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Exploring The Self-Regulatory Behaviors of Elementary Students with Hearing Loss in Inclusive Classrooms

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Abstract

An exploratory, mixed-method and multi level research design was employed to examine relationships among students' hearing loss, academic achievement and self-regulation (SR), classroom background noise levels, teachers' perceptions of inclusion of students who are hard of hearing (HH) and features of classroom instruction that support SR. Data consisted of 10 elementary teachers' perceptions of the inclusion, and ratings of 131 students, of whom 8 were hard of hearing, SR and academic achievement scores. Classroom observations were conducted to obtain background noise levels and to examine whether and how teachers implement the features of classroom contexts to support SR within their classroom. Results indicated that a) hearing status predicted SR, b) SR predicted academic achievement for normal hearing (NH) and hard of hearing (HH) students, c) HH students' received lower SR ratings than NH peers, and d) classroom background noise levels were negatively related to the use of features of instruction to support SR and to teachers' knowledge and understanding of hearing loss. These results highlight the importance for further teacher education to emphasize a) the effects of hearing loss on learning and SR, b) the influence of classroom background noise levels on HH and NH students' success, and c) effective strategies for creating an inclusive classroom.

Keywords

Self-Regulation, Emotion Regulation, Self-Regulated Learning, Prosocial Regulation, Inclusion, Hearing Loss, Elementary, Classroom Noise, Perceptions of Inclusion, Academic Achievement

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Abbreviations

Abbreviation	Meaning
21CC	21st century competencies
CFI	Comparative Fit Index
CHL	Children with hearing loss
CR	Co-regulation
D/HH	Deaf or Hard of Hearing
dBA	A-weighted decibels
EF	Executive function
ER	Emotion regulation
ESL	English second language
HH	Hard of hearing
IDEA	Individuals With Disabilities Education Improvement Acts
IQ	Intelligence quotient
ITDHH	Itinerant teacher of Deaf and hard of hearing
LAeq	A-weighted, equivalent sound level
NH	Normal hearing
RMSEA	Root mean square error of approximation
SAT	Scholastic Assessment Test
SES	Socio-economic status
SLM	Sound level meter
SR	Self-regulation
SRISI	Self-regulation in school inventory
SRL	Self-regulated learning
SRSR	Socially responsible self-regulation
SSHRC	Social Sciences and Humanities Research Council

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Preface

Within this thesis much of the literature review will include students who are deaf or Hard of Hearing (d/HH). The students in this study were children who had hearing loss and will be referred to as hard of hearing (HH) or children with hearing loss (CHL).

Chapter 1

1 Introduction

In North America, approximately 2 to 3 children out of 1000 are born with a detectable hearing loss in one or both ears (Centre for Disease Control and Prevention, 2003), and it is estimated that approximately 9% (32 million) of children in the world are affected by a disabling hearing loss (World Health Organization, 2012). Within the last two decades, North America has seen a shift in perspective and government legislation, such as the United States Education For All Handicapped Children Act of 1975, the No Child Left Behind Act of 2000, the Individuals With Disabilities Education Improvement Acts (IDEA) of 2004 (Blecker & Boakes, 2010; Cramer & Nevin, 2006; Etscheidt, 2006; Fisher, Frey, & Thousand, 2003; Foster & Cue, 2009; Tye-Murray, 2014) and the Achieving Excellence Plan for Education in Ontario (Ministry of Education, 2014). This has resulted in a dramatic increase in the number of children with a hearing loss being educated through inclusion (educational practices wherein children with a special education designation are involved in a standard school program alongside typically developing peers; Hutchinson, 2002; Mastropieri & Scruggs, 2001). Approximately 60-80% of deaf and hard of hearing (d/HH) students in North America are currently placed in a general education classroom alongside their normal hearing (NH) peers (Borders, Barnett, & Bauer, 2010; Foster & Cue, 2009; Mitchell & Karchmer, 2006; Tye-Murray, 2014).

The primary goal of inclusive education is to facilitate academic and social success for d/HH students, and effective inclusion relies largely on the beliefs and

attitudes, knowledge base, skill set, and experience that classroom teachers possess. To encourage inclusion and success for d/HH students in a general education setting, research has indicated that teachers must use their knowledge and skills to create a warm and responsive educational environment (Rimm-Kaufman & Chiu, 2007; Rimm-Kaufman, 2006). A responsive classroom is defined as one that facilitates shared learning; encourages reflective thought and behavior; emphasizes self-regulation (SR); promotes collaboration and participation; and places emphasis on developing children's social and emotional skills including empathy and prosocial behaviour (Rimm-Kaufman & Chiu, 2007; Rimm-Kaufman, 2006). Inclusive education also requires teachers to be willing to adapt and monitor the classroom (e.g. maintaining optimal noise levels for learning) and coursework to suit the individual needs of d/HH students. These features are commonly found within classrooms that provide opportunities and support for learners' engagement in SR (individuals' application of effective and adaptive approaches to regulate cognition, emotions and behavior; Zimmerman, 1994).

To date, very little research has attended to studying SR with d/HH students, and how classroom teachers create an inclusive classroom environment that provides d/HH students with opportunities to engage in it. This Master's thesis was conducted as a pilot project funded by Western University's Strategic Support for Social Sciences and Humanities Research Council (SSHRC) Success Program: Seed Grant. The goals of this exploratory study were to (a) extend the research on SR and the features of classroom instruction for supporting it, (b) examine if/how hearing loss may relate to these areas of study, (c) ascertain whether and how classroom background noise levels relate to teachers' perceptions of inclusion of HH students and opportunities for SR in classrooms,

(d) determine the methodology and feasibility of conducting a larger scale, longitudinal research study on the topic and (e) make recommendations for future research projects exploring hearing loss and SR.

1.1 Organization of Thesis

Chapter 1 presents a review of the literature, which is divided into four sections. First, this chapter build on the definition of SR by examining (a) the higher order processes (metacognition, motivation and strategic action) involved in students' SR, (b) the relationship between executive functions and SR, (c) three theoretically distinct aspects of SR: emotion regulation (ER), self-regulated learning (SRL) and socially responsible self-regulation (SRSR) that are studied in developmental and educational psychology and (d) what is known about the ER, SRL and SRSR abilities of young d/HH students. Second, the descriptions of the eight features of classroom contexts for supporting SR (complex tasks, choices, control over challenge, self-evaluation, teacher support, peer support, non-threatening evaluation and community of learners) will be elaborated upon. Third, the chapter discusses the role of inclusive education for students with hearing loss, and how teachers can create an inclusive classroom environment utilizing the eight features of classroom contexts. Finally, this chapter addresses the importance of classroom noise levels and their role in providing an inclusive classroom environment by exploring the impact on NH and d/HH student's academic performance and engagement in SR.

Chapter 2 describes the research design and methodology employed to study children's SR, classroom contexts, noise levels and teachers' perceptions of inclusion of children with hearing loss (CHL) in their classrooms. Chapter 3 describes the data analyses and

results of the current study. Chapter 4 presents the discussion and conclusion portion of the study, as well as outlines significance of the work and implications for future research.

1.2 Self-Regulation

1.2.1 Defining Self-Regulation

Self-regulation (SR) describes how individuals, including children, respond to environmental demands and control cognition and behavior to meet goals (Schunk & Zimmerman, 2007; Zimmerman & Martinez-Pons, 1990). Educational psychologists hold the belief that individuals who are effectively self-regulating utilize executive functions (EF; i.e., working memory, cognitive flexibility and inhibition control; Diamond & Lee, 2011), as well as higher order processes such as metacognition, motivation, and strategic action (Hutchinson, 2013; Perry & Winne, 2006; Schunk & Zimmerman, 2007) to regulate emotions, learning, and social interactions. Metacognition refers to individuals' knowledge of and regulation of cognition, which require flexible, analytical forms of thinking and reasoning (Brown, 1997; McCombs, 1989; Zimmerman, 1990). Students employ metacognition when they reflect on, monitor and adapt their emotions, learning processes and social interactions. For example, a child is getting frustrated with a challenging learning task. He is aware of his current emotional state, and that the learning task is causing his frustration, so he decides to step away from his work and take a walk to calm down before returning to the task, rather than giving up. Students with strong metacognitive skills can assess their strengths and weaknesses, make realistic evaluations of their performance on a task, and can distinguish areas for improvement (Cubukcu, 2009). Motivation includes self-efficacy, attributions, and goal setting, which shape an

individual's goal pursuits (Zimmerman & Schunk, 2011). Within the classroom setting, students' motivation affects goal driven behaviors and increases effort, initiation and persistence on learning tasks and activities (Larson, 2009; Pintrich & Schunk, 2002). Students who are motivated are willing to take on new tasks, are persistent in the face of a challenge, create realistic goals for learning, are more focused in class, and achieve higher levels of academic success (Linnenbrink & Pintrich, 2002). Strategic action is the behavioral enactment of individuals' metacognition and motivation (Zimmerman, Bonner & Kovach, 1996). Students who engage in strategic action may seek help on a difficult task rather than becoming frustrated, may ask for additional resources for a project, or may move to a quiet workspace to focus on a challenging activity (Hutchinson, 2013; Perry, 1998).

Studies have demonstrated that adaptive and effective SR is associated with a wide range of positive social and educational outcomes. These include high levels of motivation for learning, less conflict in their interpersonal relationships with teachers and peers, and higher levels of school adjustment (Azevedo, Cromley, Winters, Moos, & Greene, 2005; Eisenberg, Fabes, & Murphy, 1995; Isaacson & Fujita, 2006; Patrick & Middleton, 2011; Perry & Winne, 2006; Rudasill & Rimm-Kaufman, 2009). SR has been found to be a strong and positive predictor of early elementary school students' literacy, math and vocabulary skills (Blair & Diamond, 2008; Blair & Razza, 2007; Cameron, Ponitz et al., 2008; Diamond, Barnett, Thomas, & Munro, 2007; Diamond & Lee, 2011; Gilliam & Shahar, 2006; Isaacson & Fujita, 2006; Perry & Winne, 2006; Ponitz, McClelland, Matthews, & Morrison, 2009). In contrast, individuals who enact poor SR are likely to struggle in school. These students may experience more conflict laden interpersonal

relationships with peers and teachers, lower levels of academic achievement, lower self-efficacy and a lack of motivation for learning (Eisenberg et al., 2001, 1995; Järvelä & Järvenoja, 2011; Ley & Young, 2001; Thomas & Gadbois, 2007).

1.2.2 Self-Regulation and Executive Function

Educational and developmental psychologists believe that effective self-regulation also requires executive function (EF) which are basic cognitive processes such as working memory, cognitive flexibility (attention focusing) and inhibition control (Diamond, 2013; Diamond & Lee, 2011). These three processes are evoked when facing a novel challenge or at the outset of a task, and support an individual's self-regulatory goals (Hofmann, Schmeichel, & Baddeley, 2012). Working memory refers to the temporary storage and management of information in one's mind (Diamond & Lee, 2011; Salminen, Strobach, & Schubert, 2012) and contributes to SR by providing the capacity to actively focus on self-regulatory goals, and attend to relevant information needed to effectively regulate emotions, learning and social interactions. Task switching refers to cognitive flexibility—managing thoughts and ideas from various tasks, and changing perspectives (Diamond, 2013). This type of EF contributes to effective SR by allowing an individual to attain goals by shifting to alternative means of problem solving, adjusting to changing demands and switching perspectives. This EF is important for managing affect, learning and social interactions, as inhibition control allows individuals' to suppress their initial automatic impulses in favor of more adaptive and effective responses (Diamond, 2013; Hoffman, Schmeichel, & Baddeley, 2012). Strong working memory, task switching and inhibition control skills support adaptive and effective SR.

1.2.3 Self-Regulatory Behaviors of D/deaf and Hard of Hearing Students

The literature is replete with studies that establish the importance of strong self-regulatory abilities for academic and social success, yet relatively few studies examine elementary school students' SR. Of the studies that attend to young children's SR, it appears that even fewer studies have examined whether and how elementary school students who are deaf or hard of hearing (d/HH) may differ in their development and engagement in SR within classroom contexts. Relative to students with normal hearing (NH), d/HH students may be at risk for poor SR. Compared to their NH peers, d/HH students experience greater difficulty developing communication competencies (Barker et al., 2009; Hosie et al., 2000). As a consequence, opportunities for both language acquisition and communication experiences may be fewer than for NH students (Marschark & Knoors, 2012; Moog & Geers, 1985).

The development of SR requires effective communication opportunities with caregivers and teachers, as children learn these essential skills through social interactions with others (Bodrova & Leong, 2008; John-Steiner & Mahn, 1996; Zimmerman, 1995). Therefore, the language and communication delays often experienced by d/HH students may contribute to deficits in SR. In fact, teachers report more emotional and behavioral problems in d/HH students compared to their NH peers (Coll, Cutler, Thobro, Haas, & Powell, 2009; Dammeyer, 2009), and d/HH students have continually been rated as more impulsive, with lower inhibitory control (Greenberg & Kusche, 1998). Additionally, research indicates d/HH students experience less stable peer relationships, pursue fewer prosocial behaviors in a classroom setting, and are less collaborative than their NH peers

(Keilmann, Limberger, & Mann, 2007; Wauters & Knoors, 2008). These results demonstrate that d/HH students may differ in their development and engagement of SR.

1.2.4 Theoretically Distinct Aspects of Self-Regulation

Currently within the field of developmental and educational psychology, researchers have identified at least three conceptually distinct targets of effective SR. These include emotional regulation (ER), self-regulated learning (SRL) and what Hutchinson (2013) identifies and refers to as socially responsible self-regulation (SRSR). ER refers to an individual's use of metacognition, motivation and strategic action to manage emotional arousal to pursue goals (Eisenberg et al., 2016; Eisenberg, Fabes & Spinrad, 2006; Eisenberg, Sadovsky, & Spinrad, 2005). SRL describes adaptive and effective approaches to learning involving metacognition, motivation, and strategic action to pursue academic goals (Butler & Randall, 2013; Perry & Winne, 2006; Zimmerman, 1990). Lastly, Hutchinson (2013) integrated the literature on prosocial regulation, prosocial behaviors and social responsibility goals (Carlo, Knight, Eisenberg, & Rotenberg, 1991; Eisenberg et al., 1995; Wentzel, 1993; Wentzel & Watkins, 2002) to formulate an aspect of SR that is referred to as SRSR, where individuals employ self plus other awareness to regulate their engagement in social situations to assist in adaptive patterns of learning in classroom contexts.

1.3 Emotion Regulation

1.3.1 What Is Emotion Regulation and Why Do We Study It?

Emotion regulation (ER) refers to an individual's ability to control emotion arousal and affect to pursue goals (Eisenberg & Spinrad, 2004; Eisenberg et al., 2007). Hutchinson

(2013) postulates that ER requires the use of higher order cognitive processes such as metacognition, motivation and strategic action to successfully control emotions. Metacognition for ER is employed when an individual is aware of and able to label and identify the emotions they are experiencing. Motivation for ER is necessary for meeting goals in situations where emotional arousal occurs. Strategic action for ER is utilized when children manage their emotions and control behaviors effectively (Hutchinson, 2013; Hutchinson & Perry, under review). Children who have strong ER skills are able to label and identify their emotions, and use a variety of strategies to control emotion arousal (Eisenberg et al., 2005; Spinrad et al., 2006).

Studies have demonstrated that engaging in effective ER has a multitude of academic, social and mental health benefits (Bulotsky-Shearer, Domínguez, Bell, Rouse, & Fantuzzo, 2010; Macklem, 2011). Within the classroom, students who utilize ER strategies receive higher ratings of peer acceptance, and report more friendships (Shields, Ryan, & Cicchetti, 2001; Trentacosta & Shaw, 2009). In addition, students' effective ER is associated with stronger and closer relationships with teachers (Rudasill & Rimm-Kaufman, 2009; Trentacosta & Shaw, 2009), as well as lower levels of anti-social behavior, disruptive classroom behaviors and lower stress levels (Blair, Denham, Kochanoff, & Whipple, 2004; Gilliam & Shahar, 2006; Liew, Eisenberg, & Reiser, 2004; Macklem, 2011). Students who demonstrate strong ER skills are rated as less impulsive, and have better conflict resolution skills than their peers (Schreiber, Grant, & Odlaug, 2012; Schunk & Zimmerman, 2007). A clear link between effective ER and academic performance has also been demonstrated in the literature (Blair & Razza, 2007; Ponitz et al., 2008; Liew, 2012).

In a study by Graziano and colleagues (2007), the role of early elementary students' ER on academic success was analyzed. Three hundred and twenty five kindergarten students' ER behavior were examined in relation to academic success, measured using math and literacy scores, as well as teacher ratings of classroom performance and productivity. Results indicated that ER was a positive predictor of academic performance, even when children's IQ was controlled for during analysis. Similar studies have replicated these findings, demonstrating a link between strong ER skills and academic achievement (Eisenberg et al., 2016; Valiente, Swanson, & Eisenberg, 2012). In comparison, students who struggle to utilize effective ER demonstrate lower scores on standardized testing and academic performance, more anti-social and aggressive behaviors and lower ratings of teacher and peer acceptance (Denham et al., 2003; Eisenberg et al., 2001; Gumora & Arsenio, 2002; Liew, Chen, & Hughes, 2010; Macklem, 2011). Research has indicated that students' development of and engagement in ER plays a role in their social and academic success. However, this body of research has not been expanded sufficiently to understand how children with hearing loss develop and engage in ER within the classroom context.

1.3.2 Emotion Regulation and Children With Hearing Loss

The ER abilities of d/HH elementary students appear to be a relatively underexplored area of study. Due to the potential for delay in communication acquisition and language abilities stemming from hearing loss (Ching et al., 2013; Moeller & Tomblin, 2015), d/HH students may experience diminished ER abilities. Degree of hearing loss, age of intervention and onset, as well as the presence of additional disabilities are all factors that influence d/HH students' communication development (Moeller & Tomblin, 2015;

Sininger, Grimes, & Christensen, 2010). These delays in spoken language acquisition may influence development of ER skills, which hinge on effective communication in order to learn through modeling, scaffolding and collaboration.

Through everyday conversation and incidental learning, children have opportunities to learn about identifying their own feelings and the feelings of others; socio-cultural expectations for expressing emotions; strategies for emotion management and problem-focused coping (Rieffe & Terwogt, 2006; Thompson, Laible, & Ontai, 2003). Studies have indicated that hearing parents with d/HH children typically spend less time communicating with their children than NH children and their NH parents. This may mean that d/HH children have fewer opportunities to overhear everyday conversation to gain additional information needed for ER (Gray, Hosie, Russell, Scott, & Hunter, 2007). Additionally, problems in ER acquisition may arise for d/HH students who have delays in spoken communication, as they may miss out on hearing relevant conversational and contextual information (Rieffe & Terwogt, 2006).

Highly related to ER functioning is the concept of emotion understanding, which refers to the ability to label and identify the emotions of oneself and others, as well as the ability to understand the causes of emotions (Denham, McKinley, Couchoud, & Holt, 1990). The emotion understanding skills and communication abilities of young deaf children were explored in a study conducted by Wiefferink, Rieffe, Ketelaar, De Raeve, & Frijns (2013). Hearing children (n = 52) and deaf children (n = 57), ages 2.5 – 5 years were tested on their ability to (a) recognize emotions in facial expressions, and (b) attribute emotions in a situational context in a laboratory based experiment. First, they were asked to label different emotions (happiness, sadness, fear and anger) of a face demonstrated in

a picture, before discriminating emotions between multiple faces. Second, they were told a simple story where they were provided with a drawing and asked to explain how the subject should feel, and which picture accurately depicted the correct facial expression. Results indicated that young deaf children were less competent than NH children in their ability to both identify and discriminate between basic emotions. The deaf children were also less proficient at attributing emotions to others, based on the situational context. Additional studies have found that d/HH students have a less sophisticated understanding and awareness of feeling multiple emotions at once compared to NH peers (Rieffe, 2012).

In an experimental study where d/HH and NH elementary students were asked to provide ER strategies for various imaginary situations that provoked negative emotions, Rieffe (2012) found that overall, d/HH students used less effective ER strategies than NH peers. In addition, d/HH students reported the use of less avoidant tactics to regulate negative emotions in the situation. Additional studies demonstrate that in a conflict-laden situation with a peer, d/HH students express less concern for solving a situation, and express their emotions towards an aggressor more roughly than NH students (Rieffe & Terwogt, 2006).

Currently, the limited amount of research available on the ER abilities of d//HH students involve laboratory based studies and experimental scenarios. These studies may not generalize well to a classroom setting, where children have the opportunity to develop and engage in self-coping skills and ER strategies in everyday situations. To date, there appears to be no studies that have examined how classrooms provide opportunities for HH students' engagement in ER. Therefore, a goal of the current study was to utilize teachers' ratings of d/HH students' ER, as well as classroom observations to gain a more

thorough, well-rounded understanding of the ER abilities of CHL in the inclusive classroom context.

1.4 Self-Regulated Learning

1.4.1 What Is Self-Regulated Learning and Why Do We Study It?

A second theoretically distinct aspect of SR has been studied by educational psychologists and it is defined as self-regulated learning (SRL). SRL refers to an individuals' engagement in metacognition, motivation and strategic action in classrooms to achieve academic goals (Pintrich & De Groot, 1990; Schunk & Zimmerman, 2007; Zimmerman & Martinez-Pons, 1990). Metacognition for SRL is utilized when a student is aware of his/her learning strengths and weaknesses, is able to identify areas for improvement, as well as monitors, plans and adapts these for success (Efklides, 2011; Schunk & Zimmerman, 2007; Zimmerman, 1995). Motivation for SRL involves goal setting and self-efficacy. Within the classroom setting, students' motivation affects goal driven behaviors and increases effort, initiation and persistence on learning tasks and activities (Larson, 2000; Pintrich & Schunk, 2002). Students who are motivated are willing to take on new tasks, are persistent in the face of a challenge, create realistic goals for learning, are more focused in class, and achieve higher levels of academic success (Linnenbrink & Pintrich, 2002). Students utilize strategic action for SRL when they employ a variety of effective behavioral strategies to achieve positive academic outcomes (e.g., asking for additional resources to complete a task).

Evidence is accumulating, indicating that SRL enhances academic performance and success in courses, course units and on standardized test scores (Azevedo & Cromley,

2004; Cooper & Sandi-Urena, 2009; Pintrich, 2004; Zimmerman & Dibenedetto, 2008; Zimmerman, Bonner & Kovach, 1996). SRL predicts SAT scores more powerfully than IQ scores, socio-economic status or education level of parents (Goleman, 1996). SRL skills allow students to plan, monitor and evaluate their performance on academic tasks (Zimmerman & Martinez-Pons, 1990). Self-regulated learners engage in self-evaluation, are able to apply effective task strategies, request feedback, have higher levels of attention focusing, and hold strong values about learning. Students with lowered SRL abilities fail to set realistic academic goals, engage in self-monitoring or self-evaluation, re-orient learning methods when needed, and have an external locus of control. The importance of SRL on academic success is demonstrated within the literature, yet this area of study appears not to have been examined with students who are at risk for poor SRL, such as d/HH students.

1.4.2 Self-Regulated Learning and Children With Hearing Loss

To date, no studies appear to have specifically measured the teacher rated SRL abilities of d/HH students in comparison to NH peers within the classroom. However, research currently exists on d/HH student's motivation for learning and metacognitive abilities related to learning, which contribute to SRL. Some research indicates that d/HH students have lower levels of motivation for learning, and demonstrate less persistence when faced with challenging tasks than NH peers (Banner & Wang, 2011; Miller, 2009). d/HH students with hearing parents and teachers typically experience less opportunity to exercise SRL, as they are provided with more direct assistance and instruction than NH peers. SRL skills develop through independent learning, hypothesis testing, and trial and error. In the face of a novel challenge, d/HH students tend to look towards others for

guidance, or give up more frequently, rather than exercise metacognition, motivation for learning, and strategic action through independent problem solving (Marschark, Lang & Albertini, 2002). Therefore, it appears that d/HH students tend to be more passive, rather than active agents in their learning experiences within the classroom.

In studies with NH students, research has demonstrated that students with strong SRL skills are able to more accurately predict academic performance than those with less effective SRL abilities (Sinkavich, 1995), indicating the use of robust metacognitive and self-reflective engagement. Studies have demonstrated that d/HH students typically tend to overestimate their comprehension and understanding of learning (based on reading and language situations) in comparison to NH peers (Borgna, Convertino, Marschark, Morrison, & Rizzolo, 2011; Kelly, Albertini, & Shannon, 2001; Marschark, Convertino, McEvoy, & Masteller, 2004). Studies have also demonstrated that d/HH students have poor predictive abilities of their performance on college tests (Marschark et al., 2004). This indicates that the ability to metacognitively monitor learning progress (which is a crucial component of SRL) and accurately judge comprehension of academic content for d/HH students may be limited. This is typically attributed to delays in language acquisition and communication development (Harrington, 2000; Napier & Barker, 2004; Strassman, 1997). Marschark, Lang and Albertini (2002) and Strassman (1997) argue that these delays in metacognitive strategies and self-monitoring abilities may exist partially by the way in which d/HH students are taught. Educators and parents alike may oversimplify questions or reading materials for d/HH students, or may provide fewer opportunities to engage in problem solving tasks than NH students are regularly afforded.

Pagliaro and Ansell (2002) demonstrated that d/HH students experience decreased opportunities for engagement in problem-solving tasks (which allow students to use prior knowledge, metacognitive skills and reflective learning). Thirty-six teachers at an elementary school for Deaf education were questioned to determine the frequency and nature of problem solving tactics used within mathematics classes in kindergarten to grade three classes. Story-based mathematics problems are utilized to integrate subject material (engaging students in mathematics, reading and writing), employ prior knowledge to respond to new tasks, and ultimately help develop SRL abilities. In a classroom that supports SRL, problem-solving tasks and questions are utilized frequently (on a daily basis). Results indicated infrequent use of problem solving tasks, as less than 20% of Deaf education teachers reported using problem-solving mathematics tasks daily. This intermittent use was attributed to teachers' beliefs that the problem solving questions were too difficult for Deaf students to comprehend until more simple reading and math skills were obtained. The authors argued that Deaf students must be afforded the same learning opportunities as NH students in order to engage in adaptive and effective SRL—metacognition, motivation for learning, and strategic action. Simplifying d/HH students' academic challenges such as story-based mathematics problems may serve to exacerbate delays in children's development of and engagement in SRL, which can affect their academic achievement.

Altogether, it appears that d/HH students' metacognition and motivation for SRL lags behind NH peers, to date, no studies have collected data using teacher reports of SRL. These reports could provide insight into the differences that may exist between the SRL abilities of d/HH and NH students. In addition, further research investigating how

teachers utilize features of classroom contexts to support SRL may be beneficial in order to better understand how teacher instruction impacts SRL abilities of d/HH students. Therefore, a purpose of the present study was to extend knowledge on how SRL is supported within the learning environment, through utilizing (a) teachers' reports of HH students' SRL and (b) classroom observations.

1.5 Socially Responsible Self-Regulation

1.5.1 What Is Socially Responsible Self-Regulation and Why Do We Study It?

Hutchinson (2013) synthesized the relevant literature on prosocial regulation, social responsibility goals and prosocial behavior to form a third theoretically distinct aspect of SR referred to as socially responsible self-regulation (SRSR). This type of SR involves individuals employing self and other awareness to regulate their engagement in social situations to assist in adaptive patterns of learning in the classroom context (Hutchinson, 2013). SRSR is necessary for harmonious classroom collaboration and the achievement of classroom goals. A student who engages in SRSR is aware of their learning strengths and weaknesses in comparison to their peers, is motivated to assist others, is interested in the academic success of peers, and utilizes socially responsible strategies within the classroom to support self and other's learning.

SRSR supports the development of academic skills, and promotes cooperation and collaboration within the classroom (Caprara et al., 2008, 2014; Gumora & Arsenio, 2002; Layous, Nelson, Oberle, Schonert-Reichl, & Lyubomirsky, 2012; Wentzel, Filisetti, & Looney, 2007). The ability to engage in effective and adaptive approaches to SRSR has been linked to positive peer interactions and more positive, less disruptive classroom

behaviors, as well as better perspective taking skills and higher levels of empathy (Layous et al., 2012; Wentzel, Baker, & Russell, 2012; Wentzel et al., 2007). A student who utilizes SRSR tends to be viewed as more cooperative, sociable, empathetic and well liked within the classroom, as rated by teachers and peers (Layous et al., 2012; Newcomb & Bagwell, 1995).

Wentzel (1993) conducted a cross-sectional study examining the relationship between SRSR and academic success through its link with teacher preference and academic behaviors in 423 elementary students. Results of this study indicated that prosocial behaviors were positively correlated with grade point average and standardized test scores, as well as academic behavior. In addition, Caprara et al. (2008) conducted a longitudinal study examining the effects of early SRSR on future academic achievement and peer relationships of 294 elementary students. SRSR was measured using self-report, peer ratings and teacher-report questionnaires. Results indicated that early SRSR was a strong positive predictor of peer social preference and academic achievement, five years in the future.

While the importance of SRSR on academic and social success has been demonstrated in the literature, this research tends to involve typically developing students, and fails to include participants who may be at risk for poor SRSR, such as d/HH students. Future research is needed to explore the SRSR abilities of d/HH students.

1.5.2 Socially Responsible Self-Regulation and Children With Hearing Loss

Numerous studies have observed the impaired social functioning skills of d/HH students (Antia, Jones, & Luckner, 2011; Antia, Jones, Luckner, Kreimeyer, & Reed, 2013;

Brown, 1997; Foster, 1989; Gresham, 1982; Hulsing, Luetke-Stahlman, Loeb, Nelson, & Wagner, 1995; Kluwin, Stinson, & Colarossi, 2002; Marschark, 1997). Literature demonstrates that children need friendships and experience with collaboration to develop social skills, which are essential for relationships later in life, as well as academic success (Gifford-Smith & Brownell, 2003). Positive peer interactions and friendships within the classroom facilitate establishment of strong conflict management, problem solving, negotiation and empathy skills. Students who are well liked and have many friendships display higher levels of prosocial behavior (cooperative, helping acts), higher levels of empathy, less aggressive acts and stronger problem-solving abilities. By contrast, students who experience fewer friendships and are less well liked display lower levels of prosocial behavior and empathy, and more externalizing behavior and aggressive acts. Self-report studies on d/HH students indicate that these students experience less friendships, more loneliness and higher rates of peer rejection in comparison to NH peers (Antia, Jones, & Luckner, 2011; Antia et al., 2013; Brown, 1997; Foster, 1989; Gresham, 1982; Hulsing, Luetke-Stahlman, Loeb, Nelson, & Wagner, 1995; Kluwin, Stinson, & Colarossi, 2002; Marschark, 1997). In addition, research demonstrates that d/HH students engage in fewer social interactions and engage in less social play than NH peers of the same age (Antia, Jones, Luckner, Kreimeyer, & Reed, 2011; McCauley, Bruininks, & Kennedy, 1971).

Language and communication have been identified as barriers to social interactions and social play for d/HH students (Antia & Dittillo, 1998; Lederberg, 1991; Spencer, Koester, & Meadow-Orlans, 1994). Antia & Dittilo (1998) demonstrated that communication ability was a positive predictor of cooperative play for d/HH students. Lederberg (1991)

studied the language abilities (based on scores from two language tests) of 29 d/HH children in kindergarten classes. Students were grouped into low, medium and high language abilities. Results found that high language ability d/HH children initiated more interactions and maintained play for longer periods of time than low and medium level language ability peers. The relationship between d/HH students' language and communication abilities as a detractor from cooperative play and social competency skills has been replicated within the literature (Antia & Dittillo, 1998; Bat-Chava & Deignan, 2001; Minnett, Clark, & Wilson, 1994; Spencer et al., 1994; Stinson, Whitmire, & Kluwin, 1996).

In a study conducted by Wauters & Knoors (2008) the social integration of d/HH students in inclusive general education classrooms was examined. Eighteen elementary d/HH students and 344 NH peers in grades 1-5 completed two measures (peer ratings and peer nominations), to determine if differences in friendship relations, social competence and peer acceptance existed. Important to d/HH students' SRSR abilities were the results demonstrating that d/HH children received lower peer nominated scores of prosocial behaviors ("cooperative" and "helping behaviors" scales), indicating that they are less collaborative than NH students. While this study did not find a relationship between gender and SRSR for d/HH students, additional research (Martin, Bat-Chava, Lalwani, & Waltzman, 2011; Wolters, Knoors, Cillessen, & Verhoeven, 2011) has demonstrated that young d/HH girls demonstrate higher levels of prosocial behavior and a stronger ability to regulate emotions and behaviors in a prosocial manner. This is in line with research on NH students indicating that girls are perceived by teachers as having stronger SRSR

abilities (Duckworth & Seligman, 2006; Hutchinson, 2013; Matthews, Ponitz, & Morrison, 2009; Weis, Heikamp, & Trommsdorff, 2013).

Netten et al., (2015) examined empathy levels, supportive behavior and prosocial motivation of 122 d/HH students (52 cochlear implant users; 70 hearing aid users) and 162 NH peers in the Netherlands, using a combination of self-reports, parent-reports and observation tasks. Language skills and nonverbal intelligence were also assessed. Hearing status demonstrated a significant effect on observed SRSR behavior. Results of the study indicated that regardless of the type of hearing amplification, d/HH students demonstrated overall lower SRSR abilities than NH peers. d/HH students exhibited lower concern for the emotions of others, had less understanding and awareness of the causes of peers' emotions, and showed less supportive behavior for others on all measures of SRSR. In this study, d/HH students displayed lower scores on the language skills measure, and language development was found to be significantly related to SRSR behaviors and the attendance towards others' emotions.

While the link between SRSR and academic achievement has been made with NH students, I was unable to identify research studies that examined if this relationship exists for HH students. Therefore, a goal of this study is to examine if the SRSR abilities of HH children is a predictor of academic achievement.

1.6 Future Areas of Exploration for Self-Regulation and Hearing Loss

Research in educational psychology could benefit from further exploration of the ER, SRL and SRSR abilities of early elementary students. Using teacher reports allows for a

more reliable understanding of SR abilities at a young age than self-report measures. Mixed-methods research that combines classroom observations with teacher reports allows for a more thorough understanding of the inter-play between SR and how teachers create classrooms to support these abilities on a day-to-day basis. Classroom-based studies (in combination with teacher reports) allow for the opportunity to explore how ER, SRL and SRSR manifests in everyday learning situations as children use metacognition, motivation and strategic action within the classroom environment.

The influence of factors such as sex and age on the SR behaviors of NH students has been widely studied in educational psychology. Research has demonstrated that girls typically tend to receive higher levels of academic achievement in school, yet no significant differences exist between cognitive abilities (Hyde, Fennema, & Lamon, 1990; Spinath, Harald Freudenthaler, & Neubauer, 2010). This indicates that other "non-cognitive" factors (such as SR) could account for discrepancies in achievement scores between sexes. Research involving children indicates that girls typically display more frequent SR behaviors than boys, and boys tend to receive lower teacher and parent rated scores of SR (Duckworth & Seligman, 2006; Matthews et al., 2009; Ponitz et al., 2009; Weis et al., 2013). In addition, research indicates that SR develops with age (Hutchinson, 2013; Zimmerman & Martinez-Pons, 1990), and that older children receive higher ratings of SR than younger peers. Research is needed to (a) provide evidence that observable and quantifiable differences exist in the ER, SRL and SRSR abilities between d/HH elementary children and NH peers and (b) determine if d/HH students follow similar trends in that demographic variables such as sex and age influence their engagement in SR. Examining teacher reports of SR through this exploratory study will allow for further

understanding of the SR behaviors of HH students, how these skills relate to academic success and how sex and age may influence these abilities.

1.7 Classroom Contexts for Supporting Self-Regulation

1.7.1 Overview

Studies have demonstrated that students' opportunities for and engagement in SR is related to the kinds of academic tasks and practices that teachers' employ within classrooms (Hutchinson, 2013; Perry & Winne, 2013; Perry & VandeKamp, 2000). At least eight features of classroom contexts have been identified as those which provide opportunities and support for young children's development of and engagement in metacognition, motivation, and strategic action for SR at school (Hutchinson, 2013; Paris & Paris, 2001; Perry & VandeKamp, 2000; Perry, 1998). These eight features include: complex tasks, choices, control over challenge, self-evaluation, non-threatening evaluations, peer support, teacher support and participation in a community of learners (Hutchinson, 2013; Perry, Turner & Meyer, 2006; Perry & VandeKamp, 2000; Perry, 1998; Whitebread & Coltman, 2010). What is not well understood is how teachers of d//HH students in the general education setting utilize the features of classroom contexts to support engagement in SR, and if these features of instruction in turn support inclusive practices for their students with hearing loss. The eight features of classroom contexts for supporting SR are described below.

1.7.2 Complex Tasks

Complex tasks refer to academic activities that support learners' engagement in SR and are optimally challenging to allow for metacognitive decision-making and strategy use

(Perry, Turner & Meyer, 2006). Complex tasks have four defining characteristics: they allow for the creation of multiple products, span over the course of many work periods, integrate subject knowledge across domains, and address multiple goals (Ames, 1992; Miller, 2003; Perry & Winne; Perry, 1998). These tasks are typically designed to foster collaboration and motivation, as well as promote control and autonomy for learners. Most often complex tasks take the form of projects, where units of study are combined (Perry, 1998). Students typically find complex tasks interesting – in both an intrinsic and situational manner – which relates to higher levels of motivation for learning (Hidi & Renninger, 2006). Complex tasks allows for students to modify the project to suit individual learning needs, and promotes self-efficacy when children overcome an optimally challenging learning situation. Students are likely to be cognitively engaged by having opportunities to reflect on and utilize prior knowledge to solve new problems, process information and use a variety of learning strategies to succeed.

Hutchinson (2013) studied the features of classroom instruction to support SR in early elementary students, and provided qualitative vignettes depicting how these features were used within different classrooms. For example, a kindergarten teacher had students partake in a volcano experiment within her science lesson that met the four criteria for a complex task. Firstly, it required the integration of many units of study, as children were expected to incorporate knowledge from science, reading and math classes to complete the task. Second, the task set multiple goals for students; as the teacher expected children to work collaboratively with peers, generate hypothesis, and practice writing and reading skills. Third, the task required the production of multiple products, as children were asked to create pictures and writing on what they had learned in the experiment. Lastly, the task

spanned over the course of multiple work periods, as children had been learning about the topic over the course of the past few weeks. Additional analyses from the study (Hutchinson, 2013) indicated that the use of complex tasks within lessons was related to students' SR abilities. Results indicated that the use of complex tasks in classrooms was a statistically significant and positive predictor of students' SR.

1.7.3 Choices and Control Over Challenge

Choice and control over challenge occur when students are provided with opportunities to make meaningful decisions regarding their learning, oftentimes during complex tasks. The types of choices teachers provide have been associated with students' engagement in SR (Langer, 2001; Perry, 1998). These choices must be meaningful, in that they encourage students' engagement and ownership in learning. According to Stefanou et al (2004), choices that support learners' engagement in SR can be organizational (e.g. choosing group members or working as a class to devise due dates for a project), procedural (e.g. choosing a topic of personal interest for a project or deciding how they would like to present ideas they have learned), or cognitive (e.g., students are given opportunities to find multiple approaches to solving a problem). Meaningful choices allow for the development of metacognitive thought processes, strategy use and motivation for learning.

Providing choices typically allows students to control challenge (Corno, 2001). This occurs when students are given the opportunity to make decisions in order to modify a potentially challenging learning situation to suit individual learning needs. For example, children can take control over challenge choosing a research topic to suit their needs and abilities, working with a peer that will benefit their learning experience, or moving to a

quiet corner of a room to focus and resist distraction during an activity. Creating academic tasks that allow students to make choices and take control over challenge provides the opportunity to engage in SR through the utilization of metacognitive decision-making, motivation for learning and strategic action. In fact, providing students with the opportunity to take control over challenge has been linked to higher levels of motivation and perceived competence, more willingness to take on challenging academic tasks and a longing for deeper understanding of subject material (Ryan & Deci, 2000; Stefanou, Perencevich, DiCintio, & Turner, 2004)

1.7.4 Self Evaluation

Research demonstrates that including self-evaluation as a feature of academic tasks allows for the opportunity to engage in SR, and is related to academic achievement (Cleary & Zimmerman, 2004; Hutchinson, 2013; Perry, 1998; Schunk & Zimmerman, 2012). Self-evaluation occurs when students are asked to consider their learning strengths and weaknesses, evaluate their progress on a task, make improvements to work and assess overall success (Hutchinson, 2013). Engagement in self-evaluation processes have been correlated with higher levels of SRL, and research has indicated that students with higher levels of academic achievement tend to utilize self-evaluation and analyze their learning progress more often than lower level achieving peers (Lan, 1998; Ley & Young, 2001; Zimmerman & Martinez-Pons, 1990). Additional research demonstrates that students who have stronger SR skills are better able to predict their academic performance on tests than those who have lower SR abilities, indicating that self-monitoring and metacognitive thought processes are related to SR (Ley & Young, 2001). Self-evaluation prompts students to become active agents in their learning process, as

they must reflect, and then use strategic action and motivation to modify behaviors and practices in order to succeed.

1.7.5 Teacher Support and Peer Support

Instrumental forms of support (scaffolding) from teachers are essential elements of children's development of and engagement in SR in school (Corno, 2001; Hutchinson, 2013; Perry, Turner & Meyer, 2006). Teacher support refers to opportunities to receive scaffolding in order to assist with and complete academic and social tasks (Corno, 2001), while peer support refers to instrumental forms of support (such as co-regulation or scaffolding) students provide to engage in effective learning (Hutchinson, 2013).

These features stem from Vyogtskyian and neo-Vygotskyian models of learning, which advocate that children learn through interactions with others in the classroom environment (John-Steiner & Mahn, 1996). Vygotsky posited that students are able to move from their current ability level to a higher skill level through co-regulation (CR; the dynamic process in which individuals' work in partnership to regulate the behavior of self and another; Butler & Randall, 2013; Sbarra & Hazan, 2008) with the assistance of more knowledgeable learners, such as teachers and peers.

Instrumental teacher support allows for the opportunity to bridge the gap in development between what the student already knows, and more complex knowledge and skills. Teachers who provide instrumental forms of support typically guide, rather than instruct, their students' learning. They provide opportunities to engage in SR by modeling appropriate behavior to students, monitoring and evaluating students' progress, and providing hints and cues when necessary. They allow learners to work independently and

make meaningful choices related to their learning. In addition, teacher support involves providing a warm and responsive learning atmosphere, to allow students to gain necessary knowledge and skills. Instrumental teacher support allows students to rehearse and articulate understanding of concepts in order to gradually internalize these skills and move towards independent approaches to learning and using SR strategies. Research indicates that students who regularly receive support from teachers use SRL strategies and task engagement more frequently (Lee, Yin, & Zhang, 2009; Patrick, Ryan, & Kaplan, 2007; Ryan & Patrick, 2001), and students who perceive their teachers to provide higher levels of support for learning report more persistence on tasks and the use of deeper-level learning strategies (Sierens, Vansteenkiste, Goossens, Soenens, & Dochy, 2009; Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009).

Creating a classroom that promotes instrumental peer support allows for students to engage in SR through collaboration, help-seeking and CR with classmates. Newman, 2001 advocates that small-group activity is ideal for allowing students to engage in effective forms of peer support, as social comparison is reduced and the ability to collaborate and share ideas is increased. Collaborative tasks allow students to monitor their own and others' progress and understanding of material, and exchange perspectives with classmates. When a student is facing a difficult academic task, they may utilize help seeking strategies to overcome learning obstacles as a form of regulation (Newman, 2002). Adaptive help seeking occurs when students want to take control of their learning situation by enlisting the help of peers who may be more knowledgeable (Newman, 2002), and research on instrumental forms of peer support has demonstrated a positive relationship with the use of effective SRL behaviors (Whitebread & Coltman, 2010).

1.7.6 Non-Threatening Evaluations

An additional feature of classroom contexts that supports students' engagement of SR within the classroom is the use of non-threatening evaluations. This feature occurs when students are provided with opportunities to use metacognition to assess personal progress, growth, and potential for improvement, without comparison to peers or emphasizing grades (Black & Wiliam, 2006; Butler, 1990; Linnenbrink, 2005). Non-threatening evaluations are typically student-centered, and allow children to play an active role in their learning to assess their knowledge. These evaluations provide positive feedback to students that demonstrate what they can improve on over time with persistence and effort (Linnenbrink & Pintrich, 2002; Linnenbrink, 2005; Pintrich, 2004).

Zimmerman & Dibenedetto (2008) identify two forms of evaluation commonly used for learning: high stakes testing (also referred to as summative evaluation practices) and formative assessment strategies. High stakes or summative evaluations (e.g. standardized testing or end of unit tests) appear more threatening and competitive to students, as they typically involve more pressure to perform and create performance comparison between peers. In contrast, formative assessment strategies tend to be non-threatening in nature. They allow students to assess their personal progress and growth, and provide positive feedback on subsequent steps for improvement with the objective of increasing mastery of a domain or subject in a low stakes manner. Examples of formative assessments include asking students to keep a journal in order to keep track of their progress during a math unit, or asking students to summarize what they have learned at the end of a lesson. Formative assessments help educator's direct future teaching, facilitate self-assessment and encourage positive dialogue regarding learning. A meta-analysis on 108 studies of

formative assessment strategies demonstrated that the use of non-threatening evaluations for learning has a strong positive effect on academic achievement, and is especially effective for those who are deemed “less able” learners (Kulik, Kulik, & Bangert-Drowns, 2012).

1.7.7 Community of Learners

This feature refers to a classroom culture that is created to emphasize shared learning and collaboration, and has a shared set of expectations, values, and norms (Brown & Campione, 1994; Collins, Brown, & Newman, 1989; Perry, 1998). It creates an open and supportive learning environment that (a) encourages the sharing of ideas and strategies, (b) allows for individual differences in learning, (c) supports teacher-student and peer relationships, and (d) couples individual responsibility with group support (Brown & Campione, 1994; Hutchinson, 2013; Perry, 1998). The community of learners feature provides children with opportunities to learn as active participants through shared experiences and knowledge exchange between peers and educators in a supportive environment. While adults act as leaders to guide the overall process, students are responsible for the management of their own learning and participation. Research has linked communities of learners to opportunities for choice, control over challenge and peer support (Beishuizen, 2008; Crawford, Krajcik, & Marx, 1999; Staples, 2007). A community of learners facilitates shared learning; encourages reflective thought and behavior; emphasizes self-regulation (SR); promotes collaboration and participation; and places emphasis on developing empathy and prosocial skills (Rimm-Kaufman & Chiu, 2007; Rimm-Kaufman, 2006). For example, Järvelä & Järvenoja (2011) found that working on a collaborative learning task requires the use of SR, CR and shared regulation

(when group members put forth a combined effort to regulate cognitions, motivations and behaviors together) for learning in order to meet individual and group goals. Collaborative learning helps promote a community of learners as it allows students to share ideas and strategies, develop relationships, and build on individual learning while providing peer support to group members. Creating a community of learners allows for the engagement in ER, SRL and SRSR as students must use metacognition, strategic action and motivational strategies to effectively work with others to support classroom academic and social goals.

1.8 Future Areas of Exploration for Classroom Contexts

The features of classroom contexts have been examined in relation to creating inclusive learning environments for diverse and exceptional learners (see Butler, 2011 and Perry, Phillips & Dowler; 2004). To date, no studies have explored the mechanisms that teachers utilize to support d/HH students' engagement in SR within the classroom. Therefore, a goal of the present study was to conduct classroom observations and provide a qualitative description of how teachers of d/HH children employ the eight features of classroom contexts to support inclusive classrooms and the engagement in ER, SRL and SRSR for these students.

1.9 Inclusive Education and Hearing Loss

1.9.1 Defining Inclusion

Inclusion is a term used to describe educational practices wherein children with a special education designation are involved in a standard school program alongside typically developing peers (Hutchinson, 2002; Mastropieri & Scruggs, 2001). The aim of inclusive

education is to promote the acceptance of children with a disability within the classroom, school and general community, and to facilitate complete academic and social integration (Blecker & Boakes, 2010; Harvey, Yssel, Bauserman, & Merbler, 2010; Heiman, 2004; Mastropieri & Scruggs, 2001). Inclusion within the general education setting requires appropriate services and adaptations be made to both curriculum and coursework in order to best support individual students' development and learning needs (Avramidis & Norwich, 2015; Fisher et al., 2003; Harvey et al., 2010; Luckner & Howell, 2002; Thomazet, 2009).

1.9.2 Inclusion and Hearing Loss

Due to a shift in perspective and government legislation, such as the Accessibility for Ontarians with Disabilities Act of 2005, the United States Education For All Handicapped Children Act of 1975, the No Child Left Behind Act of 2000, and the Individuals With Disabilities Education Improvement Acts (IDEA) of 2004 (Blecker & Boakes, 2010; Etscheidt, 2006; Fisher et al., 2003; Susan Foster & Cue, 2009; Nevin & Cramer, 2006; Tye-Murray, 2014), a dramatic increase has occurred in the number of children with a disability, such as hearing loss, being educated through inclusive practices in general education settings. The Ontarians with Disabilities Act (Government of Ontario, 2005) advocates for the inclusion of all students with a special education designation in a general education classroom as the primary option for learning. This is also reiterated by the Ontario Ministry of Education mission statement, which aims for students to "develop the knowledge, skills and characteristics that will lead them to become personally successful, economically productive and actively engaged citizens" (Achieving Excellence: A Renewed Vision for Education in Ontario, 2014, p. 1).

Across North America, the number of students with hearing loss being educated through inclusion has increased, with approximately 60-80% of d/HH students currently placed in a general education setting (Borders et al., 2010; Susan Foster & Cue, 2009; Mitchell & Karchmer, 2006; Tye-Murray, 2014). Research demonstrates that d/HH students included in a general education setting have higher levels of academic achievement, more involvement in classroom discussion, and more positive attitudes towards school than Deaf or d/HH peers educated in special schools (Allen, 1986; Bennett, Bruns, & Deluca, 1997; Blecker & Boakes, 2010; Guralnick, 1986; Guralnick & Groom, 1988; Hadjikakou, Petridou, & Stylianou, 2008; Odom, 2000). However, d/HH students continue to score lower than NH peers on measures of academic success (math, reading and written language) within an inclusive classroom setting (McCain & Antia, 2005) and research on the social integration on d/HH students has revealed mixed results (Antia et al., 2013; Eriks-Brophy & Whittingham, 2013; Kluwin et al., 2002; Lederberg, Rosenblatt, Vandell, & Chapin, 1987; Marschark, 1997; Musselman, Mootilal, & MacKay, 1996).

Some studies (Eriks-Brophy, Durieux-Smith, Olds, & Fitzpatrick, 2006; Eriks-Brophy, Durieux-Smith, Olds, Fitzpatrick, & Duquette, 2007; Kluwin, 1999; Lederberg et al., 1987; Martin et al., 2011; McCartney, 1984; Mertens, 1989; Musselman et al., 1996) have shown that d/HH students can integrate into general education classrooms on a social level, and that inclusion provides an opportunity to develop friendships between hearing and hearing loss students with no negative consequences for the social and emotional well-being of d/HH students. However, an additional body of research has found that while inclusion may be beneficial for d/HH students' academic performance, children with hearing loss in an inclusive classroom experience lower levels of self-

esteem, higher levels of peer rejection, fewer friendships and more loneliness compared to NH peers (Antia et al., 2013; Antia, Jones, & Luckner, 2011; Foster, 1989; Foster & Cue, 2009; Gresham, 1982; Hulsing et al., 1995; Kluwin et al., 2002; Lane, 1995; Marschark, Young, & Lukomski, 2002; Marschark, 1997).

1.9.3 Inclusive Practices Within The Classroom

In the last two decades, research has generally emphasized the importance of individual characteristics of Deaf and d/HH students as they relate to academic and social success of inclusion, such as degree of hearing loss, self-advocacy, self-esteem, personality traits, communication and linguistic abilities and early intervention (Brackett, 1993; Geers, 1990; Geers & Moog, 1989; Goldgar & Osberger, 1986; Moog & Geers, 1985; Moores & Sweet, 1990). While these variables play a large role in the success of inclusive education for d/HH students, this research has often overlooked other social and environmental factors that may influence success. More recently, teachers' attitudes towards inclusion and hearing loss; experience and confidence teaching a child with hearing loss; knowledge of hearing loss and hearing technology; teaching abilities to modify and adapt lessons in response to students' needs; and access to necessary support have been identified as potential facilitators that should be considered alongside individual factors for promoting successful inclusion within the classroom (Eriks-Brophy & Whittingham, 2013). In fact, up to 50% of the variability in d/HH students' academic underachievement has been attributed to teachers' educational practices and instruction, stemming from a lack of skill, experience and knowledge (Marschark et al., 2002).

To effectively teach students with a special education designation, research has indicated that support and knowledge must be provided to teachers through teacher education

programs, continuing education and professional development programs that is specific to the nature of their work (Bolam, 2008). Yet, many general education teachers report a lack of knowledge on hearing loss and feel overwhelmingly underprepared to teach d/HH students, as their teacher education programs did not equip them with knowledge or skills needed to teach in an inclusive classroom (Ericks-Brophy & Whittingham, 2013).

1.9.4 Inclusion and Self-Regulation

It appears that to encourage academic and social success for d/HH students, teachers must use their knowledge and skills to create a nurturing educational atmosphere, facilitate shared learning, encourage reflective thought and behavior, promote collaboration and participation, and must be willing to adapt the classroom and coursework to suit the needs of d/HH students. These features are typically found within a classroom that supports SR, therefore teachers can encourage inclusion of d/HH students by fostering SR practices and instruction within the classroom.

By promoting SR within the classroom, d/HH students are provided with opportunities to engage in meaningful learning experiences that encourage metacognitive thinking, motivation for learning and strategic action, as well as collaboration with others. Through inclusive education and the opportunity to strengthen ER, SR and SRSR behaviors, d/HH children may be able to improve valuable academic and social skills, which support the overall goals of 21st century competencies (21CC; Wolters, 2010). 21CC has been identified as the knowledge base, attitudes and skill set required to prepare students of this generation for success in the workplace, and as citizens in life (Ananiadou & Claro, 2009; Jerald, 2009). This model emphasizes the importance of goal setting, independent working, motivation, self-management and the ability to monitor progress and adapt to

demands (Ananiadou & Claro, 2009). In addition, 21CC highlights the importance of collaboration, group management, help-seeking and communication to achieve common goals. These 21CC are required for life-long success, and are applied by those who demonstrate strong ER, SRSR and SRL behaviors and abilities. Therefore, educating d/HH students through inclusive practices and providing these students with the opportunity to engage in SR within the classroom is necessary to develop the core competencies required for optimizing success in their future.

1.10 Classroom Background Noise Levels

1.10.1 Optimal Noise Levels Within the Classroom

Background noise levels refer to any unwanted source of noise that interfere with a listener's ability to receive and understand auditory stimuli (Crandall & Smaldino, 1995). Within the classroom setting, students receive background noise in the form of individuals' talking; movement of feet, chairs and desks; as well as ventilation systems. An extensive body of literature has demonstrated the negative effects of background classroom noise on students' learning and comprehension (Airey & MacKenzie, 1999; Dockrell & Shield, 2007; Evans & Lepore, 1993; Hodgson, Rempel, & Kennedy, 1999; Hodgson, 2004; Klatte, Hellbrück, Seidel, & Leistner, 2010; Lundquist, Holmberg, & Landström, 2000; Maxwell & Evans, 2000; Picard & Bradley, 2001; Shield & Dockrell, 2008; Shield & Dockrell, 2003). For young students, understanding speech in noise is a skill that develops with age (into the teenage years; Elliot, 1979; Johnson, 2000), and research has shown that even moderate levels of noise can interrupt a child's understanding of a spoken message (Elliot, 1979; Soli & Sullivan, 1997). Therefore, a favorable signal-to-noise (SNR; the difference between incoming signal and intensity of

background noise) is needed for children's complete comprehension of a spoken message, and should equal or exceed +15dB (Crum, 1974; Sanders, 1965). However, in a typical, active classroom, these SNR may not be met (ranging from +5 to -7dB) and children may not be able to effectively hear and focus on teachers and peers.

Due to recent research illuminating the negative impact of classroom noise levels on academic performance, national and international guidelines have been set to establish optimal classroom noise levels for a successful learning environment. For example, both the World Health Organization Guidelines for Community Noise, and the American National Standards Institute (2009) recommend a maximum of 50 dBA within classrooms occupied by active learners (Olusanya, Neumann, & Saunders, 2014). However, studies have indicated that children are typically exposed to classroom noise levels that exceed these guidelines. In a review of the literature on classroom noise level studies conducted between 1977 to 1991, Hodgson et al. (1999) found that typical classroom noise levels ranged from 40 to 70 dBA. Other studies have indicated a range of 40 to 90+ dBA (Crukley, Scollie, & Parsa, 2011), 42 to 94 dBA (Picard & Bradley, 2001), 47.5 to 81.3 dBA (Moodley, 1989) and 58 to 72 dBA (Hay, 1995) within occupied classrooms. This indicates that the average classroom noise levels may far exceed the standards for creating an optimal listening environment, and that students' learning may be at risk.

1.10.2 The Influence of Noise Levels on Learning

Louder classroom settings have been correlated with lower level of executive functions and motivation, poor academic performance (on standardized tests of literacy, math and science), lowered attention levels, reading ability and reduced memory (Airey &

MacKenzie, 1999; Dockrell & Shield, 2007; Evans & Lepore, 1993; Klatte et al., 2010; Lundquist et al., 2000; Maxwell & Evans, 2000; B M Shield & Dockrell, 2008; Bridget M Shield & Dockrell, 2003).

In a 2008 study conducted by Shield & Dockrell, (2008), the effects of both external noise and internal classroom noise levels on academic performance were tested. Standardized test scores, as well as a battery of cognitive tests from 158, eight-year olds were collected. Results indicated that internal background noise levels in occupied classrooms were significantly and negatively related to all standardized subject test scores (math, science and reading), even when corrected for socio-economic factors. In the experimental portion of the study, classrooms were grouped into different noise conditions (silent or background noise) to test the effect of background noise on cognitive performance through an information processing task, as well as a reading, math and spelling task. For both types of tasks, results indicated that children in the background noise test group (a track playing children's talking at 65 dBA LAeq) scored significantly lower on reading, spelling, arithmetic and information processing speed scores than children in the base comparison group, even when controlled for sex and ability.

1.10.3 Hearing Loss and Classroom Noise Levels

While all children are negatively affected by poor classroom acoustics, this tends to be more problematic for d/HH children. Children with hearing loss may experience a decrease in access to auditory information in such a complex listening environment, due to factors such as: a lack of visual cues; location from the speaker; the introduction of novel information that requires higher order cognitive processing; partaking in discussion where there are multiple, rapid talkers; and the influence of a less than optimal acoustic

environment resulting from background noise (Bess, Dodd-Murphy, & Parker, 1998; Hicks, 2001; McFadden, 2008). Even with well-fit hearing aids, the effort expended in background noise on locating speakers and processing auditory signals may detract from cognitive resources that d/HH students would otherwise utilize for learning and comprehension (Bess et al. 1998; Hick, 2001; McFadden, 2008).

A seminal study by Finitzo-Hieber & Tillman (1978) provided insight into the speech perception abilities of children ages 8-12 with a mild-to-moderate degree of hearing loss, in comparison to NH peers. Speech perception abilities were tested using a multitude of SNR and reverberation time conditions in a laboratory based study. Results demonstrated that these children performed significantly worse on speech perception tests than NH peers, and that this difference between the two groups widened, as the listening environment became more challenging. When tested under acoustic conditions that were similar to a classroom environment, NH children obtained perception scores of 27%, while children with hearing loss scored just 11%.These results have also been replicated with various degrees of hearing loss (Bess et al., 1998; Bess, 1985; Crandell & Smaldino, 1995), and have also been found within the classroom setting (Crandell, 1993), indicating that d/HH children's classroom acoustic environment have a negative impact on speech perception, and ultimately learning abilities.

1.10.4 Classroom Noise Levels, Inclusion and Contexts for Supporting Self-Regulation

If the primary goal of inclusive education is to create a learning environment that promotes the academic and social success of d/HH children, teachers should be cognizant of the impact that classroom background noise levels may have on these students.

However, research (Crukley, Scollie, & Parsa, 2011; Hay, 1995; Murray et al., 1999; Moodley, 1989; Picard & Bradley, 2001) continues to indicate that in typical classrooms, background noise levels far exceed the recommended noise levels for optimal learning environments set out by the American National Standards Institute (2002).

In a study on teachers' perceptions of inclusion of students with hearing loss within general education classrooms (Ericks-Brophy & Whittingham, 2013), teachers provided data on their attitudes, knowledge, skillsets and beliefs pertaining to educating d/HH children. Findings from this study highlighted the fact that teachers felt they were not adequately prepared or educated to work effectively with d/HH students. In addition, the teachers demonstrated a need for increased training and education on the unique needs of d/HH students, and requested more instructional time during teacher education training be devoted to hearing loss and effective inclusion practices (Ericks-Brophy & Whittingham, 2013).

Inclusion within the general education setting requires appropriate services and adaptations be made to both the classroom and coursework in order to best support individual students' development and learning needs (Avramidis & Norwich, 2015; Fisher et al., 2003; Harvey et al., 2010; Luckner & Howell, 2002; Thomazet, 2009). Therefore, teachers should have the knowledge, skill set and willingness to create an inclusive classroom to optimize academic success through creating a favorable acoustic environment for both NH and d/HH students. To date, it appears that no studies have examined the background noise levels within classrooms in relation to teachers' perceptions of inclusion of d/HH students. Yet, teacher's perceptions of inclusion (i.e., attitudes towards inclusion, knowledge and understanding of hearing loss or confidence

teaching children with a hearing impairment) may play a role in how they create an inclusive listening environment and modify the classroom to suit the needs of d/HH students.

In addition, little is known about the relationship between the classroom contexts that support SR and background noise levels within the classroom; yet the way in which teachers utilize these practices to create meaningful learning experiences for students may be related to the levels of noise within a classroom. Teachers who have positive perceptions and attitudes towards inclusion, who are confident in their capabilities of teaching d/HH students, are knowledgeable about hearing loss and teaching strategies, and are willing to modify classroom practices to accommodate d/HH students may create a more favorable acoustic environment for their students. A classroom that is designed to promote SR may experience lower levels of background noise in order to facilitate attention focusing and goal directed behavior, while decreasing distraction from academic tasks. Moreover, a classroom that supports engagement in SR through instructional tasks and practices such as creating a community of learners may have lower levels of background noise. As previously discussed, creating a community of learners occurs when a culture of shared respect for learning and thinking through active participation of all students is upheld (Brown & Campione, 1994; Collins, Brown, & Newman, 1989; Perry, 1998). This involves a class working together to create a supportive culture with a shared set of expectations, values and norms (Brown & Campione, 1994; Collins, Brown, & Newman, 1989; Perry, 1998). A classroom that supports a community of learners demonstrates mutual respect for peers, where students are aware of behavioural expectations (e.g. keeping noise levels to a suitable level). In

addition, communities of learners couple individual responsibility for learning with group support, therefore students may be cognizant of the influence of their noise levels on others' ability to focus and stay on task in order accomplish learning goals. However, the relationship between classroom contexts for supporting SR and background noise levels is an area that requires further research.

1.11 Future Areas of Exploration for Classroom Background Noise Levels

The relationship between background noise levels within an occupied classroom and perceptions of inclusion of d/HH students is an area that requires future research. Additionally, the relationship between classroom background noise levels and the features of classroom contexts for supporting SR remains virtually unexplored. Further research exploring whether and how the features of classroom contexts are related to creating an optimal listening environment to promote SR and engagement in learning is needed.

1.12 The Present Study

1.12.1 Overview and Significance

An exploratory mixed method, multi-level research design was employed to examine: a) whether teacher's ratings of HH students' SR (specifically ER, SRL and SRSR) differed in comparison to NH peers; b) whether teacher's ratings of HH students' SR predicted academic achievement; c) how eight classroom contexts for supporting SR were related to noise levels as well as teachers' perceptions of inclusion of children with hearing loss within the classroom; and d) how the eight features were implemented within classrooms to include and support HH students. Research has demonstrated the importance of

studying SR in the elementary years (Hutchinson, 2013; Perry, 1998), thus this study included 10 elementary school teachers and their students (N = 131, n = 8 HH students) ranging from Kindergarten to grade 6. A review of the literature on hearing loss and SR indicates that relatively few studies utilize classroom observations and teacher ratings of SR (ER, SRL and SRSR) to measure the self-regulatory abilities of HH students. Therefore, this study extends the literature on hearing loss and students' SR abilities, as well as fills in gaps in knowledge of the features of classroom contexts that support SR, and how this relates to inclusive practices within the general education setting for HH students.

1.12.2 Research Questions

An exploratory, mixed method, multi-level research design was utilized for this pilot study to address five research questions:

1) What are the relationships among the demographic variables (sex, hearing status, age), SR, and academic achievement?

2) What are the relationships between HH students' SR and academic achievement?

3) Do teachers' ratings of HH students' differ from their ratings of NH students' SR?

4) What are the relationships between the classroom auditory environment, teachers' implementation of SR promoting tasks and practices and teachers' perceptions of inclusion?

5) How do classroom teachers implement SR promoting tasks and practices to support HH and NH students' SR?

Chapter 2

2 Methodology

2.1 Design

An exploratory, mixed method, multi-level research design was utilized for this pilot study to address five research questions and test four hypotheses:

1) What are the relationships among the demographic variables (sex, hearing status, age), SR, and academic achievement?

Hypothesis 1: It was expected that hearing status would be positive and statistically significantly correlated with SR and academic achievement.

Hypothesis 2: It was anticipated that the three demographic variables (sex, hearing status and age) would be positive and statistically significant predictors of SR.

Hypothesis 3: Based on previous research, it was anticipated that SR would be a positive and statistically significant predictor of academic achievement.

2) What are the relationships between HH students' SR and academic achievement?

3) Do teachers' ratings of HH students' SR differ from their ratings of NH students' SR?

Hypothesis 4: It was hypothesized that HH students would demonstrate lower teacher rated SR and academic achievement scores than NH peers.

4) What are the relationships between the classroom auditory environment, teachers' implementation of SR promoting tasks and practices and teachers' perceptions of inclusion?

No hypthoses were created for this question.

5) How do classroom teachers implement SR promoting tasks and practices to support HH and NH students' SR?

No hypotheses were constructed for this question.

2.2 Participants

Data were collected from 10 elementary school teachers classrooms in four elementary schools during the Winter/Spring of 2016 (see Table 2.1 for participating teachers' classroom demographic information). Class sizes ranged from 18 to 30 students, with a mode class size of 21 students. The classrooms were distributed across a full range of socioeconomic status (SES) backgrounds (see Table 2.1). The ten participating teachers provided data on approximately 131 students (63 girls; 68 boys; see Table 2.2 for participating children's demographics). The average age of participating students was 8.56 years (*SD* = 2.10 years). Teachers identified that no students (0%) who participated in the study spoke English as a second language (ESL), and 25 students (19%) were from a visible minority background. In total, 21 participating students (16%) were identified as having a special education designation or learning disability, and 8 students (4 girls) had a reported hearing loss and were identified as HH students. Through the demographic form, teachers identified that all 8 HH students were aided bilaterally (none wore a cochlear implant), and used an FM system. The average age of participating HH students

was 10.2 years (*SD* = 1.80 years). Of the HH student subsample, parents and teachers reported two students as also having a learning disability. At the time of the study all participating children were attending school in a large Catholic school district outside of Toronto, Canada.

Table 2.1

Demographic Characteristics of Participating Teachers' Classrooms (N = 10 Classrooms)

Teacher	Grade	Total students per class	Students			Students with a known hearing loss	Students with a special needs designation	Students who have an ESL designation	Students from visible minority backgrounds	Classroom SES
		(*n*)	Boys	Girls	Total	(*n*)	(*n*)	(*n*)	(*n*)	
Brown	K	18	9	9	18	1	0	0	2	High
Cameron	K	20	11	9	20	0	1	0	2	Low-Middle
McCallis	1	18	7	11	21	0	0	0	3	Low-Middle
Salo	½	27	17	10	27	0	1	0	8	Middle-High
Layton	2	19	10	9	19	0	0	0	2	Low-Middle
Trottier	3	21	11	10	21	0	0	0	3	Low
Moroney	¾	21	11	10	21	1	7	0	2	Low
Beatty	4/5	26	12	14	26	2	5	0	3	Low-Middle
Page	4/5	28	13	15	28	2	4	0	2	Middle
Harris	6	30	16	14	30	2	3	0	0	Middle

Note. Pseudonyms are provided for all teachers.

Table 2.2

Demographic Characteristics of Participating Children

Grade	*N*	Sex		Age		Visible minority status		ESL designation	Hearing Loss designation
		Boys	Girls	*M*	*SD*	Caucasian	Other		
K	22	13	9	5.42	.49	12	10	0	1
1	23	10	13	7.34	1.67	20	3	0	0
2	17	9	8	7.82	.37	15	2	0	1
3	25	13	12	8.81	.57	21	4	0	0
4	15	8	7	9.97	.26	12	3	0	3
5	13	7	6	10.74	.54	10	3	0	1
6	16	8	8	11.7	.31	16	0	0	2
Total	131	68	63	9.89	.63	106	25	0	8

2.3 Measures

Teacher report questionnaires were employed to measure students' SR and academic achievement scores, as well as teachers' perceptions of inclusion towards students with hearing loss within the classroom. In addition, classroom observations were conducted to examine classroom background noise levels, features of classroom contexts for

supporting SR and explore whether and how teachers provided meaningful opportunities for students' engagement in SR during their lessons.

2.3.1 Qualtrics

Qualtrics is a software program designed to create and distribute electronic questionnaires using the Internet. A researcher constructs individual survey items and customizes the response scales that respondents use to complete the survey. The Qualtrics survey tool is housed on a secure server at Western University. The Qualtrics survey tool was used in the present study to create two electronic teacher rating questionnaires, described below.

2.3.2 Classroom Demographic Form (Appendix A)

The classroom demographic form (Hutchinson, 2013) was employed to collect classroom demographic information from participating teachers, including the number of students in the classroom (e.g., number of boys and girls), number of students with a reported hearing loss, number of children with a special education designation, number of children from a visible minority background, number of children who spoke English as a second language, and SES (teacher's perceptions of parents' education, employment and housing location) of the class. Participating teachers completed one demographic information form for their classroom.

2.3.3 Perceptions of Inclusion Questionnaire (Appendix B)

The Perceptions of Inclusion Questionnaire (Eriks-Brophy & Whittingham, 2013) is a 60-item teacher rating instrument which measures teachers' beliefs about including children with hearing loss in their classroom. Teachers respond to items using a six-point Likert

scale, with endpoints ranging from 1 (agree strongly) to 6 (disagree strongly). The questionnaire was originally developed to measure 10 domains of inclusion:

1) Teacher attitudes towards inclusion of children with hearing loss
2) Teacher confidence in teaching children with hearing loss
3) Knowledge of hearing loss and strategies to facilitate teaching and learning
4) Effects of inclusion on students with hearing loss
5) Effects of inclusion on hearing students
6) Effects of inclusion on teacher workload
7) Teacher – itinerant teacher of Deaf and hard of hearing (ITDHH) relationship
8) Roles and responsibilities of teachers and support professionals
9) The role of the ITDHH
10) Parents of children with hearing loss

Cronbach's alpha (1951) was computed by Eriks-Brophy & Whittingham (2013) to measure the internal consistency of the item scores for the ten subscales of the perceptions of inclusion measure. Alpha (α) values provide a statistical indicator that range from 0-1, to determine the degree to which items within a domain measure the same underlying construct (Fields, 2013). Values closer to 1 indicate strong internal consistency, and generally an alpha value of 0.60 is considered acceptable, 0.70 is respectable and 0.80 is high (DeVellis, 1991). Following Eriks-Brophy & Whittingham's initial analysis of the internal consistency among items for the measure, certain items were deleted in order to reach appropriate alpha values. Domain 9 (the role of the IDTHH) and Domain 10 (parents of children with hearing loss) were removed, as they did not achieve adequate levels of reliability. The alpha values and number of items

retained by Ericks-Brophy for each domain of the Perceptions of Inclusion Questionnaire are detailed below.

Domain 1 includes 3 items that measure teacher attitudes towards inclusion of children with hearing loss (e.g., "inclusion in the regular classroom is an appropriate educational option for the majority of students with a hearing impairment"; $\alpha = .66$). Domain 2 (teacher confidence in teaching children with hearing loss) includes 3 items, $\alpha = .78$ (e.g. "I am confident of my ability to adapt my teaching to the needs of a student with a hearing impairment). Domain 3 measures knowledge of hearing loss and strategies to facilitate teaching and learning using 4 items (e.g. "I have sufficient knowledge about hearing loss to adapt my teaching strategies to the needs of students with a hearing impairment"; $\alpha = .74$). The effect of inclusion on students with hearing loss is measured in Domain 4, using 4 items ($\alpha = .66$; e.g., "inclusion in the regular classroom setting has a positive effect on the social development of students with a hearing impairment"). Domain 5, the effect of inclusion on normal hearing students, contains 5 items (e.g., " including students with a hearing impairment in the regular classroom does not negatively affect the progress of the rest of the class through the curriculum", $\alpha = .74$). The effect of inclusion on teacher workload is measured in Domain 6 ($\alpha = .70$) with 5 items (e.g., "including students with a hearing impairment in the regular classroom requires additional skill and patience on the part of the classroom teacher"). Domain 7 (teacher- ITHH relationship) includes 5 items (e.g. "the itinerant teacher of the hearing impaired recognizes the contribution of the regular classroom teacher to the progress of the student with the hearing impairment"; $\alpha = .74$). Lastly, Domain 8 contains 5 items ($\alpha = .63$) to measure roles and responsibilities of teachers and support professionals (e.g.,

"the regular classroom teacher should have input into the speech and language goals developed for the integrated student with a hearing impairment").

2.3.4 Self-Regulation In School Inventory (Appendix C)

The Self-Regulation In School Inventory (SRISI; Hutchinson & Perry, under review) is a 26- item teacher-report measure designed to provide an indirect assessment of children's academic achievement and three conceptually distinct aspects of SR (i.e., ER, SRL, and SRSR). The measure was developed by reviewing over 200 observations of tasks and activities in young children's classrooms to identify ER, SRL, and SRSR behaviours that would be familiar and easy for teachers to observe and rate. One item measures students' overall academic achievement, followed by three subject specific ratings of academic achievement in core subject areas: Language, Math, and Science. Teachers respond to the achievement items using a 7-point scale with anchors that correspond to the Ontario Ministry of Education's grading standards. For the present study, an overall measure of academic achievement was utilized because no standardized academic achievement data are available about Ontario elementary students before grade four.

The SRISI (Hutchinson & Perry, under review) includes seven items that assess ER (e.g. "Is able to talk about feelings or describe emotions"), nine items that assess SRL (e.g., "Can manage a set of directions to complete tasks independently") and six items that measure SRSR (e.g., "Adjusts feedback and support to suit peers' particular learning needs"). Teachers respond to items by indicating how often the student engages in the behaviour using a seven-point Likert scale with endpoints ranging from one (almost never) to seven (almost always). Cronbach's alpha of internal consistency was computed for the three subscales: ER ($\alpha = .95$), SRL ($\alpha = .98$) and SRSR ($\alpha = .95$), as well as total

SR ($\alpha = .98$), indicating high internal consistency among the items. For the present study, two additional items were added to the SRISI to measure hearing status of each student (whether participating children had a hearing loss or not), and whether they used technology (e.g., a hearing aid and/or FM system) to hear in the classroom.

2.3.5 Classroom Observation Instrument (Appendix D)

Perry's (1998) Classroom Observation Instrument was used to gather a running record of the events and activities that transpired in classroom contexts (Hutchinson, 2013; Perry & VandeKamp, 2000; Perry, 1998). The classroom observation instrument is comprised of three sections. The first section provides space for the researcher to provide a running record (i.e., summary) of the events and activities that transpire in classroom contexts, including verbatim dialogue exchanged between a teacher and students during classroom tasks. The second section was adapted by Hutchinson (2013) and contains a table that lists eight features of instruction (e.g., Complex Tasks, Choices, Control Over Challenge, Self- Evaluation, Teacher Support, Peer Support, Non-Threatening Evaluations, and Communities of Learners) associated with SR and examples of how they may manifest in classrooms. Column 1 lists the feature of instruction and column 2 provides detailed examples of how a particular feature of instruction may be implemented by classroom teachers.

The third section of the classroom observation instrument contains a checklist which is used by researchers to rate the extent to which the eight features of instruction are implemented in classrooms. The first column of the checklist lists the eight features of classroom contexts that support SR (complex tasks, choices, control over challenge, self-evaluation, teacher support, peer support, non-threatening evaluation and community of

learners). In addition, Column 1 expands on some of the features by depicting the four aspects of complex tasks (multiple goals, results in a number of products, integrates subject matter and engages students in a number of processes), five aspects of choices (who, what, where, when and how) and four aspects of community of learners (individual responsibility coupled with group support, making allowances for individual differences, encouraging the sharing of ideas and supporting relationships).

Column 2 of the checklist uses a three point scale (where 0 = no evidence; 1 = somewhat evident but not in ways that support SR; 2 = yes in ways that support SR) for researchers to provide a quantitative rating of the extent to which each of the eight features are present in each lesson. A summed score out of 16 is used to describe the extent to which teachers employ the features of classroom contexts during classroom lessons. For example, if a scorer reviewed the running records of a lesson and determined that students were provided with the opportunity to engage in a complex task (i.e. the activity had multiple goals, required a number of products, integrates subject matter and engages students in a number of processes) in a way that was instrumental to engaging in SR, the lesson would score a 2 for the complex task section. Instrumental opportunities to engage in SR are provided when metacognition, motivation and strategic action are promoted through the use of the feature. To elaborate, a complex task would require students to use metacognition when they are required to consider their current strengths and weaknesses in relation to the learning challenge set out for them, or when students are asked to integrate previous subject matter into the task. A complex task is optimally challenging, therefore it requires sustained motivation from students to complete the task over a period

of time. Lastly, children are required to use a variety of learning strategies to produce a number of products.

2.3.6 Classroom Noise Level Observation Sheet (Appendix E)

The acoustic environment was evaluated by observation and measurements and recorded using the Classroom Noise Level Observation Sheet. Classroom noise measurements were conducted using a calibrated Type II sound level meter (SLM). A-weighted sound level measurements at six, 40-second time samples were collected using Laeq measurements during classroom activities (three samples were conducted during teacher led instruction, and three were conducted during group work). The SLM was placed on an empty desk in the centre of each classroom. Samples were recorded with an average thirty-second break between clips. In addition, the student researcher observed and recorded the type of sounds/noise that were present in the classroom environment (fans, talking in the hallways) during this measurement.

2.4 Procedures

Ethical approval was obtained from King's University College at Western University. Teacher and student participants were recruited during Fall and Winter 2016 from a large school district outside of Toronto, Canada. First, information was sent to the district in order to receive study approval and ensure the procedures for data collection met the appropriate school board standards for conducting research with children. Next, the school board provided a list of schools and teachers eligible to participate in the research including students with a known hearing loss. The school district's protocol for

contacting eligible schools and teachers was followed, which involved contacting school principals to provide them with study information.

To ensure the protocol for involving teachers and schools in research was adhered to, the student researcher first contacted eligible principals and provided them with study information, teacher consent forms and the principal investigator's contact information. Interested principals passed this information on to teachers. Follow up phone calls and emails were conducted inviting teachers to participate in the study. Teachers who were interested in enrolling in the study were asked to sign a teacher consent form (Appendix F). Teachers were provided with a class set of parent consent forms which were sent home with students (Appendix G). Parents were asked to provide consent for students' participation in the research study.

During February and March 2016, a full morning (approximately 2.5 hours) of observations were conducted in each participating teachers' classrooms. Prior to the classroom observations, the four research assistants (RA) involved in the study received training from the developer of the classroom observation instrument (L. Hutchinson) on the proper techniques for conducting observations, in order to ensure high inter-rater reliability and consistency throughout collection. These four research assistants participated in collecting data within the classrooms. During the classroom observations, the RA positioned herself in the classroom to keep a running record of classroom activities without being intrusive. The RA documented classroom events and activities including verbatim speech between students and teachers. Following the classroom observations, the RA annotated the observation records to identify examples of events in the classroom that provided opportunities and support for SR using the third section of

the Classroom Observation Instrument (Appendix D). Following the observations, one of the RA's received additional training to provide secondary (independent) coding of all of the classroom observations in addition to the primary RA's coding, in order to calculate inter-rater reliability. At the end of data collection the two research assistants met to discuss and clarify discrepancies in the coding of the classroom observations.

In addition, noise level readings from the classroom environment were obtained utilizing the SLM and the Classroom Noise Level Observation Sheet (Appendix E). The SLM was recalibrated prior to each classroom visit. The primary RA positioned herself in the middle of the classroom, collected three forty-second samples during periods of group work, as well as during teacher led instruction, to provide a total of six noise measurements during typical classroom activity. Notes were kept on types of sound and noise also present within the environment (e.g., fans, construction outside) during the measurement.

Following classroom observations, teachers were provided with a half day of release time to complete the online questionnaire regarding classroom demographic information (Appendix A), perceptions of inclusion (Appendix B), and students' self-regulation and academic achievement (Appendix C). Teachers had approximately two weeks to complete the online questionnaire, and were provided with a $50 gift card for their participation in the study. Multiple attempts to increase sample size of CHL were made through repeated invitations (follow up phone calls and emails) for teachers to participate in the study throughout the remainder of the school year.

Chapter 3

3 Results

3.1 Overview

Chapter 3 presents the results of the study. An exploratory, mixed-method and multi-level research design was employed to examine relationships among students' hearing loss, academic achievement and SR, classroom background noise levels, teachers' perceptions of inclusion of students with hearing loss and features of classroom instructions that support SR. Quantitative data consisted of (a) teachers' ratings of students' SR and academic achievement at the individual level and (b) teachers' perceptions of inclusion, the numerical ratings from the running records at the classroom level and classroom background noise levels. Qualitative data consisted of information derived from the running records at the classroom level, to examine whether and how teachers implement the features of classroom contexts to support SR within the classroom. This chapter begins by reviewing the preliminary analyses conducted using individual level data, followed by a review of the preliminary analyses used for the classroom level analyses. Then, the study results are presented in order of the research questions posed at the outset of the study.

3.2 Preliminary Analyses

Preliminary analyses were conducted for both the individual level and classroom level data. To satisfy the conditions of linear analysis for each level of data, four assumptions were examined: normality, linearity, independent errors and equality of error variances.

In addition, the psychometric properties of study variables, as well as the inter-rater reliability of the Classroom Observation Instrument (Perry, 1998) were examined.

The assumption of normality was tested to determine the distribution of the data by (a) visual inspection of a normality plot and (b) using the Shapiro-Wilks test. The Shapiro-Wilks test is recommended to test for normal distribution in combination with visual inspection as it provides better power than other normality tests, especially for cases with small sample sizes (Steinskog, Tjøstheim, & Kvamstø, 2007; Thode, 2002). *P*-values of 0.05 or higher using the Shapiro-Wilks test indicate normal distribution of the data (Ghasemi & Zahediasl, 2012). The assumption of linearity was examined to justify the use of a linear regression model by conducting a visual inspection of scatterplots using residuals versus predicted values. The assumption of independent errors was tested using the Durbin-Watson test. The Durbin-Watson test is used in addition to a visual inspection of a scatterplot to determine autocorrelation (if residuals are independent from one another or not). Results of Durbin-Watson's *d* can range from 0-4, with values around 2 ($1.5 < d < 2.5$) typically indicating no autocorrelation (Field, 2013). Equality of error variances (homoscedasticity) was analyzed to measure how much variability exists throughout the data sets, using Levene's test for equality of variances. A *p* value greater than 0.05 indicates that the assumption has been met and group variances can be treated as equal (Field, 2013).

3.2.1 Individual Level Data

First, the assumption of normality was tested through visual inspection of histograms and by using the Shapiro-Wilks test for the SR and academic achievement variables. Visual inspection of the histograms determined that each of the variables demonstrated

approximately normal distribution, and the Shapiro-Wilks test indicated normal distribution ($p < .05$) for all variables. A scatterplot was constructed to examine the assumption of linearity. The scatterplot was created using residuals from a multiple regression analysis where academic achievement was predicted by SR, and included the sex and age variables. Since no curves appeared in the data, the assumption was satisfied. The Durbin-Watson test was computed to analyze the assumption of independent errors, and results indicated a d value of 1.78, indicating that no autocorrelation exists and the assumption was met. Lastly, homoscedasticity was assessed by visual inspection of the plot of standardized residuals versus standardized predicted values, as well as using Levene's test, which indicated that $p < .05$, and that the assumption had not been violated. Together, these tests indicated that linear analyses were appropriate for the individual level data. In addition, reliability analyses were conducted using Cronbach's alpha reliability coefficient to measure the internal consistency of the item scores individual data. Descriptive and reliability statistics for the individual level data variables are presented in Table 3.1.

Table 3.1

Psychometric Properties of Independent Level Variables

Variable	*M*	*SD*	95% CI	Skew	Kurtosis	α	Min - Max	
							Scale Range	Actual Value Range
Total self-regulation	4.33	1.27	[.98, .99]	-.09	-.18	.98	1-7	1.23-7.0
Emotion regulation	4.26	1.28	[.93, .96]	-.01	-.08	.95	1-7	1.0-7.0
Self-regulated learning	4.45	1.36	[.96, .98]	-.21	-.26	.97	1-7	1.22-7.0
Socially responsible self-regulation	4.24	1.29	[.92, .97]	-.19	-.04	.95	1-7	1.0-7.0
Achievement	4.11	1.56	[.93, .96]	-.12	-.59	.95	1-7	1.0-7.0

3.2.2 Classroom Level Data

First, the assumption of normality was tested through visual inspection of histograms and by using the Shapiro-Wilks test for the eight classroom contexts and seven perceptions of inclusion variables. Visual inspection of the normal distribution plots determined that most of the variables appeared normal, and the Shapiro-Wilks test indicated normal distribution ($p < .05$) for the majority of items. This indicated that overall, these variables did not violate the assumption of normality. The assumption of linearity was tested through visual inspection of a scatterplot for noise levels and the eight features of classroom contexts for supporting SR data. Since curves appeared in the data, the assumption was not satisfied. Lastly, homoscedasticity was assessed by conducting a

visual inspection of scatter plots using standardized residuals and standardized predicted values. Inspection of the scatterplots indicated that the assumption was violated, and heteroscedasticity was present.

In addition, reliability analyses were conducted using Cronbach's alpha reliability coefficient to measure the internal consistency of the item scores for classroom level data. Descriptive and reliability statistics for the classroom level data variables are presented in Table 3.2. Recall that alpha (α) values provide a statistical indicator that range from 0-1, to determine the degree to which items within a domain measure the same underlying construct (Field, 2013). Higher values indicate strong internal consistency, and generally an alpha value of 0.60 is considered acceptable, 0.70 is respectable and 0.80 is high (DeVellis, 1991).To ensure a minimum alpha of .60 was met for each domain of the perceptions of inclusion questionnaire, multiple items were deleted from four subscales. Domain 1 (teachers attitudes towards inclusion of children with hearing loss) required the deletion of two items (item 2 and 50) to reach an adequate alpha (.69). Items 1 and 49 were deleted from Domain 2 (teacher confidence) to obtain an alpha of .73. Two items (item 4 and 24) were removed from Domain 5 (effects of inclusion on hearing loss students; $\alpha = .72$). Items 7 and 14 were removed from Domain 7 (effects of inclusion on teacher workload), to allow for an alpha of .72. Lastly, item 11 was removed from Domain 8 (teacher roles and responsibilities; $\alpha = .63$).

Table 3.2

Psychometric Properties of Classroom Level Variables

Variable	M	SD	95% CI	Reliability	Potential	Actual
Total Perceptions of Inclusion	147.00	15.05	[.72, .89]	α = .86	33-198	123.0-169.0
Teacher Attitudes	20.90	2.13	[.43, .78]	α = .69	4-24	18.0-24.0
Teacher Confidence	15.80	3.94	[.66, .78]	α= .73	4-24	8.0-21.0
Knowledge	24.20	7.21	[.80, .96]	α = .88	6-36	11.0-34.0
Effects on Hearing Loss	20.90	2.23	[.71, .75]	α = .72	4-24	17.0-24.0
Effects on Normal Hearing	28.40	3.47	[.66, .80]	α = .73	6-36	23.0-34.0
Effects on Workload	16.60	2.84	[.68, .78]	α = .72	4-24	13.0-22.0
Roles and Responsibilities	20.20	2.90	[.61, .67]	α = .63	5-30	17.0-26.0
Total Classroom Contexts	6.15	3.70	[.26, 1.7]	κ = .72	0-16	2.0-12.5
Choices	.80	.79	[.57, 1.04]	κ = .81	0-2	0.0-2.0
Control Over Challenge	.85	.78	[.57, 1.05]	κ = .81	0-2	0.0-2.0
Complex Task	.25	.54	[.46, 1.12]	κ = .79	0-2	0.0-1.5
Self-evaluation	.55	.64	[1.0, 1.0]	κ = 1.0	0-2	0.0-2.0
Non-threatening Evaluation	1.25	2.75	[.51, 1.17]	κ = .84	0-2	0.0-1.0
Peer Support	1.00	.67	[.43, 1.09]	κ = .76	0-2	0.0-2.0
Teacher Support	1.55	.44	[.48, 1.11]	κ = .80	0-2	1.0-2.0
Community of Learners	.95	.73	[.52, 1.04]	κ = .83	0-2	0.0-2.0

3.2.3 Inter-rater Reliability of Classroom Observation Instrument

A research assistant and I conducted the classroom observations and provided the quantitative ratings of the features of contexts for this study. I conducted classroom observations for all 17 lessons (100%) in this study and the research assistant conducted classroom observation observations for four (24%) lessons. We reviewed and scored all 17 observations using the checklist component (Section 3) of the Classroom Observation Instrument. Cohen's Kappa was computed to measure the level of agreement between the raters' judgements of the total classroom contexts scores and each of the eight features of

instruction. Typically, Kappa values above 0.7 indicate good agreement between raters (Streiner, 2005)(Field, 2013). Inter-rater agreement was 82%, and Kappa was was .72 (p <.001, 95% CI = .26 to 1.7, SE = 0.5), indicating a high level of inter-rater reliability for the total classroom context scores. Kappa values for the eight features of classroom contexts are listed in Table 3.2.

3.3 What Are The Relationships Among Demographic Variables (Sex, Hearing Status, Age), Self-Regulation and Academic Achievement Variables For All Students?

To answer the first research question, a series of Pearson product-moment correlations were computed to examine the relationships among hearing status, academic achievement and SR (see Table 3.3). As hypothesized, a, statistically significant, positive correlation was observed between SR and academic achievement (r = .71). Each subscale of the SRISI demonstrated a statistically significant and positive correlation with academic achievement: ER and academic achievement (r = .64); SRL and academic achievement (r = .75); and SRSR and academic achievement (r = .63). All correlations exhibited a large effect size.

Table 3.3

Intercorrelations among Self-Regulation, Emotion Regulation, Self-regulated Learning, Socially Responsible Self-regulation, Academic Achievement, Hearing Status and Sex for All Participants

	1	2	3	4	5	6
1. Total Self-regulation	_					

2. Emotion Regulation	.97** [c]	_				
3. Self-regulated Learning	.98** [c]	.92** [c]	_			
4. Socially Responsible Self-regulation	.95** [c]	.89** [c]	.90** [c]	_		
5. Academic Achievement	.71** [c]	.64** [c]	.75** [c]	.63** [c]	_	
6. Hearing Status	.27** [a]	.26** [a]	.26** [a]	.26** [a]	.23** [a]	_

Note. Effect sizes should be interpreted such that [a]= small effect size (r = 0.2-0.5), [b]= medium effect size (r = 0.5-0.8), and [c]= large effect size (r = >0.8). **p < .01, *p < .05

As predicted, hearing status and SR were statistically significantly and positively correlated (r = .27, p < .01). Hearing status also demonstrated a statistically significant positive correlation with ER (r = .26, p < .01), SRL (r = .26, p < .01), and SRSR (r = .26, p <.01). A statistically significant positive relationship of .22 (p = <.01) was found between hearing status and academic achievement, confirming the hypothesis that hearing status and academic achievement would be statistically significant and positively related.

To further examine the first research question, a path analysis was conducted using MPlus version 7.12 (Muthén & Muthén, 2015). Path analysis provides an estimate of the degree and significance of relationships between variables using a hypothetical causal model. A path analysis is viewed as a beneficial causal model to utilize as it explores both direct and indirect effects of variables to fit the data (Streiner, 2005). The model constructed allowed for the examination of the effect of the demographic variables (i.e., sex, hearing status and age) on SR and academic achievement (see Figure 1), using maximum likelihood (ML) estimation procedures. The model constructed employed sex,

hearing status and age as predictors of SR, and SR was a predictor of academic achievement. The standardized regression coefficients (β) are presented along each path. To assess the goodness of fit for the model, two model fit indices were used (a) the root mean square error of approximation (RMSEA) and (b) the comparative fit index (CFI). Models with a good fit typically have RMSEA values less than .06, and CFI values greater than or equal to at least .95 (Field, 2013). The model constructed showed excellent fit, as RMSEA = .00 and CFI = 1.00. Statistically significant and direct effects were found between sex and SR (β = .27); hearing status and SR (β = .32); and age and SR (β = .23). Results indicated that girls (*M* = 4.69, *SD* = 1.25) received higher scores of SR than boys (*M* = 4.00, SD = 1.21), and that NH students (*M* = 4.42, *SD* = 1.26) received higher scores of SR than HH students (*M* = 2.99, *SD* = .80). In addition, a direct effect was observed between SR and academic achievement (β = .68), indicating that SR is a positive predictor of academic achievement, and that academic achievement is also indirectly and positively influenced by sex, hearing status and age.

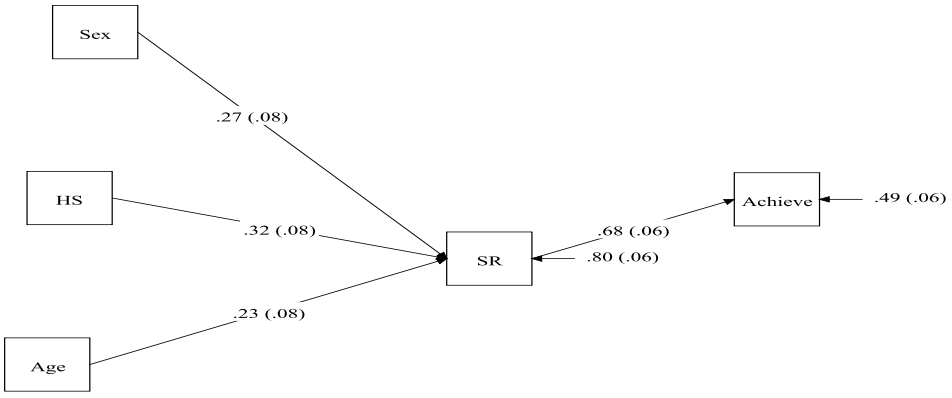


Figure 1. Path analysis demonstrating statistically significant relationships between sex, hearing status, age, self-regulation and achievement variables.

Note. Standardized scores were utilized and all paths depicted were statistically significant at the $p < .001$ level. Standard error is presented in brackets.

3.4 What Are The Relationships Between HH Students' SR and Academic Achievement?

A series of Pearson's product-moment correlation coefficients were computed to examine the relationships among academic achievement and SR variables for HH participants (see Table 3.4). A statistically significant and strong positive correlation was observed between SR and academic achievement for HH students ($r = .80$). Two of the subscales of the SRISI also demonstrated a statistically significant and positive correlation with academic achievement: ER and academic achievement ($r = .86$), as well as SRL and academic achievement ($r = .77$), while the correlation between SRSR and academic achievement was not statistically significant ($r = .43$, $p = ns$).

Table 3.4

Inter correlations among overall Self-regulation, Emotion Regulation, Self-regulated Learning, Socially Responsible Self-regulation and Academic Achievement for Hard of Hearing Participants(n = 8)

	1	2	3	4	5
1. Self-regulation	_				
2. Emotion Regulation	.92** [c]	_			
3. Self-regulated Learning	.93** [c]	.83* [c]	_		
4. Socially Responsible Self-regulation	.78* [c]	.58	.57	_	
5. Academic Achievement	.80* [c]	.86** [c]	.77* [c]	.43	_

Note. Effect sizes should be interpreted such that [a]= small effect size (r = 0.2-0.5), [b]= medium effect size (r = 0.5-0.8), and [c]= large effect size (r = >0.8). **p < .01, *p < .05

A bivariate regression analysis was computed to examine whether HH students' academic achievement was predicted by teachers' ratings of SR. Research has indicated that a minimum of approximately five to ten participants per predictor will permit an accurate estimation for regression models (Austin & Steyerberg, 2015; Vanvoorhis & Morgan, 2007). HH students' mean scores on the SR variable were employed as the predictor variable, and the overall rating of academic achievement was the criterion variable. Results demonstrated that teacher ratings of HH students' SR was a statistically significant, positive predictor of academic achievement F (1, 6) = 10.49, p =.02, with an adjusted R^2 of .64, which is consistent with the literature on typically developing students.

3.5 Do Teachers' Ratings of HH Students' SR Differ From Their Ratings of NH Students' SR and Academic Achievement?

To answer the third research question, a series of independent samples *t*-tests were computed to examine potential differences between HH and NH students' SR. Findings indicated that teachers' ratings of SR were statistically significantly different for HH and NH students, t (129) = -3.18, p = .002, d =1.36, corresponding to a very large effect (d =1.36). Findings demonstrate that HH students' in this study received statistically significantly lower scores of SR (M = 2.99, SD = .80) compared to their NH peers (M = 4.42, SD = 1.25).

Additional independent samples t-tests were conducted to determine whether teacher's ratings of HH students' and NH students' ER, SRL and SRSR scores differed. An independent samples t-test confirmed that teachers' ratings of HH and NH students' ER were statistically significantly different, t (129) = -3.10, p <.01, corresponding to a very large effect, d =1.25. That is, teachers provided lower ratings of HH students' ER (M = 2.95, SD = .97) compared to their NH peers (M = 4.35, SD = 1.25). Similarly, an independent samples *t*-test found that teachers provided statistically significantly different ratings of HH students' SRL compared to NH students' SRL, t (129) = -3.08, p = .003, d =1.32. These results indicate that in this study HH students (M= 3.06, SD = .85) received lower ratings of SRL compared to their NH peers (M = 4.54, SD = 1.34).

Finally, the independent samples *t*-test examining if teacher ratings of HH students' SRSR scores differed from NH students was statistically significant, t (129) = -3.03, p = .003, corresponding to a large effect size (d =1.25), indicating that HH students (M =

2.94, *SD* = .92) had lower teacher ratings of SRSR than NH students (*M* = 4.33, *SD* = 1.27).

To examine the differences in SR scores between HH students and NH peers within each classroom, mean scores were compared using individual HH students' SR scores and a classroom average SR score. Results are shown in Table 3.5, and indicate that HH students received lower teacher rated total SR scores than NH classmates, across all grades and within all classrooms.

Table 3.5

Mean Self-Regulation Scores for HH and NH Students

		SR Score	
Teacher	Grade	HH Student	Classroom (*SD*)
Brown	SK	3.64	4.45 (1.23)
Moroney	3	3.27	3.99 (1.77)
Page	4	1.23	5.40 (.80)
Beatty	4	3.73	4.75 (.76)
Page	5	3.0	5.40 (.80)
Beatty	5	3.50	4.75 (.76)
Harris	6	2.68	5.49 (1.31)
Harris	6	2.86	5.49 (1.31)

Note. All teacher names are pseudonyms.

3.6 What are the Relationships Between the Classroom Auditory Environment, Teachers' Implementation of SR

Promoting Tasks and Practices and Teachers' Perceptions of Inclusion?

To examine how classroom background noise levels were related to teachers' perceptions of inclusion and features of classroom contexts that support SR, a series of Pearson's product-moment correlations were computed. The relationships between the noise levels, perceptions of inclusion and features of classroom contexts are presented in Table 3.6. Data for these variables were collected at the classroom level. Noise levels within the classroom were measured using a mean score derived from six acoustic measurements captured during typical activities within each class. Teachers' perceptions of inclusion were measured using seven subscales (teacher attitudes towards inclusion, teacher confidence, knowledge of hearing loss and teaching strategies, effect of inclusion on students with hearing loss, effects of inclusion on hearing students, effect of inclusion on teacher workload and roles and responsibilities), as well as an overall summed score from the Perceptions of Inclusion Questionnaire (Eriks-Brophy & Whittingham, 2013). One subscale (teacher-ITDHH relationship) was not utilized for the study, as the participants did not work alongside an itinerant teacher. All subscale sores on the perceptions of inclusion measure were reverse coded so that higher scores would indicate higher levels of confidence, knowledge and more positive attitudes towards inclusion and lower scores would indicate lower levels of confidence, knowledge and less positive attitudes towards inclusion. Correlations between the seven subscales are displayed in Table 3.6.

Lastly, the features of classroom contexts for supporting SR were quantitatively coded for these analyses. Individual scores of each of the eight features (complex tasks, choices, control over challenge, self-evaluation, peer support, teacher support, non-threatening

Table 3.6

Inter-correlations between Noise Levels, Perceptions of Inclusion and Classroom Contexts Variables

Variable		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.	Noise Levels																		
2.	Perceptions of Inclusion (Total)	-.58																	
3.	Teacher Attitudes	-.41	**.65*** [c]																
4.	Teacher Confidence	-.31	**.81**** [c]	**.67*** [c]															
5.	Teacher Knowledge	**-.64*** [c]	**.87**** [c]	.41	**.72*** [c]														
6.	Effects on HL	-.26	.18	.46	-.08	-.09													
7.	Effects on NH	-.58	**.86**** [c]	**.68*** [c]	**.68*** [c]	.63	.54												
8.	Effects on Workload	.24	-.26	-.45	-.56	-.32	-.27	-.48											
9.	Roles and Responsibilities	-.05	.55	-.03	.31	.38	-.22	.31	.32										
10.	Contexts (Total)	**-.74***	.43	.45	.40	.55	.13	.31	-.32	-.25									
11.	Choices	-.57	.08	.25	.06	.26	.37	.24	-.49	-.61	**.83**** [c]								
12.	Complex Tasks	.17	.25	.46	.45	.16	.07	.15	-.18	-.07	.41	.26							

13.	Control Over Challenge	**-.79**** [c]	.38	.32	.30	.53	.15	.39	-.28	-.30	**.96**** [c]	**.85**** [c]	.23					
14.	Self-Evaluation	**-.78**** [c]	.36	.37	.20	.47	.09	.34	-.17	-.15	**.84****	**.68*** [c]	.04	**.79**** [c]				
15.	Non-threatening Evaluation	-.41	-.54	.07	-.31	**.66*** [c]	-.08	-.51	.29	-.40	-.37	-.33	-.05	-.37	-.34			
16.	Community of Learners	**-.73*** [c]	-.54	.46	.44	.53	.13	.50	-.20	.03	**.94**** [c]	**.66*** [c]	.46	**.87**** [c]	**.78*** [c]	-.43		
17.	Peer Support	-.63	-.13	.27	.21	.31	-.04	.13	-.21	-.52	**.85**** [c]	**.74*** [c]	.15	**.90**** [c]	**.71*** [c]	.00	**.69*** [c]	
18.	Teacher Support	-.57	-.34	.13	.17	**.68*** [c]	-.22	.10	-.07	-.01	**.65*** [c]	.52	.06	.59	**.78*** [c]	-.50	.53	.48

Note. Effect sizes should be interpreted such that [a]= small effect size (r = 0.2-0.5), [b]= medium effect size (r = 0.5-0.8), and [c]= large effect size (r = >0.8). **p < .01, *p < .05

evaluation, community of learners) were aggregated to create a total score of the features of instruction that support SR (Hutchinson, 2013; Perry, 1998). The psychometric properties of these variables are depicted in Table 3.2. Correlations between the eight features of classroom contexts are reported within Table 3.6.

The relationships between the noise levels, perceptions of inclusion and features of classroom contexts are presented in Table 3.6. Results indicated that a statistically significant, negative relationship was found between the total features of classroom contexts scores and noise levels within the classroom, $r = -.74$, $p < .05$, indicating that higher sound levels measured within the classroom were related to lower overall use of the features of classroom contexts known to provide opportunities and support for SR. Statistically significant, negative correlations were also found between noise levels within the classroom and three of the features of classroom contexts subscales: control over challenge ($r = - .79$, $p < .01$); self-evaluation ($r = -.78$, $p < .01$); and communities of learners ($r = -.73$, $p < .05$). Noise levels within the classroom were statistically significant and negatively correlated to one of the perceptions of inclusion domains: teacher knowledge and understanding of hearing loss ($r = -.64$, $p < .05$). Two statistically significant, positive correlations emerged between the perceptions of inclusion domains and the features of classroom contexts subscales. Teacher knowledge of hearing loss was statistically significantly and positively correlated with non-threatening evaluations ($r = .66$, $p < .05$), and teacher support ($r = .68$, $p < .05$), indicating that higher levels of knowledge on hearing loss were related to more opportunities for non-threatening evaluations, as well as higher levels of observed teacher support within the classroom. No

other statistically significant correlations were found between the perceptions of inclusion and features of classroom contexts variables.

An independent samples *t*-test was computed to examine potential differences in classroom teachers' use of the eight instructional tasks and practices in supporting SR. Classrooms were categorized as those that included HH students, and those with NH students only (see Table 3.7). Results demonstrated that there was no statistically significant difference in classroom teachers' overall use of the eight features of instruction to support SR, (t (8) = 1.75, p = *ns*); however, it did represent a medium-sized effect, (d =.62). Findings indicate that teachers with HH children in their classroom (M = 7.30, SD = 3.21) did not differ in their overall use of the features of instruction for supporting SR in comparison to teachers of NH students (M = 5.00, SD = 4.12). No other statistically significant results were found between the eight subscales of the features of classroom contexts variables.

Table 3.7

Features of Classroom Contexts Means for Hard of Hearing (HH) classes and Normal Hearing (NH) Classes

	Classroom				
	HH	NH	*t*	*df*	*P* value
Classroom Contexts (Total)	7.30	5.0	.98	8	.35
	(3.2)	(4.12)			
Choices	1.0	.60	.78	8	.45
	(.71)	(.89)			
Control Over Challenge	1.2	.50	1.5	8	.17
	(.57)	(.87)			
Complex Tasks	.30	.20	.27	8	.79
	(.67)	(.45)			
Self-evaluation	.60	.50	.23	8	.82
	(.42)	(.87)			
Non-threatening Evaluation	.50	2.0	-.85	8	.42
	(.35)	(3.9)			
Peer Support	1.2	.80	.94	8	.37
	(.57)	(.76)			
Teacher Support	1.6	1.5	.34	8	.74
	(.42)	(.50)			
Community of Learners	1.2	.70	1.1	8	.30
	(.57)	(.84)			

Note. * = $p < .05$, *** = $p < .001$. Standard deviations appear in parentheses below mean values.

To examine how teachers of HH students differ from teachers of NH children in their perceptions of inclusion of children with hearing loss within the general education setting, an independent samples t-test was performed (see Table 3.8). This was computed using the total perceptions of inclusion score, as well as examining the seven relevant subscales (teacher attitudes towards inclusion, teacher confidence, knowledge of hearing loss and teaching strategies, effects of inclusion on students with hearing loss, effects of inclusion on hearing students, effects of inclusion on teacher workload, and roles and responsibilities. No statistically significant results were found between the seven domains of the perceptions of inclusion questionnaire for classrooms of HH students in comparison to classrooms of NH students.

Table 3.8

Perceptions of Inclusion Means for Teachers of Hard of Hearing (HH) classes and Teachers Normal Hearing (NH) Classes

	Teachers				
	HH	NH	*t*	*df*	*P* value
Perceptions of Inclusion (Total)	149.80 (16.25)	145.20 (15.40)	.34	8	.73
Attitudes	20.40 (2.07)	21.40 (2.30)	-.72	8	.49
Confidence	15.00 (4.69)	16.60 (3.36)	-.62	8	.55
Knowledge	22.54 (7.99)	23.00 (7.04)	.50	8	.63
Effects of Inclusion on HH Students	21.20 (2.39)	20.60 (2.30)	.41	8	.70

Effects of Inclusion on NH Students	28.60 (3.05)	28.20 (4.21)	.17	8	.87
Effects of Inclusion on Workload	17.80 (3.03)	15.40 (2.30)	1.41	8	.20
Roles and Responsibilities	20.40 (3.36)	20.00 (2.74)	.21	8	.84

Note. * = $p < .05$, *** = $p < .01$. Standard deviations appear in parentheses.

3.7 How Do Classroom Teachers Implement SR Promoting Tasks and Practices to Support HH and NH Students' SR?

3.7.1 Overview

Seventeen lessons were observed in ten participating classes to examine how elementary classroom teachers implemented the eight features of contexts to provide opportunities and support for HH and NH students' SR (see Table 3.9). The following vignettes were chosen to qualitatively contrast how the eight features of contexts were employed by a two teachers: Ms. Harris, a grade three/four teacher and Ms. Moroney, a grade five/six teacher.

Table 3.9

Features of Classroom Contexts and Opportunities for Self-regulation Within and Across Classroom Observations

					Features of Classroom Contexts									
Classroom	Grade	HH Student(s)	Obs. Number	Subject/ Lesson	Choices	Complex Task	Control Over Challenge	Self-Evaluation	Teacher Support	Peer Support	Non-Threat. Eval.	Comm. of Learners	Total Context Score	Noise Level (dBA)
Brown	K	✓	1	Math	✓		✓		✓	✓		✓	8.0	58.53
			2	Literacy	✓		✓	✓	✓	✓	✓	✓	9.0	
Moroney	3/4	✓	1	Math	✓		✓	✓	✓	✓	✓	✓	7.0	69.98
			2	Literacy					✓				1.0	
Beatty	4/5	✓	1	Literacy				✓	✓	✓		✓	5.0	60.07
			2	Math			✓	✓	✓	✓		✓	9.0	
Page	4/5	✓	1	Math					✓				1.0	65.55
			2	Journals	✓		✓		✓	✓	✓	✓	10.0	
Harris	6	✓	1	Literacy	✓	✓	✓	✓	✓	✓	✓	✓	15.0	66.11
			2	Math	✓	✓	✓		✓	✓		✓	11.0	
Cameron	K		1	Science		✓			✓		✓	✓	4.0	70.57
McCallister	1		1	Language	✓		✓	✓	✓	✓		✓	7.0	63.83
			2	Science	✓				✓				3.0	
Salo	1/2		1	Math					✓	✓			2.0	72.78
Layton	2		1	Literacy	✓		✓	✓	✓	✓		✓	12.0	54.82
Trottier	3		1	Literacy					✓	✓			3.0	75.65
			2	Math					✓				1.0	

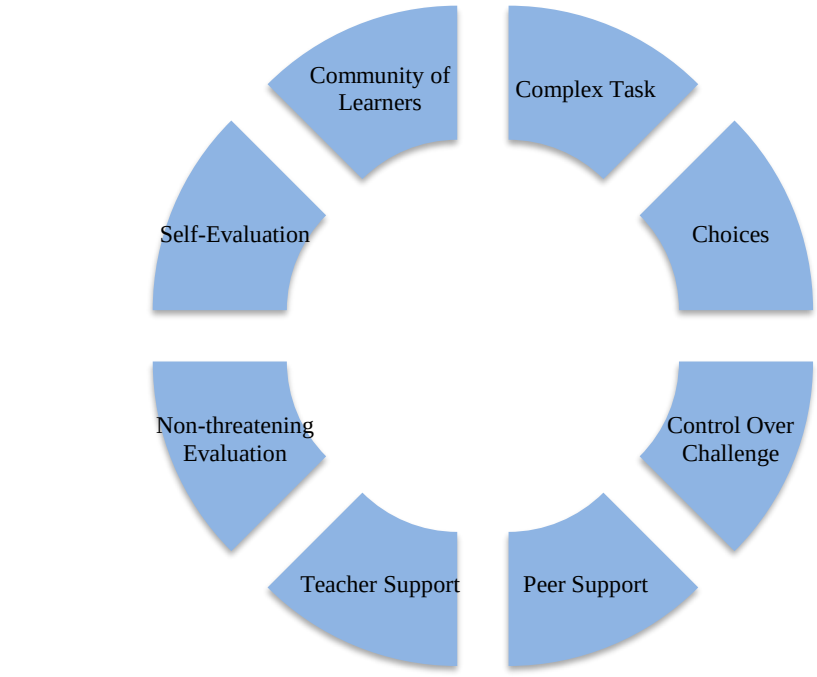
Note. Checkmarks within cells identify whether a feature was implemented in a way that was deemed instrumental to supporting SR. The shading represents a qualitative assessment of the extent to which the teacher used the features within her classroom (across lessons). Blue shading indicates the feature was consistently utilized within the classroom. Green shading indicates the feature was sometimes observed, and pink shading indicates the feature was rarely demonstrated within the classroom. Pseudonyms were used for all teachers.

3.7.2 Ms. Harris' Letter to the Principal Task

I visited Ms. Harris' grade five/six class for a half day in February 2016 and observed two activities. Both lessons provided opportunities for students' engagement in SR while learning. The following description elaborates how the "letter to the principal" task provided opportunities to support NH and HH students' SR using the eight features of classroom contexts (i.e., complex tasks, choices, control over challenge, self-evaluation peer support, teacher support, non-threatening evaluations and community of learners). These opportunities are summarized in Figure 2. Ms. Harris' class had a total of 26 students including two students with a known hearing loss. These two students sat towards the front of the classroom, and used hearing aids coupled with FM systems for hearing support.

During the week before my visit to the classroom, the students in Ms. Harris' class were learning how to create a convincing argument during a language arts class. The task on the day I visited was for the students to produce a paragraph summarizing what they had learned from the solar system unit, and then write a persuasive letter to the school principal describing why Chris Hadfield (who they had learned about in the solar system and space unit during science class the previous week) would be a suitable guest speaker. As students composed their letters, they were asked to follow the letter writing layout they learned prior to my observation to create a convincing argument for the principal (a persuasive business letter where students learned how to format the address, date, salutation, body and closing). Students were expected to work at their own pace and produce three pieces of work for marking: a writing outline for the letter, a rough draft of the letter, and a final copy which they would present to the principal. Ms. Harris expected

the task to (a) demonstrate students' prior knowledge and understanding of the solar system and space unit, (b) hone students' letter-writing skills, (c) work on creating a convincing argument, and d) focus on developing social competence skills through group work with peers.



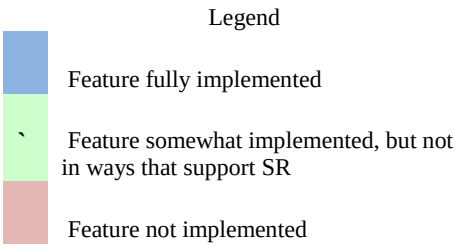


Figure 2. The features of instruction Ms. Harris implemented to support ER, SRL and SRSR during the "letter to the principal" task.

The letter to the principal task met the criteria for complex tasks. First, it was part of a larger unit of study on the solar system and space that the students had been working on for two weeks prior to the classroom observation. The task integrated subject learning across literacy and science, and drew from students' prior knowledge and understanding of the course material. For the task, students were expected to engage in several processes (reading, writing, collecting data and creating an outline) that would result in producing a number of artifacts as evidence of their learning.

During the letter to the principal task, Ms. Harris provided students with opportunities to make meaningful choices about their work and learning. They were given choices about whether to work independently or collaboratively on tasks, and they could decide where they wanted to work (in the hallway, resource room, library or classroom). Also, students were given the opportunity to decide how they wanted to use the hour of time they were given to do their work (e.g., depending on how far along they were on the task, students could work on their outline, rough draft or could begin editing). For this task, the majority of students decided to work in partners or in small groups of three or four, and the class spread out after being told they had an hour to work on the assignment. The female student with hearing loss (HL1) was asked by her peers to join a group of three other girls who relocated to the hallway, and the majority of groups relocated to the hallway floor as well. The male student with hearing loss (HL2) decided to work with his peer at the front of the class where their desks were located. HL2 stated to his partner that it was "less noisy in here, so I'll be able to hear you better". By providing students with meaningful choices such as where to work and who to work with, Ms. Harris' letter

writing task afforded students opportunities to control challenge, which supported both SRL and SRSR. HL2 was observed engaging in strategic action by choosing a quiet spot to work that was likely to increase his learning and academic success. Ms. Harris' task afforded opportunities for CHL's engagement in SRSR choosing partners, as students could consider their learning abilities and knowledge in comparison to peers, to determine if working collaboratively would help them succeed on the task.

A student raised her hand to ask Ms. Harris what the expectations were for the outline. Ms. Harris responded, "the choice is yours, you can create an outline however works best for you and your group." When the student looked confused, Ms. Harris prompted some ideas saying, "it may be helpful to create a word web to have a visualization of your ideas, or you could make a list of all of the points you want to touch on before you begin writing." The student then asked for a piece of chart paper and markers for her group to create a word web, and the majority of groups followed suit.

While students worked collaboratively on their outlines, Ms. Harris circulated to answer questions and listen to students' discussions. Ms. Harris used the time to evaluate students' progress and provide instrumental teacher support when necessary. As Ms. Harris circulated to monitor students she provided suggestions or prompted responses to support their engagement in the learning task. For example, she asked questions such as "how can this be improved to be more convincing?" and "do you think this is an appropriate word to use here? What is a synonym that might work better and provide a stronger argument?" These questions supported students' engagement in metacognition for SRL so they could reflect on the task and strategies for improving it.

Ms. Harris set out a snack for students to eat as they worked on the letter writing task. HL1 was observed getting a snack, but seemed to withdraw from her collaborative role in the group. Ms. Harris appeared to notice her disengagement so she prompted HL1's attention to the task, and asked her to join her peers on the task while she had her snack. As Ms. Harris continued to circulate around the class and answer other students' questions, she monitored HL1's task engagement and assessed her involvement in the group. Ms. Harris noticed that HL1 was not providing input for effective collaboration while others in her group were writing and sharing ideas. Ms. Harris approached HL1 and provided scaffolding and self-evaluation for ER and SRSR by asking HL1 to consider her actions in comparison to her peers, stating, "Have you noticed that [other group members] are doing most of the writing and creating the outline for your group? Is there a reason for this?" HL1 explained that she was feeling tired and frustrated, demonstrating self-evaluation for ER by identifying and expressing her emotions effectively.

HL1 explained that she wanted to be the group member that wrote the outline on the chart paper, and was upset that another student took on that role so she no longer wanted to collaborate on the task. Ms. Harris provided support to HL1 for managing ER and SRSR by offering problem solving strategies that supported adaptive and effective collaborative skills, and which provided strategies for managing negative affect (e.g. "what could you say to [group member] that would let her know how you are feeling?" and "what is a compromise you could work out so that you are both involved with the project and are both happy?") Ms. Harris provided HL1 with the opportunity to control challenge and problem solve, saying, "I think the two of you can sort this out without my help". Following this, HL1 and her peer agreed on a solution to the problem — they decided to

take turns writing on the chart paper and created the written outline together. HL1 demonstrated strategic action for ER and SRSR when she was observed working through a challenging social situation to provide instrumental support and accomplish a learning goal.

Ms. Harris also promoted control over challenge within her classroom as she encouraged students to seek out additional resources or help if necessary. In Ms. Harris' classroom students were observed engaging in metacognition, motivation, and strategic action for SRL. One student asked the teacher for a copy of the Ontario curriculum standards so she could include relevant references in her letter and identify how the learning goals for the science curriculum would be met by having Chris Hadfield as a guest speaker for the school. This student's engagement in motivation for SRL was evident as she asked for additional resources to deepen her understanding of the material and appeared to have a genuine interest in the task and engaged her work independently, without the assistance of an adult.

The "letter to the principal" task embedded opportunities for instrumental forms of peer support. During the lesson, Ms. Harris encouraged students to work in groups, share ideas, formulate an outline with a peer collaborators, and to consider whether they could ask for help from peers to address concerns before approaching the teacher. The teachers' use of peer support also supported the development of a community of learners within the classroom. HL2 and his partner demonstrated the importance of peer support and community of learners for encouraging SRSR within the classroom, as they worked collaboratively on the outline for their letter. HL2's partner was observed leading the discussion, prompting responses and asking HL2 for more input into the task. HL2 stated

that he “wasn’t very good at writing”, and his partner responded by suggesting “I will write the ideas down if you say them out loud, then after we can pick the best ones together!” The pair appeared to be metacognitively aware of each other’s learning strengths and weaknesses, and devised appropriate and effective strategies (e.g., dividing the roles and responsibilities for their work based on their strengths) for SRL and SRSR —those supported the accomplishment of personal and collaborative learning goals. By offering to write while the other student brainstormed, this pair accommodated and supported individual differences. The students themselves adjusted the workload so that the task was challenging, but was better framed to suit the learning needs of HL2.

The letter to the principal task supported students’ participation in a community of learners. While HL2 consistently contributed ideas to the task, he asked his partner for clarification on unfamiliar words in the science textbook, and asked if his thoughts “made sense” to his peer. His partner would clarify concepts from the textbook for him, and gave feedback on one suggestion that HL2 made by saying, “I like that idea, but I think our letter would flow better if we included that point at the end [not the beginning] because it doesn’t make sense to say that here”. After creating the outline for their letter, HL2 and his partner called Ms. Harris over to elicit feedback on their work. Ms. Harris provided instrumental teacher support to the pair and an opportunity for self-evaluation, asking, “how can this be improved to be more convincing?” and “what could you say in your concluding paragraph to tie everything together and drive home your point?” This allowed both students to engage in metacognitive thinking, and HL2 requested a thesaurus from Ms. Harris in order to expand his vocabulary and find “better words to make it [the letter] sound more convincing”, demonstrating his motivation and strategic

action for SRL by overcoming a learning challenge. Ms. Harris encouraged her students to overcome difficulties and regulate their learning through help-seeking and peer support, which in turn promoted SRL and SRSR within the classroom. She also created warm and responsive classroom environment that encouraged children to participate in a community of learners so they could share ideas and strategies, make allowances for individual differences and one that coupled individual responsibility for learning with group support.

At this point in time the noise levels within the classroom increased, and students seemed off task as recess was approaching. Ms. Harris addressed the class, asking them to consider how loud they were being (self-evaluation), and if the noise levels within the classroom were conducive to a good working environment. Following this announcement and reminder to stay on task (teacher support), students appeared to settle and get back on task.

Ms. Harris ended the lesson by asking all students to return to their seats so they could have an opportunity to report (to the class) what each group had accomplished on their letter to the principal task. Ms. Harris supported students' metacognition for SRL by asking students to share the progress they had made on their outlines with the class, and suggested they set realistic goals in their literacy to gauge their progress so they could remain "on task" with their learning goals for the letter to the principal task for the remainder of the week.

Ms. Harris created an inclusive learning environment for HL1 and HL2 by providing warm, responsive, and instrumental learning support to the two students with hearing

loss. She monitored these students' task understanding and task engagement throughout the "letter to the principal task". Ms. Harris provided additional prompts and reminders to HL1 to stay attentive during the lesson, and supported her engagement in ER and SRSR by providing effective and adaptive suggestions for dealing with a conflict with a peer. Ms. Harris also spent a considerable amount of time with HL2 and his partner, providing opportunities for self-evaluation and engaging in metacognitive thinking and reasoning for SRL. By allowing students to make meaningful choices (such as where they would like to work), HL2 was able to take control of his learning environment and work in a quieter area, free from distraction, which was likely to lead to learning and academic success.

In conclusion, Ms. Harris' letter to the principal task reflected her employment of all eight features of classroom contexts to promote ER, SRL and SRSR within the classroom for NH and HH students. Children were provided with opportunities to make meaningful choices (who to work with, how they wanted to create the outline) and control challenge during a complex learning task that spanned multiple class periods, incorporated a variety of subject material and resulted in the production of a number of products as evidence learning. Ms. Harris provided opportunities for students' engagement in self-evaluation and non-threatening evaluations on the task, and she provided instrumental forms of teacher and peer support so students could work as a community of learners within the classroom contexts. This in turn promoted *all* learners' engagement in ER, SRL and SRSR in the classroom and on this particular task.

3.7.3 Ms. Moroney's Literacy Task

I visited Ms. Moroney's grade three/four classroom for a half day of observations in February 2016, and observed a total of two lessons. The literacy lesson was chosen to contrast the way that the eight features of instruction were implemented in to Ms. Harris' "letter to the principal' task. This task was deemed an appropriate comparison as both activities aimed to develop children's language and literacy skills. Table 3.9 summarizes the implementation of the eight features of instruction for supporting SR during Ms. Moroney's literacy lesson.

As identified in Figure 3, only one feature of classroom instruction (teacher support) was considered instrumental for supporting SR, while the other seven features (complex tasks, choices, control over challenge, self-evaluation, peer support, non-threatening evaluations and community of learners) were not present in Ms. Moroney's literacy lesson. The absence of these features limited students' opportunities for and engagement in SR (ER, SRL and SRSR). Ms. Moroney's class was comprised of 21 students, including one female student with an identified hearing loss (HL3) who used a hearing aid coupled to an FM system within the classroom for hearing support. It should be noted that this classroom also included seven students with a special education designation. The class was set up in small pods (desks of 4 students) positioned closer to the front of the classroom, with the exception of four students whose desks were spread out individually at the back of the classroom. Ms. Moroney explained that the children sitting independently were students who had trouble focusing attention and usually distracted others from working when placed in a group setting. HL3's desk was located in a group of three at the front of the class.

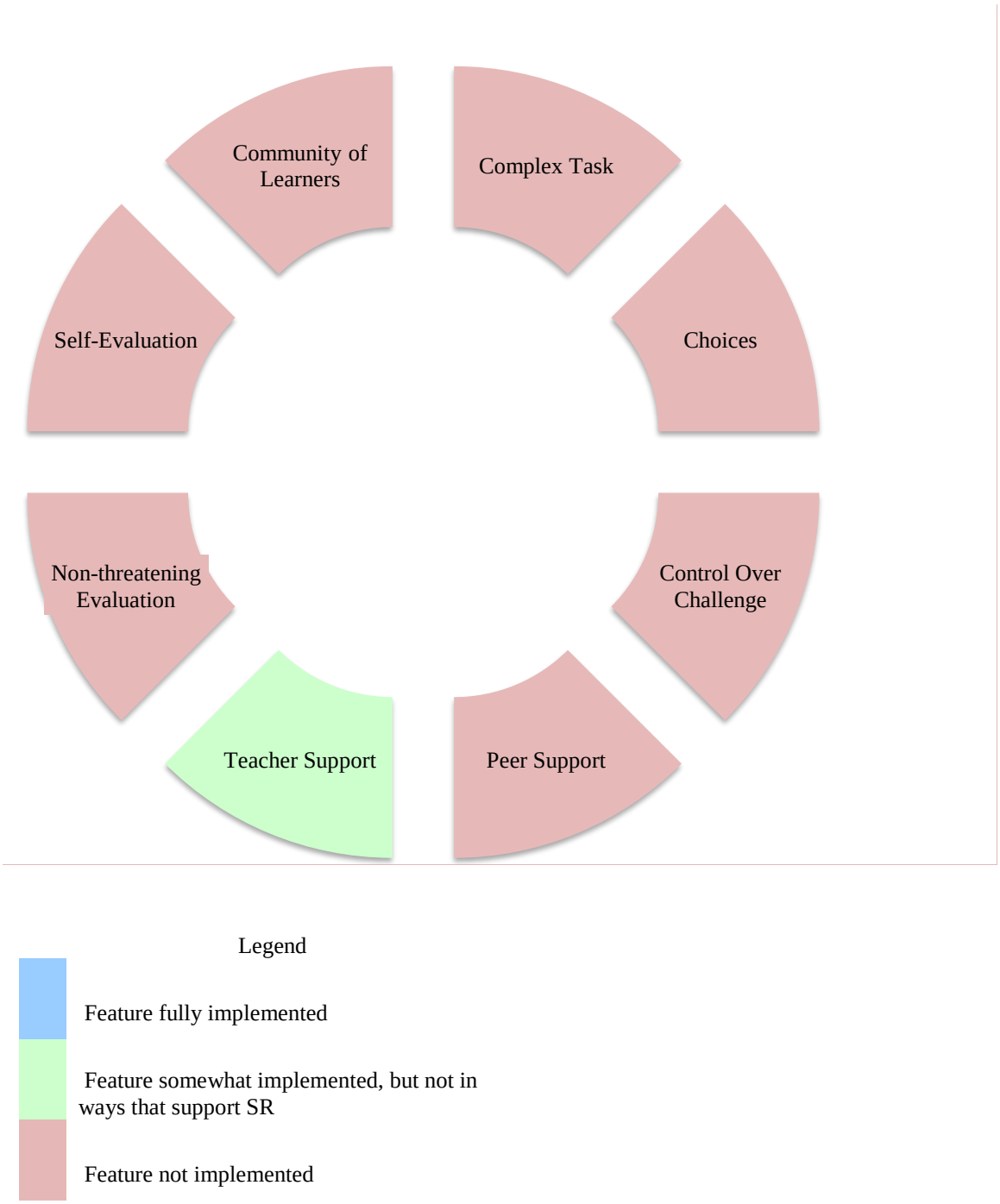


Figure 3. The features of instruction Ms. Moroney implemented to support ER, SRL and SRSR during the literacy activity.

Ms. Moroney began the lesson by pulling up a literacy worksheet on the smart board at the front of the classroom. The worksheet involved a letter with multiple spelling and grammatical errors. She explained to students that the goal of the literacy lesson was for students to identify and fix all of the mistakes present in the letter. Ms. Moroney and the class were to work through the first portion of the worksheet together and then students would be responsible for completing the rest of it independently. She explained that the class would have 30 minutes to finish the task, before they reviewed the answers as a group.

Ms. Moroney asked students to put up their hands when they noticed a mistake in the first three sentences of the letter. Students took turns pointing out grammatical errors and spelling mistakes that they observed, and Ms. Moroney would ask how they should be fixed. One student at the back of the class was observed loudly and repeatedly rocking his chair, while another continually tossed his water bottle in the air until Ms. Moroney asked the students to pay attention to the task.

HL3 sat quietly at her desk, and was not prompted to contribute, despite appearing disengaged from the conversation. After identifying multiple errors together as a class, Ms. Moroney passed out a copy of the worksheet to each student to work on independently. As the student continued to rock his chair, another stood up and began walking around the room, asking how much class time was left before recess. A third student left his desk to approach groups and startle them by yelling loudly near their ears.

Ms. Moroney's literacy activity did not meet the criteria for a complex task as it did not integrate subject material or result in a number of products. Students were not required to

integrate information or skills from across subject areas, the task did not fit within a larger unit of study, and did not allow students to meet multiple goals.

During the task, there was very little evidence that students were given the opportunity to make meaningful choices for their learning. When Ms. Moroney asked students to work independently, some students began to work with partners to try to complete the task. Observing this, Ms. Moroney stated that students could "work quietly together in partners, as long as the noise level stays down", but the lesson was not designed to provide students with a choice of whether to work independently or in a group. Although sitting in a small group (desks in sets of four), HL3 did not attempt to work with other students or share ideas, and carried out her work independently. Students were not provided with meaningful choices (e.g., what to work on, who to work with, how to accomplish the task), and Ms. Moroney did not create the lesson to allow students to control challenge (i.e. students were not supported to overcome a potentially difficult learning situation by problem solving).

As students worked individually and in groups on the handout, Ms. Moroney was preparing the next lesson, at her desk. She would occasionally prompt students to indicate how much time was left to complete the assignment. As students worked on the assignments, disputes began to arise between partners. One student and her group member began to argue over the correct answer, and were observed saying "I've had enough of you…I'm working alone now!" Another student was seen crumpling his paper when he got frustrated, and threw it at the student across from him. While the students in the class were originally able to recruit peers to work together on the task, indicating they understood some aspects of SRSR, they may have benefited from more instrumental

aspects of teacher support to sustain their engagement in it, and to regulate affect. Ms. Moroney's promoting of peer support during this lesson was limited.

At this time, one student was walking around the class pretending to shoot guns, while another turned his chair to face a wall because he was "sick and tired of doing this boring work". Ms. Moroney approached the student who was facing the wall, and sat beside him, saying "You aren't doing what I'm asking, and you aren't listening. I'm doing this to help you. Sit quietly and pay attention". She began to work one-on-one with him to review his answers and work through the handout, until he abruptly stood up and left the classroom. Following this, Ms. Moroney, who appeared frustrated, asked students to return to their seats in order to move on to the next lesson, and decided they would review their answers on a different day. Ms. Moroney was not observed providing instrumental support to the student with hearing loss, who had completed half of her worksheet and was doodling on a separate sheet of paper at the end of the lesson.

While Ms. Moroney attempted to provide teacher support to her students, it did not appear to be instrumental to students' SR while learning. No opportunities for self-evaluation or non-threatening evaluations were presented during the literacy task. Although Ms. Moroney had originally anticipated taking up the answers to the worksheet as a class, this portion of the activity was omitted. Sharing answers as a class may have provided the opportunity for students to engage in metacognition for SRL so they could reflect on their work and discuss what they had learned. A class discussion of answers may have also supported students' participation in a community of learners. However, Ms. Moroney's literacy task was not created to provide support tailored to individual learning needs or support relationships within the classroom during collaboration. While

students did share ideas and knowledge to work together on the task, this appeared to happen organically and was not instrumentally supported by Ms. Moroney during the lesson.

3.7.4 Summary

In sum, Ms. Harris' and Ms. Moroney's literacy lessons differed in the presence and implementation of the eight features of instruction for supporting ER, SRL and SRSR. Ms. Harris' "letter to the principal" task engaged students in all eight features (complex task, choices, control over challenge, non-threatening evaluation, teacher support, peer support, self-evaluation and community of learners), and children in Ms. Harris' class were seen utilizing these opportunities to engage in ER, SRL and SRSR. Ms. Moroney's literacy task did not utilize seven of the features (complex tasks, choices, control over challenge, peer support, non-threatening evaluations or creating a community of learners) in an instrumental manner to support ER, SRL and SRSR within the classroom. While Ms. Moroney did provide teacher support to some students, it was not instrumentally supportive of children's engagement in ER, SRL and SRSR. In Ms. Moroney's classroom, children's opportunities for ER, SRL and SRSR were limited. It should be noted that Ms. Moroney faced a more diverse classroom with potential teaching challenges than Ms. Harris. Ms. Moroney taught seven children with a special education designation, two children with visible minority status, one HH student and had a low rated SES classroom. In comparison, Ms. Harris taught three students with a special education designation, two HH students, no minority students and had a middle SES designation. Lastly, Ms. Harris' average classroom background noise levels (66.11 dBA) was lower than Ms. Moroney's classroom (69.98 dBA).

Chapter 4

4 Discussion

4.1 Overview of Findings

This Master's thesis was conducted as a pilot project to (a) extend the research on SR and the features of classroom instruction for supporting it, (b) examine if/how hearing loss may relate to these areas of study, (c) ascertain whether and how classroom background noise levels relate to teachers' perceptions of inclusion of HH students and opportunities for SR in classrooms, (d) determine the methodology and feasibility of conducting a larger scale, longitudinal research study on the topic and (e) make recommendations for future research projects exploring hearing loss and SR.

This study employed a mixed method, multi-level research design and addressed five research questions:

1) What are the relationships among the demographic variables (sex, hearing status, age), SR, and academic achievement?

2) What are the relationships between HH students' SR and academic achievement?

3) Do teachers' ratings of HH students' SR differ from their ratings of NH students' SR?

4) What are the relationships between the classroom auditory environment, teachers' implementation of SR promoting tasks and practices and teachers' perceptions of inclusion?

5) How do classroom teachers implement SR promoting tasks and practices to support HH and NH students' SR?

Chapter 4 presents a discussion of the results found in the study. It is divided by addressing the findings of each of the five research questions posed at the onset of the study, followed by a discussion of the limitations and implications that should be considered by educators and policy makers. The study concludes with recommendations for the next phase of this research project.

4.1.1 What Are The Relationships Among Demographic Variables (Sex, Hearing Status, Age), SR and Academic Achievement?

Findings from this study indicated that teachers' ratings of overall SR and their ER, SRL and SRSR were statistically significantly and positively related to students' academic achievement. In addition, results suggested that teachers' ratings of students' overall SR predicted their academic achievement scores. Together, these results support previous findings in the educational and developmental psychology literatures indicating that SR is a strong and positive predictor of academic achievement in elementary age children (Blair & Razza, 2007; Diamond et al., 2007; Hutchinson, 2013). To elaborate, children who were given higher scores for behavioral and emotional control, independent learning and strategy use, as well as prosocial behaviors within the classroom were likely to receive higher levels of academic achievement. Findings from this study confirm that students' engagement in ER, SRL and SRSR at school is linked to their academic success.

Results of this study confirmed that sex was a positive predictor of SR behaviors for all students. In this study, teachers provided girls with statistically significantly higher ratings of SR than boys, indicating that teachers perceive girls to engage in more frequent behaviors associated with ER, SRL and SRSR. This finding confirms previous research indicating that sex is a positive predictor of SR, and that girls tend to receive higher ratings of SR scores than boys (Hutchinson, 2013; Matthews et al., 2009; Weis et al., 2013). Results from this study also indicated that HH girls received higher SR ratings than HH boys, which is in line with research on NH children (Hutchinson, 2013; Matthews et al., 2009; Weis et al., 2013). These results raises questions regarding why these differences were observed and highlights the need for future exploration on sex differences in young children's SR behaviors. Perhaps young boys have a biological predisposition for lower SR abilities, or slower SR development than girls. For example, research involving neuroimaging has indicated that there are significant sex differences between areas of the brain involved in self-regulation, such as the frontal lobe. Studies have indicated that regions of the frontal lobe mature at a slower rate for boys (Raznahan et al., 2011), and that girl's frontal lobes reach full growth one to two years earlier than boys (Giedd et al., 2009; Lenroot & Giedd, 2010). However, it is also plausible that the current education system is set up to favor the development of SR behaviors for girls, and that the unique learning needs of young boys may not be met in ways that allow for optimal engagement in SR (Hutchinson, 2013). Future research should continue to explore why these differences exist, and should continue with research that investigates how modifying academic tasks and classroom activities to suit boys' strengths could help the development of their SR skills.

Results of this study indicated that age was a statistically significant, positive predictor of SR. This corroborates previous research indicating that SR improves as students age (Kochanska, Coy, & Murray, 2016; Zimmerman & Martinez-Pons, 1990). Lastly, hearing status demonstrated a significant, positive relationship with overall SR, ER, SRL, SRSR and academic achievement scores, which is consistent with previous studies (Borgna et al., 2011; Dammeyer, 2009; Keilmann et al., 2007; Metz & Polsky, 2009; Rieffe & Terwogt, 2006; Rieffe, 2012; Wauters & Knoors, 2008; Wiefferink et al., 2013). Research hypothesizes that predictors of poorer SR abilities for children with hearing loss are typically related to delays in the development of language and communication ability that HH children may experience (Bodrova & Leong, 2008; John-Steiner & Mahn, 1996; Marschark, 1997; Moog & Geers, 1985; Zimmerman, 1995). Future research could examine ratings of ER, SRL and SRSR in correlation to measures of language development and communication abilities to further solidify this theory.

4.1.2 What Are The Relationships Between HH Students' SR and Academic Achievement?

Results from this study indicated that teachers' reports of children's overall SR, ER and SRL were statistically significant and positively related to HH student's academic achievement. Furthermore, results demonstrated that teachers' ratings of HH student's overall SR scores are a positive predictor of academic achievement. To elaborate, HH children with higher teacher rated scores of behavioral and emotional control, socially responsible behaviors and independent and effective learning strategies were more likely to receive higher scores of academic achievement. Although differences exist between NH and HH children's SR abilities (see research question 3), findings from this study are

consistent with previous studies in that HH children follow trends similar to NH peers, in that their overall SR behaviors are positively correlated with higher levels of academic achievement (Blair & Razza, 2007; Coll et al., 2009; Diamond et al., 2007; Graziano, et al., 2007; Hutchinson, 2013; Valiente et al., 2012). No statistically significant correlation was found between HH students' SRSR abilities and academic achievement, however, this could be limited by the small sample size of the study. This differs from results found by Wentzel (1993) and Caprara et al. (2007), who studied SRSR with NH students and found that it was positively related to grade point average and predicted future academic achievement.

4.1.3 Do Teachers' Ratings of HH Students' SR Differ From Their Ratings of NH Students' Self-Regulation?

Results of this study indicated differences between HH students' SR compared to their NH peers. That is, HH students in this study received lower teacher rated scores of overall SR, ER, SRL and SRSR compared to their NH peers. This finding was established across all grade levels and within all participating classrooms.

These findings provide support for laboratory based studies and experimental research, which indicate that D/HH students typically experience a diminished ER, SRL and SRSR abilities (Antia, Jones, & Luckner, 2011; Borgna et al., 2011; Hofmann et al., 2012; Kelly et al., 2001; Marschark et al., 2004; Netten et al., 2015; Rieffe, Terwogt, & Smit, 2003; Rieffe & Terwogt, 2006; Rieffe, 2012; Sinkavich, 1995; Wauters & Knoors, 2008). Rieffe (2012) found that overall, D/HH students used less effective ER strategies than NH peers. In addition, D/HH reportedly use less avoidant tactics to regulate negative emotions in a given situation and express their emotions towards an aggressor more

roughly (Rieffe & Meerum Terwogt, 2006). They also experience less friendships, higher rates of peer rejection, less social play and social interactions resulting in more loneliness in comparison to NH peers (Antia et al., 2011; Antia et al., 1993; Foster, 1987; Green, 1990; Hulsing, et al., 1995; Kluwin et al., 2002; Lane, 1995; Marschark, 1997). An important contribution of the current study was that results were derived from naturalistic observations conducted by observing the everyday classroom activities and tasks that student's participate in. This study contributes to the literature by utilizing teacher ratings and naturalistic observations, to extend findings from laboratory based and experimental research into classroom contexts. This study confirms previous findings that hearing status impacts SR development, and that HH students may struggle in their development of and engagement in SR. The lower scores of SR that HH students received in this study have overall negative implications for both social and academic success, such as lower levels of academic achievement, lower levels of motivation for learning, more conflict laden relationships with peers and teachers, and less stable friendships (Eisenberg et al., 1995; Järvelä & Järvenoja, 2011; Ley et al., 2004; Thomas & Gadbois, 2007).

4.1.4 What Are The Relationships Between The Classroom Auditory Environment, Teachers' Implementation of SR Promoting Tasks and Practices, and Teachers' Perceptions of Inclusion?

Results from this study demonstrated classroom background noise levels are statistically and negatively correlated with overall use of the features of the classroom contexts that support SR; the community of learners, self-evaluation and control over challenge features; and teacher knowledge of hearing loss domains. Findings also suggest that teachers' perceptions of inclusion of children with hearing loss are not statistically

significantly related to the use of the eight features of classroom instruction for supporting SR, with the exception of two domains: teacher knowledge of hearing loss and non-threatening evaluations, and teacher knowledge of hearing loss and teacher support.

The background noise levels found within elementary classrooms of the present study are consistent with ranges found in previous literature on the topic. Mean background noise levels in this study ranged from 54.82 to 75.65 dBA, which are similar to other studies that have found background noise levels in student occupied classrooms ranging from 42 to 81.3 dBA (Hay, 1995; Murray Hodgson et al., 1999; Moodley, 1989; Picard & Bradley, 2001). This research reiterates the notion that most classroom background noise levels far exceed the standards (maximum of 50 dBA in an occupied classroom) for creating an optimal listening environment – supportive of students' learning (American National Standards Institute, 2002). In addition, this study contributes to the literature because it links classroom background noise levels with classroom observations that study SR and the features of classroom contexts that support students' engagement in it.

Results of this exploratory study demonstrated that classroom background noise levels were negatively associated with teachers' implementation of the eight features of classroom contexts. In other words, louder classrooms implement fewer of the tasks and practices that provide students with opportunities to engage in SR. In particular this study found that background noise was negatively correlated with the use of control over challenge, self-evaluation and community of learners features in classrooms. As previously discussed, creating a community of learners occurs when a culture of shared respect for learning and thinking through active participation of all students is upheld (Brown & Campione, 1994; Collins, Brown, & Newman, 1989; Perry, 1998). This

involves a class working together to create a supportive culture with a shared set of expectations, values and norms (Brown & Campione, 1994; Collins, Brown, & Newman, 1989; McCaslin & Burross, 2011; Perry, 1998). A classroom that supports a community of learners is likely to demonstrate mutual respect for peers where for example, students are aware of appropriate classroom behavior (e.g. keeping noise levels to a suitable level). In addition, communities of learners couple individual responsibility for learning with group support, therefore students may be cognizant of the influence of their noise levels on others' ability to focus and stay on task in order to accomplish learning goals. The control over challenge feature was related to noise levels within the classroom as children are given the opportunity to govern their learning environment and experiences. Students are aware that a quieter classroom leads to a more productive work atmosphere, and that they have the ability modify a challenging learning situation to suit their individual needs by quietly focusing on the task at hand, or by asking peers to keep noise levels to a respectable level. Classrooms that are designed to promote SR may experience lower levels of background noise in order to facilitate the coordination of executive functions (working memory, inhibition control and cognitive flexibility), plus the application of higher order processes used for SR (motivation, metacognition and strategic action) while decreasing distraction from academic tasks.

Results of this study also demonstrate that teachers' knowledge of hearing loss and classroom background noise levels are negatively correlated, indicating that better understanding of hearing loss was correlated with lower levels of classroom background noise; lower self-rated scores of knowledge and understanding of hearing loss was related to higher classroom background noise levels. These findings are important because they

reiterate the idea that teachers in general education settings may not have adequate training and understanding of hearing loss to create an inclusive classroom and optimal noise environment for HH students. Teachers may not be fully aware of the extent to which classroom noise levels can create learning challenges and impede academic success for HH students. This supports research by Ericks-Brophy and Whittingham (2013) who found that D/HH general education teachers felt they were insufficiently trained to successfully teach these students, and that their teacher education programs did not adequately prepare them to develop strategies for effective learning for D/HH children. This is of importance, as results from Avramidis and Norwhich (2015) indicate that teachers' resistance to inclusion of children with disabilities may stem from inadequate training. This research therefore highlights the need for further training on hearing loss in teacher education programs, in order to advance teachers' knowledge and understanding of effective strategies needed to create an inclusive classroom setting for HH students. By providing professional development programs and additional training to teachers, these students (and all students) can be supported to further develop their engagement in SR while learning.

Two statistically significant correlations emerged from the domains of the perceptions of inclusion questionnaire, and the eight features of classroom contexts. Teacher knowledge of hearing loss was positively related to the use of teacher support and non-threatening evaluations during lessons, yet no other significant relationships existed between domains of inclusion and contexts to support SR within the classroom. One limitation of this exploratory study may have been the use of the perceptions of inclusion questionnaire. Ericks-Brophy and Whittingham (2013), suggested the use of a revised questionnaire

with higher internal consistency for domains. Findings from the current study agree and indicate that this questionnaire may need to be further adapted, as it required the deletion of multiple items to reach an appropriate alpha level, and domains were not related to the eight features of classroom contexts for supporting SR as anticipated. However, the questionnaire did provide valuable insight into teacher's attitudes, knowledge and skillset for working with HH children. Future research could develop and validate a new teacher report measure ensuring that it included items that examine supportive opportunities for SR within the classroom. In addition, educational psychology and hearing sciences fields may benefit from collecting classroom observations on the frequency and types of inclusive practices HH teachers in general education settings use. By incorporating an inclusion observation measure within the Classroom Observation Checklist (see Appendix D), valuable information could be collected on the actual implementation of the practices, skills and adaptations HH teachers employ to promote inclusion on an everyday basis, rather than relying solely on self-report.

Results of this research imply classroom background noise levels and knowledge and understanding of hearing loss are related. Teachers may not be aware of the impact that classroom background noise levels have on both NH and HH children's learning and SR abilities. Therefore future education and training is needed for teachers as children who are d/HH will be present within their classroom environments and it is imperative that these professionals have a well-rounded understanding of the specific educational challenges these students may face. Teachers should be cognizant of the background noise levels within their classroom, and should work to create more optimal acoustic learning environments for all students.

4.1.5 How Do Classroom Teachers Implement SR Promoting Tasks and Practices To Support HH and NH Students' SR?

Qualitative data derived from classroom observations were employed to describe the extent to which the eight features of classroom contexts for supporting SR were implemented in two elementary classrooms that included both NH and HH students. Ms. Harris' letter to the principal task and Ms. Moroney's literacy task were described to understand a "day in the life" for students and to contrast whether and how the eight features of instruction were implemented by classroom teachers. Ms. Harris' and Ms. Moroney's lessons were chosen to depict how the presence or absence of the eight features of classroom contexts could support (or impede) opportunities for students' engagement in SR.

In Ms. Harris' class, children were provided with opportunities to engage in SR when she implemented all eight of the features of contexts (choices, complex tasks, control over challenge, teacher support, self-evaluation, peer support, non-threatening evaluation and community of learners) during her letter to the principal task. Ms. Harris created a classroom contexts where students had rich opportunities to develop and engage in ER, SRL and SRSR while learning. In comparison, Ms. Moroney utilized only one feature during her literacy task, and as a result provided her students with fewer opportunities to develop and engage in SR while learning.

Results of the qualitative analysis indicated that teachers vary in their implementation of the features of classroom contexts. Results of the current study are in line with previous research, which indicate that the use of the eight features of classroom contexts can be used to create opportunities for learners' engagement in SR by requiring children to

employ metacognition, motivation and strategic action (Hutchinson, 2013; Perry, 1998; Perry,Turner & Meyer, 2006). It should be noted that varied implementation of the features of classroom context could be related to the presence of children with complex needs within the classroom setting.

4.2 Limitations

Findings reported in this study should be interpreted with the following limitations in mind. A first potential limitation of this study is the selection method used. Teachers agreeing to participate in the study may have had a greater interest in SR. The classrooms used for this study were also predominantly Caucasian and low to middle SES classes, therefore the sample may not be demographically representative of other regions in Ontario. Another limitation of this study is the small sample size that was used. Access to a large HH student population was limited within the school board, and only a small portion of HH teachers contacted were willing to participate. This could be attributed to the time intensive nature of the study. Multiple teachers reported they did not have the time to commit to completing an SRISI for each student, alongside the inclusion questionnaire and allowing researchers to attend a day for classroom observations. In addition, variables such as the type of hearing loss (e.g., mild, moderate, profound) and age of onset were not taken into consideration due to small participant pool, yet these factors may influence SR abilities and overall academic achievement. Some of the students included in the sample reportedly had a learning disability in addition to hearing loss. Another limitation of this study was that the assumptions of normality tested for the classroom level data were not met. Visual inspections of scatterplots indicated that heteroscedacity was present, and that the data did not fit a normal distribution. However,

this may have been due to the small sample size. In addition, skewedness of data could be attributed to the fact that some of the participating teachers in this study were working towards SR as a goal during the school year. Therefore, some teachers may have been more apt to use the features of instruction within their classrooms. Lastly, a limitation of the qualitative classroom observations was that the data was only collected over the period of one day for each class. The results obtained from data collection may not be representative of teaching strategies commonly used over the entire year.

4.3 Implications For Educators and Policy Makers

The findings present opportunities for educators and policy makers to address the importance of self-regulatory practices in the learning environment from a young age, and should make the implementation of the features of classroom contexts to support SR a priority. Results of this study highlight that teachers can create meaningful learning experiences for diverse learners (such as HH students) by utilizing the eight features of classroom instruction. The creation of everyday lessons can determine whether students have meaningful opportunities to develop and enact strategies to regulate their learning, emotions and social behaviors, which have impacts on long term social and academic success. This research stresses the notion that teachers must be supported to create and implement effective lessons that are increasingly complex by design, and in addition they incorporate meaningful choices, involve non-threatening evaluations, and include instrumental forms of support. Teachers should receive continued education and professional development to understand the importance of (a) developing adaptive and effective SR for success in school (b) creating classroom lessons that incorporate the

eight features to support SR in meaningful ways (c) using the eight features of classroom contexts to meet the individual needs of diverse learners, such as HH students.

Because this research indicates that hearing status plays a significant role in the engagement in SR behaviors, educators and policy makers should address these concerns within both the classroom and teacher education programs, respectively. If HH students' have lower teacher ratings of SR than NH peers (see research question 3), than every effort should be made to raise awareness about the role of hearing in SR development, and to create a supportive learning environment that addresses these concerns and allows for opportunities to engage in SR. Teachers can support HH students by utilizing the eight features of classroom contexts that encourage SR, in order to meet the individual academic and social needs of these children. Moreover, teachers can concentrate efforts on providing additional scaffolding through CR and instrumental teacher support to assist HH students develop more independent learning strategies and problem solving techniques over time. Finally, these results highlight the need for adding further training for general education teachers on the specific learning needs of Deaf and d/HH students. Additional education should be provided to teachers (during teacher's education programs and through professional development courses) to further understand the impact of classroom background noise levels on SR behaviors of d/HH students.

4.4 Directions For Future Research

This Master's thesis was created as an exploratory pilot study to determine the necessity for, and feasibility of conducting a longitudinal, large-scale study on the topic of hearing loss and SR. Five recommendations can be made in relation to future directions of the longitudinal study. First, the results of this preliminary study indicate that HH children

may differ in their SR abilities in comparison to NH peers, yet a limitation of this study was the small HH participant size. Thus, it is recommended that the study be implemented on a larger scale across Ontario to corroborate these findings with an increased sample size. A significant challenge faced during this study was participant recruitment. Multiple teachers reported that they did not have the time to complete an SRISI for each student in their class, and felt that involvement in the study required too much effort during a busy school year. Future research could increase sample size by receiving ethics approval for multiple school boards across Ontario. In addition, future research could involve teachers completing one SRISI measure solely for their HH student, and these data could be compared to SRISI normative data. Results of this study included HH children who were identified by parents and teachers as having a learning disability. Children with hearing loss often have other complex factors to consider (e.g. learning disabilities, physical disabilities, developmental delays), so it is important to continue to question parents and teachers about these factors, in order to consider them within future data analysis. Future research might aim to exclude additional disabilities from the data analysis, or group participants into categories that take these variables into consideration (e.g. NH students, students with HL only, students with HL and learning disabilities, etc.). Second, adding in relevant questions related to language and communication abilities, degree/type of hearing loss, age of onset, type of hearing technology used and/or obtaining audiograms could be beneficial to further explore the role that hearing status and language play in the development of SR for HH children. Third, future research should aim to find or develop/validate an alternative method of studying general education teachers' perceptions of inclusion of children with hearing

loss in their classroom. An ideal way of measuring inclusion would be through the creation of a classroom observation measure or checklist for inclusion, which could be used in conjunction with the Classroom Observation Instrument. By measuring inclusion through quantifiable observations, researchers could avoid issues of self-report bias and have a more thorough understanding of the practices teachers use within the classroom to support inclusion on an everyday basis. Fourth, research should continue to expand on the results of this study, which found a correlation between classroom background noise levels and the implementation of the eight features for supporting SR. Future data collection including classroom background noise levels and types of noise could help to further understand the relationship between the creation of inclusive learning environments and the utilization of SR practices for classrooms of HH students. Lastly, because the current study indicates that age is a predictor or SR, and additional research demonstrates that SR develops with age (Hutchinson, 2013; Zimmerman & Martinez-Pons, 1990), it would be of interest for researchers to conduct a longitudinal study that studies the development of SR abilities for CHL in comparison to NH peers over time.

4.5 Conclusion

Effective self-regulation is associated with a wide range of positive social and educational outcomes. Results of this pilot study are important because they indicate that children with hearing loss are rated by their teacher's as having lower ER, SRL, SRSR and academic achievement than their NH peers. Teacher rating of SR was a positive predictor of the academic achievement of both CHL and NH students. Further investigation of these findings through a large-scale study is warranted. These investigations could benefit from further exploration of teachers' perceptions of inclusion

of students with hearing loss and direct measures of the communication and language abilities of HH students. They also should consider better definition of degree of hearing loss (mild to profound) of the HH students included in the study. If a larger scale study found similar results it would be important to determine interventions that would improve SR of children with hearing loss because it has life-long social and academic implications.

Teachers working in noiser classrooms used fewer overall features of classroom contexts known to provide opportunities and support for SR. Higher levels of knowledge of hearing were related to teacher's use of strategies within the classroom context for non-threatening evaluations and higher levels of observed teacher support. These results could be strengthend by a larger scale study that could then be used as evidence for changes to the classroom context to reduce noise so teachers can use SR strategies for learning that are known to be effective.

By continuing to explore the relationship between hearing loss and SR, researchers can better understand and identify the specific academic and social learning needs of HH children. Findings of this study highlight the need for the provision of quality training for teachers through teacher education programs and professional development seminars that emphasize (a) the effects of hearing loss on learning and SR, (b) effective strategies for creating an inclusive classroom environment for HH students, (c) the influence of classroom background noise levels on both NH and HH students' success, and (d) the benefits of teaching towards SR within classrooms.

If the goal of Ontario's Ministry of Education is to create a generation of learners that are "personally successful, economically productive and actively engaged citizens" (Ontario Ministry of Education, 2014, p. 1), then educators must have opportunities to learn how they can optimize classrooms to support their students' development of strong SR skills. Within the classroom, lessons and activities should be created to promote academic and social success for *all* students, including students with hearing loss. By supporting ER, SRL and SRSR within inclusive classrooms from a young age, we can assist HH children with the development of valuable 21st Century skills that emphasize the importance of SR for success in life.

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APPENDIX A

Classroom Demographic Form © 2012 Lynda Hutchinson

Classroom SES Rating (choose one):

Low Low-Middle Middle Middle-High High

Number of children in the class:

Number of Boys In Class: **Number of Girls In Class:**

Number of children from visible minority backgrounds (children who are not Caucasian):

Number of children who speak English as a second language:

Number of children with a special education designation:

Number of children with known/diagnosed hearing loss:

APPENDIX B

Perceptions of Inclusion Questionnaire © 2013 Alice Eriks-Brophy

	Item	Rating					
1.	The topics of hearing impairment and its effects on speech, language, and academic development were sufficiently addressed in the curriculum of my teacher education program.	1 Agree Strongly	2	3	4	5	6 Disagree Strongly
2.	Schools should accept and include the students with a hearing impairment who live within the school boundaries.	1	2	3	4	5	6
3.	I am familiar with hearing aids, FM systems, and other assistive listening devices for students with a hearing impairment.	1	2	3	4	5	6
4.	Students with a hearing impairment who are included in regular classroom settings are accepted by their peers.	1	2	3	4	5	6
5.	The amount of time the itinerant teacher of the hearing impaired spends with the student is sufficient to allow the student to keep up with the material presented in class.	1	2	3	4	5	6
6.	Including students with a hearing impairment in regular classroom settings reduces the instructional time available to students with normal hearing.	1	2	3	4	5	6
7.	Students with a hearing impairment who are included in the regular classroom require more supervision than students with no special needs.	1	2	3	4	5	6
8.	The itinerant teacher of the hearing impaired recognizes the contribution of the regular classroom teacher to the progress of the student with a hearing	1	2	3	4	5	6

	Item	Rating					
	impairment.						
9.	Involving parents in the education of the student with a hearing impairment should be the responsibility of the itinerant teacher of the hearing impaired.	1	2	3	4	5	6
10.	Parents of children with a hearing impairment have realistic expectations regarding the amount of individual attention the classroom teacher can devote to their child.	1	2	3	4	5	6
11.	Itinerant teachers of the hearing impaired should work within the classroom and act primarily as consultants to the regular classroom teacher.	1	2	3	4	5	6
12.	Parents of children with a hearing impairment must be assertive regarding their child`s needs in order for these needs to be met in the school.	1	2	3	4	5	6
13.	The itinerant teacher of the hearing impaired provides me with sufficient assistance in dealing with the technology of hearing aids, FM systems, and other assistive listening devices.	1	2	3	4	5	6
14.	Including students with a hearing impairment in the regular classroom increases the need for behavior management in the classroom.	1	2	3	4	5	6
15.	I am confident of my ability to adapt my teaching to the needs of a student with a hearing impairment.	1	2	3	4	5	6
16.	Working with the itinerant teacher of the hearing impaired has had a positive effect on the social skills of the student with a hearing impairment.	1	2	3	4	5	6
17.	Students with a hearing impairment can attain levels of academic achievement that are comparable to	1	2	3	4	5	6

	Item	Rating					
	those of their hearing peers.						
18.	I have sufficient knowledge about hearing loss to adapt my teaching strategies to the needs of students with a hearing impairment.	1	2	3	4	5	6
19.	I am confident that a student with a hearing impairment would experience a positive learning environment in my classroom.	1	2	3	4	5	6
20.	Including students with a hearing impairment in the regular classroom drains resources from other school programs.	1	2	3	4	5	6
21.	I am familiar with the effects of hearing loss on language development and learning.	1	2	3	4	5	6
22.	Inclusion in the regular classroom is an appropriate educational option for the majority of students with a hearing impairment.	1	2	3	4	5	6
23.	Regular classroom teachers receive sufficient preparation through their teacher education programs to work effectively with students with a hearing impairment.	1	2	3	4	5	6
24.	Inclusion in the regular classroom setting has a positive effect on the language development of students with a hearing impairment.	1	2	3	4	5	6
25.	Students with a hearing impairment require the support of itinerant teachers of the hearing impaired in order to follow the curriculum of the regular classroom.	1	2	3	4	5	6
26.	Including students with a hearing impairment in regular classroom settings has a positive effect on	1	2	3	4	5	6

	Item	Rating					
	students with normal hearing.						
27.	Including students with a hearing impairment in the regular classroom requires additional planning time for the teacher.	1	2	3	4	5	6
28.	The itinerant teacher of the hearing impaired provides me with sufficient support to allow me to work effectively with the included student with a hearing impairment.	1	2	3	4	5	6
29.	The regular classroom teacher should have input into the speech and language goals developed for the integrated student with a hearing impairment.	1	2	3	4	5	6
30.	Parents of included students with a hearing impairment have to be more involved in the schools and classrooms of their children than do parents of children with normal hearing.	1	2	3	4	5	6
31.	Itinerant teachers of the hearing impaired should work primarily with the student with a hearing impairment outside the classroom.	1	2	3	4	5	6
32.	Regular contact between teachers and parents of students with a hearing impairment is an essential component of inclusion.	1	2	3	4	5	6
33.	The itinerant teacher of the hearing impaired has realistic expectations regarding the amount of individual attention that I am able to devote to the included student with a hearing impairment during the school day.	1	2	3	4	5	6
34.	Teaching included students with a hearing impairment requires additional skill and patience on	1	2	3	4	5	6

	Item	Rating					
	the part of the classroom teacher.						
35.	Including students with a hearing impairment in the regular classroom does not influence performance expectations for other students in the class.	1	2	3	4	5	6
36.	Working with the itinerant teacher of the hearing impaired has a positive effect on the academic and communication skills of the student with a hearing impairment.	1	2	3	4	5	6
37.	Learning in the regular classroom encourages students with a hearing impairment to develop the necessary skills to become advocates for their own needs (e.g., monitoring equipment function, verifying comprehension, expressing their needs).	1	2	3	4	5	6
38.	Technology adapted to the needs of students with a hearing impairment (e.g., close-captioned videos, FM systems) is available for use in my classroom.	1	2	3	4	5	6
39.	I have the necessary expertise to work effectively with students with a hearing impairment.	1	2	3	4	5	6
40.	My school administration promotes an atmosphere of inclusion for students with special needs.	1	2	3	4	5	6
41.	Parental involvement in their child's homework is an essential component of inclusion.	1	2	3	4	5	6
42.	The regular classroom teacher should have input into evaluating the progress of the student with a hearing impairment in the areas of speech and language.	1	2	3	4	5	6
43.	The itinerant teacher of the hearing impaired provides in-service training that helps staff members understand the needs of the included student with a	1	2	3	4	5	6

	Item	Rating					
	hearing impairment.						
44.	Class size should be reduced when a student with a hearing impairment is included in the class.	1	2	3	4	5	6
45.	Including students with a hearing impairment in regular classroom settings does not negatively affect the progress of the rest of the class through the curriculum.	1	2	3	4	5	6
46.	The services provided by the itinerant teacher of the hearing impaired are insufficient for the students with a hearing impairment to follow the curriculum in the regular classroom, and, therefore, the majority of students with a hearing impairment require additional services.	1	2	3	4	5	6
47.	Inclusion in the regular classroom setting has a positive effect on the social development of students with a hearing impairment.	1	2	3	4	5	6
48.	I am familiar with the various degrees of hearing loss.	1	2	3	4	5	6
49.	Specialized in-service training is necessary in order to prepare regular classroom teachers to work effectively with students with a hearing impairment.	1	2	3	4	5	6
50.	Students with a hearing impairment should be educated primarily in special education classrooms or in classrooms for students with a hearing impairment.	1	2	3	4	5	6
51.	I regularly adapt my teaching strategies to accommodate students with a hearing impairment.	1	2	3	4	5	6
52.	Including students with a hearing impairment in the regular classroom reduces the amount of attention	1	2	3	4	5	6

	Item	Rating					
	that can be paid to other students in the class.						
53.	Parents of children with a hearing impairment are demanding of the teacher's time and energy.	1	2	3	4	5	6
54.	Inclusion in the regular classroom has a positive effect on the self-esteem of students with a hearing impairment.	1	2	3	4	5	6
55.	The caseload of the itinerant teacher of the hearing impaired is too small to justify the professional position.	1	2	3	4	5	6
56.	Including students with a hearing impairment in regular classroom settings does not disrupt classroom routines and activities.	1	2	3	4	5	6
57.	Including students with a hearing impairment in the regular classroom requires extensive modification of the curriculum.	1	2	3	4	5	6
58.	The itinerant teacher of the hearing impaired provides me with useful suggestions for teaching students with a hearing impairment.	1	2	3	4	5	6
59.	The classroom teacher should have a role in implementing the speech and language goals identified for the student with a hearing impairment.	1	2	3	4	5	6
60.	I am supported by my school administration in my efforts to educate included students with a hearing impairment.	1	2	3	4	5	6

APPENDIX C

Self-Regulation In School Inventory © Hutchinson & Perry, 2014

Achievement Items	Level 1	Level 2	Level 3	Level 4
1. Overall, what is the child's achievement level in terms of provincial expectations?	1	3	5	7
2. What is the child's achievement level in terms of provincial expectations for Language?	1	3	5	7
3. What is the child's achievement level in terms of provincial expectations for Art?	1	3	5	7
4. What is the child's achievement level in terms of provincial expectations for Math?	1	3	5	7
5. What is the child's achievement level in terms of provincial expectations for Science and Technology?	1	3	5	7
6. What is the child's achievement level in terms of provincial expectations for Health and Physical Education?	1	3	5	7

Self-Regulation Items	Never True	Almost Never True	Usually Not True	Sometimes True	Usual True	Almost Always True	Always True
7. Makes realistic evaluations of his/her performance on a task.	1	2	3	4	5	6	7
8. Offers to refer a peer to information/books that assist that peer with a project or	1	2	3	4	5	6	7

Self-Regulation Items	Never True	Almost Never True	Usually Not True	Sometimes True	Usual True	Almost Always True	Always True
task.							
9. Enjoys and/or values learning new things.	1	2	3	4	5	6	7
10. Recognizes how much support peers need for learning.	1	2	3	4	5	6	7
11. Is able to talk about feelings or describe emotions.	1	2	3	4	5	6	7
12. Is willing to try challenging tasks.	1	2	3	4	5	6	7
13. Communicates an accurate understanding of others' ideas and perspectives when discussing a group project/task.	1	2	3	4	5	6	7
14. Takes responsibility for learning successes and failures by attributing them to factors s/he can control (e.g., working harder, trying a new strategy).	1	2	3	4	5	6	7
15. Appears genuinely interested in and committed to including other children in learning activities.	1	2	3	4	5	6	7
16. Is aware of how much time it takes him/her to complete academic tasks.	1	2	3	4	5	6	7
17. Can express/communicate needs and desires	1	2	3	4	5	6	7

Self-Regulation Items	Never True	Almost Never True	Usually Not True	Sometimes True	Usual True	Almost Always True	Always True
18. Applies appropriate learning strategies to complete assignments/tasks.	1	2	3	4	5	6	7
19. Offers instrumental support to peers who are struggling with academic tasks (e.g., takes on another peer's classroom responsibilities when that peer needs more time to catch up on academic tasks).	1	2	3	4	5	6	7
20. When the child becomes overwhelmed with a difficult academic task, he/she adjusts his/her expectations for learning success.	1	2	3	4	5	6	7
21. Understands what is required to "meet expectations" for academic tasks.	1	2	3	4	5	6	7
22. Negotiates task parameters (e.g., picking a familiar top to research), when tasks are difficult rather than becoming frustrated or overwhelmed.	1	2	3	4	5	6	7
23. Retains confidence in his/her learning skills and abilities even after making mistakes.	1	2	3	4	5	6	7
24. Adjusts feedback and support to suit peers' particular learning needs.	1	2	3	4	5	6	7

Self-Regulation Items	Never True	Almost Never True	Usually Not True	Sometimes True	Usual True	Almost Always True	Always True
25. Can manage a set of directions to complete tasks independently.	1	2	3	4	5	6	7
26. Chooses a quiet space to work if other children are talking.	1	2	3	4	5	6	7
27. Has something positive to say about his/her learning, even when s/he is disappointed because s/he does not do well on an assignment.	1	2	3	4	5	6	7
28. Engages in positive self-talk or other productive strategies when faced with challenging or upsetting situations, rather than letting negative emotions get in the way.	1	2	3	4	5	6	7

Hearing Loss Items	**Response Scale**		
29. Does this child have a hearing loss?	Yes	No	I don't know
30. Does this child use technology (a hearing aid or FM system to assist them to hear better in the classroom?)	Yes	No	I don't know

APPENDIX D

Classroom Observation Instrument

(Adapted From Perry, 1998; Perry, VandeKamp, Mercer, & Nordby © 2000)

ID_____

Teacher_____ Observer_____

Grade_____ Time Start_____

Date_____ Time Stop_____

School_____ Time Total_____

_____

Description:

Examples of Classrooms Supporting Young Children's Engagement in ER, SRL, and SRSR

Category	Examples
Complex Tasks	The teacher creates meaningful tasks/activities (e.g., class discussion time on writing outlines, how to effectively brain storm/creating concept maps, guidelines for creating writing summaries) that provide opportunities for children to attain multiple learning goals (e.g., goals to develop skills of how to construct a writing outline, to engage in creative writing, to learn how to work with other students in the classroom).
	The teacher provides tasks/activities (e.g., supporting all students to keep a personal science log with terminology, diagrams, things children have learned during the unit) that presents students with opportunities to employ skills from across subjects (e.g., writing, art, science) to support learning.
	The teacher creates tasks/activities (e.g., shared reading activities, experiments) that provide opportunities for children to engage in a number of processes and support children's learning (e.g., predicting, analyzing, reasoning, remembering).
	Classroom activities and tasks (e.g., creating math problems based on children's understanding of probability) provide opportunities for children to showcase their learning in different ways (e.g., pictures, writing, building a game).
Choice	Children have choices about who they can work with.
	Children have choices about where to work (e.g., library, hall, or to another area to work quietly – free of distractions).
	Children make decisions about when they work on tasks and activities (e.g., students prioritize when they will work on reading, writing, math).
	Children decide what they will work on during class time (e.g., writing or science or a bit of both).
Control Over Challenge	Children suggest two of their favorite topics (e.g., polar bears, the ocean) as ideas for a group project.
	Children are supported to ask for guidance for learning from a teacher or peer.
	Children are supported to use resources (e.g., books, internet) when they are having difficulties finding information about the topics they are researching.
	Children are supported to negotiate with others when they have disagreements about a task or project they are working on with other children.
Student Self-Evaluation	Children have a large discussion with the class about what they have learned.
	Children have conferences with the teacher about their learning progress on a science project.
	Students use rubrics or checklists to evaluate their learning (e.g., evaluation criteria set by the class).
	Students keep journals about what they have learned in a subject using notebooks they review with the teacher.
Teacher Support	Teachers provide hints when work is difficult (e.g., what could you do if you can't spell a word?).

	Teachers model strategies for cooperating with others (e.g., "How would you ask Julia if you wanted to borrow her pencils?" "What could you say if you have another idea for the group project?).
	Teachers model thinking strategies so students can work independently (e.g., "If I get stuck spelling a word in my head, what strategy could I use to help me figure out how to spell it?").
	Teachers anticipate students' needs by scaffolding positive conflict resolution prior to task engagement (e.g., "What are some things we can do we do if there is a disagreement between classmates?).
Peer Support	Peers show other children how they have solved a task.
	Peers ask other children to work collaboratively.
	Peers volunteer information that can help another child with her/his project.
	Peers remind classmates to stay on task while working together.
Non-Threatening/Non-Competitive Evaluations	Teachers support children to focus on their personal learning progress (rather than comparing him/herself to peers).
	Teachers encourage children to view feedback as opportunities for them to improve their learning (rather than as competition).
	Teachers provide children with support that allows them to learn how to give constructive feedback to other children so that they help each other accomplish learning.
Communities Of Learners	Teachers and children meet to discuss progress on individual tasks (e.g., what's involved, what materials are needed, who to ask for expertise).
	Teachers lead a large discussion so that all children have opportunities to share their ideas and strategies for learning with other classmates.
	Teachers provide children with support (e.g., strategies student can use to help themselves make their learning more interesting based on their interests) that is tailored to an individual child's needs for learning, emotional support/warmth, and guidance.
	Individual children are supported by their classmates and teachers when they recognize they need help from someone else to complete work.

Observation Checklist for Examining Features of Classroom Contexts

Directions: When analyzing a lesson for the each of the categories/features of contexts (e.g., Choice, Control Over Challenge etc) please indicate (with a checkmark) whether a category is (a) present, and (b) supports self-regulation.

ID: Lesson Type: Date:

Category	Present		Supports Self-Regulation		
	No	Yes	No evidence (0)	Somewhat evident but not in ways that support SR (1)	Yes in ways that support SR (2)
Complex Tasks					
(*)Multiple Goals					
(*)Integrate Subject Matter					
(*)Engage Students in Several Processes					
(*)Result in a Number of Products					
Choices					
About "Who"					
About "What"					
About "When"					
About "Where"					
About "How"					
Control Over Challenge					
Student Self-Evaluation					
Teacher Support					
Peer Support					
Non-Threatening Evaluations					
Communities Of Learners					
(*)Couple Individual Responsibility with Group Support					
(*)Encourage Students to Share Ideas and Strategies					
(*)Make Allowances for Individual Differences					
(*)Support Relationships-Student-Student & Teacher-Student					
Total Score					

APPENDIX E

Self-Regulation and Hearing Loss Data Observation
Sound Level Reading Tracking Sheet

Date: _____

Class ID Number:_____

Teacher's Name:_____

Location:_____

Teacher Led Instruction:

Reading **A**	Reading **B**	Reading **C**

Time elapsed between Reading A and Reading B *(in seconds)*	
Time elapsed between Reading B and Reading C *(in seconds)*	

Group Work

Reading **D**	Reading **E**	Reading **F**

Time elapsed between Reading D and Reading E *(in seconds)*	
Time elapsed between Reading E and Reading F *(in seconds)*	

Notes:

Curriculum Vitae

Name:	Kendra Di Bacco
Post-secondary Education and Degrees:	The University of Western Ontario London, Ontario, Canada 2010-2014 B.A. The University of Western Ontario London, Ontario, Canada 2015-2016, M.Sc (*in progress*)
Honours and Awards:	Western Graduate Research Scholarship 2015-2016 Agnes Penner Prize 2014 Continuing Scholarship for Full Time Students 2013 Dean's Honor List 2012, 2014
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Publications:

1. **Di Bacco, K**., Moodie, S., Hutchinson, L. (submitted). The Self-regulatory abilities of elementary school children with hearing loss: a scoping review. Journal of Deaf Studies and Deaf Education.

2. **Di Bacco, K**. Hutchinson, L. (submitted). Self-regulation, mindfulness, stress and academic achievement. International Journal of Teaching and Learning in Higher Education.