Research Summary:
Approaches to Learning–Self-Regulation (ATL-REG) Domain in the DRDP (2015) Assessment Instrument

The **Approaches to Learning–Self-Regulation (ATL-REG)** domain assesses two interrelated areas that are recognized as important for children's school readiness and success. Approaches to learning and self-regulation have been combined into one assessment domain because of the strong connections between these two areas of development. The approaches to learning skills and behaviors include engagement and persistence, curiosity and initiative, and imitation. The self-regulation skills include self-control of feelings and behavior, self-comforting, attention maintenance, and shared use of space and materials.

The developmental processes identified in all seven measures of the ATL-REG domain are each associated with the development of *executive function* skills. *Executive function* skills, which involve developing cognitive capacities that manage more basic mental and behavioral processes (Best & Miller, 2010; Center on the Developing Child, 2011; Zelazo & Muller, 2002), are particularly important to school readiness because they affect children's capacity to engage in learning activities, to persist when doing challenging tasks, and to regulate their behavior when frustrations arise in daily interactions with peers (Vitiello, Greenfield, Munis, & J'Lene, 2011). The most important executive function skills are the growth of behavioral inhibition (resisting an impulse and instead doing what is appropriate or necessary), working memory (being able to hold information in mind and use it), cognitive flexibility (including switching perspectives, goals, or mental focus), error detection, and self-monitoring. Each of these capacities develops significantly during the preschool years and continues to develop in the primary grades, in part owing to brain development during those years (Best & Miller, 2010). With the growth of executive function skills, children become more competent in the self-regulation of thinking, attention, behavior, and emotions. However, it is important to remember that the development of executive function skills is associated with brain areas, primarily in the prefrontal cortex, that have an extended maturational period. These areas are not fully mature until early adulthood, and this means that young children are still in the early stages of acquiring the capacities for reliable self-regulation (Diamond, 2013). Adult guidance and assistance remain necessary as children proceed into the primary grades.

ATL-REG 1: Attention Maintenance

This DRDP measure highlights children's developing skills at focusing and maintaining attention toward objects, people, and events of interest. This is an important component of growing self-regulation that is associated with the development of executive function skills. In infancy, attention tends to shift frequently among people, things, sounds, and other events. In contrast, young preschoolers can focus their attention for a more sustained period, especially with adult support, and can also attend to more than one thing at a time (Rueda, 2013; Rueda & Posner, 2013).

ATL-REG 2: Self-Comforting

This measure focuses on the child's developing capacity to calm or comfort him- or herself. It includes enlisting adults for assistance in managing distress. This component of self-regulation focuses on the management of emotion and is thus an aspect of "hot" executive functions, which consists of self-regulation of heightened arousal rather than "cool" problem-solving (Zelazo & Carlson, 2012).

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Remarkably, basic forms of self-comforting are apparent in infancy, in which infants use behaviors that have previously worked to soothe themselves and use special objects or appeals to an adult to assist in relieving distress. During the preschool years, children learn to comfort themselves by using a broad range of self-regulatory strategies, as well as anticipating situations in which they will need assistance in managing distress and responding appropriately (Kopp, 1989; Thompson & Goodman, 2010).

ATL-REG 3: Imitation

This measure highlights developmental changes in children's imitation of the actions or words of others. Developmental scientists have been interested in early imitation because of what it reveals about how infants and young children interpret the actions of the adults they imitate (Meltzoff, 2011). Research has shown, for example, that 18-month-olds imitate the intentions of the person they observe rather than just the person's behaviors: they imitate a completed action that they observed the adult try but fail to accomplish (Meltzoff, 1995). Infants tend to imitate simple actions or sounds in their interactions with others. With increasing age, they repeat familiar actions or words they have observed at an earlier time and, as their development progresses, sequences of actions. This shows that they become capable of mentally representing the behavior they observe over time, which in turn enables them to imitate complex behaviors on a later occasion.

ATL-REG 4: Curiosity and Initiative in Learning

How children approach new learning and problem-solving challenges is a critical feature of their academic success (California Department of Education [CDE], 2008, p. 25). Young children's natural curiosity, interest, and self-confidence in their ability to explore and make discoveries are central components of their capacities to benefit from learning opportunities (CDE, 2008, Vol. 1, p. 25; Wang & Barrett, 2013) and are among the skills that contribute to learning throughout life (Heckman, 2007). This measure highlights how children explore the environment in increasingly focused ways to learn about people, things, materials, and events. In infancy, the motivation to discover is reflected in the infant's rapt attention to new objects or events and efforts to manipulate and explore them. In the early preschool years, children explore how things work through observing, manipulating, or asking simple questions about them. By the later preschool years, children are able to use familiar strategies, tools, or sources of information to carry out simple investigations to learn about things, materials, people, or events. These capacities contribute to the preschooler's developing ability to use alternative approaches to derive new understanding (Committee on Early Childhood Pedagogy, 2001).

ATL-REG 5: Self-Control of Feelings and Behavior

This measure highlights how children develop strategies for regulating their feelings and behavior that are increasingly independent of adult assistance (Bronson, 2000; Thompson, 2011). Developing self-regulation reflects growth in executive function skills, particularly the capacity to inhibit emotionally or behaviorally impulsive responses and instead to respond with words, negotiation, or other socially appropriate behavior (Zelazo & Cunningham, 2007). In infancy, behavior tends to be impulsive and poorly regulated, although infants respond positively to the assistance and support of adults. In the preschool years, children acquire behavioral strategies for managing their feelings, such as taking turns, substituting words for outbursts, and leaving distressing situations, although they often need adult guidance in doing so. Because their executive function skills are immature, children at this age benefit significantly from the adult's suggestion of behavioral strategies that can help to manage

emotions (such as using words to express feelings and taking deep breaths) and minimize conflict (such as choosing an alternative activity). Self-control, in other words, stems from the support of the context as well as from the child until self-regulatory capabilities are more mature (Blair, 2002; Diamond, 2014).

ATL-REG 6: Engagement and Persistence

This measure highlights how children grow in their capacity to persist in their understanding and mastery of tasks even if those tasks are challenging or difficult. Infants' ability to be persistent tends to be quite limited, even with the assistance of an adult. Early in the preschool years, children enjoy learning and are confident in their ability to make new discoveries, but they may not persist in learning tasks, especially when they encounter obstacles. Later in the preschool years and into kindergarten, children take greater initiative in identifying new solutions, returning to difficult tasks, and persisting to solve problems. The developing ability to engage and persist in completing difficult tasks and in solving problems reflects growth in executive function skills, particularly (a) the cognitive flexibility necessary to come up with new solutions to difficult problems and (b) the capacity to engage in sustained activities that require keeping a superordinate goal in mind while planning and executing the substeps involved in its achievement (Zelazo & Muller, 2002). By contrast, younger children are more likely to become frustrated by difficult problems and distracted in their enactment of multistep procedures, and thus are less likely to persist until a goal is accomplished.

ATL-REG 7: Shared Use of Space and Materials[1]

This measure highlights children's developing capacity to share the use of space and materials with others. During infancy, children tend to exhibit little spontaneous sharing of materials with others who want them. During the preschool years, children make significant advances in their capacity to share the use of space and materials with others (e.g., Fehr, Bernhard, & Rockenbach, 2008; Hamann, Bender, & Tomasello, 2013; Rochat et al., 2009). Early in preschool, children play more often by themselves and are primarily oriented toward short-term collaboration with peers. Later in preschool and into kindergarten, children demonstrate a capacity to engage in more sustained collaborative activity that may involve mutual assistance. In this respect, sharing becomes part of a broader orientation toward responsible and fair conduct toward others (Thompson, 2014). Sharing is a psychologically complex achievement for young children, as it requires their being able to understand and interpret the feelings, intentions, beliefs, and desires of others (Wu & Su, 2014). It also requires the cognitive flexibility to switch perspectives between one's own desires and those of one or more peers, and the inhibition of the impulse to secure materials and space for oneself and instead offer to share or secure resources for another. In these respects, sharing draws on developing executive function skills (Best & Miller, 2010; Center on the Developing Child, 2011).

[1] Relates to fairness and respect for others construct addressed in the Preschool Learning Foundations in History–Social Science (CDE, 2008, Vol. 3).

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