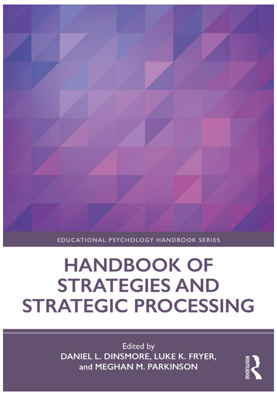

Handbook of Strategies and Strategic Processing

Daniel L. Dinsmore, Luke K. Fryer, Meghan M. Parkinson

Interplay of Strategic Processes, Executive Functions, and Autonomy Support in Students with Individual Differences

Publication details
https://www.routledgehandbooks.com/doi/10.4324/9780429423635-13
Ana Taboada Barber, Kelly B. Cartwright, Susan Lutz Klauda

13

INTERPLAY OF STRATEGIC PROCESSES, EXECUTIVE FUNCTIONS, AND AUTONOMY SUPPORT IN STUDENTS WITH INDIVIDUAL DIFFERENCES

Ana Taboada Barber
UNIVERSITY OF MARYLAND, USA

Kelly B. Cartwright
CHRISTOPHER NEWPORT UNIVERSITY, USA

Susan Lutz Klauda
UNIVERSITY OF MARYLAND, USA

Consider Gabriela, a fifth grade student, who is reading a passage about polar bears as part of a science unit on the effects of climate change on animals and their habitats. To comprehend this, or any text, Gabriela must maintain an ever-developing representation of the text meaning in working memory while continuing to decode the words in the text, updating her mental model of text meaning as she proceeds. She must also monitor her understanding of individual words and larger idea units, connecting these to her prior knowledge of the topic, and inferring ideas that the author omits from the text. Gabriela reads:

> Climate change has caused melting of sea ice at the poles, giving rise to smaller areas of frozen land mass and rising sea levels. Polar bears are increasingly endangered because they often have to travel many miles, swimming for long periods, in order to find food.

Gabriela has no difficulty decoding these words. However, to understand the connection between these sentences (i.e., to preserve local text coherence and understand the effects of climate change on an animal species), Gabriela should infer that melting ice reduces the polar bears' habitat, causing them to have to travel longer distances to find food. But, for English Learners (ELs) like Gabriela, who often struggle with reading comprehension despite adequate word decoding abilities, such inferences are often difficult. Similarly, English monolingual children with the same profile of reading skills – adequate word decoding with comparably poor reading comprehension, called specific reading comprehension deficits (RCD) – have difficulty monitoring their understanding (or lack of understanding) of texts and typically fail to make coherence-building inferences to preserve comprehension (Cain & Oakhill, 1999; Cain, Oakhill, Barnes, & Bryant, 2001; Oakhill, Hartt, & Samols, 2005).

In the current chapter, we follow early trends in research on strategic processing and take reading comprehension as our test case for examining relations of executive function (EF) skills, reading comprehension strategies, and autonomy support as a specific practice that fosters motivated and self-regulated behavior. Further, we have identified two groups of students, described in the opening vignette (i.e., ELs, and students with RCD), whose individual differences generate variability in reading comprehension performance, which may enlighten understanding of the relations among the three main variables of interest in the chapter. This chapter converges with that of Afflerbach, Hurt, and Cho (this volume) in focusing on reading strategies, yet diverges from it in centering on the linkages of strategic processing to EF skills and autonomy support, two constructs that are susceptible to improve the learning and reading comprehension of ELs and students with RCD.

EXECUTIVE FUNCTIONS AND STRATEGIC PROCESSES: HISTORICAL OVERVIEW

Strategic Processes in Reading Comprehension

As the opening vignette illustrates, skilled reading comprehension is an incredibly complex task that requires management of multiple, simultaneous, cognitive processes, all directed toward the goal of understanding text. We agree with Wagner, Schatschneider, and Phythian-Sence (2009) that one of the primary purposes for reading is to understand texts. Since the 1970s, the literacy field has seen increased interest in – and research into – the components of reading comprehension processes, particularly the strategic processes used by skilled readers to understand text (see Table 13.1 for numbers of citations by decade). This work has revealed that metacognitive strategies, such as inference making and comprehension monitoring, are at the heart of skilled reading comprehension for children and adults (see Afflerbach, Hurt, & Cho (this volume) for a review). However, monitoring and inference making are difficult for children and develop slowly over the elementary school years (Markman, 1977, 1979; Zabrucky & Ratner, 1986). Fortunately, these strategies can be taught in the context of reading real texts, resulting in improvements in reading comprehension (Brown, Pressley, Van Meter, & Schuder, 1996; Pearson & Dole, 1987), a point we take up later in this chapter.

Interest in children's cognition, including strategy use, expanded in the United States in the 1970s, due in large part to John Flavell's work. Flavell was instrumental in making Piaget's pioneering work in children's cognitive development available in the United States in the 1960s (Flavell, 1963, 1985), making children's cognitive development a valid field of study after a long period of behaviorist perspectives on children's learning. Flavell quickly turned his attention to his now landmark work in metacognition, particularly his emphasis on the deliberate, planful nature of metacognitive strategy use (Flavell, 1979). These developments in understanding children's

Table 13.1 Numbers of Citations in Google Scholar by Decade

Decade	Google Scholar Search Terms	
	"Strategy Use" and "Reading Comprehension"	"Development of Executive Function"
1970–1979	20	24
1980–1989	529	15
1990–1999	1,690	67
2000–2009	4,930	1,050
2010–2019	13,900	6,180

thinking were paralleled by work on adults' thinking that highlighted distinctions – and relations – between automatic and effortful, controlled cognitive processes (Shiffrin & Schneider, 1977).

Early research on children's cognitive strategies, inspired by Flavell's work, often focused on reading comprehension because its complexity offered a useful test case for strategy use. For example, Ellen Markman used an inconsistency-detection paradigm in which children read passages that contained deliberate inconsistencies and then were asked whether the passages "made sense." This work revealed first to third grade children (Markman, 1977), and even third to sixth grade children (Markman, 1979), did not actively monitor their own reading comprehension. These data were corroborated by interview findings that indicated 8- to 12-year-old children were often unaware of strategies to repair comprehension failure (Myers & Paris, 1978). Ensuing experimental work indicated that not only did elementary school children have difficulty monitoring comprehension of texts for inconsistencies, they also had difficulty making corrective inferences to repair comprehension after it had broken down (Zabrucky & Ratner, 1986). Noting the need for a comprehensive model of strategy use to guide the growing work in this area, Michael Pressley worked with colleagues Wolfgang Schneider and John Borkowski to develop the Good Strategy User (GSU) model, which described well the nature of strategic processes employed when readers actively comprehend texts. Pressley studied under Flavell in his early years of graduate school, and his ideas about metacognitive strategy use were clearly influenced by Flavell's work, a point he has acknowledged (Pressley, 2005; Pressley, Borkowski, & Schneider, 1987). In the GSU, strategies are defined as:

> [c]omposed of cognitive operations over and above the processes that are a natural consequence of carrying out [a] task, ranging from one such operation to a sequence of interdependent operations. Strategies achieve cognitive purposes (e.g., comprehending, memorizing) and are potentially conscious and controllable activities.
>
> (Pressley, Forrest-Pressley, Elliott-Faust, & Miller, 1985, p. 4)

These can become automatized with practice but are still available for conscious reflection when necessary, such as when comprehension breaks down.

Reading Comprehension Strategies and Executive Functions: Areas of Convergence

The GSU definition of strategies, which focuses on active, goal-directed management of tasks, is similar to definitions of EF that have emerged in the literature. For example, Goldstein and Naglieri (2014, p. 4) indicate "executive functions represent the capacity to plan, to do things, and to perform adaptive actions." EFs are goal-directed cognitive operations that enable the management of thoughts, feelings, and behaviors in order to reach particular goals (Diamond, 2013; Goldstein & Naglieri, 2014). And, although research interest in children's strategy use, particularly with respect to reading comprehension, blossomed beginning in the 1970s, interest in the development of EF is comparatively new to the field (see Table 13.1). The term "executive control" originally emerged in the neuropsychological literature, when Pribram (1973) hypothesized the relation of executive control to frontal lobe functioning; however, research in this area focused primarily on EF deficits in individuals with brain injuries or other neuropsychological problems (Goldstein & Naglieri, 2014). One exception is Myers and Paris (1978, p. 680), in the introduction to their study of children's metacognitive awareness about reading, who noted, "Metacognitive knowledge serves an executive function of coordinating and directing the learner's thinking and behavior." Only recently (i.e., around the year 2000, see Table 13.1) have researchers begun to focus on the development of EF and its relations to other developmental outcomes, such as academic success (e.g., Best, Miller, & Naglieri, 2011), rather than on EF deficits associated with neuropsychological problems or brain injuries (Goldstein & Naglieri, 2014).

Although parallels between metacognitive strategy use and EF are clear (i.e., they both involve goal-directed operations that enable management of behavioral or cognitive processes), little research has investigated the relations between the two. In 2000, Borkowski and colleagues (Borkowski, Chan, & Muthukrishna, 2000) expanded the GSU and suggested links between executive control, motivation, and strategy use. Specifically, Borkowski et al. (2000) hypothesized that EF processes develop because of successful applications of individual strategies. Those successes could lead to motivation for learning which will likely promote application of strategies in new contexts. That is, Borkowski and colleagues suggested that EF emerges only after children have learned and implemented specific strategies. Similarly, Chevalier and Blaye (2016) suggested the development of independent strategy use contributes to the development of children's EF. Finally, Roebers and Feurer (2016) recently argued that both EF and procedural metacognition (i.e., strategy use) contribute to children's developing control over their own cognitive systems, based on reviewing theoretical and empirical work from cognitive, self-regulation, and neuropsychological literatures. More empirical research is needed, however, to disentangle the nature of relations between EF, metacognition, motivation, and engagement in cognitive control processes, such as strategies.

CURRENT WORK ON EFS AND STRATEGIES IN STUDENTS WITH INDIVIDUAL DIFFERENCES

EFs and Reading Comprehension

EFs refer to a set of top-down mental processes required when one needs to guide behavior toward a goal or to coordinate performance in complex tasks (Dawson & Guare, 2010; Diamond, 2013): skills needed to work in a motivated or engaged fashion (e.g., toward a goal that may not be reached immediately; Blaye & Chevalier, 2011; Gillberg & Coleman, 2000), which implicates the involvement of motivational and engagement processes. EFs are important to learning and cognitive and emotional development because they enable children to take time to think, resist temptations or distractions, hold information in memory, and play with ideas while staying focused (e.g., Diamond, 2013). Although there are various conceptualizations of the component skills that make up EF, there is wide agreement that there are three core EFs – inhibition, working memory, and shifting or cognitive flexibility (Diamond, 2013; Miyake et al., 2000). *Inhibition*, or *inhibitory control*, refers to the suppression of dominant, habitual, or prepotent responses when necessary for task completion (Miyake et al., 2000). *Working memory* includes both storage and processing components, and refers to the holding in mind and manipulation of information while performing some operation on it (Diamond, 2013; Miyake et al., 2000). *Cognitive flexibility*, or "shifting," refers to switching back and forth among multiple tasks, operations, or dimensions of tasks (Chevalier & Blaye, 2008; Monsell, 1996) such as shifting attentional focus from an idea or a category to a new one. From the combination of these EFs, higher order EFs are built, such as reasoning, problem solving, and planning (e.g., Collins & Koechlin, 2012). If we consider the three core EFs, each plays a unique role in the prediction of reading comprehension. Working memory (Cain, 2006; Sesma, Mahone, Levine, Eason, & Cutting, 2009), inhibition (Cain, 2006; Kieffer, Vukovic, & Berry, 2013), and cognitive flexibility (Cartwright et al., 2017; Kieffer et al., 2013) all contribute significantly to reading comprehension. Additionally, composite measures of EF (based on factor analyses and theoretical underpinnings for similar functions/skills) made distinct contributions to variance in the reading comprehension of native ESs and ELs in the elementary grades (e.g., Taboada Barber et al., 2019). In sum, the evidence of the direct contributions of EFs to reading comprehension extends to a variety of readers: typically developing readers, students with RCD, and ELs.

However, the question remains: why do EFs relate to reading comprehension? If we think of each of the core EF skills, we can, at least conceptually, understand the roles they play in reading comprehension. *Working memory* plays a critical role in integrating information during comprehension by (a) holding recently processed information to make connections to the latest input (e.g., sentence/idea/word) and (b) maintaining the gist of information for the construction of an overall representation of text (e.g., Cain, Oakhill, & Lemmon, 2004). Cain et al. (2004) also suggest individual differences in inference making and comprehension monitoring are related to working memory. *Inhibition* is important to reading comprehension because it allows readers to forget or suppress information that is no longer relevant, such as inhibition of irrelevant word meanings when activating the meaning of words in a text (Barnes, Faulkner, Wilkinson, & Dennis, 2004; Henderson, Snowling, & Clarke, 2013). Inhibition may also play a role in ignoring irrelevant information at the sentence or paragraph level when building a coherent mental representation of a complete text, such as details not relevant to the overall meaning of the passage (Borella, Carretti, & Pelegrina, 2010; Cain, 2006; Kintsch, 1988). The third core EF skill, *cognitive flexibility*, is particularly important for the flexible coordination of multiple aspects of the comprehension task, such as shifting focus between words, letters, and sounds to their meaning in early childhood (Cartwright et al., 2017; Cartwright, Marshall, Dandy, & Isaac, 2010), middle childhood (Cartwright, 2002; Colé, Duncan, & Blaye, 2014), and adulthood (Cartwright, 2007; Georgiou & Das, 2018), even when controlling for known predictors of reading comprehension. Further, children and adults with RCD are lower in cognitive flexibility than typically developing peers (Cartwright, Bock, Coppage, Hodgkiss, & Nelson, 2017; Cartwright et al., 2017).

Executive Functions and Students with Individual Differences

Given that EFs refer to a family of top-down mental processes that are needed for concentration and control of attention, as well as self-regulation of behavior, their impact on learning goes beyond reading comprehension. Indeed, several areas of achievement are impacted by EFs, such as mathematics and science achievement (Bull & Lee, 2014; Latzman, Elkovitch, Young, & Clark, 2010) and writing (Altemeier, Jones, Abbott, & Berninger, 2006). However, although EFs have been explored in populations with individual differences such as students with RCD (e.g., Cain, 2006; Cartwright et al., 2017), they have been scarcely explored in ELs. Yet, the extant evidence has shown consistently that bilingual children (and adults) perform better on measures of EF skills than English monolingual speakers (e.g., Bialystok, 1999; Bialystok & Martin, 2004; Carlson & Meltzoff, 2008), possibly because bilingualism enhances a general network of executive control, in addition to targeting specific core components such as inhibition (cf. Bialystok & Martin, 2004) or shifting (cf. Meuter & Allport, 1999). Thus, an important outcome of bilingualism may be in managing executive control components to address complex goals (Bialystok, 2015). However, limited research has focused on whether the benefits of EFs found for fully bilingual populations apply to ELs in the elementary grades in the United States.

EFs and Strategies: Relations and State of the Literature

As noted above, although interest in children's strategy use and the development of executive functions has blossomed in recent decades (see Table 13.1), few empirical connections have been made between these literatures (Roebers & Feurer, 2016). Additionally, thinking in this area is mixed, with some scholars suggesting metacognitive strategy use might influence the development of EF (Borkowski et al., 2000; Chevalier & Blaye, 2016), others that EF contributes to strategy use (Gnaedinger, Hund, & Hesson-McInnis, 2016), and yet others holding the view that strategic metacognitive monitoring may be a complex form of EF (Dawson & Guare, 2010; Meltzer, 2010). Given the incipient state of this literature, we consider the relations of EFs and strategy use in the current chapter, paying particular attention to these variables in EL students and students with RCD.

ISSUES AND LIMITATIONS OF THESE TOPICS

EFs and Strategies in Students with Individual Differences

EFs and Poor Comprehenders. Studies comparing poor comprehenders (i.e., students wiZth RCD) with students whose comprehension skills are on a par with their age or grade have shown that less skilled comprehenders struggle with strategic monitoring of reading comprehension, assessed with the inconsistency detection paradigm developed by Markman (1977, 1979). In particular, children with RCD have difficulty detecting inconsistencies in text across pairs of sentences (as required in the comprehension monitoring task), both when the inconsistent sentences are adjacent and when they are separated within the text – increasing the working memory demands of the task (e.g., Oakhill et al., 2005). Sentence comprehension is also more challenging for children who struggle with working memory, such that they have more difficulty understanding sentences with complex syntactic structure than children who don't have challenges with working memory (Wingfield & Grossman, 2006). Further, neurocognitive evidence using fMRI revealed that comprehension of sentences with high working memory demands (i.e., containing additional phrases) was associated with greater inferior parietal cortex activation, evincing a large neural network supporting comprehension tasks that recruit various working memory and planning resources (Novais-Santos et al., 2007)

Sesma et al. (2009) and Follmer (2018) suggest that EF may contribute to reading comprehension because of its possible relations to higher order strategic processing in reading. Indeed, evidence shows that training reading-specific strategic processes improves reading comprehension for struggling comprehenders (e.g., Brown et al., 1996; Yuill & Joscelyne, 1988), which may do so by strengthening underlying EF skills. However, more work is needed in order to substantiate empirically this relation.

EFs and Strategies in ELs. Although there is some research showing the impact of strategy instruction on the reading comprehension of middle-school ELs (e.g., Taboada Barber et al., 2015, 2018; Vaughn et al., 2009), this work does not consider the possible relations between EFs and reading strategies, or EFs and reading comprehension. Precisely because the study of EFs is relatively new within the population of ELs, little is known about the potential interactions or relations between EF skills and achievement, or between EFs and cognitive processes such as comprehension strategies, in this population.

In some of our recent work we found that the two focal reading comprehension strategies of this chapter, inference making and comprehension monitoring, partially mediated the relation of a composite of the three core EF skills (i.e., working memory, inhibition, and cognitive flexibility) at the beginning of the school year with reading comprehension at the end of the year, while controlling for prior reading comprehension in both ELs and ESs in grades 1 through 4 (Taboada Barber et al., 2019). In agreement with others (e.g., Follmer, 2018; Gnaedinger et al., 2016; Sesma et al., 2009), we suggest that the self-regulation and higher order processing entailed in reading comprehension strategies likely necessitate EF skills, which may explain why inferencing and comprehension monitoring act as an explanatory mechanism (mediator) between EF skills and reading comprehension. That is, we suggest that the self-regulatory and intentional nature of strategies, in tandem with the higher order thinking involved in deploying strategic processes, may require or depend on EF skills. For instance, consider inhibitory control (one of the core EFs measured in the aforementioned study) as a required EF for strategic processing during reading comprehension. The capacity for inhibitory control of attention enables a prepotent mental representation (e.g., extraneous thoughts or information acquired earlier) to be resisted (Postle, Brush, & Nick, 2004) in order to attend to other information based on our goals or intention (Diamond, 2013). An association between inhibition and comprehension monitoring can be hypothesized since asking readers to resolve inconsistencies as part of a comprehension monitoring task requires them to (a) attend to the contradictory information, (b) hold it in working memory (inhibitory control is associated with several working memory measures, Diamond, 2013), (c) discard or inhibit the previously acquired (contradictory) information in order to bring the relevant information to the forefront, and (d) establish coherence between the relevant information and the rest of passage. By the same token, inhibitory control can also be strongly related to inferencing as a higher order strategic process, as when one needs to ignore irrelevant inter-sentence information in order to connect two ideas or sentences that are not adjacent to make an inference.

Cognitive flexibility, another of the core EFs we measured in ELs and their ES peers, is also a predictor of concurrent and later reading comprehension performance (Taboada Barber et al., 2019). Indeed, the ability to shift between the twin demands of decoding processes and meaning construction, as required in reading-related cognitive flexibility tasks, is clearly required for reading comprehension (as when we need to switch actively between decoding processes to updating our ever-changing mental model of text meaning in order to read for understanding) but is also likely required for inference making. If we consider that inference making requires that one consider elements from the text as well as our own background knowledge, it is apparent that switching between and coordinating text elements with knowledge we supply is essential to successful inference making. For example, in the opening vignette to the chapter, Gabriela had to coordinate and flexibly switch between ideas in the text and background knowledge about melting ice (i.e., that it gets smaller) in order to correctly infer that the polar bears' habitat was shrinking, causing them to need to travel further to find food. If a reader is unable to flexibly shift between ideas in the text and their own knowledge (while also successfully coordinating phonological, orthographic, and syntactic components of print), then inference making will fail.

Instruction in Inference Making: Benefits for Executive Functions?

As noted previously, it is plausible that instruction in comprehension strategies that require higher order processing, such as inferencing and comprehension monitoring, could result in enhancement of EFs. How might this occur? Some have suggested independent use of strategies might enhance EFs (Borkowski et al., 2000; Chevalier & Blaye, 2016) by providing practice in task-specific application of EF skills. Evidence indicates that although training in general (non-reading-specific) EF skills typically does not enhance reading comprehension (Jacob & Parkinson, 2015; Melby-Lervåg & Hulme, 2013), reading-specific tasks, which provide students with practice in coordinating various elements necessary for successful reading, enhance students' reading comprehension and reading-specific EF (Cartwright, 2002; Cartwright et al., 2017, 2010; García-Madruga et al., 2013; Melby-Lervåg & Hulme, 2013). Thus, it is reasonable to assume inference training may afford similar EF benefits. For example, one instructional activity used in training studies on inference making involves teaching students to identify clue words and using those clue words to infer such information as the setting of a story or the consequences of a character's action (McGee & Johnson, 2003; Yuill & Joscelyne, 1988; Yuill & Oakhill, 1988). For example, here is a story used by Yuill and Joscelyne (1988) to introduce students to making inferences:

> Tommy was lying down looking at a reading book. The room was full of steam. Suddenly Tommy got some soap in his eye. He reached wildly for the towel. Then he heard a splash. Oh no! What would he tell his teacher? He would have to buy a new one. Tommy rubbed his eye and it soon felt better.
>
> (Yuill & Joscelyne, 1988, p. 156)

After reading the story, children were guided in solving the "puzzle" of Tommy's location and of what happened to the book by a trainer who helped them identify clue words in the passage and make inferences based on those words. For the question of Tommy's location, the clue words were *lying down*, *steam*, *soap*, *towel*, and *splash*. Such activities may tap into students' use of the core EFs in multiple ways. For instance, to answer the question regarding Tommy's location, the reader must keep several, if not all, of the clues about the location in mind together and integrate them with their background knowledge to deduce that Tommy was in the bath, thus invoking working memory. At the same time, inhibition is likely entailed as the reader must ignore other associations conjured by the statement that Tommy was "lying down looking at a reading book," such as that he was stretched out on his bed. Cognitive flexibility is required throughout the activity as the reader must shift not only from decoding the words to identifying key (clue) words, but also from reading the passage fluently to strategically making local and global inferences. Local inferences involve linking separate ideas in text, whereas global inferences require that the reader use their prior knowledge to fill gaps in text meaning (Cain & Oakhill, 1999).

Two studies evaluating the effectiveness of inference training have included instruction in using clues to make inferences in concert with instruction in generating and answering "wh" questions (e.g., "who?," "where?," "why?") about a passage and predicting the content of "missing" sentences within a passage (McGee & Johnson, 2003; Yuill & Oakhill, 1988). In these studies, training took place in small groups that met for 6–7 sessions of 20–45 minutes. Yuill and Oakhill (1988), who studied 7- and 8-year-olds, found that those with RCD who received inference training gained 17 months in their comprehension on the Neale Analysis of Reading Ability, compared to 14 months for those who practiced answering comprehension questions orally and 6 months for those who trained in rapid decoding. In their study of 6- to 10-year-olds, McGee and Johnson (2003) found that both inference training and comprehension practice benefited students with RCD, with much greater improvement associated with the former. Additionally, Elbro and Buch-Iversen (2013) found that teaching children, via a visual support, to coordinate their prior knowledge with text elements enabled them to make inferences and improved their reading comprehension after eight 30-minute sessions.

Even shorter-term efforts appear to pay off for poor comprehenders. Yuill and Joscelyne's (1988) study provided 7- and 8-year-olds with individual training in identifying clue words and using them to solve the "puzzle" of missing information in a story, as described above, in just one session including two training stories. Notably, the stories lacked titles and pictures, which ordinarily provide indication of story meaning. Immediately after training, children were tested with eight similar story puzzles and comprehension questions. Students with RCD answered 85% of the test questions correctly, significantly outperforming their counterparts who were not given such training, who answered 72% correctly. These activities would likely strengthen students' EF skills by providing explicit strategies and practice identifying relevant elements (i.e., clues) in text and ignoring irrelevant elements (inhibition), holding multiple relevant elements of text in mind (working memory), and switching between finding missing information and attending to multiple text elements (cognitive flexibility).

Altogether, these training studies suggest that inference making is a malleable skill, especially for students who specifically struggle with reading comprehension. Further, training in higher order strategies appears to entail practice in – and thereby strengthening of – multiple EFs, thus suggesting that inference training may be a fruitful means of promoting reading achievement, as well as the development of EFs, which may itself have far-reaching benefits. How might cognitive strategy instruction facilitate EFs? As others have suggested (Borkowski et al., 2000; Chevalier & Blaye, 2016), independent use of strategies may strengthen EFs. However, students need particular kinds of instructional supports to achieve independence in strategy use (e.g., Brown, 2008), as we discuss in the next section.

FUTURE DIRECTIONS: THE ROLE OF AUTONOMY SUPPORT FOR EFS AND READING COMPREHENSION DEVELOPMENT

Autonomy Support, EFs, Reading Comprehension Strategies and Reading Engagement

Ultimately, beyond their cognitive benefits, strategies are higher order processing tools that should serve a greater good. In this case, the greater good is enhancing students' reading comprehension as well as their EF skills, given that these are malleable factors that have been associated with academic achievement and, broadly, several aspects of well-being (e.g., Best et al., 2011; Diamond, 2013). In addition, cognitive strategy instruction has consistently appeared to promote not just strategy application but also motivated, engaged reading (e.g., Guthrie, McRae, & Klauda, 2007; Souvignier & Mokhlesgerami, 2006). While learning and independently using higher order strategies may directly support students' developing EFs, it is plausible that higher order strategies also indirectly bolster EFs through their linkage with reading engagement (also see Borkowski et al., 2000).

Importantly, research exploring the reading engagement of middle school ELs has shown that engagement is a malleable factor susceptible to teacher influence (e.g., Taboada Barber et al., 2015, 2018), which is in accord with work focused on English monolingual students of varied ages and background characteristics (Guthrie, Klauda, & Ho, 2013; Guthrie et al., 2007). Academic engagement, including reading engagement in particular, is a multidimensional construct – representing students' affective, behavioral, and cognitive involvement in learning (Fredricks, Blumenfeld, & Paris, 2004; Reeve, 2012) – and as such can be affected through several kinds of instructional practices, which influence specific and sometimes multiple aspects of engagement. Such practices include assuring success, arranging opportunities for collaboration, focusing on learning and knowledge goals, incorporating real-world interactions, and providing autonomy support (Guthrie & Klauda, 2016; Guthrie, Wigfield, & You, 2012). Herein we focus especially on autonomy support, as there is burgeoning evidence for its role in the development of EFs outside the school context, which we believe likely extends to academic settings as well. But before considering that research, we briefly examine what autonomy support means, and, especially, how it may be integrated with literacy instruction.

Autonomy Support in Academic Contexts

Autonomy support refers to an interpersonal style for motivating others to learn characterized by behaviors and language that encourage learners' interests and help foster the internalization of the value of learning (Jang, 2008; Reeve, Bolt, & Cai, 1999; Ryan & Deci, 2000), which may be critical for putting forth the effort to use strategic processes. Autonomy support is often contrasted with a controlling style, which entails the teacher, in the school context, or the parent, at home, offering extrinsic rewards for making progress toward goals they've set and, potentially, enforcing consequences for failing to make such progress (Jang, Reeve, & Deci, 2010; Reeve et al., 1999; Reeve & Jang, 2006). Most research on autonomy support has been conducted within the framework of self-determination theory (Ryan & Deci, 2000, 2009), which posits that this form of support, along with support that fosters feelings of competence and relatedness to others, is critical to helping students develop and maintain more internal forms of motivation for learning.

Jang et al. (2010) set forth three general dimensions of autonomy supportive teacher behaviors: nurturing inner motivational resources, relying on noncontrolling informational language, and acknowledging students' perspectives and feelings. Autonomy supportive teachers nurture students' inner motivational resources when they allow students to explore their interests and preferences, work toward personal goals, challenge themselves, and make meaningful choices related to their learning, rather than implement incentives, directives, or deadlines (Jang et al., 2010; Reeve et al., 1999; Reeve, Jang, Carrell, Jeon, & Barch, 2004). In the reading classroom, teachers might nurture inner motivational resources by incorporating students' topic and genre interests when planning assignments and by offering students frequent opportunities to make meaningful choices, such as whether they would like to share knowledge gained through their reading in a presentation, poster, or other mode.

The second way that teachers provide autonomy support – acknowledging the students' perspectives and feelings – means verbally conveying appreciation for students' views about their learning. That is, they seek students' perspectives as well as acknowledge and accept those perspectives as a "potentially valid reaction to classroom demands, imposed structures, and the presentation of uninteresting or devalued activities" (Jang et al., 2010, p. 588). For example, when the teacher notices that students are having difficulty reading an assigned chapter in a novel, they might say "I know this is a long chapter and it contains many unfamiliar words. That can make it hard to stay focused."

The last way that teachers provide autonomy support – relying on noncontrolling informational language – is often used in conjunction with the second dimension. Employing noncontrolling language means that teachers offer explanatory rationales for assigned tasks and generally communicate in ways that are rich in information, including feedback on developing competence, and flexible, rather than evaluative without including feedback, rigid, and pressuring (Jang et al., 2010; Reeve et al., 2004). For instance, to introduce a recreational reading period in a noncontrolling manner, a teacher might say, "There's 20 minutes for free time reading after lunch," rather than "You must read for 20 minutes after lunch." In addition, they would give students a rationale for why this activity is a worthwhile use of their time, as such rationales are particularly important for supporting internalization of the value of an academic task or subject (Reeve et al., 1999; Reeve, Jang, Hardre, & Omura, 2002).

Research on the provision of autonomy support in laboratory and field settings has demonstrated its contributions to engagement and motivation (e.g., Jang et al., 2010) as well as academic performance, including that on reading comprehension tasks that benefit from strategic processing (e.g., Jang, 2008; Vansteenkiste, Simons, Lens, Soenens, & Matos, 2005). In particular, research has demonstrated that learners who received autonomy supportive messages as opposed to those that were controlling, reported greater effort and persistence (Reeve et al., 2002; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004), which are key aspects of behavioral engagement and, as such, may energize or reflect high levels of strategic processing. Learners experiencing greater autonomy support have also shown better conceptual learning (Jang, 2008; Vansteenkiste et al., 2005), deeper processing, and higher test performance (Vansteenkiste et al., 2004). Despite the self-regulation promoting characteristics of autonomy supportive practices, they have not been linked explicitly to self-regulatory cognitive processes such as EFs within academic contexts. Such research, however, has emerged within the early childhood developmental literature, pointing toward intriguing future research directions.

Parents' Autonomy Support and EFs

Interestingly, as noted earlier, autonomy support outside the school context has been studied as a possible antecedent or enhancer of EF skills; here we consider this research and, then, in the final section, connect it to our consideration of strategic processes.

Within the developmental literature, maternal autonomy support has been found to be the strongest predictor (compared to maternal sensitivity, or how appropriately and consistently the mother responds to their child's signals, and mind-mindedness, or how much the parent uses mental terms in conversation with their child) of later EFs in 2-year-old children – beyond general cognitive ability and maternal education (e.g., Bernier, Carlson, & Whipple, 2010). Maternal autonomy support in the first three years has also predicted academic achievement in elementary and high school, partially by way of its association with EFs (Bindman, Pomerantz, & Roisman, 2015). Similar findings apply to paternal autonomy support, with paternal support when children were approximately three years old predicting school readiness, a measure including EF, at five years, with child language mediating the relationship (Meuwissen & Carlson, 2018). These findings are significant because they speak of the important role that parent-child relationships may play in children's development of EFs as self-regulatory skills. Given that bodies of research in the child development, neurocognitive, and, lately, education literatures provide compelling support for the idea that individual differences in EFs are meaningful for child cognitive and socioemotional development, it is reasonable to hypothesize that, given the findings within the study of parent-child relations and EFs in early childhood, the study of teacher autonomy support in older children may be associated with individual differences in EFs. That is, the self-regulatory, noncontrolling, and motivation-inducing teacher actions that foster student autonomous learning – including that which transpires through engaged reading – may in turn contribute to the cognitive and self-regulatory nature of EFs.

As Bindman et al. (2015) contended with respect to the parental caregiving context, children with autonomy supportive parents are likely to engage in challenging activities that demand EFs, like solving puzzles more frequently on their own compared to children with more controlling parents. Because of the autonomy support they have consistently received, such children have the motivational resources to persist at those activities, despite the draw of competing activities. As they regularly persevere in such activities, they practice and enhance their EFs. Applied to instructional contexts, it is likely that students who experience autonomy-supportive teachers may not just be more motivated to persist in challenging tasks, but to apply or develop cognitive strategies that assist in those tasks.

Further, as Bindman et al. (2015) suggested, considering how the experience of autonomy may engender more enjoyment of challenging tasks, children with autonomy supportive parents may find using their EFs less enervating – or the enjoyment they experience may energize their continued efforts to use cognitive strategies effectively. Lastly, another avenue through which autonomy support may bolster children's EFs is by promoting language skills, particularly through the provision of explanatory rationales, which are a key aspect of autonomy support (Jang et al., 2010). Children may internalize the language parents and teachers use when guiding them in autonomy supportive ways (Carlson, 2017), increasing their ability to engage in self-talk, which may, in turn, guide their use of such EFs as inhibiting and switching (Bindman et al., 2015; Matte-Gagné & Bernier, 2011; Vallotton & Ayoub, 2011). They may also use such self-talk to encourage their own persistence.

IMPLICATIONS FOR PRACTICE: CLASSROOM AUTONOMY SUPPORT, EXECUTIVE FUNCTIONS, AND STRATEGIC PROCESSES

Might these same processes hypothesized to be at play in the parenting realm be extrapolated to teacher-student interactions and the use of strategic processes for reading comprehension and other academic tasks? It seems likely. However, research is needed to explore whether the outcomes of teacher autonomy support include enhanced reading-specific EFs. In addition, we need research that addresses whether the dynamics among autonomy support and EFs relate to engagement and achievement in different learning contexts. We hypothesize that teacher autonomy support may affect the deployment of EFs in the classroom through the opportunities it affords students for self-determined and self-regulated action, such as solving problems independently, pursuing their own interests through engaged reading, and selecting and applying cognitive strategies to make sense of text. Further, when students effectively regulate their own learning, we suspect that this facilitates more positive teacher-student relationships, compelling teachers to further encourage their students' developing autonomy – and EFs, parallel to how Bernier et al. (2010) suggested positive parent-child interactions may feed back to promote even stronger EFs. Additionally, students may internalize the language that their teachers use when, for instance, providing reading strategy instruction in an autonomy supportive manner and, in turn, translate this language into self-talk that they use when reading independently and deploying their EFs to select and implement cognitive strategies appropriately (Bodrova, Leong, & Akhutina, 2011; Cragg & Nation, 2010).

While we have focused on autonomy support and how it strengthens internalized and intrinsic motivation and engagement, other teacher practices and other aspects of motivation should be examined as contributors to students' strategy usage and strategy selection prior to implementation – processes which necessitate higher order EFs like planning, task analysis, and monitoring (Borkowski et al., 2000). We would love to see future empirical studies consider the relations of teacher practices and motivation in ELs and students with RCD as conduits to effective strategy regulation and thereby, potentially, enhanced EFs and reading comprehension.

REFERENCES

Afflerbach, P., Hurt, M., & Cho, B.-Y. (this volume). Reading comprehension strategy instruction. In D. L. Dinsmore, L. K. Fryer, & M. M. Parkinson (Eds.), *Handbook of strategies and strategic processing: Conceptualization, measurement, and analysis*. New York: Routledge.

Altemeier, L., Jones, J., Abbott, R. D., & Berninger, V. W. (2006). Executive functions in becoming writing readers and reading writers: Note taking and report writing in third and fifth graders. *Developmental Neuropsychology*, *29*, 161–173. doi:10.1207/s15326942dn2901_8

Barnes, M. A., Faulkner, H., Wilkinson, M., & Dennis, M. (2004). Meaning construction and integration in children with hydrocephalus. *Brain and Language*, *89*, 47–56. doi:10.1016/S0093-934X(03)00295-5

Bernier, A., Carlson, S. M., & Whipple, N. (2010). From external regulation to self-regulation: Early parenting precursors of young children's executive functioning. *Child Development*, *81*, 326–339. doi:10.1111/j.1467-8624.2009.01397.x

Best, J. R., Miller, P. H., & Naglieri, J. A. (2011). Relations between executive function and academic achievement from ages 5 to 17 in a large, representative national sample. *Learning and Individual Differences*, *21*, 327–336. doi:10.1016/j.lindif.2011.01.007

Bialystok, E. (1999). Cognitive complexity and attentional control in the bilingual mind. *Child Development*, *70*, 636–644. doi:10.1111/1467-8624.00046

Bialystok, E. (2015). Bilingualism and the development of executive function: The role of attention. *Child Development Perspectives*, *9*(2), 117–121.

Bialystok, E., & Martin, M. M. (2004). Attention and inhibition in bilingual children: Evidence from the dimensional change card sort task. *Developmental Science*, *7*, 325–339. doi:10.1111/j.1467-7687.2004.00351.x

Bindman, S. W., Pomerantz, E. M., & Roisman, G. I. (2015). Do children's executive functions account for associations between autonomy supportive parenting and achievement through high school? *Journal of Educational Psychology*, *107*, 756–770. doi:10.1037/edu0000017

Blaye, A., & Chevalier, N. (2011). The role of goal representation in preschoolers' flexibility and inhibition. *Journal of Experimental Child Psychology*, *108*, 469–483. doi:10.1016/j.jecp.2010.09.006

Bodrova, E., Leong, D. J., & Akhutina, T. V. (2011). When everything new is well-forgotten old: Vygotsky/Luria insights in the development of executive functions. In R. M. Lerner, J. V. Lerner, E. P. Bowers, S. Lewin-Bizan, S. Gestsdottir, & J. B. Urban (Eds.), *Thriving in childhood and adolescence: The role of self-regulation processes* (Vol. *133*, pp. 11–28). San Francisco, CA: Jossey-Bass, New Directions for Child and Adolescent Development. doi:10.1002/cd.

Borella, E., Carretti, B., & Pelegrina, S. (2010). The specific role of inhibition in reading comprehension in good and poor comprehenders. *Journal of Learning Disabilities*, *43*, 541–552. doi:10.1177/0022219410371676

Borkowski, J. G., Chan, L. K. S., & Muthukrishna, N. (2000). A process-oriented model of metacognition: Links between motivation and executive functioning. In G. Schraw & J. C. Impara (Eds.), *Issues in the measurement of metacognition* (pp. 1–41). Lincoln: Buros Institute of Mental Measurements, University of Nebraska-Lincoln.

Brown, R. (2008). The road not yet taken: A transactional strategies approach to comprehension instruction. *The Reading Teacher*, *61*, 538–547. doi:10.1598/RT.61.7.3

Brown, R., Pressley, M., Van Meter, P., & Schuder, T. (1996). A quasi-experimental validation of transactional strategies instruction with low-achieving second-grade readers. *Journal of Educational Psychology*, *88*, 18–37. doi:10.1037//0022-0663.88.1.18

Bull, R., & Lee, K. (2014). Executive functioning and mathematics achievement. *Child Development Perspectives*, *8*, 36–41. doi:10.1111/cdep.12059

Cain, K. (2006). Individual differences in children's memory and reading comprehension: An investigation of semantic and inhibitory deficits. *Memory*, *14*, 553–569. doi:10.1080/09658210600624481

Cain, K., Oakhill, J., & Lemmon, K. (2004). Individual differences in the inference of word meanings from context: The influence of reading comprehension, vocabulary knowledge, and memory capacity. *Journal of Educational Psychology*, *96*, 671–681. doi:10.1037/0022-0663.96.4.671

Cain, K., & Oakhill, J. V. (1999). Inference making ability and its relation to comprehension failure in young children. *Reading and Writing*, *11*, 489–503. doi:10.1023/A:1008084120205

Cain, K., Oakhill, J. V., Barnes, M. A., & Bryant, P. E. (2001). Comprehension skill, inference-making ability, and their relation to knowledge. *Memory & Cognition*, *29*, 850–859. doi:10.3758/BF03196414

Carlson, S. M. (2017, February). Shaping executive function skills: What can caregivers do? [Video file]. Retrieved from www.simmsmanninstitute.org/projects/videos/#!

Carlson, S. M., & Meltzoff, A. N. (2008). Bilingual experience and executive functioning in young children. *Developmental Science*, *11*, 282–298. doi:10.1111/j.1467-7687.2008.00675.x

Cartwright, K. B. (2002). Cognitive development and reading: The relation of reading-specific multiple classification skill to reading comprehension in elementary school children. *Journal of Educational Psychology*, *94*, 56–63. doi:10.1037/0022-0663.94.1.56

Cartwright, K. B. (2007). The contribution of graphophonological-semantic flexibility to reading comprehension in college students: Implications for a less simple view of reading. *Journal of Literacy Research*, *39*, 173–193. doi:10.1080/10862960701331902

Cartwright, K. B., Bock, A. M., Coppage, E. A., Hodgkiss, M. D., & Nelson, M. I. (2017). A comparison of cognitive flexibility and metalinguistic skills in adult good and poor comprehenders. *Journal of Research in Reading*, *40*(2), 139–152. doi:10.1111/1467-9817.12101

Cartwright, K. B., Coppage, E. A., Lane, A. B., Singleton, T., Marshall, T. R., & Bentivegna, C. (2017). Cognitive flexibility deficits in children with specific reading comprehension difficulties. *Contemporary Educational Psychology*, *50*, 33–44. doi:10.1016/j.cedpsych.2016.01.003

Cartwright, K. B., Marshall, T. R., Dandy, K. L., & Isaac, M. C. (2010). The development of graphophonological-semantic cognitive flexibility and its contribution to reading comprehension in beginning readers. *Journal of Cognition and Development*, *11*, 61–85. doi:10.1080/15248370903453584

Chevalier, N., & Blaye, A. (2016). Metacognitive monitoring of executive control engagement during childhood. *Child Development*, *87*, 1264–1276. doi:10.1111/cdev.12537

Chevalier, N., & Blaye, N. (2008). Cognitive flexibility in preschoolers: The role of representation activation and maintenance. *Developmental Science*, *11*, 339–353. doi:10.1111/j.1467-7687.2008.00679.x

Colé, P., Duncan, L. G., & Blaye, A. (2014). Cognitive flexibility predicts early reading skills. *Frontiers in Psychology: Cognitive Science*, *5*, 1–8. doi:10.3389/fpsyg.2014.00565

Collins, A., & Koechlin, E. (2012). Reasoning, learning, and creativity: Frontal lobe function and human decision-making. *PLoS Biology*, *10*(3). doi:10.1371/journal.pbio.1001293

Cragg, L., & Nation, K. (2010). Language and the development of cognitive control. *Topics in Cognitive Science*, *2*, 631–642. doi:10.1111/j.1756-8765.2009.01080.x

Dawson, P., & Guare, R. (2010). *Executive skills in children and adolescents: A practical guide to assessment and intervention* (2nd ed. ed.). New York, NY: Guilford Press.

Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, *64*, 135–168. doi:10.1146/annurev-psych-113011-143750

Elbro, C., & Buch-Iversen, I. (2013). Activation of background knowledge for inference making: Effects on reading comprehension. *Scientific Studies of Reading*, *17*, 435–452. doi:10.1080/10888438.2013.774005

Flavell, J. H. (1963). *The university series in psychology. The developmental psychology of Jean Piaget*. Princeton, NJ: Van Nostrand. doi:10.1037/11449-000

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. *American Psychologist*, *34*(10), 906–911. doi:10.1037/0003-066X.34.10.906

Flavell, J. H. (1985). John H. Flavell. *American Psychologist*, *40*, 291–295.

Follmer, D. J. (2018). Executive function and reading comprehension: A meta-analytic review. *Educational Psychologist*, *53*, 42–60. doi:10.1080/00461520.2017.1309295

Fredricks, J. A., Blumenfeld, P. B., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, *74*, 59–109. doi:10.3102/00346543074001059

García-Madruga, J. A., Elosúa, M. R., Gil, L., Gómez-Veiga, I., Vila, J. Ó., Orjales, I., … Duque, G. (2013). Reading comprehension and working memory's executive processes: An intervention study in primary school students. *Reading Research Quarterly*, *48*, 155–174. doi:10.1002/rrq.44

Georgiou, G. K., & Das, J. P. (2018). Direct and indirect effects of executive function on reading comprehension in young adults. *Journal of Research in Reading*, *41*, 243–258. doi:10.1111/1467-9817.12091

Gillberg, C., & Coleman, M. (2000). *The biology of the autistic syndromes* (3rd ed.). London, UK: Cambridge University Press.

Gnaedinger, E. K., Hund, A. M., & Hesson-McInnis, M. S. (2016). Reading-specific flexibility moderates the relation between reading strategy use and reading comprehension during the elementary years. *Mind, Brain, and Education*, *10*, 233–246. doi:10.1111/mbe.12125

Goldstein, S., & Naglieri, J. A., (Eds.) 2014. *Handbook of executive functioning*. Springer Science & Business Media. doi:10.1007/978-1-4614-8106-5

Guthrie, J. T., & Klauda, S. L. (2016). Engagement and motivational processes in reading. In P. Afflerbach (Ed.), *Handbook of individual differences in reading: Reader, text, and context* (pp. 41–53). New York, NY: Routledge.

Guthrie, J. T., Klauda, S. L., & Ho, A. (2013). Modeling the relationships among reading instruction, motivation, engagement, and achievement for adolescents. *Reading Research Quarterly*, *48*, 9–26. doi:10.1002/rrq.035

Guthrie, J. T., Mason-Singh, A., & Coddington, C. S. (2012). Instructional effects of Concept- Oriented Reading Instruction on motivation for reading information text in middle school. In J. T. Guthrie, A. Wigfield, & S. L. Klauda (Eds.), *Adolescents' engagement in academic literacy* (pp. 155–215). Retrieved from www.corilearning.com/research-publications

Guthrie, J. T., McRae, A. C., & Klauda, S. L. (2007). Contributions of Concept-Oriented Reading Instruction to knowledge about interventions for motivations in reading. *Educational Psychologist*, *42*, 237–250. doi:10.1080/00461520701621087

Guthrie, J. T., Wigfield, A., & You, W. (2012). Instructional contexts for engagement and achievement in reading. In S. Christensen, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 601–634). New York, NY: Springer Science.

Henderson, L., Snowling, M., & Clarke, P. (2013). Accessing, integrating, and inhibiting word meaning in poor comprehenders. *Scientific Studies of Reading*, *17*, 177–198. doi:10.1080/10888438.2011.652721

Jacob, R., & Parkinson, J. (2015). The potential for school-based interventions that target executive function to improve academic achievement: A review. *Review of Educational Research*, *85*, 512–552. doi:10.3102/0034654314561338

Jang, H. (2008). Supporting students' motivation, engagement, and learning during an uninteresting activity. *Journal of Educational Psychology*, *100*, 798–811. doi:10.1037/a0012841

Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology*, *102*, 588–600. doi:10.1037/a0019682

Kieffer, M. J., Vukovic, R. K., & Berry, D. (2013). Roles of attention shifting and inhibitory control in fourth-grade reading comprehension. *Reading Research Quarterly*, *48*, 333–348. doi:10.1002/rrq.54

Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction– integration model. *Psychological Review*, *95*, 163–182. doi:10.1037/0033-295X.95.2.163

Latzman, R. D., Elkovitch, N., Young, J., & Clark, L. A. (2010). The contribution of executive functioning to academic achievement among male adolescents. *Journal of Clinical and Experimental Neuropsychology*, *32*, 455–462. doi:10.1080/13803390903164363

Markman, E. M. (1977). Realizing that you don't understand: A preliminary investigation. *Child Development*, *48*, 986. doi:10.2307/1128350

Markman, E. M. (1979). Realizing that you don't understand: Elementary school children's awareness of inconsistencies. *Child Development*, *50*, 643–655. doi:10.2307/1128929

Matte-Gagné, C., & Bernier, A. (2011). Prospective relations between maternal autonomy support and child executive functioning: Investigating the mediating role of child language ability. *Journal of Experimental Child Psychology*, *110*, 611–625. doi:10.1016/j.jecp.2011.06.006

McGee, A., & Johnson, H. (2003). The effect of inference training on skilled and less skilled comprehenders. *Educational Psychology*, *23*, 49–59. doi:10.1080/01443410303220

Melby-Lervåg, M., & Hulme, C. (2013). Is working memory training effective? A meta-analytic review. *Developmental Psychology*, *49*, 270–291. doi:10.1037/a0028228

Meltzer, L. (2010). *Promoting executive function in the classroom*. New York, NY: Guilford Press.

Meuter, R. F. I., & Allport, A. (1999). Bilingual language switching in naming: Asymmetrical costs of language selection. *Journal of Memory and Language*, *40*, 25–40. doi:10.1006/jmla.1998.2602

Meuwissen, A. S., & Carlson, S. M. (2018). The role of father parenting in children's school readiness: A longitudinal follow-up. *Journal of Family Psychology*, *32*(5), 588–598. doi:10.1037/fam0000418

Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The unity and diversity of executive functions and their contributions to complex "frontal lobe" tasks: A latent variable analysis. *Cognitive Psychology*, *41*, 49–100. doi:10.1006/cogp.1999.0734

Monsell, S. (1996). Control of mental processes. In V. Bruce (Ed.), *Unsolved mysteries of the mind: tutorial essays in cognition* (pp. 93–148). Hove, UK: Erlbaum.

Myers, M., II., & Paris, S. G. (1978). Children's metacognitive knowledge about reading. *Journal of Educational Psychology*, *70*, 680–690. doi:10.1037/0022-0663.70.5.680

Novais-Santos, S., Gee, J., Shah, M., Troiani, V., Work, M., & Grossman, M. (2007). Resolving sentence ambiguity with planning and working memory resources: Evidence from fMRI. *Neuroimage*, *37*, 361–378. doi:10.1016/j.neuroimage.2007.03.077

Oakhill, J., Hartt, J., & Samols, D. (2005). Levels of comprehension monitoring and working memory in good and poor comprehenders. *Reading and Writing*, *18*, 657–686. doi:10.1007/s11145-005-3355-z

Pearson, P. D., & Dole, J. A. (1987). Explicit comprehension instruction: A review of research and a new conceptualization of instruction. *The Elementary School Journal*, *88*, 151–165. doi:10.1086/461530

Postle, B. R., Brush, L. N., & Nick, A. M. (2004). Prefrontal cortex and the mediation of proactive interference in working memory. *Cognitive, Affective, & Behavioral Neuroscience*, *4*, 600–608. doi:10.3758/CABN.4.4.600

Pressley, M. (2005). Metacognition in literacy learning: Then, now, and in the future. In S. E. Israel, C. C. Block, K. L. Bauserman, & K. Kinnucan-Welsch (Eds.), *Metacognition in literacy learning* (pp. 391–411). Mahwah, NJ: Erlbaum.

Pressley, M., Borkowski, J. G., & Schneider, W. (1987). Cognitive strategies: Good strategy users coordinate metacognition and knowledge. *Annals of Child Development*, *4*, 89–129. Retrieved from www.researchgate.net/publication/47873647_Cognitive_Strategies_Good_Strategy_Users_Coordinate_Metacognition_and_Knowledge

Pressley, M., Forrest-Pressley, D. L., Elliott-Faust, O. J., & Miller, G. E. (1985). Children's use of cognitive strategies, how to teach strategies, and what to do if they can't be taught. In M. Pressley & C. I. Brainerd (Eds.), *Cognitive learning and memory in children* (pp. 1–47). New York: Springer-Verlag.

Pribram, K. H. (1973). The primate frontal cortex—Executive of the brain. In K. K. H. Pribram & A. R. Luria (Eds.), *Psychophysiology of the frontal lobes* (pp. 293–314). New York, NY: Academic Press.

Reeve, J. (2012). A self-determination theory perspective on student engagement. In S. Christensen, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 149–173). New York, NY: Springer Science.

Reeve, J., Bolt, E., & Cai, Y. (1999). Autonomy-supportive teachers: How they teach and motivate students. *Journal of Educational Psychology*, *91*, 537–548. doi:10.1037/0022-0663.91.3.537

Reeve, J., & Jang, H. (2006). What teachers say and do to support students' autonomy during a learning activity. *Journal of Educational Psychology*, *98*, 209–218. doi:10.1037/0022-0663.98.1.209

Reeve, J., Jang, H., Carrell, D., Jeon, S., & Barch, J. (2004). Enhancing students' engagement by increasing teachers' autonomy support. *Motivation and Emotion*, *28*, 147–169. doi:10.1023/B:MOEM.0000032312.95499.6f

Reeve, J., Jang, H., Hardre, P., & Omura, M. (2002). Providing a rationale in an autonomy-supportive way as a strategy to motivate others during an uninteresting activity. *Motivation and Emotion*, *26*, 183–207. doi:10.1023/A:1021711629417

Roebers, C. M., & Feurer, E. (2016). Linking executive functions and procedural metacognition. *Child Development Perspectives*, *10*, 39–44. doi:10.1111/cdep.12159

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*, 68–78. doi:10.1037/0003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2009). Promoting self-determined school engagement: Motivation, learning, and well-being. In K. Wenzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 171–195). New York, NY: Routledge/Taylor & Francis Group.

Sesma, H. W., Mahone, E. M., Levine, T., Eason, S. H., & Cutting, L. E. (2009). The contribution of executive skills to reading comprehension. *Child Neuropsychology*, *15*, 232–246. doi:10.1080/09297040802220029

Shiffrin, R. M., & Schneider, W. (1977). Controlled and automatic human information processing: II. Perceptual learning, automatic attending and a general theory. *Psychological Review*, *84*, 127–190. doi:10.1037//0033-295x.84.2.127

Souvignier, E., & Mokhlesgerami, J. (2006). Using self-regulation as a framework for implementing strategy instruction to foster reading comprehension. *Learning and Instruction*, *16*, 57–71. doi:10.1016/j.learninstruc.2005.12.006

Taboada Barber, A., Buehl, M. M., Beck, J. S., Ramirez, E. M., Gallagher, M., & Archer, C. J. (2018). Literacy in social studies: The influence of cognitive and motivational practices on the reading comprehension of english learners and non-english learners. *Reading & Writing Quarterly*, *34*, 79–97. doi:10.1080/10573569.2017.1344942

Taboada Barber, A., Buehl, M. M., Kidd, J., Sturtevant, E., Richey, L. N., & Beck, J. (2015). Reading engagement in social studies: Exploring the role of a social studies literacy intervention on reading comprehension, reading self-efficacy, and engagement in middle school students with different language backgrounds. *Reading Psychology*, *36*, 31–85. doi:10.1080/02702711.2013.815140

Taboada Barber, A., Cartwright, K. B., Stapleton, L., Klauda, S. L., Archer, C., & Smith, P. (2019). *The role of higher order skills, executive functioning, and reading engagement in the reading comprehension of English learners and English speakers*. Manuscript submitted for publication.

Vallotton, C., & Ayoub, C. (2011). Use your words: The role of language in the development of toddlers' self-regulation. *Early Childhood Research Quarterly*, *26*(2), 169–181. doi:10.1016/j.ecresq.2010.09.002

Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic effects of intrinsic goal contents and autonomy-supportive contexts. *Journal of Personality and Social Psychology*, *87*, 246–260. doi:10.1037/0022-3514.87.2.246

Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., & Matos, L. (2005). Examining the motivational impact of intrinsic versus extrinsic goal framing and autonomy- supportive versus internally controlling communication style on early adolescents' academic achievement. *Child Development*, *76*, 483–501. doi:10.1111/j.1467-8624.2005.00858.x

Vaughn, S., Martinez, L. R., Linan-Thompson, S., Reutebuch, C. K., Carlson, C. D., & Francis, D. J. (2009). Enhancing social studies vocabulary and comprehension for seventh-grade English language learners: Findings from two experimental studies. *Journal of Research on Educational Effectiveness*, *2*(4), 297–324.

Wagner, R. K., Schatschneider, C., & Phythian-Sence, C. (Eds.). (2009). *Beyond decoding: The behavioral and biological foundations of reading comprehension*. New York, NY: Guilford Press.

Wingfield, A., & Grossman, M. (2006). Language and the aging brain: Patterns of neural compensation revealed by functional brain imaging. *Journal of Neurophysiology*, *96*, 2830–2839. doi:10.1152/jn.00628.2006

Yuill, N., & Joscelyne, T. (1988). Effect of organizational cues and strategies on good and poor comprehenders' story understanding. *Journal of Educational Psychology*, *80*, 152–158. doi:10.1037//0022-0663.80.2.152

Yuill, N., & Oakhill, J. (1988). Effects of inference awareness training on poor reading comprehension. *Applied Cognitive Psychology*, *2*, 33–45. doi:10.1002/acp.2350020105

Zabrucky, K., & Ratner, H. H. (1986). Children's comprehension monitoring and recall of inconsistent stories. *Child Development*, *57*, 1401–1418. doi:10.2307/1130419