

Kringelbach, M.L. & Berridge, K.C. (2009). Towards a functional neuroanatomy of pleasure and happiness. *Trends in Cognitive Sciences,* 13, 479-87.

Kuh, G. D., Jankowski, N., Ikenberry, S. O., & Kinzie, J. (2014). *Knowing what students know and can do: The current state of student learning outcomes assessment in US colleges and universities*. Urbana, IL: University of Illinois and Indiana University, National Institute for Learning Outcomes Assessment (NILOA).

Kuh, G.D., Gambino, L.M., Bresciani Ludvik, M., & O'Donnell, K. (2018, February). *Using*

ePortfolio to document and deepen the impact of HIPs on learning dispositions (Occasional Paper No. 32). Urbana, IL: University of Illinois and Indiana University, National Institute for Learning Outcomes Assessment (NILOA). Retrieved from http://learningoutcomesassessment.org/occasionalpaperthirtytwo.html

Kyllonen, P.C., & Christal, R.E. (1990). Reasoning ability is (little more than) working-memory capacity?! *Intelligence, 14*(4), 389-433.

Ladd, G. W., Birch, S. H., & Buhs, E. S. (1999). Children's social and scholastic lives in kindergarten: Related spheres of influence? *Child development, 70*(6), 1373-1400.

Leiberg, S., Klimecki, O., & Singer, T. (2011). Short-term compassion training increases prosocial behavior in a newly developed prosocial game. *PLoS ONE,6*(3), e17798. doi:10.1371/journal.pone.0017798

Linares, L. O., Rosbruch, N., Stern, M. B., Edwards, M. E., Walker, G., Abikoff, H. B., & Alvir, J. M. J. (2005). Developing cognitive social emotional competencies to enhance academic learning. *Psychology in the Schools, 42*(4), 405-417.

Lopes, P. N., Grewal, D., Kadis, J., Gall, M., & Salovey, P. (2006). Evidence that emotional intelligence is related to job performance and affect and attitudes at work. *Psicothema, 18*.

Luders, E., Toga, A., Lepore, N., & Gaser, C. (2009). The underlying anatomical correlates of long-term meditation: Larger hippocampal and frontal volumes of gray matter. *NeuroImage, 45*(3), 672–678. doi:10.1016/j.neuroimage.2008.12.061

Lueke, A. & Gibson, B. (2014). Mindfulness meditation reduces implicit age and race bias: The role of reduced automaticity of responding. *Social Psychology and Personality Science, 1-8*. doi: 10.1177/1948550614559651

Lutz, A., Brefczynski-Lewis, J., Johnstone, T., & Davidson, R. J. (2008). Regulation of the neural circuitry of emotion by compassion meditation: Effects of meditative expertise. *PLoS One, 3*(3), e1897.

Kuh, G. D., Gambino, L. M., Bresciani Ludvik, M., & O'Donnell, K. (2018, February). *Using ePortfolio to document and deepen the impact of HIPs on learning dispositions* (Occasional Paper No. 32). Urbana, IL: University of Illinois and Indiana University, National Institute for Learning Outcomes Assessment (NILOA). Retrieved from http://learningoutcomesassessment. org/occasionalpaperthirtytwo.html

Macrina, F. (1995). *Dynamic issues in scientific integrity: Collaborative research*. Washington, DC: American Academy of Microbiology

McClelland, M. M., Cameron, C. E., Connor, C. M., Farris, C. L., Jewkes, A. M., & Morrison, F. J. (2007). Links between behavioral regulation and preschoolers' literacy, vocabulary, and math skills. *Developmental Psychology, 43*, 947.

Melby-Lervåg, M., Redick, T. S., & Hulme, C. (2016). Working memory training does not improve performance on measures of intelligence or other measures of "Far Transfer": Evidence from a meta-analytic review. *Perspectives on Psychological Science, 11*(4), 512-534.

Meuwissen, A.S., and Zelazo, P.D. (2014). Hot and Cool Executive Function: Foundations for Learning and Healthy Development. *Zero to Three, 35*(2), 18-23.

Miyamoto, K., Huerta, M., Kubacka, K., Ikesako, H., & Oliveira, E. (2015). *Skills for social progress: The power of social and emotional skills*. OECD Skills Studies, OECD Publishing. Retrieved from https://nicspaull.files.wordpress.com/2017/03/oecd-2015-skills-for-social-progress-social-emotional-skills.pdf

Mohr, C., Leyendecker, S., & Helmchen, C. (2008). Dissociable neural activity to self- vs. externally administered thermal hyperalgesia: A parametric fMRI study. *European Journal of Neuroscience,27*(3)3, 739-49.

Mohr, C. Binkofski, F., Erdmann, C., Buchel, C., & Helmchen, C. (2005). The anterior cingulate cortex contains distinct areas dissociating external from self-administered painful stimulation: A parametric fMRI study. *Pain,114*(3), 347-57.

National Academies of Sciences. (2017). *Supporting students' college success: The role of assessment of intrapersonal and interpersonal competencies*. Washington D.C: The National Academies Press.

National Institute for Learning Outcomes Assessment (NILOA). (2016, May). *Higher education quality: Why documenting learning matters*. Urbana, IL: University of Illinois and Indiana University.

Organisation of Economic Cooperation and Development (OECD). (2013). *OECD skills outlook 2013: First results from the survey of adult skills*. Retrieved from http://skills.oecd.org/documents/OECD_Skills_Outlook_2013.pdf.

Organisation of Economic Cooperation and Development (OECD). (2017). *Global competency for an inclusive world*. Retrieved from https://www.oecd.org/education/Global-competency-for-an-inclusive-world.pdf

Olesen, P.J., Westerberg, H., and Klingberg, T. (2003). Increased prefrontal and parietal activity after training of working memory. *Nature Neuroscience, 7*(1), 75-79.

Payton, J., Weissberg, R. P., Durlak, J. A., Dymnicki, A. B., Taylor, R. D., Schellinger, K. B., & Pachan, M. (2008). *The positive impact of social and emotional learning for kindergarten to eighth-grade students: Findings from three scientific reviews*. Chicago, IL: Collaborative for Academic, Social, and Emotional Learning.

Peterson, E., and Welsh, M.C. (2014). The Development of hot and cool executive functions in childhood and adolescence: Are we getting warmer? In S. Goldstein and J.A. Naglieri (Eds.), *Handbook of Executive Functioning* (p. 45-65). New York: Springer. doi 10.1007/978-1-4614-8106-5_4

Petrie, N. (2014a). Future trends in leadership development. *Center for Creative Leadership*. Retrieved from https://www.ccl.org/wp-content/uploads/2015/04/futureTrends.pdf

Petrie, N. (2014b). Wake up: The surprising truth about what drives stress and how leaders build resilience. *Center for Creative Leadership*. Retrieved from https://www.ccl.org/wp-content/uploads/2015/04/WakeUp.pdf

Ponitz, C. E. C., McClelland, M. M., Jewkes, A. M., Connor, C. M., Farris, C. L., & Morrison, F. J. (2008). Touch your toes! Developing a direct measure of behavioral regulation in early childhood. *Early Childhood Research Quarterly, 23*(2), 141-158.

Posner, M.I., & Rothbart, M.K. (2007). Research on attention networks as a model for the integration of psychological science. *Annual Review of Psychology, 58*, 1-23.

Reason, R. (2013). *Creating and accessing campus climates support personal and social responsibility.* Retrieved from https://www.aacu.org/publications-research/periodicals/creating-and-assessing-campus-climates-support-personal-and-social

Raver, C. (2002). Emotions matter: Making the case for the role of young children's emotional development for early school readiness. *Harris School of Public Policy*

Studies, University of Chicago, Working Papers, 16.

Responsive Classroom (2018). *Principles & Practices*. Retrieved from https://www.responsiveclassroom.org/about/principles-practices/

Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychological Well-being revisited, 69*(4), 719–727.

Schaie, K.W. (1994). The Course of adult intellectual development. *American Psychologist, 49*(4): 304-313.

Schwarzer, R., Diehl, M., & Schmitz, G. S. (1999). *Self-Regulation Scale*. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2442651/#R32

Singer, T. & Klimecki, O.M. (2014). Empathy and compassion. *Current Biology,24*(18), 875-878.

Singer, T. & Lamm, C. (2009). The social neuroscience of empathy. *Annals of the New York Academy of Science,1156*, 81-96.

Singer T, Seymour, B., O'Doherty, J.P., Stephen, K.E., Dolan, R.J., & Frith, C.D. (2006). Empathic neural responses are modulated by the perceived fairness of others. *Nature, 439,* 466–469.

Smith, B. H., & Low, S. (2013). The role of social-emotional learning in bullying prevention efforts. *Theory Into Practice, 52*(4), 280-287.

Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioural Medicine, 15*, 194–200.

Spear, L.P. (2013). Adolescent neurodevelopment. *Journal of Adolescent Health, 52* (2, 2), 7-13.

Stell, A.J. & Farsides, T. (2016). Brief loving-kindness meditation reduces racial bias, mediated by positive other-regarding emotions. *Motivation and Emotion, 40*(1), 140-147.

Strathearn L., Fonagy P., Amico J., Montague P.R. (2009). Adult attachment predicts maternal brain and oxytocin response to infant cues. *Neuropsychopharmacology, 34*(13), 2655–66.

Tang, Y.Y., Ma, Y., Wang, J., Fan, Y., Feng, S., Lu, Q., & Posner, M.I. (2007). Short-term meditation training improves attention and self-regulation. *Proceedings of the National Academy of Sciences, 104*(43), 17152-17156.

Taylor, R. D., Oberle, E., Durlak, J. A., and Weissberg, R. P. (2017). Promoting positive youth development through school based social and emotional learning interventions: A meta analysis of follow up effects. *Child Development, 88*(4), 1156-1171.

Tsukayama, E., Duckworth, A. L., & Kim, B. E. (2013). Domain-specific impulsivity in school-age children. *Developmental Science, 16*(6), 879–893.

Twemlow, S. W., Fonagy, P., Sacco, F. C., Gies, M. L., Evans, R., & Ewbank, R. (2001). Creating a peaceful school learning environment: A controlled study of an elementary school intervention to reduce violence. *American Journal of Psychiatry, 158*(5), 808-810.

UNESCO. (2016). The ABCs of global citizenship education. Retrieved from http://unesdoc.unesco.org/images/0024/002482/248232E.pdf

UNESCO (n.d.) What is ESD. Retrieved from https://en.unesco.org/themes/education-sustainable-development/what-is-esd

Warwick-Edinburgh Mental Well-being Scale (WEMWBS). (2006). NHS Health Scotland, University of Warwick and University of Edinburgh. Retrieved from https://warwick.ac.uk/fac/med/research/platform/wemwbs/

Weger, U.W., Hooper, N., Meier, B.P., & Hopthrow, T. (2012). Mindful maths: Reducing the impact of stereotype threat through a mindfulness exercise. *Consciousness and Cognition*, *21*(1). 471-475.

Zeidan, F., Johnson, S.K., Diamond, B.J., David, Z., & Goolkasian, P. (2010). Mindfulness meditation improves cognition: Evidence of brief mental training. *Consciousness and Cognition: An International Journal, 19*(2): 597-605.

Zelazo, P.D., Anderson, J.E., Richler, J., Wallner-Allen, K., Beamont, J.L., & Weintraub, S. (2013). NIH toolbox cognition battery (CB): Measuring executive function and attention. *Monographs of the Society for Research in Child Development, 78*(4). doi: 10.1111/Mono.12039

Zelazo, P.D., Anderson, J.E., Richler, J., Wallner-Allen, K., Beaumont, J.L., Conway, K.P., &Weintraub, S. (2014). NIH toolbox cognition battery (CB): Validation of executive function measures in adults. *Journal of the International Neuropsychological Society*, *20*(06), 620-629.

Zelazo, P. D., Blair, C. B., & Willoughby, M. T. (2016). *Executive function: Implications for education* (NCER 2017-2000) Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education.

Zelazo, P.D., & Müller, U. (2002). Executive function in typical and atypical development. In U. Goswami (Ed.), *Handbook of Childhood Cognitive Development* (p. 445-469). Oxford: Blackwell.

Zylowska, L., Ackerman, D.L., Yang, M.H., Futrell, J.L., Horton, N.L., Hale, T.S., Pataki, C., & Smalley, S.L. (2008). Mindfulness meditation training in adults and adolescents with ADHD: A feasibility study. *Journal of Attention Disorders*, *11*(6), 737-746.

United Nations
Educational, Scientific and
Cultural Organization

Mahatma Gandhi Institute
of Education for Peace
and Sustainable Development

UNESCO MGIEP
35 Ferozshah Road, ICSSR Building, 1st Floor, New Delhi 110001
Phone +91 11-23072356-60
W: www.mgiep.unesco.org
F: facebook.com/mgiep
T: twitter.com/UNESCO_MGIEP
E: mgiep@unesco.org