Effects of the Self-Regulation Empowerment Program (SREP) on middle school students' strategic skills, self-efficacy, and mathematics achievement☆

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A R T I C L E   I N F O

A B S T R A C T

The current study examined the effectiveness of an applied self-regulated learning intervention (Self-Regulation Empowerment Program (SREP)) relative to an existing, school-based remedial mathematics intervention for improving the motivation, strategic skills, and mathematics achievement of academically at-risk middle school students. Although significant group differences in student self-regulated learning (SRL) were not observed when using self-report questionnaires, medium to large and statistically significant group differences were observed across several contextualized, situation-specific measures of strategic and regulatory thinking. The SREP group also exhibited a statistically significant and more positive trend in achievement scores over two years in middle school relative to the comparison condition. Finally, SREP students and coaches reported SREP to be a socially-valid intervention, in terms of acceptability and importance. The importance of this study and critical areas for future research are highlighted and discussed.

1. Introduction

Educators and researchers have long recognized that student success in middle and high school goes beyond mere exposure to high quality instruction and mastery of basic academic skills, such as reading, mathematics, or writing. Student achievement is also determined by a host of interacting cognitive abilities (e.g., fluid reasoning, executive functions) and motivational and regulatory skills (DiPerna, Volpe, & Elliot, 2002; Fuchs et al., 2003; Graham & Harris, 2009). In recent years, self-regulated learning (SRL) and motivation principles have been thrust into the spotlight. Self-regulated learning, which is broadly defined as self-generated thoughts and actions that are proactively initiated and cyclically sustained to attain personal goals, has been identified as a core 21st century skill (Anderson Koenig, 2011) and is naturally embedded in national curriculum standards and initiatives, such as Common Core (White & DiBenedetto, 2015). Despite decades of research underscoring SRL and motivation as critical predictors of academic success, there is evidence that these variables are not routinely incorporated into classroom instruction nor do they serve as an integral component of academic support services or many academic-based interventions (Cleary, Gubi, & Prescott, 2010; Wehmeyer, Agran, & Hughes, 2000).

This lack of attention to SRL and motivation is particularly problematic for middle school students because of the unique set of

demands, expectations, and challenges that they encounter when transitioning from elementary school (Grolnick & Raftery-Helmer, 2015). For example, unlike in elementary school when most students learn content area information or academic skills from one or two teachers, middle school students receive instruction from a myriad of teachers who will likely vary in their teaching styles and instructional approaches. Middle school students will also encounter more complex and rigorous courses and are typically expected to display more independent, self-directed learning outside of the school day (Cleary & Chen, 2009; Grolnick & Raftery-Helmer, 2015). Given that students also periodically encounter many other types of academic challenges, such as preparing for comprehensive unit tests in math, managing multiple homework assignments, or attempting to catch up with schoolwork after missing several days due to an illness, it is important for educators to recognize that all students will encounter some type of challenge during school. In fact, many of these students are likely to experience multiple and/or intensive challenges that concurrently operate and intersect.

The unfortunate reality, however, is that many students will struggle to effectively cope with and overcome these challenges because of maladaptive motivation profiles or mindsets (e.g., low self-efficacy, entity conceptions of ability), deficient metacognitive and strategic skills (Blackwell, Trzesniewski, & Dweck, 2007; Butler, Beckingham, & Lauscher, 2005; Dignath & Büettner, 2008), or inadequate feedback provided by others (Cleary et al., 2010; Hattie & Timperley, 2007). This combination of maladaptive SRL skills and ineffective forms of feedback makes it very difficult for some students to reflect adaptively and to figure out ways to overcome barriers to their learning. When also taking into account that youth from marginalized or disadvantaged backgrounds are prone to exhibit maladaptive motivation beliefs (e.g., self-efficacy, interest) and underdeveloped problem-solving or regulatory skills (Byrnes, 2003; Steele, 1997), there is a strong need to develop intervention programs that target these types of processes and populations. The primary purpose of the current study was to examine the extent to which a school-based academic intervention, Self-Regulation Empowerment Program (SREP), enhanced the regulatory skills and mathematics achievement of a group of academically at-risk youth in an urban middle school.

1.1. Need for integrating academic and psychological intervention supports

The types of intervention support services that academically at-risk students receive in middle school often vary across school districts. Although the large majority of public schools provide instructional programming and support services for students with disabilities, such as resource room and related services (e.g., counseling), the quality and the availability of other remedial or supportive academic programs is much less uniform. For example, whereas some middle schools may exhibit the capacity and infrastructure to offer different types of instructional supports or study skills programs to students who struggle, not all school districts are as fortunate. Many schools, particularly those in urban, less affluent neighborhoods, do not have the financial or personnel resources to provide such programming. Of even greater concern are findings from research showing that many K-12 schools do not frequently provide SRL and motivation intervention supports and services to students (Cleary et al., 2010).

The overall lack of SRL and motivation supports in schools is interesting given that there are intervention approaches available to address these issues (Butler et al., 2005; Cleary, 2015; Dignath & Büettner, 2008; Hattie, Biggs, & Purdie, 1996). In terms of motivation, which can be defined as goal-directed behavior that is self-initiated and sustained (Schunk, Meece, & Pintrich, 2014), interventions targeting specific motivation beliefs, such as self-efficacy (i.e., enhancing students' beliefs in their capacity to perform specific behaviors), growth mindset (i.e., cultivating a belief that intelligence and ability can be improved), purpose for learning (i.e., enhancing students' perceptions of the meaningfulness or value of learning), and attribution re-training (i.e., getting students to attribute failure to controllable factors), have been shown to exert positive effects on student behavior and academic outcomes (Bandura, 1997; Blackwell et al., 2007; Borkowski, Weyhing, & Carr, 1988; Dweck & Leggett, 1988; Good, Aronson, & Inzlicht, 2003). Along the same lines, study skills or strategy instruction, which entails teaching students knowledge and procedures about how to learn or acquire information, has also been a topic of interest among educators and researchers (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013; Gettinger & Seibert, 2002; Pressley & Harris, 2008). Although different labels have been used to describe strategic processes, such as study skills, cognitive strategies, and regulatory or metacognitive strategies, several meta-analyses and review articles have shown that students who become more knowledgeable and skilled in using tactics and strategies during learning tend to improve their academic outcomes (Dunlosky et al., 2013; Hattie et al., 1996; Pressley & Harris, 2008).

Researchers have also noted that motivation or strategy instruction alone is often not as effective as when combined with metacognitive or regulatory training (Cleary & Platten, 2013; Dignath & Büettner, 2008; Montague, Enders, & Dietz, 2014). In their comprehensive review of SRL interventions implemented with school-aged populations, Dignath and Büettner (2008) concluded that interventions that combined strategy instruction with reflection activities (metacognition) tended to produce the largest effect sizes. Although most contemporary SRL interventions tend to integrate cognitive strategy instruction and metacognition training, relatively few of them attempt to address all three areas (motivation, strategy use, metacognition) in a comprehensive way as part of authentic learning experiences. A few of the more notable applied SRL intervention programs that address all three components include Guthrie and colleagues' Concept-Oriented Reading Instruction (CORI; Guthrie et al., 2004), Graham and Harris's Self-Regulated Strategy Development (SRSD; Graham & Harris, 2009), and Montague's SolveIt (Montague et al., 2014). These intervention programs have received much empirical support with each being linked to a core academic skill: reading (CORI), writing (SRSD), and mathematics problem-solving (SolveIt).

To our knowledge, however, very few applied academic intervention programs exist that are specifically structured to help middle and high school students reflect on the course-specific and day-to-day academic challenges that inhibit their learning. There is also a paucity of applied intervention programs that provide students with intensive motivation and SRL coaching and feedback needed for them to learn, practice, and revise their strategic attempts to succeed (Butler et al., 2005; Cleary & Platten, 2013). The Self-Regulation Empowerment Program (SREP) is a school-based, SRL academic intervention program developed to address these issues.