Emotion Regulation in Children with Borderline Intellectual Functioning: Exploring the Self-Regulatory Profiles of an Understudied Population

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Abstract

Students with borderline intellectual functioning (BIF) have specific deficits related to self-regulation that increasingly impact their school performance as the demands of schooling rise during middle childhood. A central aspect of self-regulation is the ability to appropriately regulate one's emotions in relation to the environment. To date, research investigating self-regulation in children with BIF has focused on identifying deficits in meta-cognitive aspects of executive functioning, such as working memory (Alloway, 2010; Danielsson, Henry, Messer, & Rönnberg, 2012). However, other components of executive functioning, such as emotion regulation abilities, have yet to be examined among children with BIF. The current study investigated the emotion regulation profiles of children with BIF as compared to typically developing peers, ages 9 to 13. Results indicated that children with BIF did not differ significantly from same-age peers with regards to their ability to modulate the frequency and intensity of their emotions. However, a significant difference was found between groups in terms of their overall use of cognitive emotion regulation strategies. While findings revealed significant positive correlations between intellectual functioning and the use of adaptive cognitive emotion regulation strategies, such as Acceptance ($r = .40$) and Refocusing on Planning ($r = .39$), no significant correlations were found between intellectual functioning and maladaptive cognitive coping strategies. These data provide information regarding the emotion regulation abilities of middle school children with BIF, as well as the relation between intellectual ability and the use of cognitive emotion regulation strategies among children.

Résumé

Les étudiants ayant un fonctionnement intellectuel limite (FIF) ont des déficits liés à l'autorégulation qui ont un impact croissant sur leur rendement scolaire au fur et à mesure que les exigences scolaires augmentent durant l'enfance. Un aspect central de l'autorégulation est la capacité de réguler ses émotions de manière appropriée par rapport à l'environnement. À ce jour, la recherche chez les enfants avec FIF a mis l'accent sur l'identification des déficits par rapport aux aspects métacognitifs de fonctionnement exécutif, comme la mémoire de travail (Alloway, 2010; Danielsson, Henry, Messer, et Rönnberg, 2012). Cependant, d'autres composants de fonctionnement exécutif, comme les capacités de régulation des émotions, doivent encore être examinés chez les enfants avec FIF. L'étude actuelle a enquêté sur les profils de régulation des émotions des enfants atteints de FIF par rapport à leurs pairs à développement typique de 9 à 13 ans. Les résultats ont indiqué que les enfants avec FIF n'ont pas de dépréciation spécifique en ce qui concerne leurs capacités de régulation émotionnelle par rapport à leurs pairs du même âge. Cependant, une différence significative a été trouvée entre les groupes par rapport à leur utilisation de stratégies cognitives de régulation émotionnelle. Les résultats ont également révélé des corrélations positives significatives entre le fonctionnement intellectuel et l'utilisation de stratégies cognitives de régulation émotionnelle adaptatives, comme l'acceptation ($r = .40$) et le recentrage sur la planification ($r = .39$), alors que de telles corrélations n'ont pas été trouvées entre le fonctionnement intellectuel et l'utilisation des stratégies cognitives de régulation émotionnelle non adaptative. Ces données fournissent des informations sur les capacités de régulation émotionnelle des enfants avec FIF, ainsi que la relation entre la capacité intellectuelle et l'utilisation de stratégies cognitive de régulation émotionnelle chez les enfants.

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Introduction

Scope of the Problem

Historically, students with borderline intellectual functioning (BIF) have been referred to as "slow-learners" or "low-achievers", terms that are now considered derogatory and have fallen out of favour (Shaw, 2008). Because of their inability to perform to academic expectations combined with their lack of access to services, children with BIF are overlooked by both general and special education systems, making them a uniquely vulnerable population (Fernell & Ek, 2010; Karande, Kanchan, & Kulkarni, 2008; Shaw, 2008). Children with BIF represent an understudied population as research on intelligence has been a contentious issue in North America over the last few decades. However, the study of intelligence and how it impacts children's ability to learn in school is important, particularly in the case of children who have below average intelligence resulting in low levels of academic achievement. High levels of academic achievement is associated with better psychological outcomes for students, as well as higher socioeconomic status and better employment outcomes in adulthood than low levels of academic achievement (Kuncel, Hezlett, & Ones, 2004; Skaalvik & Hagtvet, 1990; Valiente, Lemery-Chalfant, & Swanson, 2010).

In Canada, the education of children falls under provincial or territorial jurisdiction. Each jurisdiction is responsible for curriculum development and the assessment of educational achievement among its students (Klinger, DeLuca, & Miller, 2008). Despite variability across jurisdictions, large-scale assessments are central to education in Canada and play a crucial role in shaping curriculum and instruction (McEwen, 1995). Current provincial school systems, such as the reformed Quebec Education Program, have introduced competency-based curriculums and accountability requirements in the form of results-based management (Quebec Ministry of

Education, 2001). This places certain children at a disadvantage as the achievement of cross-curricular aspects of learning may be expected of children with average intelligence or higher, however they may be unattainable for students who are unable to engage in the higher mental processes prioritized by these competency-based programs (Neault, 2015). Additionally, students must master complex cognitive skills in order to perform on high-stakes tests now required to progress through the general education system in Canada. These skills, such as generalization and abstract problem solving, are particularly challenging for students with below average intelligence (Shaw, 2010). This then creates barriers to academic achievement as many of these students are not eligible for government funded special education resources, and may be unable to afford help elsewhere.

Children who fall below the average range of normal intelligence, though able to learn, do not keep up with the typical pace of instruction thus increasing their risk for school failure, grade retention and dropout (Ritzema & Shaw, 2012; Shaw, 2008). This is particularly true for those students who fall just below the average range because they do not have a diagnosable intellectual disability and are not eligible to receive government-funded services to support their academic achievement. This population is referred to as having borderline intellectual functioning, defined as intelligence test scores that fall between one and two standard deviations below the population mean (American Psychiatric Association [APA], 2013). Children with BIF represent over 14% of the student population; a number that is greater than the overall number of students who qualify for all special education service categories in the United States combined (Shaw, 1999; Shaw, 2008; Shaw, 2010). Some estimates report an even greater prevalence of individuals with BIF in the general population (Gottlieb, Alter, Gottlieb, & Wishner, 1994; Hassiotis et al., 2008; Salvador-Carulla et al., 2013). According to Cooter and Cooter (2004),

there are three to four students with BIF in the average elementary school classroom. Therefore, increasing support and improving outcomes for students with BIF represents a cause for concern to be addressed within the context of the current educational system in order to diminish ongoing failure and dropout among these students.

Self-Regulation in the Modern Classroom

Self-regulation is a crucial aspect of achieving academic success in the modern classroom. The better a child can self-regulate, the better prepared they will be to master the complex skills and concepts presented in the classroom. Broadly defined, self-regulation refers to time-limited goal-directed behaviour (Hofmann, Schmeichel, & Baddeley, 2012). In the classroom context this means that students with effective self-regulation skills are able to stay calmly focused and alert while learning. Self-regulation is a complex process however, subserved by many functions. This complexity is reflected by myriad definitions in the literature, including but not limited to, the ability to attain, maintain and appropriately adjust one's level of arousal, to control one's emotions, to formulate a goal, monitor progress and adjust goal-directed behaviour, to manage social interactions, and to be aware of one's academic strengths and weaknesses and have strategies to deal with academic challenges (Vohs & Baumeister, 2004).

Students who lack the ability to independently regulate their behaviour and achieve small goals are unable to succeed without constant support and supervision from the teacher. In classrooms of 25 or more students, it is difficult for teachers to supervise and provide support to individual students without falling behind in the programmed curriculum (Biddle & Berliner, 2008; Blatchford, Baines, Kutnick, & Martin, 2001). As a result, children often go unnoticed, or are identified as lazy and unmotivated, and blamed for their poor achievement scores.

Difficulties associated with self-regulation deficits, such as difficulties in executive functioning, represent an important risk factor for children with BIF as they make their way through the school system (Jankowska, Bogdanowicz, & Shaw, 2012). For example, many metacognitive processes such as planning, goal-setting, organizing, and self-monitoring are necessary for effective self-regulation to occur, in addition to motivational and behavioural processes like perceived self-efficacy and help-seeking (Zimmerman, 1990). However, the cognitive limitations experienced by children with BIF, particularly poor working memory, cognitive organization skills, and generalization skills, significantly impact these metacognitive processes and further limit motivational and behavioural self-regulation processes to occur (Jankowska, 2011; Shaw, 2008). The aforementioned difficulties likely lead children with BIF to experience limited self-awareness and in turn difficulty regulating their behaviour in the classroom. As self-regulation demands increase when children move from kindergarten to middle school and onward to high school, children with BIF increasingly fall behind and over time the achievement gaps widens (Shaw, 2008; Shaw, 2010).

Studying Emotion Regulation in Students with Borderline Intellectual Functioning

To date, research investigating self-regulatory capacities in children with BIF has focused on identifying deficits in meta-cognitive skills associated with effective self-regulation, such as the executive functions and working memory (Alloway, 2010; Danielsson et al., 2012; Gioia, Isquith, Retzlaff, & Espy, 2002; Schuchardt, Gebhardt, & Mäehler, 2010). These areas of difficulty have also been used as targets for intervention. Training students to improve their working memory functions has been successful, yet these improvements have remained limited to the task on which training occurred (Diamond & Lee, 2011; Holmes, Gathercole & Dunning, 2009). Currently, efforts to improve working memory and executive functions have not

generalized to success in the school setting (Diamond & Lee, 2011). Although meta-cognitive functioning is an important aspect of school success, other unexplored components of self-regulation may have a greater impact on the ability of children with BIF to function in the classroom at an optimal level. For example, difficulty following the pace of instruction due to working memory and attention shifting deficits may be compounded by the inability to regulate one's emotions effectively due to the constant experience of frustration (Levine, 2003; Shaw, 2008). An important aspect of self-regulation is the ability to regulate one's emotions appropriately in relation to the environmental context. This skill also plays a key role in successful adaptation during middle childhood (Shields & Cicchetti, 1997). Having a comprehensive understanding of the specific self-regulation difficulties, such as potential emotion regulation deficits, faced by children with BIF will have important future implications for intervention.

Rationale for the Current Study

Self-regulation, and specifically emotion regulation, in dynamic classroom environments may not only improve students' ability to adapt to changes and stressors in the environment, but may also allow students with BIF to harness their limited meta-cognitive abilities more fully and work to their potential. Given that self-regulation and executive functioning are inextricably linked (Barkley, 2001), it is likely that children with BIF experience deficits in their ability to regulate their emotions, in addition to existing executive functioning deficits. Furthermore, because students with BIF often encounter school failure, they are at risk for developing social and emotional problems (Shaw, 2010). Thus, the ability to modulate their own emotional experience in effective ways gains another dimension of importance with regard to school motivation and success for children with BIF. Emotion regulation could thus serve as a potential

target for intervention for children with BIF during a critical time in their emotional and cognitive development, such as middle childhood. However, there exists little evidence that emotion regulation abilities are lower in children with BIF than in children of average to above average intelligence (McClure, Halpern, Wolper, & Donahue, 2009). Before being able to design targeted and effective interventions, it is important to gain a more complete understanding of the specific processes underlying academic difficulties among children with BIF, such as those involved in self-regulated learning. With a focus on emotion regulation, the proposed study will thus contribute to the literature on self-regulation in children with BIF. More specifically the goal of this study will be to investigate the association between behavioural regulation and academic underachievement in children with BIF by comparing the emotion regulation profiles of children with BIF to those of typically developing children of the same age.

<div align="center">**Literature Review**</div>

Borderline Intellectual Functioning

Borderline intellectual functioning is neither a form of intellectual disability, nor a developmental disorder (Ferrari, 2009). Thus most main diagnostic classification systems fail to provide a clear definition for BIF, if at all (Ninivaggi, 2005). According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), BIF is defined as an IQ score that falls between one and two standard deviations below the population mean (71 to 84) (APA, 2013). Not only does this definition lie within what is considered normal variation in the population, between the average range and mild intellectual disability, but children with BIF have a physically healthy appearance and a normal medical and developmental history (Karande et al., 2008). As a consequence of their normal health, physical appearance and early adaptive functioning, children with BIF are often difficult to identify at an early age when intervention may be most effective. Due to their cognitive limitations, many children with BIF require

professional attention, yet their difficulties tend to become apparent only after years of school failure that finally warrants the need for a psychological assessment (Ninivaggi, 2005). BIF thus represents a significant risk factor for educational and vocational failure, psychopathology, and persistent future problems in adaptive functioning (Emerson, Einfeld, & Stancliffe, 2009; Ferrari, 2009; Karande et al., 2008; Ninivaggi, 2001).

Definitional problems. As borderline intellectual functioning is not a single neurodevelopmental syndrome, it is absent from diagnostic manuals as a diagnosis with a comprehensive description of symptomology (Salvador-Carulla et al., 2013). As a result, children with BIF cannot be classified as having a clinical disorder since Borderline Intellectual Functioning is not recognized as a form of intellectual disability (APA, 2013; Salvador-Carulla et al., 2013). Yet through differential diagnosis individuals may be described as having BIF if they present with IQ scores ranging from 71–84 in addition to adaptive and academic impairments (APA, 2013). Their inability to meet diagnostic criteria for a clinical disorder therein restricts their access to services in educational settings as they are not deemed eligible for special education resources, leading them to "fall between the cracks" (Shaw, 2008, p. 292).

Academic underachievement. Children with BIF are characterized as having a series of learning deficits that make classroom instruction particularly challenging, including: difficulty with abstract concepts, difficulty generalizing skills, knowledge and strategies, difficulty organizing new material and assimilating new information, difficulty with long-term goals and time management, more practice needed to develop skills, and academic motivation deficits (Shaw, 2010). Additionally, children with BIF often experience difficulties in both spoken and written language comprehension as well as attention and executive functioning, coupled with a

lack of compensatory strategies (Cornoldi, Giofrè, Orsini, & Pezzuti, 2014; Salvador-Carulla et al., 2013).

Learning difficulties in children with BIF are not confined to a particular domain such as reading or writing (Karande et al., 2008). Further, heterogeneity of specific deficits and a multifaceted etiology contribute to a variety of clinical profiles that can be distinguished among individuals with BIF, all differing in their symptoms and underlying cognitive difficulties (Bradley & Corwyn, 2002; Jankowska, 2011; Jenkins, Woolley, Hooper, & De Bellis, 2014; Shaw, 2008). As a result, BIF presents a set of unique and often poorly understood challenges to address in the classroom. Given their lack of visibility, combined with large general education classroom sizes and curriculum demands placed on teachers due to high stakes testing, teachers may not always be equipped to meet the diverse needs of students with BIF. Furthermore, children with BIF are aware that they are unable to keep up with their classmates and are rarely rewarded for their efforts (Shaw, 2008). This often leads to feelings of frustration, a lack of motivation and poor emotional outcomes over time (Shaw, 2008; Shaw, 2010). Eventually, it becomes difficult for teachers to differentiate between an inability to perform in the same way as other students and a lack of motivation leading to underachievement among their students with BIF.

Self-Regulation

Self-regulation is a construct consisting of both behavioural and cognitive processes (Hofmann et al., 2012; Liew, 2012). It is a process whereby individuals are able and motivated to initiate, adjust, interrupt or terminate goal-directed behaviour as a result of different internal and external factors (Baumeister & Heatherton, 1996; Baumeister, Heatherton, & Tice, 1993, 1994; Carver & Sheier, 1988; Heatherton & Ambady, 1993). Successful self-regulation entails

three components: (a) endorsing, maintaining and monitoring standards of thought, feelings and behaviour, (b) having sufficient motivation to attain those standards, and (c) having the capacity to achieve the standard level of self-regulation in all domains (Baumeister et al., 1994; Hofmann et al., 2012). In other words, self-regulation is the capacity to alter one's own behaviours in order to adapt to the demands of the environment in socially acceptable ways (Baumeister & Vohs, 2007). Alternately, Hofmann and colleagues (2012) describe successful self-regulation as the pursuit of long-term goals in the face of tempting alternatives; a crucial component of academic success.

Baumeister and Heatherton (1996) posit that self-regulation strength is a limited resource that must be exercised like a muscle and that, in turn, can be depleted by the demands of the environment, thus implying that many individual differences in self-regulation exist. Furthermore, self-regulatory failure can also occur in different ways, including misregulation and under-regulation. Effective self-regulation is associated with positive outcomes in school and at work, good mental health and adjustment, as well as good interpersonal relationships (Baumeister et al., 1994; Duckworth & Seligman, 2005; Mischel, Shoda, & Peake, 1988; Shoda, Mischel, & Peake, 1990; Tangney, Baumeister, & Boone, 2004; Wolfe & Johnson, 1995).

Self-regulated learning. Self-regulatory skills are essential for school readiness and future achievement. There is a growing body of research demonstrating that students who participate proactively in the learning process by self-regulating emotional, motivational and cognitive processes, achieve greater academic outcomes, providing further evidence that self-regulation and academic competencies go hand in hand (Liew, 2012; Nota, Soresi, & Zimmerman, 2004; Zimmerman & Schunk, 2012). Students who regulate their own behaviors in the classroom apply specific personal self-activating and self-directed strategies in order to

actively acquire new knowledge and skills (Zimmerman, 1998). Zimmerman and Martinez-Pons (1986, 1988) identified 14 self-regulated learning strategies, many of which represent skills deficits among children with BIF, such as self-evaluation, organizing and transforming, goal-setting and planning, among others (Jankowska, 2011; Shaw, 2008).

       Executive functioning and borderline intellectual functioning. The aspect of self-regulation that has been most widely studied among students with BIF is executive functioning. Executive functioning is widely known as a multi-dimensional construct associated with self-regulated behaviour. Many definitions and theoretical frameworks have been proposed in an effort to integrate and operationalize the many dimensions of these two constructs. Barkley (2001) defines executive functions as the "general forms or classes of self-directed actions that humans use in self-regulation" (p. 5). Other authors have also conceptualized executive functioning as self-directed cognitive functions that subserve self-regulatory abilities (Hofmann et al., 2012).

       In general terms, executive functions refer to the cognitive processes that regulate and control goal-directed thought, action and emotion (Danielsson et al., 2012; Gioia et al., 2002). Given their executive functioning deficits, it follows that students with BIF might experience difficulties related to the processes of self-regulation and goal-directed behaviours that rely on cognitive processes involved in executive functioning (Alloway, 2010). Furthermore, executive functioning capacities are essential to finding success in the modern day classroom, for many reasons. For example, working memory skills are involved in a range of learning activities such as remembering and carrying out instructions, keeping track of places when reading and writing, and solving mental math problems (Gathercole, Lamont, & Alloway, 2006). Many of these skills also involve processes such as shifting, updating, and inhibiting automatic responses (St

Clair-Thompson & Gathercole, 2006). Cognitive deficits observed in children with BIF largely impact executive functioning skills associated with the ability to think abstractly and to organize new information while learning (Masi, Marcheschi, & Pfanner, 1997; Shaw, 2008). Specifically, deficits in working memory and the other meta-cognitive functions, such as planning and inhibition, have been identified as weaknesses that impact their ability to learn and organize new verbal and visuo-spatial information in the classroom (Alloway, 2010; Danielsson et al., 2012; Schuchardt et al., 2010).

Most commonly, children with BIF are characterized as lacking cognitive flexibility, and metacognitive awareness, as well as having a limited ability to plan, analyze and undertake tasks (Masi et al., 1997). These difficulties have been associated with specific developmental and qualitative deficits in executive functions such as working memory (Schuchardt et al., 2010). Academically, this translates into problems with abstract and critical thinking as well as organizing and generalizing new information, especially as children with BIF move through the educational system and must rely increasingly on these skills (Masi et al., 1997; Shaw, 2008; Shaw, 2010). In learning how to think abstractly and organize information, as well as how to plan ahead and undertake new tasks, children develop the ability to integrate complex new concepts with previously learned basic information, as well as to study independently and understand the consequences of failing to complete assigned homework. Children with BIF, however, struggle to learn basic meta-academic skills that come naturally to other students (Shaw, 2008). For example, they experience difficulty when trying to turn word problems into workable math equations without the help of a sample, or are unable to remember what homework they have to complete or how to do the homework on their own (Masi et al., 1997; Shaw, 2010).

Executive functioning and emotion regulation: A theoretical framework. Executive functioning is a multidimensional construct encompassing many cognitive processes that regulate and control goal-directed behaviour (Danielsson et al., 2012; Gioia et al., 2002; Ursache, Blair, & Raver, 2012). Many definitions and theories of executive functioning have been proposed. According to Barkley's revised model (1997), behavioural regulation is related to four main components of executive function: working memory, internalization of self-directed speech, reconstitution, and emotion regulation. Working memory refers to the ability to hold and manipulate information in one's mind allowing for the imitation of complex behaviour sequences, cross-temporal organization, understanding new abstract concepts as well as sense of time (Barkley, 1997). This specific component of executive functioning has been most frequently investigated in relation to deficits seen in children with BIF (Alloway, 2010; Danielsson et al., 2012; Schuchardt et al., 2010). Internalization of speech and reconstitution refer to the ability to perform rule-governed behaviours such as following directions, and creative goal-oriented behaviours such as self-questioning, respectively (Barkley, 1997). Finally, emotion regulation is the component of executive functioning that allows for effective emotional self-control in addition to a more general self-regulation drive and motivation (Barkley, 1997). Based on Barkley's (1997) theoretical framework, working memory, internalization of speech and reconstitution represent meta-cognitive components of executive functioning (Barkley, 1997; Gioia, Isquith, Guy, & Kenworthy, 2000). Meta-cognitive functions are often referred to as higher-order cognitive processes or "cool" executive functions (Barkley, 1997; Gioia et al., 2000). Alternatively, emotion regulation is often viewed as a lower order or "hot" executive function concerning affective or emotional aspects of behavioural regulation (Barkley, 1997; Zelazo & Cunningham, 2007).

Within Barkley's (1997) multidimensional framework, both the higher and lower order executive functions are highly interrelated, working together to execute appropriate behaviour. Accordingly, from a neurodevelopmental perspective, cognition and emotions are dynamically linked and work together to produce goal-oriented behaviour (Bell & Wolfe, 2004). Moreover, extensive research has shown that both cognitive and emotional components of executive functioning are uniquely related to academic success, after accounting for intelligence (Bull, Espy, & Wiebe, 2008; Graziano, Reavis, Keane, & Calkins, 2007; St Clair-Thompson & Gathercole, 2006; Ursache et al., 2012). That said, researchers have yet to investigate emotion regulation abilities among children with BIF, and its impact on academic achievement and other outcomes.

Emotion Regulation

Research interest in emotion regulation has increased dramatically over the last two decades. Although emotion regulation is a phenomenon that is common to everyday life, the definition of this complex self-regulatory process continues to be the subject of debate among behavioural scientists (Thompson & Goodman, 2010). Most commonly, emotion regulation refers to the adaptive and effective ability to monitor, evaluate and modulate the presence, duration and intensity of emotions in response to contextual demands, in order to achieve one's goals (Graziano et al., 2007; Shields & Cicchetti, 1997; Suveg & Zeman, 2004; Thompson, 1994). Emotion regulation is a complex process that involves the ability to first perceive and understand one's emotions and then to use cues in the environment as well as internal cues in order to determine the appropriate emotional response according to social convention (Carlson & Wang, 2007; Garnefski, Rieffe, Jellesma, Terwogt, & Kraaij, 2007; Shields & Cicchetti, 1997, Thompson, 1994). Effective emotion regulation is involved in coping with positive and negative

emotions alike, such as pleasure, fear, and anxiety (Kopp, 1989; Suveg & Zeman, 2004), in addition to managing stressful and frustrating situations (Konstantareas & Stewart, 2006).

As children mature, emotion regulation becomes crucial to adaptive social and emotional functioning, as it can influence the ability to develop and maintain supportive relationships, as well as have an impact on long-term academic motivation (Graziano et al., 2007; Gumora & Arsenio, 2002; Shaw, 2010). A child's ability to regulate their emotions effectively is associated with increased perseverance in emotionally rousing situations as well as greater school liking, classroom participation, and student teacher relationships, all leading to improved academic outcomes (Graziano et al., 2007; Gumora & Arsenio, 2002; Huffman et al., 2001; Shields & Cicchetti, 1997; Suveg & Zeman, 2004).

Emotion regulation and development. Acquiring the ability to regulate ones emotions is a major developmental achievement (Cicchetti, Ganiban, & Barnett, 1991; Cole, Michel, & Teti, 1994)**.** Many of the developmental tasks accomplished in early development are emotion based. For example, in the first seven years of life infants must learn to tolerate frustration and being alone, in addition to coping with fear and anxiety (Cole et al., 1994). During this time infants must also learn to engage in enjoying others and making friends, and learn to find interest and motivation for learning (Cole et al., 1994). A child's ability to regulate their emotions will determine how they react in potentially distressing situations, and plays an important role in many aspect of behaviour and the development of social relationships (Butler, Lee, & Gross, 2007; Dennis, Malone, & Chen, 2009; Dodge & Garber, 1991).

During the transition from the preschool years to grade-school, the way in which children regulate their emotions changes dramatically. As children mature and enter middle childhood, around the age of 8 or 9 years, their emotion regulation abilities continue to improve as they

experience a shift from using primarily external to primarily internal emotion regulation strategies (Garnefski et al., 2007). Whereas younger children rely on external cues such as parents and other people around them to determine appropriate emotional expression, as they get older they rely on cognitions about the self, others and their feelings to appropriately regulate their emotions (Garnefski et al., 2007; Shields & Cicchetti, 1997). Other skill advancements such as the ability to think abstractly and apply mental representations, planning, selective attention and improved social-emotional skills contribute further to the development of effective emotion regulation (Cole et al., 1994; Dodge & Garber, 1991; Underwood, 1997). Thus, in middle childhood children become better able to cope with stressful and anxiety provoking situations (Cole et al., 1994; Underwood, 1997). Furthermore, the development of complex and effective emotion regulation processes in older children allows for efficient organization of information, basic metacognition, effective self-regulation, and academic motivation and success (Gray, 2004; Graziano et al., 2007; Huffman et al., 2001; Zimmerman, 1989).

Emotion regulation failure. Not all children learn effective emotion regulation skills during their emotional development, and failure to achieve these developmental milestones may have serious consequences. As a result, some children develop emotion dysregulation, a common dimension of many DSM-5 diagnostic categories (APA, 2013; Cicchetti et al., 1991) and a defining feature in many cases (Cole et al., 1994). Many definitions of emotion dysregulation exist (Cole et al., 1994). Broadly, it refers to difficulties processing and flexibly integrating emotional information with other processes, and having poor control over the feeling and expression of such emotions (Cicchetti et al., 1991; Kopp, 1989). As children mature, inefficient emotion regulation has increasingly detrimental effects on their emotional and psychological well-being as well as their ability to engage in higher order cognitive processing

(Blair, 2002; Gross, 1998; Keenan, 2000). Identifying patterns of inefficient emotion regulation can provide an improved understanding of the risk factors associated with higher rates of psychopathology, executive functioning difficulties, and academic underachievement and failure among children with BIF. Such patterns may also help to identify targets for intervention.

Cognitive emotion regulation. Individuals' thoughts about the world influence their emotional responses to the environment (Steinberg, 2005). Further, cognitions allow individuals to regulate their own emotions when processing and managing difficult events and situations. The use of cognitions to regulate one's emotions is of critical importance particularly when coping with situations over which the individual has little or no control, such as parental divorce or familial economic hardship (Garnefski, Kraaij, & Spinhoven, 2001). Cognitive emotion regulation becomes increasingly important as children's social worlds expand and they begin to encounter more situations over which they have no control; meanwhile, relying less on the regulatory structures provided by adults to help cope with these situations (Prencipe et al., 2011). As such, cognitive emotion regulation plays an important role in the course of emotional development and psychological adjustment (Garnefski, Kraaij, De Graaf, & Karels, 2009).

Garnefski and colleagues (2007) identified nine different emotion regulation strategies that individuals use to regulate their emotions. Of these nine strategies, five are adaptive (Acceptance, Refocusing on Planning, Positive Refocusing, Putting into Perspective and Positive Reappraisal), and the remaining four are maladaptive (Self-Blame, Blaming Others, Rumination and Catastrophizing) (Garnefski et al., 2001). These cognitive strategies are defined as the "conscious, mental strategies individuals use to cope with the intake of emotionally arousing information" (Garnefski et al., 2009, p. 450). Maladaptive strategies are associated with various forms of psychopathology such as depression and delinquency (Auerbach, Claro, Abela, Zhu, &

Yao, 2010). Additionally, engaging in cognitive emotion regulation, particularly the use of

adaptive strategies, requires a certain level of cognitive mastery wherein the refinement of

advanced cognitive skills facilitates the use of cognitive emotion regulation strategies overall

(Garnefski & Kraaij, 2006). Children with BIF may not have the same ability to engage in

adaptive emotion regulation strategies as their typically developing classmates as a function of

their lower cognitive ability.

Conclusions

Self-regulation is a crucial component of healthy development and academic achievement

among students. The shift to using more internal self-regulation strategies occurs during the

same developmental period that the academic achievement gap between students with BIF and

their typically developing peers begins to widen (Cooter, 2004; Garnefski et al., 2007; Hines,

2004). The period of middle childhood is thus a critical developmental period for children with

BIF. To date, research suggests that children with BIF experience both developmental and

qualitative deficits in executive functioning, specifically inhibition, planning and non-verbal

working memory (Alloway, 2010; Danielsson et al., 2012); all functions that subserve effective

self-regulation. Yet, research investigating self-regulatory profiles in children with BIF has

focused solely on the metacognitive aspects of self-regulation, namely "cold" executive

functions. Given the interconnected nature of these cognitive and emotional constructs, it is

likely that children with BIF will have different emotion regulation profiles from their typically

developing peers. Moreover, in the pursuit to explain poor academic functioning among children

with BIF, it is also likely that the metacognitive difficulties explanation is confounded both by an

inability to effectively regulate emotions and the frustration caused by the awareness that other

students do not experience the same struggle to keep up at school. Accordingly, this complex interaction between risk factors warrants further investigation.

There exists a gap in the current literature on the affective aspects of executive functioning, or "hot" functions, among children with BIF. Emotion regulation is necessary for successful socio-emotional development, long-term adjustment, and academic and vocational achievement. Therefore, more research is necessary in order to determine whether children with BIF differ significantly from typically developing children in their ability to effectively regulate their emotions. Gaining a better understanding of the mechanisms underlying their impairments may lead to the development and implementation of more effective and generalizable intervention strategies that have the potential to significantly impact the developmental outcomes of children with BIF.

Hypotheses of Current Study

The hypotheses of the current study were as follows:

1. Children with BIF will obtain significantly higher scores on measures of emotion regulation than their typically developing peers, indicating higher levels of impairment in their ability to successfully modulate the presence and intensity of their emotions in response to environmental demands.

2. Children with BIF will use significantly more maladaptive cognitive emotion regulation strategies and significantly fewer adaptive cognitive emotion regulation strategies than their typically developing peers to regulate their emotions in response to negative or stressful events.

Method

Participants

Participants for this study were recruited from a French-language primary school in Montreal, Quebec, that serves an ethnically diverse and low socioeconomic status population. All children were recruited from the same school in order to reduce variance due to SES. Additionally, this recruitment pool was selected as a convenience sample as the school from which participants were recruited has two special education classrooms designed for children with BIF, called Difficultés Graves d'Apprentissage (DGA). Children are assigned to these classes based on a previously administered psychoeducational assessment confirming cognitive abilities between one and two standard deviations below the population mean. Further, these students do not have diagnoses of a specific learning disability or developmental disability that would allow them to qualify for government funded educational support services.

Participants included 49 children (61.2% male, 38.8% females) between the ages of 9 and 13 years ($M = 10.86$, $SD = 1.14$). Participants were divided into two groups according to classroom assignment. The first group ($n = 24$) included children with borderline intellectual functioning (BIF). The comparison group ($n = 25$) was composed of typically developing children (TYP) from the same school and matched on chronological age. Socio-demographic characteristics such as chronological age, gender, and Raven's IQ scores for children with BIF and typically functioning children are presented in Table 1.

Measures

Demographics questionnaire. Data related to socio-demographic features of each participant was collected using a socio-demographic questionnaire designed by the Connections Lab research team. Information collected with this questionnaire included child age and gender,

ethnicity, native language and socio-economic status. This questionnaire was sent home and completed by parents who consented to their child's participation in the study.

Raven's Standard Progressive Matrices. Each child's cognitive abilities were assessed using the Raven's Standard Progressive Matrices (SPM; Raven, 2003). This test was administered to ensure that the groups significantly differed in terms of average overall cognitive functioning. The SPM is a culturally and ethnically fair, non-verbal test that measures general cognitive ability in children and adults. It is composed of 60 items that are divided into five sets (A-E) with 12 items per set, and has been validated for use with individuals from 6:0 to 16:0 and 17:0+ years of age. Administration time for the SPM ranges between 20 to 45 minutes, and it may be administered in small groups of approximately 15 children per administrator. The SPM has reliably demonstrated high internal consistency, $r = .80$ (Rushton, Skuy, & Fridjhon, 2002). As this is a non-verbal test, the instructions are minimal, and a previously translated French version of the instructions was used.

Delis Rating of Executive Functions – Self Form. Emotion-regulation was assessed using the Emotional Functioning Index (EFI) of the Delis Rating of Executive Functions (D-REF; Delis, 2012). The D-REF is a questionnaire used to assess executive functioning in children and adolescents from 5 to 18 years of age. The D-REF includes three core indexes (Behavioural functioning, Emotional functioning, Cognitive functioning) based on three manifestations of executive control problems. Four additional indexes are available (Attention/Working Memory, Activity Level/Impulse Control, Compliance/Anger Management, Abstract Thinking/Problem Solving) to identify patterns of clinically relevant symptoms. For the purpose of this study, students were asked to complete ratings for the EFI in the self-report form, composed of eight questions (i.e., "When I'm upset I react without thinking") scored on a 4-point

scale (Seldom/Never, Monthly, Weekly, Daily). The EFI measures children's ability to regulate their emotions relative to the demands of the environment, by assessing poor frustration tolerance, emotional lability, sensitivity to criticism, anger control problems and interpersonal issues. Higher scores on these items indicate higher levels of emotional reactivity, thus greater impairments in emotional functioning. The parent, teacher and self-rating forms show high internal consistency for the EFI as well as the other core indexes. Furthermore, the D-REF is sensitive to common developmental disorders like autism and learning disorders (Delis, 2012).

Cognitive Emotion Regulation Questionnaire - Child. The child version of the *Cognitive Emotion Regulation Questionnaire* (CERQ; Garnefski et al., 2007) was used to assess the extent to which children use adaptive versus maladaptive cognitive strategies to modulate the way in which they react to emotionally arousing information. The CERQ is a 36-item self-report measure including nine scales that are conceptually and empirically related to nine distinct cognitive emotion regulation strategies used by participants in relation to negative life events. These nine strategies include five adaptive strategies (i.e., acceptance, positive refocusing, refocusing on planning, positive reappraisal, and putting into perspective), and four maladaptive strategies (i.e., self-blame, rumination, catastrophizing, and blaming others). Each item is scored on a 5-point Likert-type scale, with response items ranging from 1 (almost never) to 5 (almost always). Each scale score is measured by summing item responses of four items specific to a particular emotion regulation strategy, thus producing scores ranging from a minimum of 4 to a maximum of 20. Higher scores indicate greater use of the specific cognitive emotion regulation strategy. Sample items include "I think that I have to accept it" for positive strategies, or "Again and again, I think of how I feel about it" as a measure of negative strategies. The nine subscales

have demonstrated high internal consistency for children aged 9 to 12, with Cronbach's alphas ranging from 0.62 to 0.79 (Garnefski et al., 2007).

French translation. The EMI and the CERQ were translated into French by a graduate student specializing in English to French translation and subsequently back-translated by an undergraduate interpreter to ensure accurate translation. Finally, a French-speaking school psychologist reviewed all French language items to confirm accuracy and cultural appropriateness.

Procedure

Children with BIF were identified based on previous assessments done by a school-board based school psychologist. Following approval from the McGill University Research Ethics Board and the ethics committee of the Commission scolaire de la Pointe-de-l'Ile, consent forms were sent to parents along with a letter explaining the purpose and the procedures of this study. Participation in this study was voluntary and only children whose parents provided consent were eligible to participate. Both parental consent and personal assent were obtained for all children who participated in the study. All students who had parental consent chose to provide personal assent.

After receiving consent, a demographics questionnaire was sent home to be completed by the participants' parents. Parents were requested to complete all questionnaires within four weeks of the beginning of the data collection phase. Data were collected from both children with BIF and typically developing children at school during their regular class time and in their usual classrooms. Children whose parents did not consent to their participation in the study were given exercises by their teachers to be completed while their peers participated in the study.

Administration of the SPM took place during the first part of the data collection period, lasting no more than 45 minutes. The EMI and the CERQ were completed during the second

half of the data collection period lasting approximately 30 minutes. To ensure the response

validity for written questionnaires, French-speaking research assistants read the questions out

loud to students experiencing difficulty with reading and reading comprehension. Data were

collected in a total of 4 classrooms (2 DGA & 2 TYP) with 12 to 13 students each time.

Research Design and Data Analysis

The current research project consists of a correlational study with a cross-sectional

design. Both t-tests and a multivariate analysis of covariance (MANCOVA) were conducted

using the Statistical Package for the Social Sciences (SPSS version 20, 2012) at the $p < .05$

significance level to identify differences between the study and comparison groups on the SPM

and EMI, and all CERQ scales, respectively. In this way children with BIF were compared to

TYP children in their ability to modulate the presence and intensity of their emotions, as well as

the pattern of cognitive strategies used to regulate their emotions. Gender and age were included

as covariates in the analyses. A series of correlations were also conducted to explore the strength

of the relationship between intellectual functioning, emotion regulation and cognitive emotion

regulation strategy use.

<div align="center">Results</div>

Prior to conducting the analysis, the data were screened for missing values and univariate

outliers, and to ensure that the multivariate statistical assumptions were met. Assumptions of

linearity and homoscedasticity were both met. Upon review of the standardized skewness scores

of each variable, two continuous variables were found to violate the assumption of normality:

CERQ – Self-Blame, $z_{skewness} = 4.67$, and CERQ – Other-Blame, $z_{skewness} = 3.80$, were

problematic. The standard scores for these variables, obtained by dividing the skewness statistic

by its standard error, significantly departed from normality, using a $z = 3.20$ cut-off score

(Tabachnick & Fidell, 2013). Square root transformations were conducted for both non-

normally distributed variables, yielding acceptable distributions, CERQ – Self-Blame, $z_{skewness}$ = 3.20, and CERQ – Other-Blame, $z_{skewness}$ = 2.55. Transformed scores were applied to subsequent analyses.

Before analyses were performed, independent samples t-tests were conducted in order to test for significant group differences in Standardized IQ scores (Raven's IQ), age and gender. The BIF group had a significantly lower mean Raven's IQ than the TYP group, $t(47)$ = -5.46, $p <$ .001, as expected. The BIF group had a mean Raven's IQ of 87.79 and the TYP group had a mean Raven's IQ of 111.04. No significant difference in age or gender was found between the groups.

Overall Group Differences in Emotion Regulation

Results of the 2-tailed independent samples t-test comparing EMI scores revealed that there was no significant difference between the BIF and the TYP group in their ability to regulate their emotions. Thus, these results do not support the first hypothesis that children with BIF would have more difficulty regulating their emotions than their typically developing peers. Conversely, results of the MANCOVA revealed that there was a significant difference between groups in the way they regulate their emotions, $F(11,37)$ = 2.26, p = .036, η^2_p = .39. These results thus support the hypothesis that children with BIF and typically developing children differ significantly in the cognitive strategies they use to regulate their emotions. Subsequently, a series of univariate tests was conducted in order to identify the specific dependent variables, or cognitive emotion regulation strategies, on which both groups differed. However, upon further investigation of univariate tests, no significant differences were found on any measure of cognitive emotion regulation in isolation. Descriptive statistics are shown in Table 2.

Raven's IQ and Emotion Regulation

A series of bivariate correlations was conducted in order to examine the relationships between Raven's IQ scores, EMI scores and CERQ scores. Many significant correlations were found (Table 3). Notably, there was a significant positive correlation between Raven's IQ scores and CERQ – Total score, $r = .34$, $p = .019$. Furthermore, Raven's IQ scores were significantly correlated with the use of adaptive cognitive emotion regulation strategies (CERQ – Adaptive), $r = .35$, $p = .013$. Specifically, a significant positive correlation was found between Raven's IQ scores and CERQ – Acceptance, $r = .39$, $p = .005$, and CERQ - Refocusing on Planning, $r = .39$, $p = .006$, respectively. No significant correlation was found between Raven's IQ scores and the maladaptive cognitive emotion strategies or the EMI. Of note, CERQ scales were highly inter-correlated. Thus, the use of adaptive cognitive strategies was related to the frequent use of other adaptive strategies and maladaptive strategies as well. In other words, the use of adaptive and maladaptive cognitive emotion regulation strategies is not mutually exclusive. Finally, significant positive correlations were found between EMI scores and the following CERQ scales, respectively: Acceptance ($r = .39$, $p = .006$), Catastrophizing ($r = .37$, $p = .009$), Self-Blame ($r = .51$, $p < .001$), Blaming Others ($r = .30$, $p = .036$), Maladaptive Strategies ($r = .49$, $p < .001$), and CERQ – Total ($r = .30$, $p = .040$). A significant negative correlation was found between EMI and CERQ – Positive Refocusing, $r = -.29$, $p = .043$.

Discussion

Overall, there was no significant difference between groups' ability to regulate their emotions. However, children with BIF and typically developing children differed significantly in terms of the pattern of cognitive strategies they used to regulate their emotions after accounting for age and gender; although no clear pattern was evidenced. As expected, a

significant amount of variance in cognitive emotion regulation appears to be explained by cognitive functioning. Based on these results, it is possible that although intellectual ability may not play a significant role in children's ability to regulate their emotions, or in their emotional reactivity, children with BIF may significantly differ in terms of the specific strategies they use to regulate their emotions, particularly with regards to cognitive emotion regulation strategies.

Emotion Regulation

Based on the current results, children with BIF do not have a relative impairment in their ability to monitor, evaluate and modulate the presence, duration and intensity of their emotions, compared to their typically developing, same-age peers. This implies that certain systems involved in the process of emotion regulation do not rely on sophisticated, higher order cognitive functions that are often impaired in children with BIF, but rather on lower order functions as suggested by Barkley (1997). It is likely that individual differences in executive functioning and self-regulation that affect academic achievement in children with BIF are better accounted for by meta-cognitive or "cool" functions. Alternately, it is possible that differences in emotion regulation only arise, or become more apparent later in development as individuals use cognitive emotion regulation strategies more frequently and as they encounter more emotionally demanding situations, from early adolescence to adulthood (Garnefski & Kraaij, 2006). In other words, as children move into adolescence and early adulthood not only do their perceptions and the nature of interpersonal dilemma and stressful situations change, but they rely increasingly on cognitive strategies to cope with the influx of emotionally rousing stimuli (Garnefski & Kraaij, 2006). Thus emotion regulation becomes an increasingly cognitive process as individuals mature. The group chosen for the current study was in middle childhood; a period

in development where children rely more and more on cognitive strategies to regulate their emotions yet also continue to engage in alternative forms of coping when they encounter stressful situations, particularly in the case of children with cognitive limitations (Bagdi & Pfister, 2006).

Cognitive Emotion Regulation

Although significant differences were found in terms of the overall pattern of cognitive emotion regulation strategies used by children in different groups, no significant differences were found across specific strategies. As such, no specific pattern arose, as had been expected at the outset, and we were unable to conclude that children with BIF used more or less maladaptive or adaptive cognitive emotion regulation strategies than their typically developing peers. Specifically, univariate differences were non-significant while the multivariate analysis was significant. Lo and colleagues (1995) proposed four possible scenarios leading to this outcome: (a) unbalanced sample sizes, (b) missing data, (c) significant within group variation, and (d) the presence of an interaction. As the groups in this study were almost identical in size, $n = 24$ and $n = 25$ respectively, and there were no missing data in the analysis, the first two reasons may be ruled out as possible explanations. Furthermore, no significant interaction effects were noted in the analysis. As such, this outcome may have been caused by an unknown and unidentified interaction that was not accounted for by the analysis, or caused by significant within group variation. The latter explanation is most plausible given the large number of dependent variables included in this analysis, and the nature of the construct under study. It is likely that students have a preference for certain cognitive strategies over others based upon previous experience, modelling and pre-existing cognitive schemas. As a result, children in the same group,

whether with BIF or typically developing, are likely to differ with regards to the emotion regulation strategies that they prefer and use most frequently, creating a significant amount of variability across individual children within each group. Furthermore, the use of both adaptive and maladaptive cognitive emotion regulation strategies is not mutually exclusive and many individuals, children and adults alike, regularly engage in both. This then adds a level of complexity to the pattern of outcomes and variability that may be seen within and across groups.

Intellectual Functioning and Emotion Regulation

Correlations between variables revealed an interesting pattern of findings with regards to the relation between intelligence and cognitive emotion regulation. Although, the Raven's Standard Progressive Matrices do not include a verbal component, this test provides a valid measure of general intelligence, *g* (Raven, 2003). Raven's IQ scores were thus used in this analysis as an estimate of general intelligence. Intelligence was significantly correlated with greater overall use of cognitive emotion regulation strategies, which may be expected given the cognitive nature of these skills. However, a distinction arose between adaptive and maladaptive strategies, wherein significant positive correlations were found between Raven's IQ scores and overall Adaptive strategy scores, as well as Acceptance and Refocussing on Planning. From this, intellectual ability appears to be positively related with adaptive cognitive strategy use, more so than the use of maladaptive cognitive emotion regulation strategies. Adaptive cognitive strategies, such as Refocusing on Planning, may demand more cognitive ability to implement, as they involve more sophisticated cognitive processes like organizing and goal setting. For example, an increase in the use of positive reappraisal is particularly marked in the transition from later adolescence to adulthood as individuals master

more advanced cognitive abilities (Aldwin, 1994; Garnefski & Kraaij, 2006). Moreover, maladaptive strategies may be more automatic, conditioned responses to stressful situations and thus easily used to cope with stressful events by individuals of all intellectual ability.

Furthermore, EMI scores were correlated with Maladaptive strategies overall, as well as Catastrophizing, Self-Blame and Blaming Others. As the EMI is largely a measure of emotional reactivity, significant correlations between this measure and various measures of maladaptive cognitive strategies suggests that maladaptive strategies are used as an initial reaction to stressful situations regardless of individuals' intellectual ability. However, given the correlational nature of the current data, further investigation is needed to determine the causal links behind this pattern of outcomes.

Overall, emotion regulation deficits may not represent a significant risk factor for children with BIF in middle childhood. Children with BIF may not necessarily use more negative coping strategies than their typically developing peers, but they may lack the ability to engage in adaptive cognitive coping when faced with stressful stimuli. The current results suggest that children with BIF develop a non-adaptive or inefficient pattern of cognitive coping over time, marked by limited use of adaptive cognitive strategies, which may represent a significant risk factor with regards to their future academic achievement and psychological well-being.

Limitations

The current study had several limitations. The small sample size limited the power of the statistical analyses, particularly in the case of univariate tests, and significantly limited our ability to detect even small effects. Overall, observed effects were small. In addition, the population from which students were recruited in Montreal has a large representation of

immigrant and low income families, limiting the generalizability of these results to other populations. Furthermore, this study was cross-sectional and exploratory in nature and did not allow for any developmental conclusions that a longitudinal design would have provided.

Due to limited resources and school regulations, a full psychoeducational evaluation could not be conducted to verify the cognitive functioning of each child participating in the study. As such, participants we assigned to the BIF group or the TYP group based on classroom assignment. The SPM was thus used simply to verify that a true difference in cognitive functioning existed between the two groups. On its own, this test represents a limited means of measuring cognitive ability, and thus was not used for the purpose of group assignment. Additionally, based on the Raven's IQ scores, the BIF group had a mean level of cognitive functioning slightly above the definitional cut-off score of 85 for children with BIF. This may be because the SPM is a non-verbal measure and students were initially assigned to DGA classes on the basis of cognitive evaluations including a verbal component. Furthermore, no measure of meta-cognitive functioning was included in this study, thus we do not know if the current sample experienced the same meta-cognitive limitations as has been demonstrated in the literature among other children with BIF. The internal validity of the study is then limited as it is unclear whether the experimental group truly meets the criteria for BIF.

Another limitation of this study involves the procedure used to collect the data. All data collected for this study, with the exception of demographic information and the SPM, was verbal and self-reported in nature. Once again due to limited resources and time constraints, parent and teacher reports were not collected. This is particularly problematic because no assessment of language comprehension was done to ensure that participants

understood the content of the questionnaires, and children with BIF generally have significant

verbal deficits at baseline (Jankowska, 2011), thus potentially limiting the validity of their

responses to self-reported questionnaires. Furthermore, children aged 9 to 13, particularly

those with cognitive impairments, may lack the introspective ability necessary to complete

many self-report questionnaires related to complex emotional states (Bauminger, Edelsztein, &

Morash, 2005; Cook, Greenberg, & Kusche, 1994). Therefore it is impossible to know whether

children were able to give truthful and accurate answers to these questions even if they did

understand the content of each question. A measure such as an emotion regulation q-sort

(Shields & Cicchetti, 1997), or an interview involving visual images and vignettes (Zeman &

Garber, 1996) may have helped to reduce response bias and increase comprehension.

A final limitation of the study is that factors such as cross-cultural differences, socio-

economic status, and parent education were not controlled for in the analyses. The

participants included in the study may represent a specific subset of children from the BIF

population. Participants were recruited through a primary school in the north-east end of

Montreal. Many of the parents in these families had lower educational attainment, were

immigrants, and spoke neither French nor English as a first language. As such, it is possible

that these environmental factors played a role in their child's developmental delay, whereas

another subset of children with BIF may have an entirely different etiology giving rise to

different outcomes.

Conclusion and Future Directions

The goal of the current study was to gain a better understanding of the emotion

regulation abilities and strategies of children with BIF. Overall, children with BIF did not

have a specific impairment with regards to their emotion regulation abilities compared to

same-age peers. However, a significant difference was found between groups in terms of their overall use of cognitive emotion regulation strategies, but the analyses revealed no specific pattern. Finally, significant positive correlations were found between intellectual functioning and the use of adaptive cognitive emotion regulation strategies, while no such correlations were found between intellectual functioning and maladaptive cognitive coping strategies.

Although children with BIF have deficits in executive functioning related to their inability to perform to academic standards as seen in the literature, the results of the current study suggest that these difficulties may be limited to the meta-cognitive aspects of executive functioning, while emotion regulation abilities appear to be intact at this age. Emotion regulation is an important aspect of development and an integral part of effective self-regulatory behaviour. If developed successfully then efficient emotion regulation can arm children with numerous protective factors including the development of strong social relationships, and the ability to cope with stressful situations. These skills are particularly important in dynamic classroom settings, where children with BIF often experience significant difficulty. Thus, to remain engaged at school they must be able to rely on their emotion regulation abilities in order to deal with the many daily stressors they encounter. However, though children with BIF in this study did not differ in their ability to modulate the presence and intensity of their emotions, their cognitions about their emotions differed. This, in turn, may impact the way they experience emotional stimuli. Further, this may have significant implications for the development of cognitively controlled emotion regulation skills overtime as children with BIF transition into adolescence and begin to rely more heavily

on cognitive strategies to regulate their emotions; all the while dealing with significant environmental changes and increasing curriculum demands in high school.

Finally, the findings that children with BIF use different patterns of cognitive emotion regulation strategies, and that adaptive cognitive strategies are related to higher intellectual functioning, raise important questions about emotion regulation in children with BIF which warrant further investigation. A limited ability to use adaptive cognitive strategies to cope with stressful situations at a young age may represent a significant risk factor for children and adolescents with BIF. For example, overtime a preference for negative cognitive strategies may lead to the development of emotional dysregulation rooted in thought patterns characterized by high levels of rumination, catastrophizing and self-blame (Garnefski et al., 2001). These maladaptive thought patterns are associated with various forms of psychopathology and lower levels of achievement (Garnefski, Kraaij, & van Etten, 2005; Masi et al., 1997). As such the finding that children with BIF indeed use fewer adaptive cognitive emotion regulation strategies than their typically developing peers and rely on maladaptive cognitive strategies to regulate their emotions is of particular concern.

Although the current findings provide evidence that children with BIF differ from their typically developing peers in their use of cognitive emotion regulation strategies, future research should investigate and clarify the patterns of cognitive strategies used among older children and adolescents with BIF. Having a better understanding of the cognitive processes and patterns underlying emotion regulation will allow practitioners to provide these students with more targeted interventions and alternative strategies for thinking about emotional experiences and coping with stress, either in school or at home. Furthermore, specific prevention programs may be tailored to the needs of these students. For example, programs

may be developed that provide explicit instruction on the types of adaptive cognitive strategies that children with BIF can use to cope with stressful situations, and to replace potential maladaptive cognitive patterns. By teaching and encouraging children to practice using adaptive strategies to increase their automaticity, they may be able to override the use of maladaptive coping strategies and in turn become more resilient when faced with academic adversity. Due to their invisibility in the classroom and clinical heterogeneity, children with BIF represent a relatively large proportion of the general population and a uniquely vulnerable group of students. Although the current findings were mixed, given the paucity of existing research on the emotional functioning of these individuals and the important clinical implications of using emotion regulation as an avenue for developing resilience, this is an area of research that warrants further exploration in order to improve the future outcomes of many students with borderline intellectual functioning.

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Table 1

Socio-Demographic Characteristics and Raven's IQ Scores of Participants by Group

Variable	Group	
	Borderline Intellectual Functioning	Typically Developing
Chronological Age in Years *M* (*SD*)	10.75 (.989)	10.91 (1.276)
Gender, *n* (%)		
Male	15 (62.5)	15 (60)
Female	9 (37.5)	10 (40)
Raven's IQ score, *M* (*SD*)	87.79 (16.38)	111.04 (12.46)

Table 2

Means and Standard Deviations of D-REF – EMI and CERQ Scale Scores by Group

Variable	Group Borderline Intellectual Functioning	Typically developing
D-REF – EMI	15.67 (5.561)	16.84 (6.216)
CERQ – Total	90.88 (15.496)	93.96 (22.654)
CERQ – Adaptive	54.71 (10.515)	56.60 (15.658)
CERQ – Acceptance	9.46 (2.702)	10.68 (3.224)
CERQ – Positive Refocusing	11.92 (4.313)	11.24 (5.101)
CERQ – Refocusing on Planning	11.08 (3.256)	12.52 (5.116)
CERQ – Positive Reappraisal	11.21 (3.362)	10.36 (3.161)
CERQ – Putting into Perspective	11.04 (3.689)	11.80 (4.637)
CERQ – Maladaptive	36.17 (10.016)	37.36 (13.203)
CERQ – Rumination	10.71 (3.532)	10.80 (5.066)
CERQ – Catastrophizing	10.71 (3.355)	9.80 (5.000)
CERQ – Self-Blame	7.38 (2.763)	8.36 (4.241)
CERQ – Blaming Others	7.38 (2.856)	8.40 (4.690)

Note. CERQ – Total is a composite of CERQ – Adaptive and CERQ – Maladaptive. CERQ – Adaptive is a composite of 5 scale scores and CERQ – Maladaptive is a composite of 4 scale scores.

Table 3

Correlations for Scores on the Raven's SPM, D-REF – EMI and CERQ Scales

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Raven's IQ	1	.052	.335*	.352*	.392**	.107	.385**	.156	.195	.155	.200	.038	.120	.037
2. D-REF – EMI[a]		1	.295*	.001	.385**	-.290*	-.006	-.010	.065	.489**	.265	.368**	.512**	.301*
3. CERQ – Total			1	.808**	.713**	.276	.664**	.503**	.665**	.740**	.651**	.731**	.547**	.187
4. CERQ – Adaptive				1	.600**	.571**	.837**	.647**	.735**	.200	.246	.312*	.105	-.116
5. Acceptance					1	-.062	.409**	.382**	.537**	.499**	.416**	.471**	.449**	.079
6. Positive Refocusing						1	.470**	.153	.132	-.193	-.123	-.066	-.172	-.172
7. Refocusing on planning							1	.420**	.477**	.149	.297*	.273	.154	-.336*
8. Positive reappraisal								1	.397**	.097	.142	.124	-.073	.023
9. Putting into perspective									1	.266	.202	.347*	.103	.097
10. CERQ – Maladaptive										1	.801**	.858**	.789**	.443**
11. Rumination											1	.593**	.606**	.079
12. Catastrophizing												1	.674**	.220
13. Self-Blame													1	.030
14. Other Blame														1

[a]Higher D-REF – EMI scores are indicative of indicative of more emotion regulatory impairment.
*p < .05. **p < .01 For above, significance is 2-tailed.

Appendix A

FORMULAIRE DE CONSENTEMENT DE RECHERCHE

Institution : Faculté de l'éducation, Université McGill

Titre du projet : **La régulation cognitive des émotions chez les enfants à risque d'échec scolaire : Exploration des profils d'autorégulation**

Chercheur : Marie-Michelle Boulanger

Superviseur : Dr Steven Shaw, Ph.D.

Cher parent ou tuteur légal,

Nous vous invitons à permettre à votre enfant de participer à un projet de recherche qui étudie les profils d'autorégulation des enfants qui sont à risque d'échec scolaire par rapport à leurs pairs. Veuillez examiner les informations suivantes avant d'accepter de participer à ce projet de recherche. Ce formulaire de consentement explique le but de l'étude, les procédures, les avantages, les risques et les inconvénients, ainsi que la liste des personnes à contacter en cas de besoin.

Quel est le but de l'étude?
Le but de cette étude est d'explorer la façon dont les différents enfants contrôlent leurs émotions face aux situations stressantes. Le but de cette étude est de comprendre pourquoi certains enfants ont plus de difficulté à faire face à la frustration et l'échec scolaire. Nous voulons voir si les élèves qui ont plus de difficulté à réussir à l'école ont des réactions émotionnelles différentes à des situations stressantes par rapport à d'autres étudiants. Les résultats de l'étude seront utilisés pour améliorer l'enseignement pour les étudiants à l'avenir. Les résultats peuvent également être publiés dans des revues scientifiques et présentés lors de conférences professionnelles.

Qu'est-ce que votre enfant sera tenu de faire?
Si vous consentez à la participation de votre enfant dans cette étude, votre enfant sera invité à remplir deux questionnaires courts sur leurs émotions et leur façon de faire face à des situations stressantes. Ils seront également invités à regarder différentes séries d'images et à choisir une image parmi d'autres qui complète chaque série. La participation de votre enfant est volontaire et il ou elle peut se retirer à tout moment sans conséquence et sans avoir à expliquer pourquoi. Les questionnaires et les activités seront réalisés au cours de la journée scolaire en présence de l'enseignante habituelle et du chercheur principal. La participation de votre enfant ne durera pas plus de 90 minutes.

Risques et inconvénients
L'étude n'utilise pas de procédures qui causent des malaises ou qui créent un risque de blessure. Toutefois, votre enfant peut devenir frustré ou ennuyé au cours de la séance. Nous serons prêts à répondre aux questions et aider votre enfant à comprendre l'ensemble des informations contenues dans les questionnaires.

Vie privée et confidentialité

Votre enfant aura un numéro de dossier et toutes ses informations seront désignées par ce numéro. Les réponses et les résultats de votre enfant seront privés. Seuls l'investigateur principal (Marie-Michelle Boulanger) et son équipe de recherche auront accès aux questionnaires et aux fiches d'activité que votre enfant complètera. L'équipe de recherche ne partagera aucune information sur ce que dit votre enfant au cours de l'étude ou sur ses résultats si vous demandez des informations à cet égard. Aucune information identifiable ne sera partagée avec les enseignants et les administrateurs scolaires par rapport aux résultats de votre enfant. Lorsque cette recherche sera présentée, aucune information d'identification ne sera révélée.

Déclaration du parent ou du tuteur légal :

J'ai lu la description de l'étude et été pleinement informé des procédures, des exigences, des risques et des avantages de l'étude. Je consens librement et volontairement à la participation de mon enfant à cette étude.

_____

Nom du participant   Signature du parent/tuteur légal   Date

_____

Date de naissance du participant

_____

Nom du chercheur   Signature du chercheur   Date

Si vous avez des questions ou des préoccupations, vous pouvez contacter les chercheurs en utilisant les coordonnées ci-dessous. Si vous avez des questions concernant les droits et le bien-être de votre enfant en tant que participant dans cette étude, vous pouvez communiquer avec l'officier d'éthique de la recherche à McGill au 514-398-6831 ou par courriel : lynda.mcneil@mcgill.ca.

Cordialement,

Marie-Michelle Boulanger, BA
Faculté d'éducation, Université McGill
3700, rue McTavish, salle 614
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Coordonnées:
Chercheur principal: Marie-Michelle Boulanger
                       marie-michelle.boulanger@mail.mcgill.ca
Superviseur: Steven Shaw
                       steven.shaw@mcgill.ca

Appendix B

Questionnaire Démographique

Cher parent,
Veuillez répondre aux questions suivantes :

1. Nom de votre enfant : _____

2. École : _____

3. Sexe de votre enfant : Mâle _____ ou Femelle _____ ou autre _____

4. Date de naissance de votre enfant : _____

5. Langues :

Langue maternelle de l'enfant?	
Langue maternelle du père?	
Langue maternelle de la mère?	
Autres langues parlées par l'enfant à la maison?	
Langue le plus souvent utilisée à la maison?	

6. Revenu familial annuel (cochez une case) :
    ☐ Moins que ou égale à $39,000
    ☐ $40,000 — $49,000
    ☐ $50,000 — $59,000
    ☐ $60,000 — $69,000
    ☐ $70,000 — ou plus

7. Quel état matrimonial vous correspond le mieux?
    ☐ Marié(e) (et non séparé(e))
    ☐ Vivant en union libre
    ☐ Veuf(ve)
    ☐ Séparé(e)
    ☐ Divorcé(e)
    ☐ Célibataire

8. Combien de personnes habitent à la maison?

- ☐ Adultes _____
- ☐ Enfants _____

9. Choisissez le plus haut niveau de scolarité de vous et votre époux ou épouse :

	Mère	Père
Quelques années de secondaire		
Diplôme de secondaire		
Quelques années de cégep, collège ou école technique		
Diplôme d'études collégiales ou d'étude technique		
Quelques années d'étude universitaire		
Diplôme de baccalauréat		
Maitrise		
Diplôme en médecine (MD), dentisterie (DDS, DMD), médecine vétérinaire (DVM), l'optométrie (OD) ou droit (LL.B)		
Doctorat		
Autre (précisez)		

10. Quel est votre statut d'emploi actuel?

	Mère	Père
À temps plein		
À temps partiel		
Sans emploi		
Retraité		
Étudiant		
Congé de maladie payé		
Autre		

11. Pays d'origine

- ☐ Mère : _____
- ☐ Père : _____
- ☐ Enfant : _____

12. Comment décririez-vous votre héritage ethnique ou culturel?

    ☐ Mère : _____

    ☐ Père : _____

    ☐ Enfant : _____

*S'il vous plait, retournez ce questionnaire et le questionnaire de l'Indice de Stress Parental à l'enseignante de votre enfant dans l'enveloppe **scellée**.*

Merci pour votre temps!!

Appendix C

Placez un X dans la case qui correspond à votre réponse

		Rarement/ Jamais	Tous les mois	Toutes les semaines	Tous les jours
1	Les gens disent que je me fâche facilement				
2	J'essaie de contrôler ma colère, mais je ne suis juste pas capable				
3	Mon humeur peut changer de content à fâchée ou triste, rapidement				
4	Si je deviens fâché, fais attention				
5	Je deviens tellement fâché que je veux casser quelque chose				
6	Je deviens vraiment bouleversé quand les gens interfèrent avec ce que je fais				
7	Les adultes me critiquent				
8	Les adultes me disent de me calmer, même quand je ne suis pas en colère				

Citation: Delis, D. C. (2012). *Delis rating of executive functions*. Bloomington, MN: Pearson.

Appendix D

Questionnaire sur la régulation cognitive des émotions

Garnefski, 2007

Tout le monde se trouve un jour ou l'autre confronté à des événements négatifs ou désagréables et chacun y réagit à sa façon. En répondant aux questions suivantes, on vous demande ce que vous pensez généralement lorsque vous vivez des événements négatifs ou désagréables.

"Lorsque je vis des événements négatifs ou désagréables..."

	Presque jamais	Parfois	Régulièr-ement	Souvent	Presque toujours
1. Je pense que je suis celui/celle à blâmer	1	2	3	4	5
2. Je pense que je dois accepter la situation.	1	2	3	4	5
3. Encore et encore, je pense à ce que je ressens à ce sujet	1	2	3	4	5
4. Je pense à des choses plus agréables	1	2	3	4	5
5. Je pense à ce qui serait la meilleure façon pour moi de faire	1	2	3	4	5
6. Je pense pouvoir apprendre quelque chose de la situation	1	2	3	4	5
7. Je pense qu'il y a de pire choses dans la vie	1	2	3	4	5
8. Je pense souvent que ma situation est bien pire que celle des autres	1	2	3	4	5
9. Je pense que les autres sont à blâmer	1	2	3	4	5
10. Je pense que j'ai été stupide	1	2	3	4	5
11. Je pense que c'est arrivé comme ça, il n'y a rien que je peux faire à ce sujet	1	2	3	4	5
12. Je suis souvent préoccupé(e) par ce que je pense et ce que je ressens à ce sujet	1	2	3	4	5
13. Je pense à des choses agréables qui n'ont rien à voir avec ce qui s'est passé	1	2	3	4	5

"Lorsque je vis des événements négatifs ou désagréables..."

	Presque jamais	Parfois	Régulièr-ement	Souvent	Presque toujours
14. Je pense à la meilleure manière de faire face à la situation	1	2	3	4	5
15. Je pense que ça me fait sentir "plus vieux et plus sage"	1	2	3	4	5
16. Je pense que d'autres personnes passent par des expériences bien pires	1	2	3	4	5
17. Encore et encore, je pense à quel point tout cela est horrible	1	2	3	4	5
18. Je pense que les autres ont été stupides	1	2	3	4	5
19. Je pense que je suis responsable de ce qui s'est passé	1	2	3	4	5
20. Je pense que je ne peux rien changer à ce qui s'est passé	1	2	3	4	5
21. Sans cesse, je pense que je veux comprendre pourquoi je me sens ainsi	1	2	3	4	5
22. Je pense à quelque chose d'agréable plutôt qu'à ce qui s'est passé	1	2	3	4	5
23. Je pense à la façon de changer la situation.	1	2	3	4	5
24. Je pense qu'il y a aussi des côtés positifs à la situation	1	2	3	4	5
25. Je pense que la situation aurait pu être bien pire	1	2	3	4	5
26. Constamment, je pense que c'est la pire chose qui puisse arriver à quelqu'un	1	2	3	4	5
27. Je pense que c'est la faute des autres	1	2	3	4	5
28. Je pense que je suis la cause de ce qui s'est passé	1	2	3	4	5
29. Je pense que je ne peux rien faire à ce sujet	1	2	3	4	5
30. Je pense souvent à ce que je ressens à propos de ce qui s'est passé	1	2	3	4	5

"Lorsque je vis des événements négatifs ou désagréables..."

	Presque jamais	Parfois	Régulièr-ement	Souvent	Presque toujours
31. Je pense à des choses agréables que j'ai vécues	1	2	3	4	5
32. Je pense à ce que je peux faire le mieux	1	2	3	4	5
33. Je ne pense pas que toute la situation s'est mal passée	1	2	3	4	5
34. Je pense qu'il y a de pires choses dans le monde	1	2	3	4	5
35. Je pense souvent à quel point la situation a été horrible	1	2	3	4	5
36. Je pense que tout cela est causé par d'autres personnes	1	2	3	4	5