The *multilevel person-in-context ~ neuroperson* (MPC*n*) model:

Guidance for quality improvement systems (QIS) focused on socio-emotional skill growth and transfer outcomes

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Introduction

Reviewing theory and research on socio-emotional learning (SEL) highlights the importance of a wide range of psychological and behavioral skills, ranging from very specific psychological processes that occur on the order of milliseconds (e.g., updating working memory) to broad patterns of behavior that occur over minutes, days, and months (e.g., teamwork and relationship skills). Attempts to organize this vast array of skills into a coherent theoretical or measurement framework has yielded dozens of unique but overlapping frameworks. For example, a recent review of SEL theory, research, and practice by the American Institutes for Research (Berg et al., 2017) found over 100 different SEL frameworks.

The diverse array of theoretical, empirical, and applied approaches to studying and promoting SEL skill growth reflects a lack of consensus about the core nature of SEL skills and the context factors that effectively promote SEL development among children and adolescents. In addition to undermining shared understanding and the development of a common language for conversing about SEL skill growth, this lack of consensus tends to obscure some of the most important implications and social goals associated with focusing on SEL skill growth, such as highlighting the integral role of context factors (e.g., supportive relationships, caring communities) in promoting positive youth development (Hoffman, 2009).

Given the extent of diversity across such frameworks, Jones et al. (2019) developed resources to help stakeholders understand the unique strengths of different frameworks as well as the alignment between core elements of these different frameworks. The general conclusions from this work are (a) there is currently no single consensus framework that is obviously more scientifically or practically valid than any or all of the others, and (b) the use of the same terms by different frameworks where presumably referring to different things (i.e., jingle fallacies), and the use of different terms by different frameworks where presumably referring to the same things (i.e., jangle fallacies), are abiding challenges faced by stakeholders charged with making funding, evaluation, training, performance, measurement, and analysis decisions.

The extent of confusion about the core nature of SEL skills can be illustrated by reference to some of the more popular frameworks used in the fields of OST and K-12 schooling. For example, in Farrington et al.'s (2012) University of Chicago Consortium on Chicago School Research (UCCSR) report on "The Role of Noncognitive Factors in Shaping School Performance," SEL was described in terms of "five general categories of noncognitive factors related to academic performance" (p. 6): academic behaviors, academic perseverance, academic mindsets, learning strategies, and social skills. In contrast, in Nagaoka et al.'s (2015) UCCSR report on "Foundations for Young Adult Success," SEL was described in terms of three "factors for success" (i.e., agency, competencies, and integrated identity) and 4 "foundational components" (i.e., self-regulation, knowledge & skills, mindsets, and values). In further contrast, Domitrovich et al.'s (2015) Collaborative for Academic, Social, and Emotional Learning report on "Effective Social and Emotional Learning Programs" described SEL in terms of "five interrelated sets of cognitive, affective, and behavioral competencies" (p. 2): self-awareness, self-management, social awareness, relationship skills, and responsible decision-making.

Close analysis of the content of the general domain categories used to frame these reports, as well as those used in the present paper, reveals a wide range of possible psychological and social processes and mechanisms that could be construed as the core elements of SEL skills (e.g., the ability to selectively focus attention, the ability to identify and name emotions in oneself and others, and the ability to form and maintain healthy relationships). Regardless of the ways that domains are named or defined, the specific psychological and social processes implicated by these domains tend to overlap both within and between the domains used by any given approach. For example, Nagaoka et al.'s (2015) description of two of their four foundational components (i.e., knowledge and mindsets) appears to constitute a classic jangle fallacy; that is, the two phrases used to describe, respectively, knowledge and mindsets – i.e., "sets of facts, information, or understanding about self, others, and the world" (p. 4) and "beliefs and attitudes

about oneself, the world, and the interaction between the two" (p. 4) – are, from the theoretical perspective described below, different words used where referring to the same set of intraindividual part-processes (i.e., belief systems). In other words, "sets of facts, information, or understanding" are represented by the brain as "beliefs and attitudes," which means that these two sets of words can be viewed as referring to the same things: beliefs about the self, world, and self-in-relation-to-the-world.

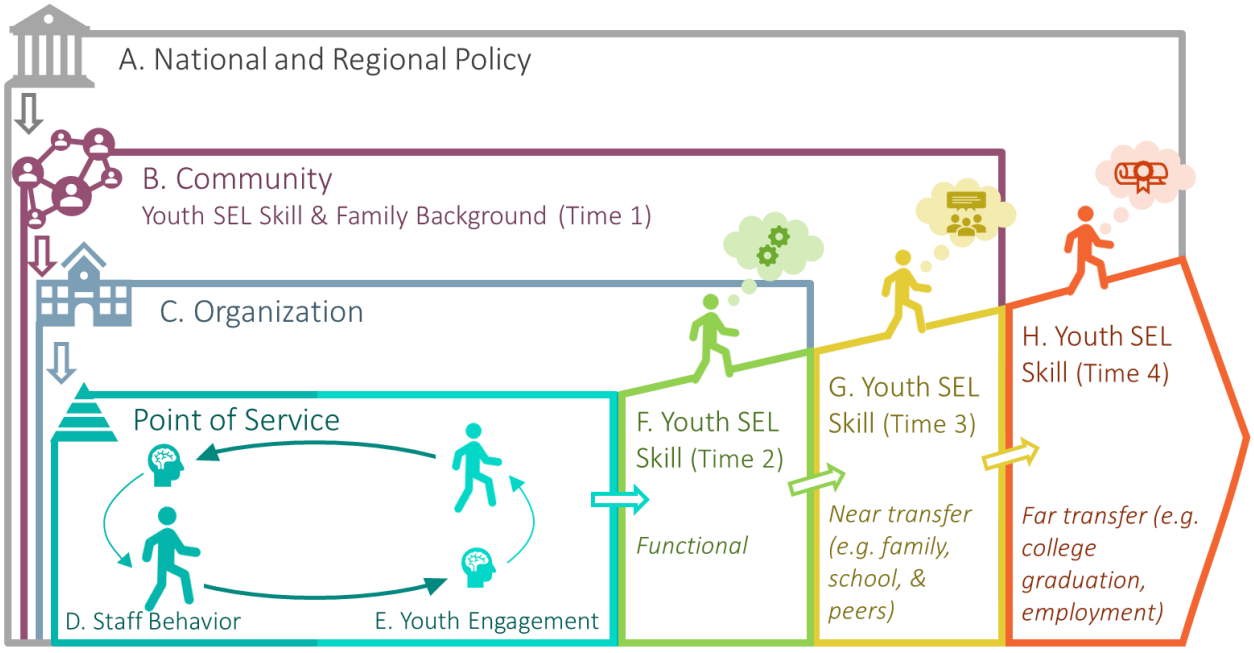
The *multilevel person-in-context* model of youth development programs (Smith, McGovern, Peck, et al., 2016) facilitates thinking about how the SEL skills being developed at the point of service (POS) are both (a) embedded within the wider context of policy decisions, family background, and out-of-school time (OST) program quality and (b) related subsequently to shorter-term youth outcomes (e.g., SEL skill growth) and longer-term youth achievements (e.g., graduation and employment). The multilevel person-in-context model, and the corresponding *neuroperson* model that focuses on the structure and dynamics of SEL skill growth (described below), together constitute the multilevel person-in-context, neuroperson (MPC*n*) framework that was developed to improve the precision, validity, and comprehension of performance data used in lower-stakes quality improvement systems (QIS) in the OST sector (Smith, McGovern, Larson, et al., 2016; Smith, McGovern, Peck, et al., 2016; Smith et al., 2019).

I. Theory of Change

Taken together, the various parts and processes constituting the MPC*n* model (described below) can be arranged into a generic *theory of change* (ToC), applicable to most youth development program settings (see Figure 1). The MPC*n* ToC provides (a) an overview of how the various parts and processes associated OST programs and SEL growth go together and (b) guidance about the kinds of measures necessary to address specific questions about both program quality and young people's SEL skill growth. This ToC maps fairly closely onto, and extends, the Weikart Center's "QuEST" model expressed in terms of Quality, Engagement, Skills, and Transfer (Smith, 2013; Smith, McGovern, Peck, et al., 2016). In particular, QTurn's MPC*n* ToC provides more detail about (a) the geographical nesting of program-specific points of service within organizations, communities, and regions, along with their corresponding policy mandates, and (b) the diverse manifestations of young people's SEL skills both before they enter OST programs (e.g., pre-existing skill levels and family background) and after they leave these programs (e.g., skill transfer to both contemporaneous family, school, and peer settings and longer-term life course achievements, such as early adulthood health, education, and employment).

The idea that youth engagement and learning is nested within multiple setting levels informed the development and testing of the Youth Program Quality Intervention (YPQI; Smith et al., 2012), in which policy mandates originating at the national, regional, or community levels influence children's and adolescent's SEL skill growth mainly by cascading through intermediate setting levels (i.e., organizations and program offerings, or the POS). This multilevel continuous improvement cascade process highlights the extent to which YPQI effects depend on program staff enacting different roles at different setting levels (e.g., managers and frontline staff plan with data during team meetings at the organization level and then staff enact intended improvement practices at the POS level). From this multilevel cascade perspective, youth engagement and learning depend critically on managers and staff creating and implementing high-quality curricula at the organization level and, then, staff implementing high-quality instructional practices at the POS level.

Figure 1: QTurn MPCn Theory of Change for OST Contexts and Youth Development.



The QTurn MPC*n* ToC shows the main pathways for youth development and learning in OST settings, including engagement at the POS and the eventual transfer of skills from OST settings to other contexts (e.g., family, school, and peers). This relatively-generic ToC is intended to support program staff's thinking about quality improvement systems, staff practices at the POS, and youth SEL skill growth in ways that (a) support intentionality in program planning and delivery and (b) make more efficient use of resources committed to measurement, evaluation, and continuous improvement. The MPC*n* ToC is also designed to help providers think clearly about the kinds of youth outcomes they are trying to achieve (e.g., engagement at the POS versus SEL skill growth) and empower them to focus on, review, and discuss the details of specific youth experiences and staff practices (e.g., as reflected in survey and assessment form item content), rather than the more abstract domain and scale names typically associated with the corresponding measurement instruments.

According to the QTurn MPC*n* ToC, high-quality staff practices and content delivered at the POS, where staff and youth meet during program offerings, will produce heightened levels of youth engagement and learning during program offerings. The concept of "high-quality staff practices" and their effects on youth motivation and learning reflects a long history of person-in-context models emphasizing the calibration of learning environments to the current skill levels of participating youth, as in Eccles & Midgley's (1989) general concept of *stage-environment fit* and Vygotsky's (1978) more specific concept of the *zone of proximal development*. In either case, the basic idea is that youth learning is best promoted by scaffolding task demands that are slightly beyond what youth can do on their own but that are manageable where well-supported by instructional staff.

The more nuanced idea is that, in addition to moderately-difficult content, the way this content is delivered by staff has decisive impacts on the learning process. For example, a substantial literature in developmental science indicates that instructional practices that combine moderate difficulty, positive affect, adult modeling, and co-participation in the learning task promote youth engagement in the learning process, skill development, and skill integration (Fischer & Bidell, 2006; Shernoff & Vandell, 2007). In addition to the idea that youth motivation and engagement during learning experiences is increased where

learning environments address basic needs for physical safety, emotional support, competence, and autonomy (e.g., Deci & Ryan, 1985; 2000), youth who become interested in and motivated by the activities of a setting increase their effort, learning, and development (Csikszentmihalyi & Larson, 1984; Gottfried, Fleming, & Gottfried, 2001; Guay, Boggiano, & Vallerand, 2001; Pearce & Larson, 2010; Shernoff & Vandell, 2010). Consequently, the QTurn MPC*n* ToC is centered on the idea that with sufficient attendance at, and intensity of exposure to, multiple program offering sessions (time), the combination of high-quality staff practices and youth engagement at the POS promotes the growth of SEL skills and the transfer of these skills to other settings, including school-day classrooms.

The Multilevel Person-in-Context ~ Neuroperson Model of SEL Skills

The Multilevel Person-in-Context. QTurn's MPC*n* ToC is intended to reflect the complexities of both human development and the extensive range of social structures and processes in which that development is embedded. Rather than settling for a model based on a relatively arbitrary set of nested and intersecting circles, we drew from an increasingly extensive literature on multilevel systems theories in effort to represent as accurately as possible the full range of forces acting on youth, families, programs, and policymakers. As described below in more detail, the resulting MPC*n* model challenges reliance on unidimensional multilevel system models and general linear modeling (GLM) strategies by highlighting *multidimensional* multilevel system models and pattern-centered analytic methods. For example, accounting simultaneously for both person-by-context interactions, and the parallel distributed processes characterizing the personal and social dynamics that produce the behavior that influences those interactions, appears to require the use and integration of several different kinds of multilevel system models (Peck, 2007, 2009). Most of the details of these different kinds of multilevel systems are beyond the scope of this paper. However, because they provide the overarching framework for all of the specific details implied by the MPC*n* ToC, we briefly describe the key multilevel systems frameworks we used to assemble the MPC*n* model, along with their implications for measurement and modeling.

Most of the scientific methods and theories used to understand and study human development and social systems are framed implicitly by the meta-theoretical assumption either of a single level of analysis only or of a unidimensional series of "levels," or scales of magnitude, ranging from the sub-atomic to the super-galactic. Known from ancient times as *the great chain of being*, this series of materially-nested part-processes has been more recently referred to as the default *hierarchy of nature* (Salthe, 1985), the *mainstream hierarchy* (Aronson, 1987), and the *hierarchy of life* (Ahl & Allen, 1996). Segments of this hierarchy most proximal to the concerns of social and behavioral scientists have been variously termed *psychosocial* (Erikson, 1968), *biopsychosocial* (Engel, 1977), *bioecological* (Bronfenbrenner & Ceci, 1994), *neurons to neighborhoods* (Shonkoff & Phillips, 2000), *molecules to mind* (McEwen, 2001), and *cells to society* (Gehlert et al., 2007). Taken together, these approaches do not converge on a unidimensional series of levels, mainly because many of them – particularly those focused on social processes – diverge from the core defining property of materially-nested part-processes characterizing approaches focused on physical and, to a lesser extent, biological proceses. In short, whereas the physical and biological sciences are based on a fairly consensual understanding of a series of materially-nested physical and organic *levels of organization* (LoOrg) (e.g., molecules, cells, organs), there is minimal consensus within the social sciences about (a) the names, nature, and ranges of relevant LoOrg, particularly those extending beyond the organism; (b) the units of analysis characterizing LoOrg; and (c) the extent to which units of analysis used in any given theory or study map clearly onto to any particular LoOrg scheme (Peck, 2007; Salthe, 1985).

Before discussing why the LoOrg framework largely fails the social sciences, and what we can do about it, it is important to mention at least one of the ways that it helps us. First, because so many of the phenomena concerning social scientists are characterized by materially-nested part-processes (e.g., youth are materially-nested in program spaces populated with other people, or groups), the basic principles of

LoOrg should inform our thinking about how to understand and model social dynamics. One of the main principles is that "there is a real break, or boundary, in the world at every jump *across* a level [of organization]" (Salthe, 1985, p. 122), such that the relations among the components of one level tend to be quite strong relative to the relations between components at adjacent levels. The net result of this situation, for our purposes, is that the causal effects of processes occurring within any given LoOrg influence processes at other LoOrg only by traveling through adjacent levels. For example, the effects of cells on organismic functions (e.g., behavior) are generally fully mediated by organs and their functions. This means, among other things, that the relations between things like a human organism and the immediate social group of which it is a part tend to unfold in decidedly serial manner (e.g., behavior is emitted, environmental effects occur, and feedback travels back to the organism). In other words, it is the material composition of, and boundary between, organisms and their environments that allows us, or forces us, to situate the person-in-context relation squarely within the standard, material-nested LoOrg framework characteristic of the physical and biological sciences (e.g., organs, organisms, groups).

The theoretical and methodological implications of persons and contexts existing at different LoOrg are many, but one of the most important implications relates to how we measure and model units of analysis associated with different levels of analysis. The basic idea is that objects of measurement that exist at the same place and time (e.g., at the same level of organization, at the same point in time) tend to interact dynamically in ways that objects across different places and times do not. Consequently, measures must be specific to the units of analysis at a given level, and the analysis of the relations among these units should respect their qualitative differences. Consistent with this idea, Magnusson (2003) argued that "the basic prerequisite for a pattern analysis that can contribute to an understanding of developmental processes is that the data being analyzed refer to the same level of the organismic system" (p. 19) and that "pattern analyses that mix data from different levels can only yield, at best, meaningless results" (p. 19). This, of course, requires us to know something about which units of analysis correspond to which levels of the system and means, for example, that including measures of objects from different LoOrg (e.g., beliefs, behavior, and social norms) in the same cluster analysis is unlikely to reveal meaningful subgroups of people, places, or things. In short, failure to adhere to this basic LoOrg principle yields all kinds of theoretical and methodological confusion.

If all of the phenomena concerning social scientists were characterized solely by materially-nested part-processes, our theoretical and modeling tasks would be relatively straightforward. However, biological evolution has yielded some very complex, nonlinear systems (e.g., the human brain) that apparently defy the principles of LoOrg. Specifically, in addition to the neatly-ordered unidimensional series of materially-nested part-processes known as LoOrg, there appears to be at least two additional multilevel systems that are essential for understanding and modeling biological and social systems such as human organisms, organizations, and populations: *levels of representation* (LoRep), corresponding to the evolutionary history of the human species (i.e., the sequential development, on an evolutionary timescale, of the biological part-processes characterizing the human brain stem, limbic system, neocortex, and prefrontal neocortex) and *levels of integration* (LoInt), corresponding to the developmental history of individuals (i.e., the sequential development, on a human developmental timescale, of the biological part-processes characterizing complex schema and belief systems) (cf. Grene, 1988; Piaget, 1954; Schneirla, 1949; Wapner & Demick, 1990; Werner, 1957).

These two additional kinds of multilevel systems both appear to be characterized mainly by *heterarchically-organized* (e.g., functionally nested, parallel processing) control systems (Berntson & Cacioppo, 2008; Holland, 1995; Lewis & Todd, 2007; Pattee, 1973a; Salthe, 1985). Specifically, in contrast to materially-nested LoOrg, heterarchically-organized multilevel systems have been described as "control hierarchies" (Pattee, 1973b, p. 75), or "command hierarchies" (Salthe, 1993, p. 45), that typically function as *parallel distributed processes* (Holland, 1995; McClelland & Rogers, 2003). For example, although the heart is not nested materially within the brain, the brain and the heart influence each other by passing "signals" through intermediary physiological systems. In stark contrast to the *nontransitive* (i.e.,

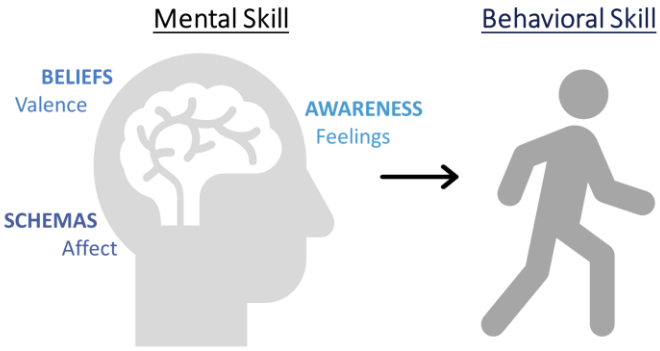
through adjacent levels) relations across LoOrg, LoRep are characterized by causal effects that can run directly (i.e., *transitively*) from any level to any other level (Berntson & Cacioppo, 2008; Salthe, 1985).

Personal and social control processes reflecting heterarchically-organized multilevel systems include brains and communities, respectively, and it is likely that any practically useful multilevel systems framework will need to attend explicitly to these functionally-nested systems. For example, as reflected in the neuroperson part of the MPC*n* model, described below, successive regions of the human brain that have emerged throughout evolution can be described as an increasingly sophisticated series of LoRep, ranging from the brain stem to the neocortex and marked by qualitatively different, and increasingly powerful, information processing capacities. One of our primary theoretical and methodological tasks, then, is to measure and model the various part-processes associated with persons, contexts, and the relations between them in ways that reflect accurately the kinds of causal dynamics that typify that multilevel systems of which they are composed and in which they are embedded.

Consequently, taken as whole, the MPC*n* model facilitates the conceptual and operational definition of level-specific units of analysis and the application of appropriate measurement and analytic models which, in turn, provides theoretically-generated guidance about how to integrate variable- and pattern-centered methods by indicating, for example, (a) which items to factor into relevant scale dimensions (e.g., items specific to a single LoRep), (b) which scales to profile within which levels (e.g., scales specific to the operating characteristics of a particular system level), (c) cross-level configurations to construct (e.g., beliefs by schemas), and (d) temporal flows to model (e.g., Context -> Person -> Behavior). The MPC*n* model provides a basis for integrating theories and measurement frameworks focused on hierarchical and heterarchical multilevel systems so that we and others can more clearly understand, model, and communicate about the kinds of person-by-context dynamics that characterize OST programs. For example, the MPC*n* model allows us to address, in a relatively comprehensive way, questions such as: How, and to what extent, do the effects of policy decisions cascade through local social systems (e.g., community organizations, classrooms) to influence OST program practices (e.g., staff training, planning with data, instructional practices) and positive youth development (e.g., socio-emotional skills, educational attainment, social mobility)?

The Neuroperson. The QTurn neuroperson model of SEL skills (see Figure 2) is a simplification of the more detailed Basic Levels of Self (BLoS) model (Peck, 2007; Roeser, Peck, & Nasir, 2006; Roeser & Peck, 2009) and focuses on three qualitatively different kinds of mental skills (described below) involved with youth becoming more behaviorally-skilled (e.g., at self-regulation and social interactions). Where considering the potential effects of context quality on SEL skill development, as well as the extent to which youth participate in their own learning, the neuroperson part of the MPC*n* model provides a framework for understanding how different parts of the self-system play distinct roles in processing information about, and formulating goal-directed behavioral responses to, contextual opportunities and constraints. In particular, the neuroperson model advances previous approaches to understanding, studying, and promoting SEL skills by, for example, highlighting the roles of emotional experiences and prior learning, clarifying two different forms of youth agency, and focusing especially on skills that enable youth to intentionally author their own development.

Figure 2: The Neuroperson Model.



The neuroperson model is based on the existence of, and interrelations among, three distinct regions of the brain involved with SEL skill representation and functioning[1] which, for simplicity, we refer to using the terms: Schemas, Beliefs, and Awareness. The terms schemas, beliefs, and awareness denote three qualitatively different internal representation systems (and associated functions) centered, respectively, within the limbic system, the neocortex, and the prefrontal cortex. Similar to dual-systems approaches to psychological functioning (e.g., Deutsch & Strack, 2006; Hofmann et al., 2009; Kahneman & Frederick, 2007), these three terms denote distinct information storage and processing systems typical of all developing humans, as reflected in multiple clinical and experimental literatures (Berntson & Cacioppo, 2003; Bowlby, 1988; Derryberry & Tucker, 1991; Epstein, 2003; Lewis & Todd, 1997; MacLean, 1990; Roeser & Peck, 2009).

In BLoS terms, each level of self (e.g., schemas as *iconic* representations centered in the limbic system vs. beliefs as *symbolic* representations centered in the neocortex) corresponds to a qualitatively distinct way of representing information about the self and world. Each of the three representation, or information processing, systems was achieved over the course of millions of years of biological and social evolution. In other words, from the perspective of biological evolution, there is a relatively clear set of brain systems marked by increasingly flexible processing capacities as we move up the neuroaxis from the brain stem to the neocortex (Berntson & Cacioppo, 2003; Bronson, 1965; Derryberry & Tucker, 1991; Herrick, 1949; Lewis & Todd, 1997; MacLean, 1990; Schneirla, 1949). The information processing units within these brain systems (e.g., schemas, beliefs, and thoughts) represent the same organismic and environmental conditions in qualitatively different ways (cf. Grene, 1988; McClelland et al., 1995; Pattee, 1973b; Salthe, 1985; Sherry, 2006). For example, symbolic representations (e.g., beliefs) centered in the neocortex differ qualitatively from iconic representations (e.g., schemas) centered in the limbic system, and these different kinds of representations can implicate conflicting or converging behavioral responses to the same environmental conditions (cf. Boysen & Berntson, 1995; Epstein, 1990; Flannelly et al., 2007; McClelland et al., 1989; Roeser et al., 2006; Schultheiss, 2001; Schultheiss et al., 2008).

Schemas. The term *schemas*, as used here, refers to the species-typical, sub-cortical capacity for the development of "sensory-affective and affective-motor schemas that become increasingly differentiated and integrated into higher order sensory-affective-motor scripts as a function of direct experience with the immediate environment" (Roeser et al., 2006, p. 402); or, more simply, non-verbal, non-symbolic, affectively-charged representations of the self and world, as in attachment schemas (Bowlby, 1988). The schema system in the neuroperson model corresponds to what we have described elsewhere as the iconic representation system (Peck, 2007, 2016, 2018; Roeser et al., 2006; Roeser & Peck, 2009; Smith, McGovern, Peck, et al., 2016) and is similar to Barnard et al.'s (2007) *implicational meaning* system, Epstein's (2003) *experiential* system, Deutsch and Strack's (2006) *impulsive* system,

[1] The neuroperson model uses the terms schemas, beliefs, and awareness to denote three qualitatively different internal representation systems (and associated functions) *centred* within, respectively, the limbic system, the neocortex, and the prefrontal cortex. The BLoS model uses similar but additional terms mapped onto to a more nuanced description of brain systems.

Bowlby's (1988) *working model* system, Baldwin's (1992) *relational schema* system, and Izard's (2009) *emotion schema* system.

The basic idea is that schemas are initially formed and elaborated nonconsciously and automatically during child-caregiver interactions and can described in terms of four primary forms of *attachment style* (i.e., secure, insecure [anxious, or avoidant], and disorganized). As relatively-enduring parts of the self/identity system, such attachment schemas act like *set points* for the way youth initially engage in and respond to program content and staff practices. Including schemas as a core feature of the neuroperson model is intended to help practitioners address both basic human needs (e.g., competency, autonomy, and relatedness) and the background experiences of children and adolescents. For example, many youth enter OST program offerings having had a wide range of adverse childhood experiences (Carlson et al., 2019; Merrick et al., 2018), and 'meeting youth where they are at' means being sensitive to their feelings and understanding that they may be experiencing emotional turmoil that makes it difficult or impossible for them to be mentally present and engaged with offering activities.

Beliefs. The term *beliefs*, as used here, refers to the species-typical, neo-cortical capacity for the development of "declarative (e.g., beliefs about things) and procedural (e.g., beliefs about how to do things) knowledge (primarily verbal in nature) that becomes increasingly differentiated . . . and integrated . . . over time" (Roeser et al., 2006, p. 403); or, more simply, verbal-symbolic evaluative representations of the self and world. In these terms, "within the symbolic level of representation, beliefs are the most fundamental unit of information, and basic beliefs differentiate and integrate across time to form more complex belief systems such as attitudes that combine to form goals that combine to form plans" (Peck, 2007, p. 1139). During childhood, and beyond, beliefs are formed automatically during social interactions but, also, intentionally during self-reflection (particularly, during and after adolescence). Just as attitudes, goals, and plans can be viewed as increasingly complex belief systems, there are many other psychological constructs that can be defined in terms of belief systems (e.g., values, opinions, mindsets, self-concepts, personal identities). Most of the terms used by typical SEL theoretical frameworks can be defined in terms of beliefs about the self and world. For example, both perspective-taking (e.g., the ability to distinguish another person's perspective from one's own perspective) and theory of mind (e.g., the ability to understand that other people have their own intentions and feelings) can be defined in terms of *beliefs about* others' goals, intentions, and feelings.

In contrast to schemas, which are relatively stable and change mainly as a result of many direct and repeated social interactions, beliefs are relatively malleable and can be modified as a result of single indirect social interactions (e.g., vicarious learning, or learning by observing something that happens to someone else) or even simply by reflecting on previous or anticipated social interactions. Nevertheless, once formed, both schemas and beliefs tend to be relatively-enduring, exist and function outside of conscious awareness, and influence *conscious* feelings and behavior only after being *activated* (e.g., by an environmental trigger or self-reflection). Including beliefs as a core feature of the framework is intended to help practitioners address things like specific content knowledge (e.g., what youth need to know about their task, situation, and culture) and more general personal and social identity issues (e.g., values, efficacy, and roles).

Principles associated with BLoS (e.g., parallel distributed processes) can be used to understand the behavioral implications of simultaneously operating factors such as (a) beliefs about the value and relevance of program-offering content (hypothesized to be represented primarily as belief systems within the symbolic representation system) and (b) social *rejection sensitivity* (hypothesized to be represented primarily as schemas within the iconic representation system). For example, two youth with similarly favorable attitudes toward program-offering content (and similarly favorable context quality) may vary in their tendency to remain fully engaged in constructive interactions with program staff as a function of their differential sensitivity to social rejection. In more general terms, such cross-level BLoS dynamics have been described in terms of dual-process models of self-regulation and impulse control (Ayduk et al., 2008; Deutsch & Strack, 2006; Hofmann et al., 2009; Kahneman & Frederick, 2007; Kochanska &

Knaack, 2003; Rodriguez et al., 1989; Rothbart, 2007; Schultheiss, 2001; Sherman et al., 2008; Sloman, 1996, 2014; Smith & DeCoster, 2000; Strack & Deutsch, 2004), but few of these models are based on well-developed multilevel systems theories.

Thinking about mental processes in terms of two qualitatively different processing systems is an advance beyond models that assume a single system, but such dual-process models invariably omit reference to or otherwise conflate additional systems relevant for understanding human psychological functioning and behavior. For example, most dual-process approaches contrast a relatively-automatic, fact-acting nonconscious experiential system with a relatively-controlled, slow-acting, conscious rational system (cf. Epstein, 2013; Kahneman & Frederick, 2007; Leiberman, 2003; Metcalfe & Mischel, 1999). Although the experiential, reflexive, or hot system in these approaches corresponds fairly closely to what we call the schema or iconic system, the rational, reflective, or cool system in these approaches does not correspond so clearly to what we call the belief or symbolic system, mainly because most dual-systems approaches collapse what we call the belief and awareness systems into a single rational, reflective, or cool system.

However, rather than viewing the rational system (Epstein, 2003), or the reflective system (Deutsch & Strack, 2006), as a single form of representation or processing, we distinguish among (a) beliefs as symbolic representations existing in long-term memory, (b) thoughts and feelings as *phenomenological representations* existing in working memory, and (c) *awareness* defined similarly to how James (1890) defined *I* as Thought and Erikson (1981/1996) defined *I* as the "most elusive endowment of creatures with consciousness" (p. 293) (cf. Peck, 2007, 2009; Roeser & Peck, 2009). In these terms, a complete description of the structures and functions constituting the rational or reflective system requires reference to symbolic representations (e.g., beliefs about my past, present, and future) that have been *activated* as phenomenological representations (e.g., by exposure to environmental stimuli) and then re-activated (or not) by selectively focusing awareness (described below) on some of these representations but not others. Consequently, according to the MPC*n* model, understanding the relations among the biological, psychological, and social factors associated with social and emotional learning requires (a) distinguishing the serial processing characteristic of the *hierarchically*-arranged levels of organization (e.g., persons in relation to contexts) from the parallel processing characteristic of the *heterarchically*-arranged levels of the self-system and (b) attending explicitly to more than simply "dual" processes (Peck, 2007; Roeser et al., 2006) which, in this case, means taking full account of the role of awareness in relation to schemas, beliefs, and behavior (Roeser & Peck, 2009).

Awareness. The term *awareness* (or *executive attention*), as used here, refers specifically to consciously shifting and sustaining the focus of awareness in relation to ongoing thoughts and feelings. However, as suggested previously, the awareness part of the neuroperson model also stands for the entire set of *currently-activated* beliefs and schemas (i.e., phenomenologically immediate thoughts and feelings) and the *executive functions* (e.g., working memory) that operate on those thoughts and feelings to provide the basis for all forms of self-reflection (e.g., secondary appraisal, planning, and the effortful control of impulses). In this view, consciously shifting and sustaining the focus of awareness are the primary skills that allow individuals to actively participate in the otherwise automatic relations between what James (1890) referred to as *I* (i.e., awareness) and *Me* (e.g., thoughts and feelings).

However, in order to best appreciate awareness skills, it is necessary to distinguish them clearly from both (a) thoughts and feelings and (b) beliefs and schemas. For example, saying something like "I'm aware of social stigma" is, in MPC*n* terms, tantamount to saying "I believe that social stigma exists," and neither of these statements reflect what we mean by shifting and sustaining the focus of awareness. A simple way to keep in mind the distinction between thoughts (and feelings) and awareness is to think of thoughts and feelings as the *contents* of the *stream of consciousness* and awareness as the *process* of focusing consciously on only some of those thoughts and feelings. This was James' (1890) strategy, codified by distinguishing between the *I* and *Me*. Similarly, a simple way to keep in mind the distinction between beliefs (or schemas) and thoughts (or feelings) is to think about how the hundreds of

beliefs and schemas that you have accumulated across your lifespan tend to remain unconscious, in long-term memory, most of the time and how the few thoughts and feelings that are activated, in working memory, in any given moment reflect only a small proportion of the total set of beliefs and schemas that could potentially be activated in any given moment.

In the neuroperson model, we use the term awareness as a label for the top level of the self-system in order to contrast this level from the schema and beliefs levels. However, the *I* vs. *Me* distinction described above makes clear that the awareness level of the neuroperson model is intended also to include reference to ongoing thoughts and feelings. These ongoing thoughts and feelings (or, phenomenological representations) are, in turn, contrasted with the beliefs and schemas stored in long-term memory that may or may not be activated, or *re-represented*, as thoughts and feelings in any given moment. In other words, although the neuroperson model simplifies the self-system into three main levels (i.e., awareness, beliefs, & schemas), addressing the details of SEL skill growth often requires specific reference to activated thoughts and feelings. We have, for simplicity purposes, nested the concept of activated thoughts and feelings within the awareness level but, technically, they are not awareness proper at all. Rather, thoughts and feelings are construed best as phenomenological representations, or activated and re-represented beliefs and schemas, that typically influence behavior but that may or may not become the focus of awareness.

Including awareness as a core feature of the MPC*n* model is intended to help practitioners address the most developmentally-advanced forms of self-regulation; in particular, to help youth use awareness to reflect, evaluate, plan, problem solve, inhibit and redirect dominant responses, and otherwise participate consciously in their own personal and social identity development. As described below in more detail, consciously shifting and sustaining the focus of awareness on specific aspects of ongoing thoughts and feelings allows individuals to, among other things, selectively activate, create, elaborate, and encode into long-term memory some beliefs systems at the expense of others, and these processes are the core of human self-regulation, autonomy, agency, and identity development.

Agency. Consistent with the idea that human self-regulation is not a monolithic phenomenon, and that there are multiple self-regulatory mechanisms distributed across multiple levels of analysis, the MPC*n* model encompasses two broad approaches to describing the concept of human agency. These two approaches correspond to two fundamentally different kinds of subject-object distinctions that map, respectively, onto LoOrg and LoRep. The first, most general and historically popular description, involves conceiving of human organisms-as-whole as *subject* and the environment in which organisms are embedded as *object*; that is, "the divide is between *object* and *subject*. Each object is, roughly, an 'it', and each subject is a 'you'. On this usage, it is items like *us* that stand in contrast to objects. We are subjects; trees, universals, colleges, colors, and—well, all things not like us in relevant respects—are objects" (Rettler & Bailey, 2017, sec. 1.3). In this view, organisms are *agents*, and human agency is described in terms of the relations between persons and environments. There are innumerable instances – throughout the social science literature on self-regulation, self-control, and agency – of framing descriptions of human agency using this kind of "Type 1 subject-object relation" (Peck, 2007, p. 1145). For example, Cervone et al. (2006) argued that "the entity that is self-regulating is a person" (p. 335) and "whole complex persons, residing in a social world, are the beings engaged in the efforts that we label 'self-regulation'" (p. 335). Given that virtually all LoOrg schemes treat human organisms as agents embedded in environments, the Type 1 subject-object relation applies to any person-in-context model that treats the organism-as-a-whole as the primary unit of analysis.

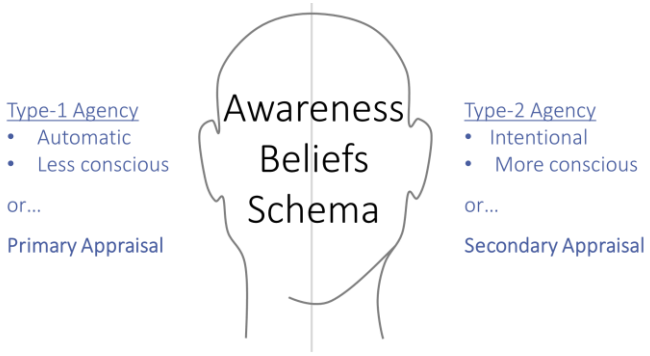
In contrast to the classic Type 1 subject-object distinction that works well where framing questions in terms of a unidimensional series of hierarchical, materially-nested LoOrg, the psychological sciences have drawn attention to a second, or Type 2, kind of subject-object relation that reflects the conscious experience of being an agent of one's own thinking, feelings, and behaving. Consistent with James' (1890) distinction between the *I* and *Me*, the Type 2 subject-object relation reflects the phenomenological – awareness-as-subject and contents-of-thought-as-object – type of subject-object

distinction (Peck, 2007); that is, "to be a subject in this sense is, roughly, to experience or to be conscious" (Rettler & Bailey, 2017, sec. 1.3). In this view, psychological part-processes (particularly, awareness), are agents, and agency is described in terms of the relations between awareness and the contents of the stream of consciousness (i.e., thoughts and feelings), as in *self-reflection,* or behavior more generally. For example, Baumeister and Vohs (2003) argued that "the aspect of the self that initiates behaviors and makes selections is called executive function" (p. 197) and "the executive function of the self can be thought of as the aspect of the self that is ultimately responsible for the actions of the individual" (p. 199).

Given the paucity and diversity of LoRep schemes, most of which omit reference to awareness as defined in the MPC*n* model, it is impossible to generalize Type 2 subject-object relations to all multilevel self-system models (e.g., because few distinguish awareness from thoughts and feelings). Nevertheless, in addition to James' (1890) classic distinction between the *I* and *Me*, and Roeser and Peck's (e.g., 2009) work on the BLoS model, there are many excellent descriptions of Type 2 subject-object relations that pertain specifically to multilevel conceptions of self-systems, the concept of human agency, and the distinction between "awareness" and self-system objects such as beliefs, schemas, thoughts, and feelings. For example, Klein (2012) argued that:

> "psychologists often fail to appreciate that: (a) the subjective self is not an object, but an awareness, a consciousness, and as such is not privy to anyone but itself, and (b) that there are profoundly important differences between self as a subjective entity (the ontological self) and the self as types of knowledge available to that subjectivity (i.e., the epistemological bases of self-knowledge…). The two selves are contingently related, but are not conceptually reducible. By conflating them, we assume we are casting empirical light on one (the ontological self) all-the-while experimentally exploring the other (epistemological self-knowledge)" (p. 497).

Figure 3. Type 1 and Type 2 Agency.



With these Type 1 and Type 2 subject-object relations mapped to their respective locations within the LoOrg and LoRep systems, the BLoS model refers to two different but interrelated forms of human agency: *automatic*, or Type 1, agency and *intentional*, or Type 2, agency (see Figure 3). We refer to automatically-activated beliefs and schemas as *Type 1 agency* because it invokes the classic Type 1 – person-as-subject, environment-as-object – subject-object distinction, or what happens automatically when a person encounters an environment. For example, Blair and Raver (2012) described the automatic, primary-appraisal processes characterizing Type 1 agency as "less effortful processes associated with stress physiology, emotional arousal, and attention focusing" and "reactive, highly automatic, and phylogenetically older styles of response" (p. 648). In contrast, we refer to intentionally-, or consciously-, activated beliefs and schemas as *Type 2 agency* because it invokes the phenomenological Type 2 – awareness-as-subject, contents-of-thought-as-object – type of subject-object distinction, or what happens when a person reflects consciously about themselves or the world. For example, Blair (2016) described the more intentional, secondary-appraisal processes characterizing Type 2 agency, or *executive functions*, as "working memory, inhibitory control, and the flexible volitional shifting of the focus of attention" (Blair, 2016, p. 1) involved with deliberate decision-making processes (e.g., planning and goal setting).

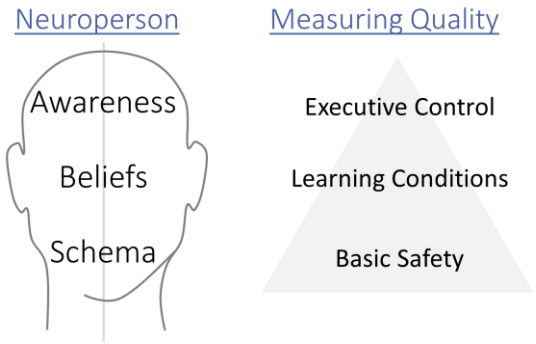
All humans exhibit *automatic agency* (Type 1), as in behavior driven by primary appraisals derived from prior experience and nonconscious knowledge of themselves and the world around them.

For example, the integrated system of schemas and beliefs that young people bring to OST program offerings provide a set point for their default regulation skills (e.g., how likely they are to be interested in or triggered by offering content). In contrast, *intentional agency* (Type 2) involves the more subtle and sporadic process of consciously shifting and focusing awareness among the contents of immediate thoughts and feelings, as in self-reflection and secondary appraisal. Consciously focusing on thinking, feeling, and acting to optimize learning experiences occurs best when young people (a) have had their basic regulation needs met (e.g., they have not been triggered emotionally and task content has been scaffolded to a moderate difficulty level) and (b) are being actively supported by staff to consciously reflect on information, experiences, meaning, and implications as they emerge during POS engagement.

Focusing on schemas, beliefs, awareness, and agency – in contrast to terms like cognition, emotion, and motivation (which tend to be ambiguous) – draws attention to, and helps demystify, some of the key challenges faced by stakeholders and practitioners, such as: (a) how to understand and respond to young people who have had adverse life experiences and whose corresponding attachment schemas are triggered while participating in youth services (creating basic self-regulation issues), (b) how to understand the bulk of terms used in the many SEL frameworks as different words (e.g., knowledge, mindsets, values) for the same things (i.e., beliefs about the self and world), and (c) how to understand the critical role that conscious awareness plays in promoting the highest forms of human agency (e.g., allowing youth to become intentional authors of their own identity and development). Harmonization of these BLoS systems in pursuit of life goals (e.g., developing an integrated identity, graduating from school, and keeping a good job) can be viewed as the main point of focusing on SEL skill growth.

In addition, placing the BLoS model, or its neuroperson simplification, at the center of the person-in-context system facilitates detailed understanding of the sequential and reciprocal relations among staff practices, youth experiences, youth SEL skills, and youth behavior. For example, youths' beliefs and schemas are activated, consciously or unconsciously, by their engagement with context. Settings that effectively activate youths' secure attachment schemas and personal goals are much more likely to promote engagement with task content and learning (see Figure 4). Because youth arrive at program offerings with very different prior experiences and ways of seeing the world, effectively engaging their learning and agency depends on practitioners building and maintaining relationships with youth and their communities, which means getting to know them deeply – a best practice in trauma-informed approaches.

Figure 4. SEL Skills and Supportive Quality Practices.



Being sensitive to youths' attachment schemas is particularly important where serving youth who have experienced chronic stress or trauma, which means that they are likely to respond unintentionally to triggers or challenge arising in provision. Staff may need guidance on how best to respond to such emotional episodes (e.g., how to be supportive but not intrusive), but the main goal is to be responsive rather than dismissive. Youth are empowered when they are supported in consciously acknowledging their thoughts and feelings about what is happening in and around them and what it means for their ability to function constructively within provision. Social and emotional learning, then, is a process of self-organization and self-regulation that promotes youth experience of agency, or the experience of control, efficacy, and esteem that follow from being supported and trusted to make decisions about things that affect them (Smith, McGovern, Larson, et al., 2016).

II. SEL Outcome Domains

Although we use the term *outcome* according to the dictionary definition – that is, a consequence of something that happens as a result of something else – it is important to recognize that any given measure can be used as a predictor or outcome, depending on its placement within the overall program or study design. In other words, the term outcome should be understood not as "final outcomes per se but rather indicators of progress along a successful life path" (Eccles & Gootman, 2002, p. 67). In these terms, outcomes include both the SEL skills themselves, however conceived, and the life course achievements they are associated with (e.g., health, education, and employment). Developmental experiences in youth program settings – and the staff practices and relationships that help to create them – provide opportunities to learn SEL skills by doing, and this experiential learning (i.e., SEL skill growth) provides a strong basis for transferring these skills to other settings. To complete the logic model, SEL skills that transfer then support achievement of a broad set of outcomes across different settings and moments in the life course.

Following the seminal work on the key personal and social assets characterizing positive youth development that was generated by the US-based National Research Council's Committee on Community-Level Programs for Youth (Eccles & Gootman, 2002), along with a variety of similar efforts (e.g., Jones et al., 2017; Larson et al., 2006; Lerner et al., 2005), there is general consensus around the kinds of social and emotional skills that matter for young people. The outcome domains described below are intended to both simplify and extend the common language for discussing and promoting SEL skill growth in a way that is easily understood by stakeholders, practitioners, and youth.

We organize our outcomes framework by reference to six domains of youth SEL skills and corresponding staff practices. We selected these domains because:

- They were generated from evidence-based practitioner expertise and youth interviews about the experiences that build SEL skills and how skills transfer beyond OST program settings and into the early adult life course (Smith, McGovern, Peck, et al., 2016).[2]
- They have extensive overlap with many other frameworks that seek to describe SEL skills.
- They describe, in plain language, SEL mental and behavioral skills that are both developed during program offerings and transferred beyond those offerings.

[2] The work of Reed Larson and colleagues provided the primary evidence base for developing the interview questions, SEL skill domains, and performance standards. Domain content was derived primarily from the voices of practitioners and adolescents, via hundreds of interviews conducted across two decades. A list of published work related to the six SEL skill domains can be found in Smith, McGovern, Larson, et al., 2016, Appendix C; a complete list of Larson's work in this area can be found at http://youthdev.illinois.edu/).

Figure 5. Youth Outcomes: SEL Skill Domains and Transfer Outcomes.

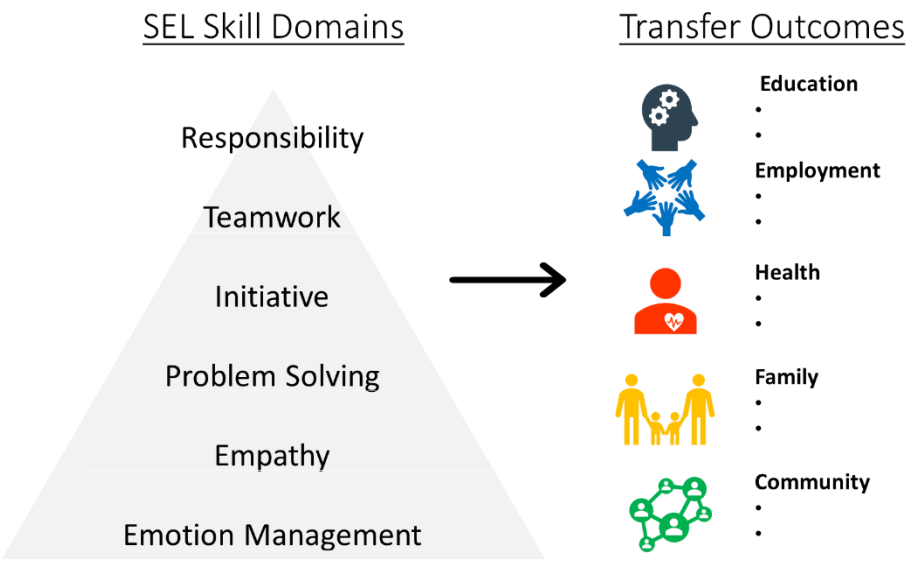


Figure 5 describes six SEL skill domains that reflect sets of interrelated staff practices and youth experiences within program offerings, as well as SEL skills that youth bring to provision and transfer to other domains of life, such as family, school, and early adulthood. Ideally, youth OST program offerings, which entail setting-specific staff practices and youth experiences at the POS, are designed to achieve specific SEL benchmarks (i.e., types and levels of performance) in one or more skill domains. Achieving proximal benchmarks (e.g., youth engagement at the POS) promotes both skill growth during program offerings and skill transfer beyond those offerings.

Specification. According to the MPC*n* ToC, the content of each outcome domain includes (a) the quality of staff practices at the POS, (b) youths' demonstration of mental and behavioral skills at the POS, and (c) the mental and behavioral skills youth bring to and transfer from OST program offerings. Table 1 provides plain language descriptions of young people's mental and behavioral skills for each of the six domains.

Table 1. Youth Mental and Behavioral Skills for Each of the Six Domains.

Domain	
Emotion Management	Youth SEL Skills: Abilities to be aware of, name, understand, and constructively handle both positive and negative emotions. Mental Skill Indicators: Focusing and shifting awareness; reappraisal; response inhibition. Behavioral Skill Indicators: Easily frustrated; remains calm in stressful situations. Optimal Skill Benchmarks: 4.0 on the ARYB – Emotion Management (EM) scale. Functional Skill Benchmarks: Positive T1-T2 individual-level functional SEL skill profile change & positive mean-level change on EM belief scale.
Empathy	Youth SEL Skills: Relating to others with empathy, compassion, acceptance and understanding, and sensitivity to their diverse perspectives and experiences Mental Skill Indicators: Abilities to understand how others feel, feel what others are feeling, and feel bad for others who are worse off or get their feelings hurt.

	Behavioral Skill Indicators: Noticing when others are emotionally upset, showing empathy by reflecting others' feelings, responding to others' feelings without taking them personally. Optimal Skill Benchmarks: 4.0 on the ARYB – Empathy (EY) scale. Functional Skill Benchmarks: Positive T1-T2 individual-level functional SEL skill profile change & positive mean-level change on EY belief scale.
Problem Solving	Youth SEL Skills: Abilities to plan, strategise and implement complex tasks, including critical thinking, goal setting and responsible decision making. Mental Skill Indicators: Abilities to brainstorm and organize ideas, make alternative plans, make step-by-step plans, manage time, and keep track of goal progress. Behavioral Skill Indicators: Brainstorm ideas before developing a plan, evaluate alternative plans for reaching a specific goal, create plans with multiple steps, manage time, keep track of goal progress, and adjust to feedback . Optimal Skill Benchmarks: 4.0 on the ARYB – Problem Solving (PS) scale. Functional Skill Benchmarks: Positive T1-T2 individual-level functional SEL skill profile change & positive mean-level change on PS belief scale.
Initiative	Youth SEL Skills: Abilities to take action, sustain motivation, and persevere through challenge toward and identified role. Mental Skill Indicators: Abilities to take the initiative, generate new solutions, persist during challenge, and risk failure. Behavioral Skill Indicators: Take the initiative, set ambitious but realistic goals, stay on-task despite distractions, and push through during a challenging task. Optimal Skill Benchmarks: 4.0 on the ARYB – Initiative (IN) scale. Functional Skill Benchmarks: Positive T1-T2 individual-level functional SEL skill profile change & positive mean-level change on IN belief scale.
Teamwork	Youth SEL Skills: Abilities to collaborate and coordinate action with others, including communication, teamwork and leadership. Mental Skill Indicators: Abilities to do fair share of group work, help others, seek help from others, respect others' viewpoints, and hold others accountable. Behavioral Skill Indicators: Help or cooperate with others who are struggling, seek help from others, remind others to do their part, and keep track of own and others' group progress. Optimal Skill Benchmarks: 4.0 on the ARYB – Teamwork (TM) scale. Functional Skill Benchmarks: Positive T1-T2 individual-level functional SEL skill profile change & positive mean-level change on TM belief scale.
Responsibility	Youth SEL Skills: Abilities to reliably meet commitments and fulfil obligations of challenging roles. Mental Skill Indicators: Abilities to take responsibility for their actions, finish tasks that are started, be counted on to get their part done, do the things that they say they are going to do, and do their best when an adult asks them to do something. Behavioral Skill Indicators:Finish the task that they started, do the things that they said they are going to do, acknowledge mistakes and take action to address them, and do the things an adult asked them to do. Optimal Skill Benchmarks: 4.0 on the ARYB – Responsibility (RS) scale. Functional Skill Benchmarks: Positive T1-T2 individual-level functional SEL skill profile change & positive mean-level change on RS belief scale.

III. Guidelines for Measurement

Benefits of an Integrated Model

Integrated Models, as described by Grice (2015), focus on the tangible parts and processes, or causes and effects, governing mental and behavioral skills in specific settings or contexts; as such, they can be used to represent and distinguish among (a) mental skills that frame or predicate meaning-making, (b) behavioral episodes that express meaning, and (c) situational features that support or undermine particular meanings or behavior. Integrated models for specific research or evaluation questions are relatively easy to develop where using these distinctions. For OST settings and systems focused on young people's SEL skill growth, the key parts and processes are outlined in the ToC shown in Figure 1. Prior to selecting measures, we recommend that local practitioners use this ToC to guide the creation of integrated models that reflect each of the specific research or practical questions they want to address. As discussed below, with these integrated models in hand, the type and range of viable measures relevant for testing the selected models should become more apparent than would otherwise be the case (e.g., where using only variable-centered models).

In addition to detailing the mental and behavioral components of an integrated model, the BLoS model implies some general guidelines for selecting measures based on sensitivity to change in the target of measurement. For example, the schema, belief, and awareness systems can be ordered along a *stability hierarchy* reflecting the expected malleability of their constituent elements: Schemas are relatively-enduring, on the order of years, so a time 2 schema assessment (e.g., attachment, social phobia) sensitive to change would likely be on the order of months, years, and decades. Beliefs are relatively-enduring, on the order of minutes to months, so a time 2 belief assessment sensitive to change could be on the order of minutes, months, or years. Awareness, per se, is relatively-fleeting, on the order of milliseconds to seconds, so a time 2 awareness assessment sensitive to change would be on the order of milliseconds to minutes. However, the awareness system conceived as a proxy for phenomenological experience (e.g., currently activated beliefs and schemas) can also be viewed as reflecting the underlying neurobiological systems that support awareness and phenomenological representation (e.g., arousal and working memory), and these systems have base-rate stabilities that more closely resemble schemas than awareness. In other words, measurement demands vary widely across specific aspects of the awareness system, so providers should take care that the measures selected map closely onto the specific skills they intend to measure and promote.

Mental and Behavioral Skills. The BLoS model also highlights the necessity of distinguishing between mental skills and behavioral skills. From this perspective, young people's behavior is an external manifestation of mental skills developed through mental and behavioral engagement with the context (which includes both task demands and social relationships). Behavior is an important indicator of the status of basic and advanced mental regulation skills, but provides only loosely coupled information about those skills due to the principles of equifinality (e.g., similar behaviors can be produced by different psychological processes) and multifinality (e.g., different behaviors can be produced by the similar psychological processes) (Bertalanffy, 1968; Cicchetti & Rogosch, 1996). Consequently, comprehensive assessments of young people's SEL skills require measures of both mental and behavioral skills.

Optimal and Functional Skill Measures. In addition to distinguishing between mental and behavioral skills, the BLoS model also distinguishes between youth outcomes conceived as *states* of optimal engagement at the POS (e.g., demonstrating SEL skills with the aid of high-quality support) versus youth outcomes conceived as relatively-enduring functional SEL skill *traits* that are transferred into and out of provision. The distinction between states and traits, as used here, reflects the distinction between optimal and functional skill levels (Fischer, Rose, & Rose, 2006); that is, optimal skill is the best

someone can do while receiving the highest-quality supports, and functional skill is the best they can do with few supports. In these terms, measures of young people's behavioral engagement at the POS, where they are relatively-well supported, reflect optimal skill levels, whereas measures of SEL skills in general (e.g., typical self-report measures) reflect functional skill levels, or how young people think they perform in general, where high-quality supports cannot be assumed.

As shown in Figure 6, we recommend adult ratings of young people's SEL behavioral skills at the POS because they are more likely to reflect optimal skill levels than young people's self-reports about their skills in general, which should be more likely to reflect functional skill levels. In addition, the former are likely to be more sensitive to variations in context quality than the latter because optimal behavioral skills are more proximal to provision supports than the relatively-distal functional skills typically assessed using self-report tools focused on skills in general.

Figure 6. Recommended Measures by Type and Purpose.

	Mental	*Behavior*
Optimal	Requires a performance task	**Recommended for feasibility and sensitivity to program effects on SEL skill**
Functional	**Youth Survey**	Requires a rating from home, school, etc.

Linking POS Engagement, SEL Skill Growth, and Transfer Outcomes. Evaluating the relations between POS engagement, SEL skill growth, and SEL skill transfer should be the most informative where measures are aligned, to the extent feasible, by reference to one of the six SEL skill domains (see Table 1). For example, where examining the relations of mental engagement at the POS to SEL skill growth, the SEL skill measures should be relatively domain-specific and aligned with staffs' intentions and practices. However, where examining the relations of SEL skill growth to far-transfer outcomes (see Figure 5), the domain-specificity requirement is less applicable because life course achievements such as employment and health appear to depend more on integrated SEL skill sets than any particular SEL skill alone. A lack of well-developed SEL skills in any of the six domains would likely have similarly deleterious effects on achieving a good education, a good job, the best possible physical and mental health, as well as well-functioning family, peer, and community networks.

Selecting Measures

We encourage providers to think carefully about the specific mental and behavioral skills they intend to work on during provision and then select tools that are (a) designed explicitly to assess those skills, (b) produce data of known reliability and validity, and (c) have been shown empirically to be sensitive to changes predicted to occur within the span of time during which they are able to collect pre-test and post-test data. The selected measures must also be (d) *feasible* to administer, meaning both providers and young people must have the time, motivation, and infrastructure necessary to complete the measures. For example, despite having selected measures with evidence of reliability and validity, it may not be feasible to use an on-line version of those measures if they require an hour to complete, if providers have access to only a few or no computers, and if no time within provision has been budgeted for young people to sit sequentially through the data collection process.

The ToC (see Figure 1) can be used to identify the kinds of measures necessary for addressing a wide range of research and evaluation[3] questions. In general, the further left you go in the ToC, the more

[3] By "research and evaluation" questions, we are referring to questions about both (a) provision impact on young people's point-of-service engagement and SEL skill growth and (b) the use of provision data (e.g., staff instructional quality, young people's POS engagement, and young people's SEL skills) in continuous quality improvement processes (e.g., planning with data and training decisions) (cf. Smith et al., 2019).

that specific measurement details matter. For example, having detailed information about the specific SEL strengths and weaknesses young people bring to provision helps front-line staff calibrate and target their interactions with each particular young person. As a basic principle of scaffolding, such background details are analogous to a math teacher knowing whether each student has mastered addition before moving on to subtraction. Here, we focus on the elements of the ToC most relevant to youth SEL skill growth, labelled with the letters B, E, and F.

Needs Assessment and Baseline SEL Skills. For both impact and continuous quality improvement (CQI) questions, the ToC suggests starting with pre-provision, or baseline, measures of young people's SEL skills that are relevant to SEL skill growth and functioning within provision, or element B of the ToC: young people nested within their local communities (e.g., family, neighbourhood, school, peers). In this case, measures of young people's SEL skills are conceived as *individual-level* measures of the mental and behavioral skills that are likely to be displayed in community settings, prior to participation in provision. Pre-provision measures can include both more general *needs assessments* and more specific *pre-tests* of the SEL skills that will be assessed subsequently to estimate the growth of young people's functional and optimal mental and behavioral skills.

Baseline needs assessments can include information about young people's (a) family and community situations, (b) histories of education and enrichment experiences, and (c) exposure to stressful life events (e.g., adverse childhood experiences). In particular, consistent with the neuroperson model, baseline needs assessments could also include measures of young people's attachment schemas or related constructs, such as fear of abandonment, social phobia, or rejection sensitivity. Schemas and beliefs operate as integrated systems, so achieving a holistic understanding of young people's SEL skill status prior to entering provision requires measures of both schemas and beliefs.

Pre-test assessments of functional mental and behavioral skills generally take the form of self-report measures associated with SEL-oriented youth outcome frameworks (e.g., self-esteem, emotional wellbeing, relationships). There are literally hundreds of possible measures from which to choose. Although many of these measures focus on mental skills, self-report measures often also include items about young people's functional behavioral skills.

For youth provision settings, we recommend pre-test information about young people's optimal behavioral skills, which we view as generally more valid and sensitive measures of SEL skills than young people's self-reports of their mental skills**.** In typical situations, assessing optimal behavioral skill levels should be done by providers after a few weeks in provision (as element E of the TOC). We recommend that provision staff collect pre-test data about young people's optimal behavioral skills during the provision or intervention to ensure that they are becoming sufficiently familiar with each young person's behavior and so that they will know how to work with, and respond to, that and subsequent data about young people's behavioral skills.

Whichever measures are selected for the pre-provision assessment should generally be (a) relevant to a specific practical or research question, (b) aligned with program plans and staff intentions to promote the kinds of skill growth the measures are intended to assess, and (c) used again at the first post-provision assessment (i.e., element F of the ToC). In cases where it may be necessary or advantageous to obtain pre-test measures of young people's behavioral SEL skills *before they arrive at provision*, as part of element B of the ToC, there are several options: Use measures of optimal behavioral skills from prior years in provision; parent reports of young people's behavior before entering provision; or young people's self-reports of their own baseline behavior.

POS Engagement and Skill Growth. According to the ToC, high-quality staff practices at the POS that are scaffolded to a young person's skill levels promote both youth engagement at the POS and

SEL skill growth during and following provision. Measures of young people's engagement at the POS correspond to element E of the ToC and take two primary forms: mental engagement and behavioral engagement. The term mental engagement, as used here, corresponds to the Awareness component of the neuroperson model (see Figure 2) and refers to the thoughts and feelings young people experience at the POS (e.g., interesting, challenging, stressful). According to the BLoS model, immediate thoughts and feelings are a function of the interaction between social supports and mental skills; that is, mental engagement is influenced by mental skills, but such thoughts and feelings should not be confused with mental skills themselves.

In addition to the influence of mental skills on mental engagement, mental engagement is conceived as a primary driver of mental skill growth. In short, young people who are mentally engaged at the POS are expected to undergo more mental skill growth than young people who are disengaged. For example, according to the ToC, the amount of growth in SEL skills that is expected to occur between pre- and post-provision assessments of SEL skills will differ by the extent of mental engagement at the POS for that young person. Assessments of young people's mental engagement at the POS can be obtained from youth self-report surveys about their thoughts and feelings that are administered either during or immediately following a provision. Care should be taken to ensure that the measures used for this purpose are designed to assess young people's phenomenological experience at the POS, as opposed to, for example, young people's beliefs about their own or others' mental skills. Assessments of optimal mental skills, whether occurring inside or outside of provision, generally require intensive measurement procedures that may be impractical for many providers.[4]

In addition to mental engagement, element E of the ToC also includes behavioral engagement at the POS. The term behavioral engagement, as used here, corresponds to the behavioral component of the neuroperson model (see Figure 2). We generally describe behavioral engagement at the POS in terms of optimal behavioral skills. However, the behavioral skills young people display at the POS can vary along a continuum from functional to optimal, depending on the quality of supports provided by staff at the POS. For example, lower-quality staff practices at the POS are, by definition, more likely to promote the display of functional than optimal behavioral skills among participating young people.

Assessments of young people's behavioral skill at the POS can be obtained from external ratings of young people's behavior observed directly by providers during several hours and weeks of provision. The first such behavioral rating should occur only after providers have had the opportunity to become familiar with each of the individuals that they will be rating; that is, providers should have directly observed young people's behavior at the POS for several hours and weeks before conducting their first set of behavioral ratings. Subsequently, and assuming methods for tracking the same young people over time have been implemented, evidence of young people's behavioral skill growth can be derived from behavioral ratings that are repeated after at least three months of provision. Provider ratings of young people's behavioral skill at the POS tend to be the most sensitive indicators of the effects of provision quality; hence, they are ideal for generating quality-to-outcomes impact estimates. Repeated ratings of young people's behavioral skill at the POS that are spaced less than three months across time should generally not be used for impact analyses because null findings may be confused with insufficient time for detectable skill growth to occur.

SEL skill assessments that occur after young people have participated in provision for several months can take several different forms. A first kind of post-provision assessment was described previously in terms of post-provision functional skill measures (i.e., element F of the ToC); these

[4] Measurement procedures that yield detailed information about mental processes and skill growth, such as *direct assessments*, are becoming more widely available and viable for use within provisions (cf. McKown et al., 2013; 2019), but may nevertheless remain impractical in many settings.

measures should generally be the same measures used for the pre-test assessment (i.e., element B of the ToC). A second kind of post-provision assessment was described in terms of in-provision behavioral skill rating measures (i.e., element E of the ToC); however, the follow-up, or repeated assessment, of behavioral skills can be viewed as post-provision to the extent that they are based on several hours and months of provider observation of young people at the POS. Two additional kinds of post-provision assessments are described next in terms of near- and far-transfer outcomes.

Transfer Outcomes. A third kind of post-provision assessment involves measures of SEL skills, and the consequences of SEL skills, as they occur in community contexts other than provision, such as family and school (i.e., element G of the ToC). We refer to this assessment period as involving the *near transfer* of SEL skills developed during provision to other community settings because the growth of SEL skills during provision should be evident in how those skills are transferred to tasks such as being a good family member, student, and friend. Accordingly, measures relevant to assessing the near transfer of SEL skills include academic grades and school discipline referrals obtained from school system records and parent (or guardian) reports of youth well-being and behavior. If changes in near transfer effects are of prime interest to providers, they would be advised to include such measures as part any pre-testing (i.e., element B of the ToC) and plan on follow-up assessments scheduled not more frequently than biannually or annually.

A fourth kind of post-provision assessment involves measures of the *far transfer* of SEL skills to personal and social achievements occurring during early adulthood and in contexts that can (but do not necessarily have to) extend well beyond the local community into regional, national, or international contexts (i.e., element H of the ToC). Measures of the far transfer of SEL skills developed within provision include high school, vocational training, and college graduations; obtaining, maintaining, and advancing employment; and developing a physically and mentally healthy lifestyle. These measures typically have no pre-test counterparts but can nevertheless be informative about the impact of high-quality youth services on young people's developmental pathways.

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