

THE RELATIONSHIP BETWEEN CHILD SOCIAL-EMOTIONAL COMPETENCE,
CHILD COMMUNICATION COMPETENCE, AND PARENTAL STRESS IN A
SAMPLE OF CHILDREN WHO ARE DEAF OR HARD OF HEARING

by

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Abstract

This study examined the relationship between child social-emotional competence, child communication competence, and parental stress level in a sample of parents of children 5-12 who are deaf or hard of hearing (DHH). A cross-section of parents ($N = 53$) responded to an online survey. Two main study hypotheses were supported: first, levels of parental stress were negatively correlated with levels of children's social-emotional competence; second, levels of child communication competence were negatively correlated with the level of parental stress; and child communication competence was positively correlated with child social-emotional competence. Girls were rated as having higher social-emotional competence than boys, $F(1, 51) = 7.83, p < .01, \eta_p^2 = .13$. Parent stress level was not found to be a statistically significant moderator (did not impact the strength of the relationship) between child communication competence and child social-emotional competence $\Delta R^2 = .002, \Delta F(6, 52) = .151, ns$. Child communication competence was shown to account for 12.04% of the variance in child social-emotional competence and parent stress level was shown to account for 17.4% of the variance in child social-emotional competence in the second regression model of the moderation analysis $\Delta R^2 = .265, \Delta F(5, 47) = 12.30, p < .001, f^2 = .78$. There was a statistically significant indirect effect of parental stress in two mediation models where parent stress level was a possible mediator between child communication competence and child social-emotional competence. The mediation models controlled for (a) the effects of gender and socioeconomic status ($B = .50$; $CI = .15$ to 1.12), and (b) functional hearing status and socioeconomic status ($B = .44$; $CI = .11$ to 1.00). This study builds on existing literature suggesting that parental stress plays a vital role in child social-emotional development

and seeks to understand factors contributing to this relationship in the context of childhood disability.

Preface

This research was approved by the University of British Columbia's Behavioural Research Ethics Board. The Ethics Certificate obtained was H12-00097.

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To my friends: Thank you for your understanding and love for me in so many forms during this process. To my family: Thank you moms and dads and sisters (Mains and Coleros). You have been so supportive and loving in this process that I am forever humbled. To my daughters Maria and Liliana: May your lights always shine bright. I love you both always and forever. To my husband Sandy: You are my love and partner on this great journey of life. You embody the idea that living is about a posture of faithfulness rather than a pursuit of success. Thank you for loving me and for supporting me to be who I'm made to be. To you and our girls (and any other little ones that come), I dedicate this thesis.

Chapter One: Introduction

Children who are deaf or hard of hearing (DHH) experience unique and significant challenges in social-emotional development (Calderon & Greenberg, 2003, 2011; Greenberg & Kusché, 1989; Marschark, 1997; Meadow, Greenberg, Erting, & Carmichael, 1981). All children require the support of family, school and community to develop social and emotional competence, as these skills are “a critical foundation for life success” (Calderon & Greenberg, 2011, p. 188). Greenberg and Kusché (1993) describe social and emotional competence to include processes and outcomes such as the ability to communicate, understand feelings, deal with frustration, and use behaviors that maintain healthy relationships (p. 24). Social-emotional development has also become increasingly recognized as an important mediator of educational and behavioural performance of children, including those with disabilities (Durlack, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Walker, Irvin, Noell, & Singer, 1992).

Forty-five percent of children who are DHH are likely to have an additional disability (Mitchell, 2004), and children with disabilities experience more disadvantage than their peers in the development of social-emotional competence (Seligman & Darling, 2007). For example, children with disabilities are more likely than other children to be abused or neglected (Stalker & McArthur, 2012). Research has found that childhood disability significantly impacts many domains of social and behavioural development (Elias, 2004; Odom, McConnell, & McEvoy, 1992). Children with learning disabilities have been documented to struggle with a variety of difficulties such as peer rejection, depression and anxiety, and withdrawn behaviors (Al-Yagon, 2007; Dyson, 2003; Estell et al., 2008; Lackaye & Margalit, 2006). Specific to children who are DHH are added

risks such as lack of overhearing (i.e., spontaneous conversations, general public comments); restricted incidental learning, or learning that is indirect; issues arising from parent-child communication; and a lack of opportunities for children who are DHH to grow up with a deaf or hard of hearing culture and identity (Calderon & Greenberg, 2003; 2011).

Bronfenbrenner's (1979) ecological theory of human development emphasizes the importance of interactions over time between a developing person and her environment. Research on social-emotional competence in children who are DHH has drawn from Bronfenbrenner's theory because it emphasizes the importance of appreciating the role that interactions play in a child's overall social-emotional development (i.e., interactions between a child's disability, the individual, and the proximal and distal variables that influence the developing child and family (Zaidman-Zait, 2007)). Along with early intervention and support through schools, and the deaf and hard of hearing community, the role of the family is a powerful player in the development of social-emotional competence for children who are DHH (Calderon & Greenberg, 2011).

A relevant factor in studies of family interaction is parenting stress. Parenting stress has been defined as "the aversive psychological reaction to the demands of being a parent" (Deater-Deckard, 1998, p. 315). Many adverse outcomes are associated with increased parenting stress, including child behavior problems, and overly negative or less involved parenting interactions (Creasy & Rease, 1996; Crnic & Greenberg, 1990; Crnic & Low, 2002). Higher levels of parenting stress have been consistently linked to poorer child outcomes in both hearing and deaf populations (Crnic & Low, 2002; Hintermair, 2006). When parents' stress levels are high, their ability to model social-emotional and

behavioral competence is reduced. A parent's stress can also be complicated by the communication barriers introduced by having a child who is DHH, especially if the parent has typical hearing (Jamieson, 1994). While some studies specifically link child social-emotional competence to parental stress level, scant research has explored the relationship between child social-emotional development and parental stress levels in families with children who are DHH (Hintermair, 2006; Quittner et al., 2010).

Research Problem: Child Social-Emotional Competence, Child Communication Competence and Parental Stress in Families of Children who are Deaf or Hard of Hearing

Bilateral permanent childhood hearing loss of at least moderate severity affects 1 in 750 children in western countries (Davis & Wood, 1992), making this type of hearing loss rare, but affecting hundreds of thousands of children in North America. Ranging from mild to profound deafness, hearing loss is considered a low incidence disability that represents less than 2% of overall impairments in children (Seligman & Darling, 2007). The proportion of students identified for special education in the United States due to hearing loss or deafness has been recently reported at 1.1 per 1000 (Mitchell & Karchmer, 2006). Because early identification programs for hearing loss are not implemented in all communities, not all children who are DHH receive the appropriate services.

A diagnosis of hearing loss can have a major impact on the cognitive and social-emotional development of a child. Studies on the psychosocial development of children who are DHH show a significantly higher rate of behavior problems than children with typical hearing (Barker et al., 2009; Hintermair, 2007; Mitchell & Quittner, 1996;

Quittner et al., 2010; van Eldik, 2005; van Eldik, Treffers, Veerman, & Verhulst, 2004). For example, Hintermair (2007) used the German version of the *Strengths and Difficulties Questionnaire* (SDQ; Goodman, 1997) with 426 parents of deaf and hard of hearing children and found a 2.5 times increase in problem behaviors compared to the German representative sample.

Parents of children with a disability are at risk to experience higher levels of stress than other parents (Hadadian, 1994). The relationship between parental stress and parental coping related to childhood disability has been established in the literature (Scorgie, Wilgosh, & McDonald, 1998; Yau & Li-Tsang, 1999). Research addressing parental stress levels in parents of children who are DHH offers mixed results and is growing (Lederberg & Golbach, 2002; Meadow-Orlans, 1994; Pipp-Siegel, Sedey, & Yoshinaga-Itano, 2002; Quittner, Glueckauf & Jackson, 1990; Zaidman-Zait & Most, 2005). A recent study summarized research in this area with children who are DHH, and concluded that specific contextual factors such as language delays and child behaviour problems have direct associations with parental stress (Quittner et al., 2010).

Currently, limited research links parental stress to child social-emotional competence in families with children who are DHH. Watson, Henggeler, and Whelan (1990) showed that lack of social competence in hearing-impaired youths occurred in correlation with parental stress. Their cross-sectional study sample consisted of 75 DHH children and their parent(s) who responded to measures of family adjustment.

Hintermair (2006) explored relationships between parental resources (social support, personal psychological characteristics), parental stress level, and child social-emotional development when hearing loss is present using path analysis. He studied 213

mother and father pair parents of DHH children. The results of the path analysis showed a statistically significant and positive relationship between parental stress and social-emotional problems in children for both mothers and fathers ($r = .64$ for mothers, $r = .61$ for fathers, $p \leq .05$). The relationship between child communication competence and parental stress was also found to be statistically significant, and negative, for both mothers and fathers ($r = -.41$ for mothers, $r = -.44$ for fathers, $p \leq .05$). A statistically significant negative relationship between child communication competence and social-emotional problems was found for mothers and fathers ($r = -.32$ for mothers, $r = -.38$ for fathers, $p \leq .05$). The results of Hintermair's study suggest that parents reporting higher stress levels also report children with greater difficulties in social-emotional ability (e.g., bullied by other children) and children with more difficulty in their communication skills.

Quittner et al. (2010) found support for the hypothesis that parent reported child behavior problems created an indirect effect in the relationship between child language delays and general parenting stress in a sample of 181 deaf children awaiting cochlear implant surgery (mean age 2) and 92 children with normal hearing using path analysis in a cross-sectional design. Indirect paths from hearing status to parent-reported behavior problems via language delays were significant for both receptive and expressive language ($p < .01$). The extended path from hearing status to general parent stress via receptive language delays and parent-reported behavior problems was found to be statistically significant ($p < .01$). The extended path from hearing status to general parenting stress via expressive language delays and parent-reported behavior problems was also statistically significant ($p < .01$). Taken together, these studies suggest that child communication may

be a key factor in the development of child social-emotional competence and parental stress levels in a DHH population.

Overview of the Research Problem

This study brings together issues of parental stress and child social-emotional development in the context of families where a child has been diagnosed with childhood hearing loss. Initial research has shown support for this link between parental stress and child social-emotional competence, and the importance of considering child communication ability (Barker et al., 2009; Hintermair, 2006, Quittner et al., 2010; Watson et al., 1990). Because social-emotional development is at risk in children who are DHH, further study is needed to ensure these children and families have the best possible outcomes.

Purpose of Study

The purpose of this study was to investigate the relationships between child social-emotional competence, child communication competence and parental stress level, including a potential effect of child gender on social-emotional competence. A secondary purpose of the study was to look at how parent stress level might influence the relationship between child communication competence and social-emotional competence. This cross-sectional study design will capture parent report data from families of children who are deaf or hard of hearing between the ages of 5 to 12.

Research Questions

1. What is the relationship between child social-emotional competence, child communication competence and parental stress level?

2. What are the relationships between demographic variables (e.g., child gender) and child social-emotional competence?

Study Significance

The importance of exploring parental experience in families with children who are DHH is based on current early intervention programs which aim to improve services for children who are DHH and their families (Zaidman-Zait & Most, 2005). Results from this study may indicate where helping professionals can focus their efforts. For example, a stress reduction approach for families may be encouraged by mental health professionals. Improved support for social-emotional development of children with hearing loss is important for maximizing quality of life for this population.

Definition of Terms

The following definitions of terms will be used:

Social-Emotional Competence: Includes processes and outcomes such as the ability to communicate, understand feelings and needs of oneself and others, deal with frustration, appreciate different cultural values, and use behaviors that maintain healthy relationships (Greenberg & Kusché, 1993, p. 24).

Disability: Refers to any impairments, activity limitations, participation restrictions, or to “the outcome or result of a complex relationship between an individual’s health condition and personal factors, and of the external factors that represent the circumstances in which the individual lives” (World Health Organization, 2001, p. 17).

Parental Stress: “The aversive psychological reaction to the demands of being a parent” (Deater-Deckard, 1998, p. 315).

Communication Competence: The ability of a child who is DHH to express thoughts, initiate conversation, understand, and explain him or herself (Hintermair, 2006).

Chapter Summary

Children who are deaf or hard of hearing (DHH) experience unique and significant challenges in social-emotional development (Calderon & Greenberg, 2003, 2011; Greenberg & Kusché, 1989; Marschark, 1997; Meadow et al., 1981). Studies on the psychosocial development of children who are DHH show a significantly higher rate of behavior problems than children with typical hearing (Barker et al., 2009; Hintermair, 2007; Mitchell & Quittner, 1996; Quittner et al., 2010; van Eldik, 2005; van Eldik, et al., 2004). Risks to social-emotional development for children who are DHH are due to factors such as lack of overhearing, issues arising from parent-child communication, as well as lack of opportunities for children who are DHH to identify with a deaf or hard of hearing culture (Calderon & Greenberg, 2003; 2011).

Bronfenbrenner's (1979) ecological theory emphasizes the importance of appreciating the interactions between a child's disability, the individual, and the systems proximal and distal to the developing child and family (Zaidman-Zait, 2007). Along with early intervention and support through schools and the deaf and hard of hearing community, the role of the family is a powerful player in the development of social-emotional competence for children who are DHH (Calderon & Greenberg, 2011). A primary factor in studies of family interaction is parenting stress. Higher levels of parenting stress have been consistently linked to poorer child outcomes in both hearing and deaf populations (Crnic & Low, 2002; Hintermair, 2006).

Overall, there is limited research exploring the relationship between child social-emotional development and parental stress levels in families with children who are DHH. Initial research has shown support for this link and the importance of considering child communication ability (Barker et al., 2009; Hintermair, 2006, Quittner et al., 2010, Watson et al., 1990). The purpose of this study was to investigate the relationships between child social-emotional competence, child communication competence and parental stress level, including a potential effect of child gender on social-emotional competence. A secondary purpose of the study was to look at whether parent stress level influences the relationship between child communication competence and social-emotional competence. The study used parent report data from families of children who are deaf or hard of hearing between ages 5 and 12 ($N = 53$).

Chapter Two will review research on social-emotional development and parental stress in the context of childhood disability. Research linking parental stress and child social-emotional development in families with children who are deaf or hard of hearing will also be described, followed by the impacts of child communication competence and related factors. Chapter Three will describe the statistical methods used to address the research questions as well as details regarding ethics, recruitment, data collection, measures, and analytic strategies. Chapter Four will review study results. Chapter Five will discuss study results, strengths and limitations, implications and future research.

Chapter Two: Literature Review

Overview

This section of this study will review research on child social-emotional development and parental stress in the context of childhood disability. Research linking parental stress and child social-emotional development in the context of families with children who have a specific disability, those who are deaf or hard of hearing, will also be described, followed by the impacts of child communication competence and other related factors.

Social-Emotional Development

Overview. The impact of social-emotional competence in a person's life is significant for interactions at home, work, and in leisure. The possession of adequate social skills has been shown necessary to maintain social, psychological, and occupational well-being (Segrin, 2000). Elksnin and Elksnin (2006) indicate that individuals who lack social skills are at risk for developing mental health problems that persist during adulthood. Strong social-emotional ability in childhood has also been linked in the literature to academic achievement. For example, Durlak et al. (2011) conducted a meta-analysis of 213 school-based universal social-emotional learning programs. They found that in addition to significantly improved social and emotional skills, attitudes, and behavior, the academic performance improvements of participants reflected an 11-percentile-point gain in achievement.

Impacts of Childhood Disability. Children with disabilities may experience more disadvantage than their peers (Seligman & Darling, 2007). Children with disabilities are more likely than other children to be abused or neglected (Stalker & McArthur, 2012). Research has found the impact of childhood disability on many domains of social and behavioural development to be significant (Elias, 2004; Odom et al., 1992). Children with learning disabilities have been documented to struggle with social-emotional and behavioral difficulties such as high levels of peer rejection and loneliness, high levels of depression and anxiety, more somatic problems, low levels of coping resources, low levels of self-efficacy, and more withdrawn behaviors than typically developing children (Al-Yagon, 2007; Dyson, 2003; Estell et al., 2008; Lackaye & Margalit, 2006). Research that identifies factors associated with social-emotional development for children with disabilities is important (Murray & Greenberg, 2001).

Importance of the Family Environment

Bronfenbrenner's (1979) ecological theory of human development conceived of the environment, or context in which humans develop, as four systems nested within each other. A more recent version of this theory, known as the bioecological model (Bronfenbrenner & Morris 1998), emphasizes the importance of reciprocal interactions over time between a developing person and the systems within their environment. Research on social-emotional competence in children who are DHH have drawn from Bronfenbrenner's theory, as it emphasizes the importance of appreciating the role that interactions play in a child's overall social-emotional development (i.e., between a child's disability, the individual, and the proximal and distal variables that influence the developing child and family (Zaidman-Zait, 2007)).

Because children with disabilities require specialized help early in life, the family has an important role to play to ensure children receive the services they need. The importance of exploring parental experience in families with children with disabilities is based on current early intervention programs that aim to improve services for children and their families (Zaidman-Zait & Most, 2005). The benefits of early intervention for children who are DHH has been specifically noted in research related to improvement of language and behavior for children (Stevenson et al., 2011).

Parental Stress

Overview. Differing definitions of parenting stress share a consensus that parenting stress refers to the difference between the demands of the parenting role and the resources a parent can access (Deater-Deckard, 2004). Reviews of research define parenting stress as “the aversive psychological reaction to the demands of being a parent” (Deater-Deckard, 1998, p. 315). Parenting stress is experienced as negative feelings toward the self and/or the child or children, and is a result of a complex process involving the pragmatic demands of parenting, a parent’s psychological well-being and behavior, the parent-child relationship, and the child’s psychological adjustment (Deater-Deckard, 1998). All parents experience some level of parenting stress (Crnic & Greenberg, 1990). Thus, parenting stress can be thought of as ranging from normal to extreme and is thought to be distinct from other domains of stress (Crnic and Low, 2002; Deater-Deckard, 1998), such as workplace stress.

Parenting stress has been conceptualized through looking at major life events, daily irritants and the parent-child relationship (Abidin, 1992, 1995; Crnic & Greenberg, 1990; Crnic & Low, 2002). This study will use Abidin’s (1992, 1995) model of parenting

stress that has been shown to be appropriate when conceptualizing stress in families with children who are deaf or hard of hearing (Adams & Tidwell, 1989; MacTurk, Meadow-Orlans, Koester, & Spencer, 1992; Quittner et al., 1990). Abidin's model of stress is based on Lazarus and Folkman's (1984) general theory of stress that describes stress as a relationship between the person and the environment, where a person's well-being is affected when s/he feels a lack of coping resources.

Abidin (1992) hypothesized that the interaction between the parenting role, or a parent's self-appraisal of stressors including parent characteristics, child characteristics, and other relevant variables (work, environment, marital relationship, daily hassles, life events), creates parenting stress. Abidin further theorized that parenting stress acts as a motivator for parents to access their personal resources, such as social support, parenting skills, material resources, and cognitive coping skills. According to Abidin (1992), the influences surrounding the parenting role, a parent's resulting stress, and a parent's resources available to cope with that stress, result in the parent's behavior.

The stress that a parent experiences is related to his/her appraisal of child characteristics, parent characteristics, and situational variables (Abidin, 1995). Based on Abidin's extensive research and clinical experience, child characteristics include four temperamental (adaptability, demandingness, mood, and distractibility/hyperactivity) and two interactive (acceptability and reinforces parent) attributes. Parent characteristics (depression and competence) are also related to parental stress level; these characteristics impact on parental attachment, which assesses a parent's investment to fulfill the role of parent. Lastly, four situational variables (spouse, isolation, health, and role restriction)

impact parenting stress. Taken together, these influences lead to a parental stress level within the range of normal to dysfunctional parenting.

Impacts of Childhood Disability. Parents of children with a disability are at risk to experience higher levels of stress than other parents (Hadadian, 1994). The relationship between parental stress, parental ability to cope, and childhood disability has been described in the literature. Scorgie et al. (1998) reviewed 25 studies on stress and coping in families with children of various ages and a variety of disabling challenges. They summarize the key areas for understanding the parental coping process as family variables (e.g., problem solving, creativity, cohesion), parent variables (e.g., quality of marital relationship, maternal locus of control), child variables (e.g., age, gender, temperament), and external variables (e.g., social network supports). Yau and Li-Tsang (1999) noted five categories for parental coping after reviewing studies published over last the 20 years that included personal resources, marital relationship, characteristics of the disabled child, parent support groups, and social resources. They emphasize the interrelated nature of these categories.

Linking Parental Stress and Child Development

Parenting stress levels have been linked to child development outcomes although the relationship is thought to be indirect (Crnic & Low, 2002; Deater-Deckard, 1998). A longitudinal study did not support the hypothesis that parent behavior mediates the relationship between parental stress and child adjustment in typically developing pre-schoolers (Crnic, Gaze & Hoffman, 2005). In contrast, another study suggested that parenting behavior can mediate the relationship between parenting stress and child

internalizing disorders over time (Bayer, Sanson, & Hemphill, 2006). A mediator is a variable that accounts for how or why a predictor impacts an outcome variable.

Regardless of the mechanism of the link, many adverse outcomes are associated with parenting stress, including increased child behavior problems and more negative or less involved parenting (Creasy & Rease, 1996; Crnic & Greenberg, 1990; Crnic & Low, 2002). Parents of children with externalizing behavior problems (inattention, defiance, impulsivity and aggression) report higher levels of stress than parents of children without these issues (see Morgan, Robinson, & Aldridge, 2002 for review). Internalizing problems (anxiety, depression) have also been linked to child self-reported adjustment (Rodriquez, 2011). The mechanism of the link between parental stress and child social-emotional development in populations of families with children who are DHH, where parenting stress levels may be elevated, has not been well researched. The complex nature of the construct of parenting stress necessitates ongoing research to clarify these processes.

Children who are Deaf or Hard of Hearing

Overview of Child Social-Emotional Development. Some research has shown that children and adolescents with hearing loss demonstrate reduced ability in many areas of social-emotional development and thus are at risk for adverse outcomes (Greenberg & Kusché, 1989; Marschark, 1997; Meadow et al., 1981). Among potential issues of poor outcome, elevated rates of behavior problems have been specifically documented (Barker et al., 2009; Mitchell & Quittner, 1996; Quittner et al., 2010; van Eldik et al., 2004). For example, in a sample of 116 severely and profoundly deaf and 69 typically hearing children ages 1.5 to 5 years, Barker et al. (2009) showed that lower language ability was

related to poorer attention regulation, less parent-child communication, and increased child behavior problems.

Parenting Stress. More than 90% of children who are DHH are born to parents with typical hearing (Moore, 2001). Thus, a distinction has been made in the literature between parents with typical hearing and parents who are deaf or hard of hearing with children who are DHH (Jamieson, 1994; Meadow et al., 1981). Parents with typical hearing may experience more stress as a result of disrupted interactions with their child due to the hearing loss (Quittner et al., 1990).

Previous research on stress in parents (with typical hearing) of children with hearing loss has shown the importance of measuring context-specific stressors in parents (Quittner et al., 2010). Studies demonstrate that although parents of children with hearing loss may not experience general stress levels higher than parents of hearing children, they experience specific stressors to a greater degree, such as communication difficulties with their children (Lederberg & Golbach, 2002; Quittner et al., 1990; Quittner et al., 2010; Zaidman-Zait & Most, 2005). Research using measures of general parenting stress such as the *Parenting Stress Index (PSI)* (Abidin, 1995) has not shown differences in overall stress levels when comparing parents of hearing children to those with hearing loss (Åsberg, Vogel, & Bowers, 2008; Lederberg & Golbach, 2002; Meadow-Orlans, 1994; Pipp-Siegel et al., 2002). Despite these findings, many hearing parents in studies using the *PSI* had clinically significant levels of stress (Åsberg et al., 2008; Meadow-Orlans, 1994; Pipp-Siegel et al., 2002).

Pipp-Siegel et al. (2002) found no significant differences in their study of the stress experience of mothers of children with hearing loss ($N = 184$) compared to a

hearing sample ($N = 800$). However, they suggest that their results could be due to the intervention received by families in their test sample which included weekly in-home services to support parents and children to develop auditory, speech and language skills. They further hypothesize that characteristics such as lower levels of perceived support, perception of daily hassles, the presence of additional disabilities, slowed language development and less severe hearing losses may place families of children with hearing loss at a particularly high risk for clinically significant levels of stress. Lederberg and Golbach (2002) also explored this relationship in a longitudinal study and found that mothers of deaf children ($N = 23$) with appropriate support only reported significant stress in specific areas.

Child Social-Emotional Development, Child Communication Competence, and Parental Stress in the context of Childhood Hearing Loss. The importance of the family environment in the development of children who are DHH is demonstrated by research which suggests that parental attitudes, involvement, social support, expectations, and problem-solving skills are related to the academic and social development of deaf children in early and middle childhood (Bodner-Johnson, 1986; Calderon, 2000; Calderon & Greenberg, 1993; Calderon, Greenberg & Kusché, 1991; Watson et al., 1990). Calderon et al. (1991) applied a coping-based model to families of deaf children ($N = 36$, mean child age = 10.2 years). Their findings suggest that maternal problem-solving ability was positively related to the child's emotional understanding and cognitive and interpersonal problem solving. Socioeconomic status was also positively correlated with a child's reading achievement. Calderon (2000) examined the impact of school-based, teacher-rated parental involvement on four child outcomes: language development, early

reading skills, and positive and negative measures of social-emotional development ($N = 28$). Mothers who were rated as having better communication skill with their children had children (45 to 88 months old) with higher language and reading scores and less behavior problems, after controlling for hearing loss.

Fewer studies have looked specifically at parental stress and child social-emotional outcomes. Watson et al. (1990) showed that lack of social competence in DHH youths occurred in correlation with parental stress. Their cross-sectional study sample consisted of 75 DHH children and their parent(s) who responded to measures of family adjustment. In the Watson et al., (1990) sample, higher maternal ratings of child social competence was associated with lower family stress, $R^2 = 0.07$ $F(1, 65) = 18.92$, $p < 0.001$, which corresponds to a small effect size ($f^2 = 0.08$).

In their review of evidence concerning the relationship between early communication and social-emotional development in children with hearing loss, Vaccari and Marschark (1997) suggest that early communication abilities are important for social-emotional development in children who are DHH. The development of communicative competence in children who are DHH becomes a central issue for hearing parents because parents must learn new communication strategies (Jamieson, 1994). However, few studies have linked objective measures of child social-emotional development, child communication ability and parental stress.

Hintermair (2006) explored relationships between internal parental resources (social support, personal psychological characteristics), parental stress level, and child social-emotional development when hearing loss is present using path analysis in 213 mother and father pairs of DHH children. Hintermair found statistically significant

relationships between parental stress and child social-emotional problems ($r = .64$ for mothers, $r = .61$ for fathers, $p \leq .05$), as well as negative relationships between child communication competence and parental stress ($r = -.41$ for mothers, $r = -.44$ for fathers, $p \leq .05$) and child communication competence and child social-emotional problems ($r = -.32$ for mothers, $r = -.38$ for fathers, $p \leq .05$). These relationships represent medium to large effect sizes (Cohen, 1992).

Hintermair's (2006) overall theoretical model was confirmed for both mothers and fathers (mothers: $\chi^2 = 16.4$, $df = 24$, $p = 0.87$; fathers: $\chi^2 = 12.6$, $df = 21$, $p = 0.92$). The results of the path analysis showed a statistically significant and positive relationship between parental stress and social-emotional problems in children for both mothers and fathers. The relationship between child communication competence and parental stress was also found to be statistically significant, and negative, for both mothers and fathers. A statistically significant negative relationship between child communication competence and social-emotional problems was found for fathers. The results of Hintermair's study suggest that parents reporting higher stress levels also report children with greater difficulties in social-emotional ability (e.g., bullied by other children) and children with more difficulty in their communication skills. However, the conclusions in Hintermair's study are limited. The short version of the *Parental Stress Index (PSI-K-36)* (Abidin, 1995) was used, which is still in process of validation among hearing and deaf populations (Zaidman-Zait et al., 2010). Further, the research was conducted in schools for the deaf and hard of hearing rather than in general education classrooms where children who are DHH are spending more time than in the past (Mitchell & Karchmer, 2011).

Quittner et al. (2010) found support for the hypothesis that parent reported child behavior problems mediated the relationship between child language delays and general parenting stress in a sample of 181 deaf children awaiting cochlear implant surgery (mean age 2) and 92 children with normal hearing using path analysis in a cross-sectional design. They found a positive relationship between general parental stress and child behavior problems ($r = .56$), and between language delay and behavior problems ($r = .29$ for receptive language delay, $r = .30$ for expressive language delay), which corresponds to medium-to-large effect sizes. A smaller negative relationship was seen between language delay and general parental stress ($r = -.14$ for receptive language delay, $r = -.17$ for expressive language delay), which corresponds to a small effect size. In Quittner et al.'s (2010) path analysis, indirect paths from hearing status to parent-reported behavior problems via language delays were significant for both receptive $\beta = .07$; $z = 2.76$, $p < .01$ and for expressive language $\beta = .06$; $z = 3.15$, $p < .01$. The extended path from hearing status to general parent stress via receptive language delays and parent-reported behavior problems was statistically significant $\beta = .03$; $z = 2.60$, $p < .01$. The extended path from hearing status to general parenting stress via expressive language delays and parent-reported behavior problems was also statistically significant $\beta = .03$, $z = 2.91$, $p < .01$. Quittner et al.'s (2010) results suggest that language delays influence parenting stress by way of child behavior problems. Taken together, results of this study demonstrate that child communication may be a key factor in the development of child social-emotional competence and parental stress levels in a population of children who are DHH. The use of the *PSI-K-36* (Abidin, 1995) in Quittner et al.'s (2010) study as a measure of general

parenting stress limits conclusions given the recent validity research on this measure (Zaidman-Zait et al., 2010).

Overall, research suggests that different aspects of child social-emotional competence (behaviour problems, academic outcomes, social competence) are linked to parental attributes, including parental stress. The mechanism of the link between parental stress and child social-emotional development in populations of families with children who are DHH, where parenting stress levels may be elevated, has not been well researched. Child communication ability has been noted in two recent studies to be linked to both parental stress and aspects of child social-emotional competence in children who are DHH and their families (Hintermair, 2006; Quittner et al., 2010).

The Importance of Research in Integrated School Settings. Further research related to child social-emotional competency of children who are DHH in integrated school settings (where children who are DHH are enrolled with hearing classmates) is needed, because most children who are DHH are spending more time in integrated settings than in the past (Mitchell & Karchmer, 2011). Previous research has shown discrepancies between social interaction of children with hearing loss and that of hearing children (Antia & Dittilo, 1998; Weisel, Most, & Efron, 2005). Research in this area has focused on both the quantity (e.g., Antia & Dittilo, 1998) and quality (e.g., Weisel et al., 2005) of children's social play. It is suggested that the presence of peers with typical hearing, who can help to model and organize cooperative play, can influence the quality of play in children who are DHH (Antia, Kreimeyer, Metz, & Spolsky, 2011). Positive peer interactions have an important impact on overall social development (Odom et al., 1992). On the other hand, children in separate schools for the deaf and hard of hearing

would have regular access to a DHH community, which could support social-emotional development through identity formation (Calderon & Greenberg, 2003; 2011).

Hintermair's (2006) study was conducted in separate schools for DHH children, which was stated to be a limitation of the study. Thus, while research in both settings is important, further research in integrated settings, where more DHH children are spending time, is needed.

Other Factors Impacting Child Social-Emotional Competence in Children who are DHH. Limited research suggests that child gender impacts the degree of social-emotional competence in children who are DHH (Cartledge, Paul, Jackson, & Cochran, 1991; Schnittjer & Hirshoren, 1981). Language used to communicate (spoken versus sign) has not been found significant in associations with social-emotional challenges (Knoors, Meulemann, & Klatter-Folmer, 2003, p. 294). Advances in intervention and technology in hearing loss have made research into the effects of hearing loss on child social-emotional competence become quickly dated. Factors such as age of diagnosis of hearing loss and functional or aided hearing status are important to consider in current research.

Chapter Summary

Social-emotional development is important for a person's interactions at home, work and leisure. When a child has a disability, research has shown that his/her social-emotional competence can be at risk (Elias, 2004; Odom et al., 1992). The family environment is central to developmental outcomes for all children, including those with disabilities. Links showing a negative relationship between parental stress and child development problems have been consistently reported (Crnic & Low, 2002; Deater-Deckard, 1998).

Research has also shown that parents of children with disabilities report elevated stress levels in comparison to general populations (Hadadian, 1994). Research linking elevated parental stress levels to poorer child social-emotional competence has also been seen in families with children who are deaf or hard of hearing (DHH), although current research is limited in this area (Watson et al., 1990). Child communication competence has been highlighted as a particularly relevant variable in explorations of the relationship between parental stress and child social-emotional competence in families with children who are DHH (Hintermair, 2006; Quittner et al., 2010). Previous research exploring child social-emotional competence, child communication competence and parental stress has been limited. The goal of this study is to further examine the relationship between child social-emotional competence, child communication competence and parental stress in families of children who are DHH.

Chapter Three: Methodology

Overview

Chapter three presents a review of the research methodology employed in this study. In the first section of this chapter, the research procedures are described including the application for ethical approval, participant recruitment, and data collection strategies. In the second part of this chapter, the details of the assessment tools employed in this study are described. Third, the research questions and analytic strategies are reviewed.

Summary of Study

The present study employed a cross-sectional research design to examine relationships among children's social-emotional competence, communication competence, and parental stress with a sample of parents whose children are deaf or hard of hearing (DHH).

Ethics

Ethical approval was received from the University Ethics Board (BREB) in April 2012.

Recruitment and Data Collection

Parents completed an electronic survey using the Canadian-based survey website Fluid Surveys (FluidSurveys, 2011). The survey consisted of demographic questions relevant to the subject area and three measures: The *Devereux Student Strengths Assessment (DESSA*; LeBuffe, Shapiro, & Naglieri, 2008), the *Parenting Stress Index (PSI*; Abidin, 1995, 2012), and the *Short Questionnaire for Child's Communicative Competence (SC*, Hintermair, 2006). The authors of each assessment provided the researcher with permission to use the instruments electronically. The survey remained

open between January 2013 and October 2013, to ensure sufficient power to address the research questions. An informed consent sheet preceded each survey to describe the study, and to inform participants that the survey was voluntary and they could withdraw at any time (Appendix A). To maintain confidentiality, participants were not asked to provide their names on the questionnaires, and the data were kept in a secure location. A diagnosis of childhood hearing loss is known to be a particularly stressful experience for parents (Hintermair, 2004). Thus, all participants were offered a list of counselling resources relevant to the subject matter at the completion of the online survey, and were encouraged to contact the researcher if they had any concerns (Appendix B).

Prior to recruitment, four raters piloted study questions for website function and question wording accuracy. Groups of parents of children who are DHH (ages 5 to 12) and organizations supporting families were targeted for recruitment. Third party recruitment information (Appendices C and D) was circulated by email and posted on relevant websites. An informational poster was also created for posting at public health audiology clinics (Appendix E). Recruitment documents asked potential participants or contacts to forward the information to parents who might be interested, which resulted in snowball sampling with participants in North America and worldwide. All participants who were interested were entered into a draw for a \$100 Visa giftcard.

Measures

This study assessed child social-emotional competence, parental stress level, and child communication competence from the perspective of parents of children who are DHH.

Demographic Characteristics. Demographic information was collected to provide a comprehensive description of participants (Table 1, Appendix F). This type of demographic information has been collected in previous studies in this area (Hintermair, 2006; Quittner et al., 2010).

Table 1

Demographic Information Collected in Survey

Parents	Children
Role	Age
Marital status	Gender
Age	Functional (aided) hearing status
Education level	Unaided hearing status
First language	Age of diagnosis
Location	Age of first amplification
Family Size	Cause of hearing loss
Type of living space	Additional disabilities
Home size	Preferred mode of communication
Rent or own	Educational placement
Hearing status	

Child Social-Emotional Competence. The *Devereux Student Strengths Assessment (DESSA*; LeBuffe et al., 2008) is a 72-item standardized, norm-referenced behaviour rating scale that assesses various social-emotional competencies in children between kindergarten and grade 8 (ages 5-12). Parents, teachers, or staff in settings such as schools, and after-school, social service and mental health programs can complete the *DESSA*. Items are rated on a 5-point Likert scale and are entirely strength-based, meaning that they address positive behaviours (e.g., “During the past 4 weeks, how often did the child keep trying when unsuccessful”) rather than maladaptive ones (e.g., “How often did the child give up easily”). The measure contains eight subscales including Self-Awareness, Social-Awareness, Self-Management, Goal-Directed Behaviour, Relationship

Skills, Personal Responsibility, Decision Making, and Optimistic Thinking. A Social-Emotional Composite, or total score is also calculated to provide an overall level of child social-emotional competence.

The *DESSA* standardization sample consisted of 2494 children and youth between kindergarten and grade eight (LeBuffe et al., 2008). To gain estimates of internal consistency reliability, Cronbach alpha coefficients were obtained from the *DESSA* standardization sample. Coefficients for the eight social-emotional competence scales ranged from .82 (Optimistic Thinking and Self-Awareness – Parent Raters) to .94 (Relationship Skills – Teacher Raters). Cronbach's alpha for the Social-Emotional Composite was reported as .98 for parent raters and .99 for teacher raters. Test retest reliability was examined by a group of teachers ($n = 38$) and a group of parents ($n = 54$) rating the same child on different occasions separated by an interval of four to eight days (LeBuffe et al., 2008). Correlations were all significant ($p < .01$) and ranged from $r = .79$ (Social-Awareness – Parent Raters) to $r = .94$ (Personal Responsibility and Decision Making Scales – Teacher Raters). A study on inter-rater reliability of two parents who lived in the same household with the child ($N = 51$) or two teachers (or teacher and aide) ($N = 51$) showed that pairs of parents or teachers who saw the children in the same environment or at the same time rated children similarly (LeBuffe et al., 2008). All correlations were significant ($p < .01$) and subscale values ranged from $r = .63$ (Self-Management – Parent Raters) to $r = .84$ (Decision Making – Teacher Raters). The results of these studies suggest that the *DESSA* is a reliable measure for assessing children's social-emotional competencies.

As a measure of behaviours related to social-emotional competence, scores on the *DESSA* should predict social-emotional functioning of school-aged children. The criterion-validity of the *DESSA* was studied by looking at two samples of children. The first sample, reported as seriously emotionally disturbed ($N = 78$), was matched to a comparison group from the regular education system ($N = 78$) selected from the standardization sample. The results of this study showed that the Social-Emotional Composite was able differentiate between the two samples ($t(155) = 8.12, p < .01; d = 131$) (LeBuffe et al., 2008). The Convergent validity of the *DESSA* was examined by correlating T-scores on the *DESSA* with standard scores from the *Behavioral and Emotional Rating Scale-Second Edition (BERS-2; Epstein, 2004)* and the *Behavior Assessment System for Children-Second Edition (BASC-2; Reynolds & Kamphaus, 2004)*. Parents ($n = 133$) and teachers ($n = 94$) completed the *DESSA* and the *BERS-2* and/or the *BASC-2* in one session. The *DESSA* Social-Emotional Composite (SEC) correlated significantly ($r = .80, p < .01$) with the *BERS-2* Strength Index for both parent and teacher raters. The *DESSA* Social-Emotional Composite correlated with the Adaptive Skills Scale on the *BASC-2* for both parents ($r = .77, p < .01$) and teachers ($r = .92, p < .01$). The SEC correlated negatively with the Behavioral Symptoms Index of the *BASC-2* for both parents ($r = -.64, p < .01$) and teachers ($r = -.72, p < .01$). Finally, the SEC was negatively correlated with the School Problems Scale of the *BASC-2*, which is completed only by teachers ($r = -.70, p < .01$). Results indicate the *DESSA* has strong convergent validity with the total scale scores for both the *BERS-2* and the *BASC-2* (Nickerson & Fishman, 2009).

In the current study, child social-emotional competence was operationalized as the total score, or the Social-Emotional Composite score on the *DESSA*. For the current study the Cronbach alpha coefficient for the social-emotional composite was calculated as .98. Cronbach alpha coefficients for the *DESSA* subscales ranged from .88 (Decision Making) – .93 (Personal Responsibility). These values are consistent with those reported above by LeBuffe et al. (2008). The *DESSA* was deemed appropriate for use within a DHH population given its robust psychometric properties, strength-based approach, and the ability to use the measure in an online format.

Parental Stress Level. The *Parenting Stress Index (PSI)* (Abidin, 1995, 2012) is a screening, diagnostic and research tool, designed to yield a measure of the level of stress in the parent-child system. The measure consists of the child, parent and life stress domain based on Abidin's theoretical model (1992, 1995). The child domain contains 6 subscales including Adaptability, Demandingness, Mood, Distractibility/Hyperactivity, Acceptability, and Reinforces Parent. The parent domain contains 7 subscales including Depression, Competence, Parental Attachment, Spouse, Isolation, Health, and Role Restriction. The Life Stress domain scale is included as an optional measure because it assesses situational stressors (such as pregnancy or divorce) that can inflate parenting stress. The *PSI* is standardized for use with parents of children age 1 month to 12 years. The measure contains 101 items, on a 5-point Likert scale (e.g., "My child is not able to do as much as I expected") plus an additional optional 19 Life Stress items. It takes approximately 20 minutes to complete.

Normative information for the *PSI-4* is based on a sample of 534 mothers and 522 fathers (Abidin, 2012). To gain estimates of internal consistency reliability, Cronbach

alpha coefficients were obtained based on responses from the normative sample.

Coefficients from subscales of the Child domain ranged from .70 to .83, and from .70 to .84 for subscales of the Parent domain. Total Stress score and total domain scores were .90 or greater. Hauenstein, Scarr and Abidin (1987) obtained comparable internal consistency reliability from their cross-cultural sample.

To determine test-retest reliability, estimates from four studies with re-test interval ranging from 3-weeks to 1 year yielded correlations ranging from .55 to .82 for the Child domain, .69 to .91 for the Parent domain and .65 to .96 for Total Stress score (Abidin, 1995; Burke, 1979; Hamilton, 1981; Zakreski, 1983). Factor analysis was completed for the *PSI* based on a sample of 543 mothers (Abidin, 1995). For the Child domain, a six-factor solution, as theorized, accounted for 41% of the variance. The seven-factor solution of the Parent domain accounted for 44% of the variance. When considering the 13 subscales together, a two-factor solution (Parent and Child domain) accounted for 58% of the variance.

For the current study, parental stress level was operationalized as the total stress score on the *PSI*. To gain estimates of internal consistency reliability, Cronbach alpha coefficients were calculated for Total Stress at .96. Cronbach alpha coefficients for subscales ranged from .75 (Parental Attachment) to .92 (Role Restriction) in the Parent Domain, and .62 (Reinforces Parent) to .86 (Distractibility/Hyperactivity, Adaptability) in the Child Domain.

Quittner et al. (1990) used an earlier version of the *PSI* (Abidin, 1983) in a sample of 96 mothers of children who were DHH and reported internal consistency reliability alpha values ranging from .60 to .95, and a test-retest reliability ranging from .70 to .90

for a 3- to 4-week interval. In a sample of 50 hearing parents with children who are DHH, Adams and Tidwell (1989) found that *PSI* results correlated well ($r = .75$) with the *Questionnaire on Resources and Stress-Short Form* (Friedrich, Greenberg & Crnic, 1983), which is a measure that assesses stress in families with disabilities.

Although the short version of the *PSI*, the *PSI-K-36* (Abidin, 1995) has been widely used in more recent studies with this population, the underlying factor structure remains questionable (Hintermair, 2006). A recent validity study using item response theory on the *PSI-K-36* with children with autism suggests that interpretations of its use are questionable for children with autism and other disabilities (Zaidman-Zait et al., 2010). Thus, the long version of the *PSI* was selected for this research.

Communication Competence. The *Short Questionnaire for Child's Communicative Competence* (*SC*, Hintermair, 2006) was administered. This parent report questionnaire includes four items (e.g. "My child is able to tell me something about all things that are on his/her mind") on a 5-point Likert scale. Cronbach's alpha for internal consistency for this measure has been reported at .79 (Hintermair, 2006). This questionnaire has been broadly used in research in Germany with children who are DHH. For the present study, child communication competence is operationalized as the total score for this measure. The Cronbach alpha coefficient was calculated as .92 for this study indicating a high level of internal consistency among the item scores.

Descriptive Analyses

Descriptive statistics were used to identify the frequencies, percentages, means, standard deviations, and range for the demographic and main study variables. Results of these analyses are described in Chapter 4.

Review of Research Questions and Analytic Strategies

1. What is the relationship between child social-emotional competence, child communication competence and parental stress level?

Hypotheses:

- a. Parental stress level will predict scores on a child psychological adjustment inventory. Specifically, lower levels of parental stress will be associated with higher levels of children's social-emotional competence as measured by the *Devereux Student Strengths Assessment (DESSA)*; LeBuffe et al., 2008).
- b. Child communication competence will be related to effects on parental stress levels and child social-emotional competence such that child communication competence will be negatively correlated with parental stress levels and positively correlated with child social-emotional competence.

To answer the first research question, a series of Pearson product-moment correlations were computed to examine the bivariate relationships between the variables. The magnitude of these relationships were measured using Cohen's (1992) benchmarks for effect size.

2. What are the relationships between demographic variables (e.g., child gender) and child social-emotional competence?

To examine the second research question, a one-way ANOVA was conducted to examine the effect of gender on child social-emotional competence. Functional (aided) hearing status, and socioeconomic status (number of bedrooms in home) were also assessed for their impact on child social-emotional competence. The purpose of analyzing

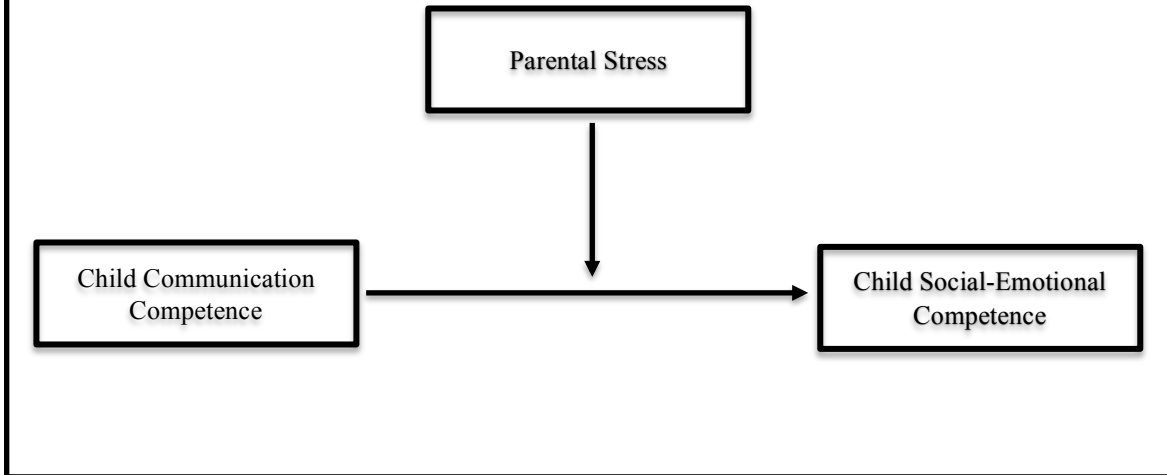
demographic variables was to determine which ones should be used as control variables in the regression analyses.

Once the control variables were determined, a moderation analysis was planned to explore the direction of bivariate relationships between the main study variables. A moderating variable impacts the strength of the relationship between the predictor and outcome variable. The interaction between predicting variables may serve as a better predictor of the outcome variable than one predictor alone. A moderation regression analysis was planned to determine whether parental stress (moderating variable) might impact the strength of the relationship between child communication competence (predictor) and child social-emotional competence (outcome variable) (Figure 1). To conduct the moderation analysis, first child communication competence was centered to eliminate any multicollinearity effects between the predictor and the moderator (Aiken & West, 1991). To center the variable, the mean child communication competence was subtracted from each of the individuals' scores on child communication competence. This created a new mean of zero for child communication competence. The potential moderator, parental stress, was also centered in the same manner. Then, the interaction term was created by multiplying the moderator (centered parental stress) with the centered predictor (child communication competence).

These terms were entered into an hierarchical linear regression, with child social-emotional competence as the outcome variable, in the following steps: control variables were entered in step one, centered child communication competence and centered parental stress level were entered at step two, and the interaction term (centered child communication competence * centered parental stress level) was entered at step three. If

there is a significant change in R^2 when the interaction term is entered in step 3, this indicates that the moderation effect is significant.

Figure 1: Moderation Model of Child Communication Competence, Parental Stress Level and Child Social-Emotional Competence.

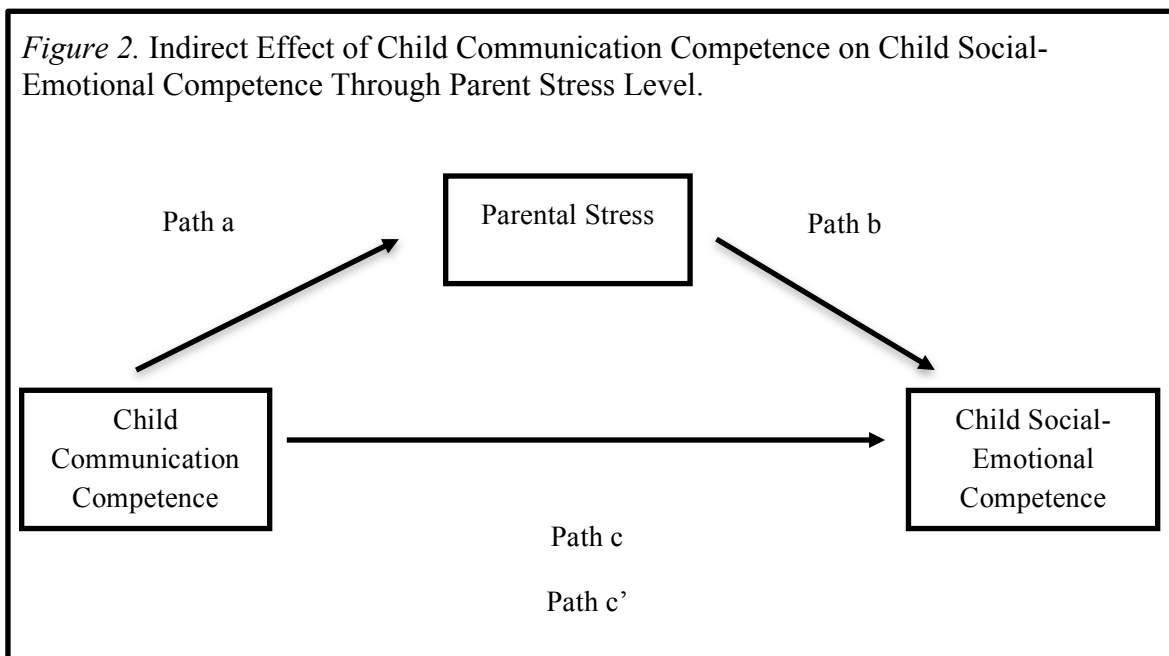


Next, mediation analyses were planned to determine if parent stress acts to create an indirect effect between child communication competence and social-emotional competence. A mediator is a variable that accounts for how or why a predictor impacts an outcome variable. According to Baron and Kenny (1986), three conditions must be met for a variable to be considered a possible mediator: a) the predictor must be significantly associated with the hypothesized mediator, b) the predictor must be significantly associated with the outcome variable, c) the mediator must be significantly associated with the outcome variable¹. Mediation analyses were planned if these conditions were met using parent stress level as the potential mediator. This would mean that parent stress

¹ Hayes (2009) suggests these conditions are not always necessary to conduct a mediation analysis.

creates an indirect effect (amplifying or suppressing) the relationship between child communication competence and social-emotional competence (Figure 2).

Multiple regression analyses were planned to assess each component of the proposed mediation model. First, whether child communication competence was significantly associated with parent stress level. Second, whether the mediator, parent stress level, was significantly associated with child social-emotional competence. If both the a-path and b-path were significant, mediation analyses were planned using the bootstrapping method with bias-corrected confidence estimates (MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2004).



Chapter Summary

A cross-sectional research design was employed to examine relationships among child social-emotional competence, child communication competence, and parental stress with a sample of 53 parents and their children who are deaf or hard of hearing (DHH).

Items from three assessment tools were compiled so that an electronic questionnaire could be administered to participating parents. Items to measure children's social-emotional competence were from the *Devereux Student Strengths Assessment (DESSA*; LeBuffe et al., 2008). Items from the *Parental Stress Index (PSI*; Abidin, 1995, 2012) were used as a measure of parental stress level. The *Short Questionnaire for Child's Communication Competence (SC*, Hintermair, 2006) was employed to gather information about children's communication competence. Finally, a series of demographic questionnaire items were administered. Potential ethical issues were addressed in the informed consent sheet and through a resource list to participants.

To examine the research questions, a series of Pearson product-moment correlations were computed to examine the bivariate relationships between the main study variables via Cohen's (1992) measures of effect size. Next, a one-way ANOVA was conducted to examine the effect of gender on child social-emotional competence. Finally, a series of multiple regression analyses were planned to see if parental stress acted as a moderator (impacting the strength of the relationship) or mediator (creating an indirect effect) between child communication competence and social-emotional competence.

Chapter Four: Results

Overview

This chapter describes the results of this study. In the first section of this chapter, the preliminary analyses that were conducted are described including: missing data, testing of linear assumptions, and power analysis. Next, descriptive statistics for the sample and main measures are reported. Finally, findings from the two research questions are presented.

Preliminary Analyses

Missing Data. Guidelines for missing data computations from the *Parenting Stress Index (PSI*; Abidin, 1995, 2012) and the *Devereux Student Strengths Assessment (DESSA*; LeBuffe et al., 2008) manuals were consulted in addition to psychometric literature that discusses guidelines for missing data (Finch, 2010; Tabachnick & Fidell, 2013). Replacement values were imputed with the series mean for missed values. The *Short Questionnaire for Child's Communicative Competence (SC*, Hintermair, 2006) measure did not give guidelines for missing data, therefore the missing value was imputed with the series mean similar to the *PSI* and *DESSA*.

Testing Regression Assumptions. In order to examine the research questions, assumptions of normality, linearity, independence, equality of error variances and outliers were examined to determine the suitability of linear analyses for the data in this sample. Normality was assessed by graphing the residuals on a probability plot. The majority of residuals were near the probability line. Linearity was examined visually with a matrix scatterplot to assess the presence of any non-linear relationships between the predictors and dependent variable. No such relationships were observed. The Durbin-Watson

statistic was used to objectively test for independence, ($d = 1.729$). To check for homoscedasticity, standardized residuals were graphed against predictors, and residuals were equally distributed. No significant multicollinearity between predictors was observed because the variance inflation factor was less than two. A boxplot of the standardized residuals was inspected to detect extreme data points; none were observed.

Description of Participants.

A minimum of 40 participants was determined a priori to have sufficient power to answer the research questions based on previous research in this area (Watson et al., 1990; Zaidman-Zait & Most, 2005). A total of 66 participants were recruited and sent unique online links to complete the survey. The inclusion criterion for participants was that the individual was a parent of a child between the ages of 5 and 12 who is deaf or hard of hearing. This child age range, from 5-12, was specifically targeted due to the assessment measures used, and because of the benefits of early intervention for children who are DHH (Stevenson et al., 2011). Parents with more than one child who was DHH were able to fill out one survey per child. Seventy-one participants started the online survey, and 55 participants completed the survey. Two participant surveys of the original 71 were completed but registered online as incomplete. This was likely because the participant did not press the submit button at the end of the online survey. Thus, 57 surveys were included in initial analyses. One participant was excluded because the survey information was duplicated on the same child. Another participant was excluded due to missing data on the DESSA (11%), exceeding the requirements in the *DESSA* manual. Finally, two participants were excluded because their children were outside of the age range of 5-12 years. Thus, the total sample for analysis was 53.

Demographics for the final sample are presented in Table 2 and 3. This sample consisted of 53 children (28 boys). The average age of participating children was approximately 8 years old ($SD = 2.29$ years) and they ranged in age from 4.99 – 12.48 years. The age of hearing amplification of the child varied such that most children received amplification at or after the age of 36 months ($n = 24, 45.3\%$). Fewer participants received amplification between the ages of one year and three years old ($n = 11, 20.8\%$), less than 12 months (9.4%), and less than 6 months (20.8%). Two children's parents reported amplification (3.6%) as not applicable. The functional hearing status of participants varied from typical hearing ($n = 15, 28.3\%$) to mild loss ($n = 22, 41.5\%$), moderate ($n = 10, 18.9\%$), severe ($n = 4, 7.5\%$), and profound loss ($n = 2, 3.8\%$). Ten children (18.9%) were described as having additional identified disabilities of some kind. The majority of children's educational placement was described as fully or partially mainstreamed or integrated ($n = 43, 81.1\%$), while fewer children were described as placed in a separate class within a mainstream education setting ($n = 4, 7.5\%$) or in a separate school for children who are deaf or hard of hearing ($n = 6, 11.3\%$).

The majority of parent participants were mothers ($n = 51, 96.2\%$), although 2 fathers also completed the survey (3.8%). Twenty-seven participants (50.9%) were from Canada, 21 (39.6%) participants were from the United States of America, three (5.7%) from Australia or New Zealand, one (1.8%) from the Philippines and one (1.8%) unspecified. English was the first language of 86.8% of participants. The majority of parents were college graduates (50.9% mothers, 50.9% fathers), while 28.3% of mothers and 26.4% of fathers had completed graduate or professional school, 15.1% of mothers and 15.1% of fathers completed vocational or some college, and 5.7% of mothers and

7.5% of fathers had completed 9th to 12th grade as their highest level of education. The majority of parents described themselves as hearing (92.5%).

Table 2

Demographic and Background Characteristics for Parents

Variable	Frequency (Percent)	
Gender		
Mothers	51 (96.2%)	
Fathers	2 (3.8%)	
Age		
20 – 29	1 (1.9%)	
30 – 39	23 (43.4%)	
40 – 49	29 (54.7%)	
Education Level	Mothers	Fathers
9 th to 12 th grade	3 (5.7%)	4 (7.5%)
Vocational or some College	8 (15.1%)	8 (15.1%)
College Graduate	27 (50.9%)	27 (50.9%)
Graduate or Professional School	15 (28.3%)	14 (26.4%)
Marital Status		
Single	4 (7.5%)	
Married	45 (84.9%)	
In a long-term/common-law relationship	4 (7.5%)	
First Language		
English	46 (86.8%)	
Other	7 (13.2%)	
American Sign Language, Chinese, English and Czech, French, Portuguese, Russian, Unspecified		
Location		
Australia/New Zealand	3 (5.7%)	
Canada	27 (50.9%)	
United States	21 (39.6%)	
Other	2 (3.8%)	
Philippines, Unspecified		
# Bedrooms in Home		
1	1 (1.9%)	
2	7 (13.2%)	
3	19 (35.8%)	
4	18 (34.0%)	
> 4	8 (15.1%)	
Parent Hearing Status		
Deaf	3 (5.7%)	
Hard of Hearing	1 (1.9%)	
Hearing	49 (92.5%)	

Note. *N* = 53 participants in the sample

Table 3

Demographic and Background Characteristics for Children

Variable	Frequency (Percent)
Age	
4	1 (1.9%)
5	9 (17.0%)
6	12 (22.6%)
7	8 (15.1%)
8	10 (18.9%)
9	1 (1.9%)
10	3 (5.7%)
11	3 (5.7%)
12	6 (11.3%)
Gender	
Girls	25 (47.2%)
Boys	28 (52.8%)
Functional (Aided) Hearing Status	
Typical	15 (28.3%)
Mild loss	22 (41.5%)
Moderate loss	10 (18.9%)
Severe loss	4 (7.5%)
Profound Loss	2 (3.8%)
Age of Diagnosis	
< 6 months	17 (32.1%)
<12	6 (11.3%)
<36	9 (17.0%)
≥36	21 (39.6%)
Age of Amplification	
< 6 months	11 (20.8%)
<12	5 (9.4%)
<36	11 (20.8%)
≥36	24 (45.3%)
Not Applicable	2 (3.8%)
Cause of Hearing Loss	
Genetic	20 (37.7%)
Unknown	24 (45.3%)
Other	9 (17.0%)
Additional Identified Disabilities	
Yes	10 (18.9%)
No	43 (81.1%)
Preferred Mode of Communication	
Speech	40 (75.5%)
Sign	1 (1.9%)
Simultaneous speech and sign	6 (11.3%)

Variable	Frequency (Percent)
Other	5 (9.4%)
Missing	1 (1.9%)
Educational Setting	
Fully/partially mainstreamed/integrated	43 (81.1%)
Separate class in the mainstream	4 (7.5%)
Separate school for the deaf or hard of hearing	6 (11.3%)

Note. $N = 53$ participants in the sample

Descriptive Statistics of Survey Responses. Descriptive statistics for the sample in this study are displayed in Table 5. The *DESSA* yields a total score for social-emotional competence, and is then transformed to a total *T* score based on the standardization sample ($M = 50$, $SD = 10$). In the current sample, the mean *DESSA T* score of 46.13 indicates that as a group, these children were less than one half a standard deviation lower than the standardization sample in social-emotional strengths. The range of scores fell between 28-70. *DESSA T*-scores between 28 and 40 fall in the need for instruction range (at risk). Scores of 40 or less mean that the child was rated as showing few behaviors associated with the various social-emotional strengths and may be considered at risk for developing social-emotional problems (LeBuffe et al., 2008). In the current sample, 28.3% of children were rated with *DESSA T*-scores of 40 or below in the need for instruction range. *DESSA T*-scores of 41 to 59 are described as typical. Children rated in the typical range will likely benefit from universal social-emotional competence strategies. In the current sample, 58.5% of children were rated with *DESSA T*-scores in the typical range. *DESSA T*-scores of 60 to 72 should be described as having social competence strength. In the current sample, 13.2% of children were rated in the strengths range.

Girls' and boys' scores were analyzed separately. Girls' scores were calculated with a mean *DESSA T*-score of 50.44, which is comparable to the standardization sample. Boys' scores were calculated with a mean *DESSA T*-score of 42.29, which is approximately three quarters of one standard deviation below the mean of the *DESSA* standardization sample.

Child communication competence, as measured by the *Short Questionnaire for Child's Communicative Competence*, had a possible range of scores between 4 and 20. Raw scores are reported, as this measure is not standardized. In the current sample, scores ranged from 9 to 20. The mean score was calculated at 16.28 ($SD = 3.28$). This suggests that as a whole sample, parents rated their children as able to communicate at a middle-high range of ability. A frequency analysis was done to look at the range of scores in the current sample for child communication competence. In the current sample, 18.9% of children were rated to communicate in a mid-range of ability, 30.2% were rated as communicating in a mid to high range of ability, and 50.9% of the sample was rated to communicate at a high range of ability (Table 4).

Table 4

Range of Scores on the Short Questionnaire for Child's Communication Competence

A child's ability as rated by their parents to talk about the things on their mind, initiate conversation, understand what is being communicated, and explain themselves.

Description	Range of Score	Frequency	Percent
Low-Middle	4-8	0	0
Middle	9-12	10	18.9
Middle-High	13-16	16	30.2
High	17-20	27	50.9

Parental stress level was measured by the *PSI-4* (Abidin, 2012). Scores between the 16th and 84th percentiles suggest normal scores. Scores in the 85th to 89th percentiles are considered high, and scores in the 90th percentile or higher are considered clinically significant. The mean score for parental stress level for this sample was a raw score of 233.83, suggesting these parents stress levels were slightly higher than the mean of the normative sample but within the normal range. A frequency analysis revealed that 9.4% of parent raters had stress levels lower than normal ranges, 79.2% of parents reported stress levels in normal ranges, 1.9% reported stress levels in the high range, and 9.4% in the clinically elevated range. The Defensive Responding score is important to consider in light of *PSI-4* scores. A Defensive Responding score of 24 or less suggests a parent may be responding in a defensive manner, and caution should be used when interpreting the remainder of his or her scores. Low Defensive Responding scores indicate high levels of defensive responding. Extremely low Total Stress scores may also indicate defensive

responding (Abidin, 2012). In the current sample, 20.8%, or 11 of 53 participants scored 24 or less on the Defensive Responding subscale.

Table 5

Descriptive Statistics and Reliability on the SC, PSI, and DESSA

<i>N</i> = 53	Mean	Range	Cronbach Alpha Reliability
Child Communication Competence (<i>SC</i>)	16.28 (3.28)	9 – 20	.92
Parental Stress Level (<i>PSI</i>)	233.83 (52.97)	120 – 356	.96
Child Social-Emotional Competence (<i>DESSA</i>)	46.13 (11.26)	28-70	.98
Boys	42.29 (11.43)	28-69	N/A
Girls	50.44 (9.55)	28-70	N/A

Note. Higher scores for Child Communication Competence and Social-Emotional Competence indicate improved functioning. Higher scores of Parental Stress indicate higher stress levels.

To examine the hypotheses presented in this research question, a series of Pearson product-moment correlations were computed to examine the bivariate relationships between the variables and the magnitude of these associations where (a) $r = 0.1$ signifies a small positive association, (b) $r = 0.3$ signifies a positive medium association, and (c) $r = 0.5$ signifies a positive, large association (Table 6).

Table 6

Benchmarks for Pearson Product-Moment Correlations (Cohen, 1992)

Strength of Association	Coefficient, r	
	Positive	Negative
Small	.1 to .3	- 0.1 to - 0.3
Medium	.3 to .5	- 0.3 to - 0.5
Large	.5 to 1.0	- 0.5 to - 1.0

A statistically significant and negative relationship was observed between parental stress and children's social-emotional competence, corresponding to a large effect size, and consistent with the first hypothesis (Table 7). Parents who reported lower levels of anxiety of parenting stress rated their children as engaging in higher levels of self-management and relationship skills. A statistically significant and negative relationship was observed between child communication competence and parental stress, corresponding to a medium effect size, and confirmed the second hypothesis: parents who reported that their children were less able to understand concepts being explained to them also reported higher parental anxiety. Finally, a statistically significant and positive relationship was observed between child communication competence and child social-emotional competence corresponding to a large effect size ($r = .56$). Parents who reported their children to have higher communication competence also reported their children displayed higher levels of socially and emotionally competent behavior.

Table 7

Correlations for Major Study Variables (N = 53)

Variables	1	2	3
1. Communication Competence	-	-.42**	.56**
2. Parental Stress Level		-	-.59**
3. Child Social-Emotional Competence			-

Note. ** $p < .01$, two-tailed.

A one-way ANOVA was conducted to examine the effects of gender on the social-emotional competence variable. A Bonferroni correction was applied to the p value of the ANOVA (i.e., $p = 0.05/2 = 0.025$) such that statistical significance was accepted if the p values obtained from the ANOVA was less than 0.025. This correction was applied to the ANOVA procedure to reduce the likelihood of Type I errors. There was a statistically significant effect of child gender on the social-emotional competence variable, $F(1, 51) = 7.84, p < .01, \eta_p^2 = .13$, corresponding to a medium effect size measured by the partial eta squared statistic (Cohen, 1992). Specifically, girls were rated by their parents as displaying behaviors indicative of higher social-emotional competence ($M = 50.44, SD = 9.55$) compared to boys ($M = 42.29, SD = 11.43$) on the measure of child social-emotional competence (*DESSA*). This finding aligns with research suggesting that in general, girls tend to receive higher ratings of social and emotional competence compared to boys (Rudasill & Rimm-Kauffman, 2009).

Child gender, functional (aided) hearing status, and socioeconomic status (number of bedrooms in the home) were selected to be control variables in future regression analyses. Child gender was chosen because girls were shown to have scores on the

DESSA that were significantly higher than boys' scores. Thus, controlling for gender will ensure that the variance of child communication competence and parental stress in predicting child social-emotional competence are not due to gender. Functional (aided) hearing status was chosen because of its unique relevance to this population. Degree of impairment may influence social and emotional challenges (Calderon & Greenberg, 2003; 2011). Number of bedrooms was selected as a proxy for socioeconomic status. Previous studies in this area have used parent income (Quittner et al., 2010). However, a smaller home size would represent socioeconomic status because parent income is likely related to home size. Home size is also a more direct way to assess the type of environment in which a family system exists. Researchers debate the impact of socioeconomic status on child social-emotional outcomes, and there is little consensus on which demographic variables serve as the best proxy. However, the potential relationship between socioeconomic status and child social-emotional competence made it an important variable to consider as a control (e.g., Hartas, 2010).

Main Analysis

Because significant correlations were found between parental stress level, child communication competence, and child social-emotional competence (Table 7), multiple regression analyses were conducted to further determine the effect of parental stress on the relationship between child communication competence and social-emotional competence. A moderation analysis was conducted first, and a mediation analysis followed.

In order to explore the direction of the bivariate relationships observed between child communication competence, parental stress and child social-emotional competence,

a moderation analysis was conducted. A moderating variable impacts the strength of the relationship between the predictor and outcome variable. The interaction between predicting variables may serve as a better predictor of the outcome variable than one predictor alone. Thus, to see if parental stress affects the strength of the relationship between child communication competence and social-emotional competence, a moderation analysis was conducted (see Figure 3). To conduct the moderation analysis, first child communication competence was centered to eliminate any multicollinearity effects between the predictor and the moderator (Aiken & West, 1991). To center the variable, the mean child communication competence ($M = 16.28$) was subtracted from each of the individuals' scores on child communication competence. This created a new mean of zero for child communication competence. The potential moderator, parental stress, was also centered in the same manner. Then, the interaction term was created by multiplying the moderator (centered parental stress) with the centered predictor (child communication competence).

These terms were entered into a hierarchical linear regression, with child social-emotional competence as the dependent variable, in the following steps: child gender, functional hearing status and socioeconomic status were entered in step one as the control variables, centered child communication competence and centered parental stress level were entered at step two, and the interaction term (centered child communication competence * centered parental stress level) was entered at step three. If there is a significant change in R^2 when the interaction term is entered in step 3, this indicates that the moderation effect is significant. As seen in Table 8, in the third step of the regression analysis, the interaction term between child communication competence and parental

stress level was not significant. Follow-up bootstrap testing results supported this because zero was included in the 95% confidence interval. Thus, parental stress was not found to be a statistically significant moderator of the relationship between child communication competence and child social-emotional competence when controlling for child gender, functional hearing status and socioeconomic status. However, parental stress level and child communication competence were shown to be statistically significant predictors of child social-emotional competence in the second model $\Delta R^2 = .265$, $\Delta F(5, 47) = 12.30$, $p < .001$, $f^2 = .78$, which corresponds to a large effect size (Cohen, 1992). Child communication competence was shown to account for 12.04% of the variance in child social-emotional competence and parent stress level was shown to account for 17.4% of the variance in child social-emotional competence.

Figure 3: Moderation Model of Child Communication Competence, Parental Stress Level and Child Social-Emotional Competence.

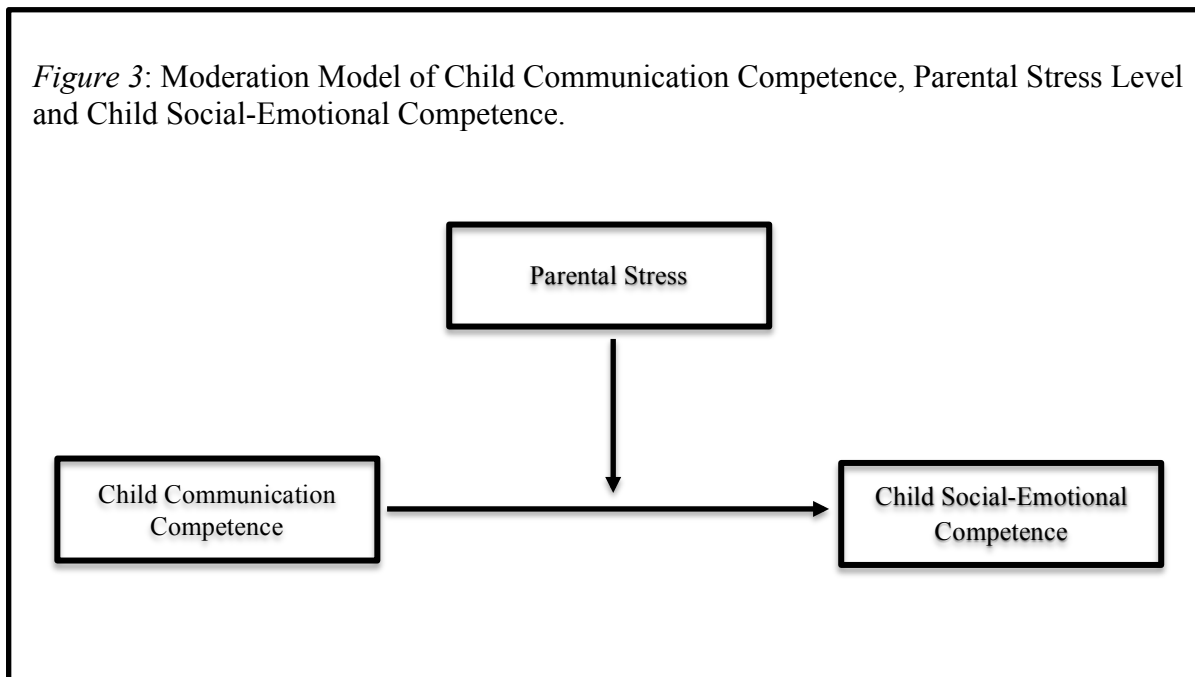


Table 8

Testing the Moderation Effect of Parental Stress on the Relationship Between Child Communication Competence and Child Social-Emotional Competence While Controlling for Child Gender, Socioeconomic Status and Functional Hearing Status.

	<i>B</i> (Unstandardized)	<i>SE B</i>	<i>B</i> (Standardized)
Step 1			
Constant	29.43	6.19	
Child Gender	7.88	2.84	.35**
Functional Hearing Status	2.88	1.36	.27*
Socioeconomic Status	1.39	1.49	.12
Step 2			
Constant	44.14	5.93	
Child Gender	3.46	2.54	.16
Functional Hearing Status	-.36	1.31	-.03
Socioeconomic Status	.27	1.28	.023
Child Communication Competence	1.19	.43	.35**
Parental Stress Level	-.09	.03	-.42**
Step 3			
Constant	44.66	6.13	
Child Gender	3.50	2.56	.16
Functional Hearing Status	-.42	1.32	-.04
Socioeconomic Status	.23	1.29	.02
Child Communication Competence	1.17	.44	.34*

	<u><i>B</i> (Unstandardized)</u>	<u><i>SE B</i></u>	<u><i>B</i> (Standardized)</u>
Competence			
Parental Stress	- .09	.03	- .42**
Level			
Interaction Term	.003	.008	.04

Note adjusted $R^2 = .180$ for Step 1; R^2 change = .265 for Step 2 ($p < .001$); R^2 change = .001 for Step 3 (*ns*). * $p < .05$, ** $p < .01$.

In order to further explore the direction of the bivariate relationships observed between child communication competence, parental stress and child social-emotional competence, mediation analyses were conducted. A mediator is a variable that accounts for how or why a predictor impacts an outcome variable. Baron and Kenny's (1986) conditions were met for parent stress level as a potential mediator. Mediation analyses were conducted to see if parent stress creates an indirect effect (amplifying or suppressing) the relationship between child communication competence and social-emotional competence. A series of four mediation analyses were conducted and two are reported below (Figures 4 and 5)².

A mediation analysis including child gender and socioeconomic status as control variables determined parental stress level as a statistically significant mediator in the model (Figure 4). Multiple regression analyses were conducted to assess each component of the proposed mediation model. First, it was found that child communication competence was negatively associated with parent stress level ($B = - 5.85$, $t(51) = - 2.79$, $p < .01$). Results indicated that the mediator, parent stress level, was negatively

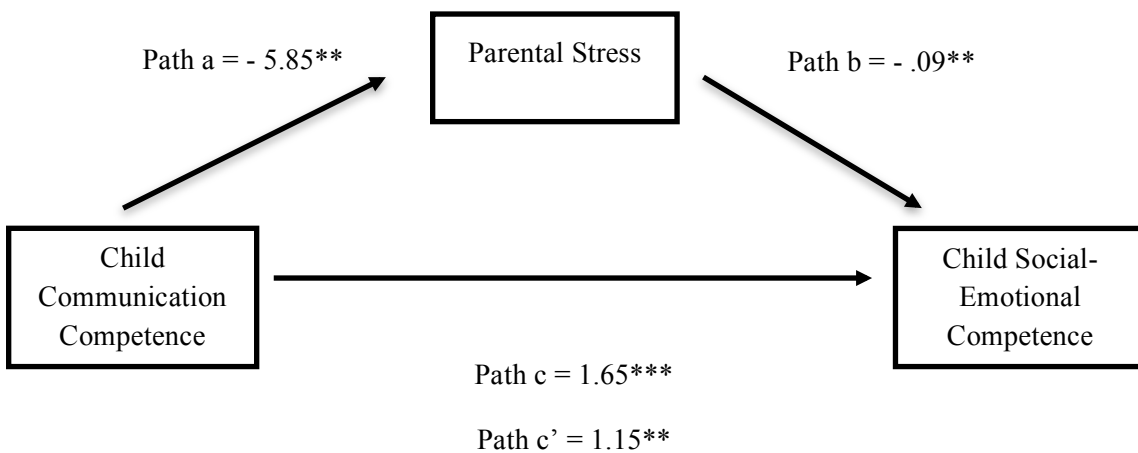
² A mediation model that considered functional hearing status, gender, and socioeconomic status as controls was not statistically significant. A mediation model that considered functional hearing status and gender as control variables was not statistically significant.

associated with child social-emotional competence ($B = -.09, t(51) = -3.43, p < .01$). Because both the a-path and b-path were significant, mediation analyses were tested using the bootstrapping method with bias-corrected confidence estimates (MacKinnon et al., 2004; Preacher & Hayes, 2004). In the present study, the 95% confidence interval of the indirect effects was obtained with 5000 bootstrap resamples (Preacher & Hayes, 2008). Results of the mediation analysis confirmed a partial mediating role of parent stress level in the relationship between child communication competence and child social-emotional competence ($B = .50$; $CI = .15$ to 1.12). Because the direct effect of child communication competence on child social-emotional competence remained significant when considering parent stress level, partial mediation is suggested. Results of this mediation analysis is displayed in Figure 4.

A second mediation analysis that included functional hearing status and socioeconomic status as controls determined parental stress level as a statistically significant and partial mediator in the relationship between child communication competence and child social-emotional competence (Figure 5). First, it was found that child communication competence was negatively associated with parent stress level ($B = -4.71, t(51) = -2.18, p < .05$). Results indicated that the mediator, parent stress level, was negatively associated with child social-emotional competence ($B = -.09, t(51) = -3.57, p < .001$). Because both the a-path and b-path were significant, mediation analyses were tested using the bootstrapping method with bias-corrected confidence estimates (MacKinnon et al., 2004; Preacher & Hayes, 2004). In the present study, the 95% confidence interval of the indirect effects was obtained with 5000 bootstrap resamples (Preacher & Hayes, 2008). Results of the mediation analysis confirmed a partial

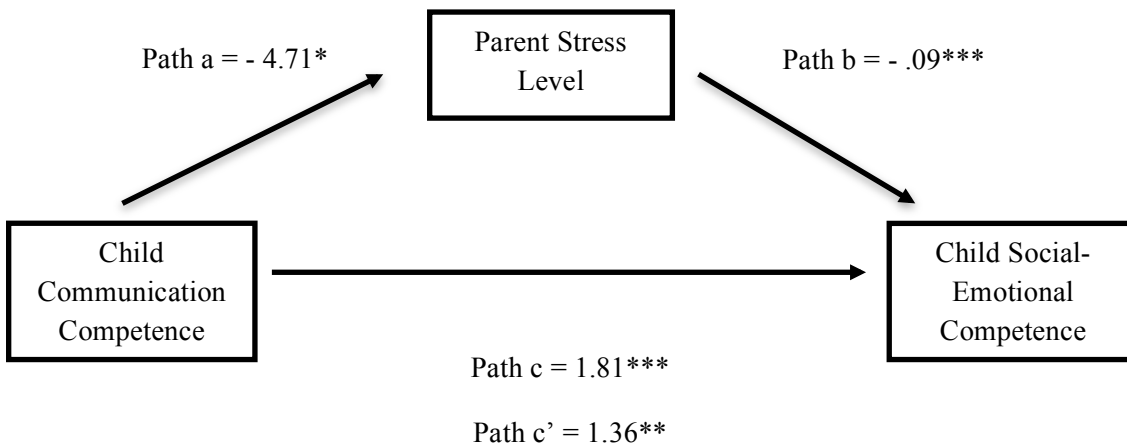
mediating role of parent stress level in the relationship between child communication competence and child social-emotional competence ($B = .44$; $CI = .11$ to 1.00). The results of this mediation analysis are displayed in Figure 5.

Figure 4. Indirect Effect of Child Communication Competence on Child Social-Emotional Competence Through Parent Stress Level Controlling for Child Gender and Socioeconomic Status.



Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Figure 5. Indirect Effect of Child Communication Competence on Child Social-Emotional Competence Through Parent Stress Level Controlling for Functional Hearing Status and Socioeconomic Status.



Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Chapter Summary

This chapter offered results from data collected electronically from 53 parents of children who are DHH. Parents were asked to report on their child's social competence, communication competence, and their own stress levels. Results from bivariate analyses demonstrated that a decrease in levels of parent stress was found to predict an increase in levels of child social-emotional competence. An increase in child communication competence predicted a decrease in parent stress levels. An increase in child communication competence predicted an increase in social-emotional competence. An effect of child gender on social-emotional competence was observed, meaning that girls were shown to have scores on the measure of social-emotional competence that were significantly higher than boys' scores. Parent stress level was not found to be a

statistically significant moderator, or did not impact the strength of the relationship between child communication competence and child social-emotional competence. Child communication competence was shown to account for 12.04% of the variance in child social-emotional competence and parent stress level was shown to account for 17.4% of the variance in child social-emotional competence in the second regression model of the moderation analysis $\Delta R^2 = .265$, $\Delta F(5, 47) = 12.30$, $p < .001$, $f^2 = .78$. There was a statistically significant indirect effect of parental stress in two mediation models where parent stress level was a possible mediator between child communication competence and child social-emotional competence. The mediation models controlled for (a) the effects of gender and socioeconomic status ($B = .50$; $CI = .15$ to 1.12), and (b) functional hearing status and socioeconomic status ($B = .44$; $CI = .11$ to 1.00).

Chapter 5: Discussion

This chapter presents a discussion of study results. This chapter begins by presenting an overview of the study's purpose, research questions, methodology, and main findings. Next, a general discussion of study results follows. Then, the strengths and limitations of this study are assessed. This chapter concludes by presenting the theoretical and practical implications of the study's results and suggestions for future research.

Overview of the Study

This study examined relationships among child social-emotional competence, child communication competence and parental stress in families of children who are deaf or hard of hearing. Parent-report data were obtained from an electronic questionnaire consisting of items from three measures: the *Devereux Student Strengths Assessment* (DESSA; LeBuffe et al., 2008), a measure of children's social-emotional competence; the *Short Questionnaire for Child's Communicative Competence* (SC, Hintermair, 2006), a measure of children's communication competence; and the *Parenting Stress Index* (PSI; Abidin, 1995, 2012) which served as a measure of parental stress. This study tested two main hypotheses: 1) as parent stress decreased, child social-emotional competence would increase, and 2) as child communication competence increased, parental stress would decrease, and child social-emotional competence would increase. The study explored the effect of gender on children's social-emotional competence. Also, this study examined the indirect and direct effects of the three main study variables (communication competence, social-emotional competence and parent stress). This study explored whether parental stress level moderated (influenced the strength of the relationship) or

mediated (amplified or suppressed) the relationship between child communication competence and social-emotional competence.

Findings indicated support for the first two study hypotheses. A decrease in parent stress levels was found to predict an increase in levels of child social-emotional competence. An increase in child communication competence predicted a decrease in parent stress levels, and an increase in child communication competence predicted an increase in social-emotional competence. Parents provided higher ratings of social-emotional competence for girls compared to boys. Parent stress level was not a statistically significant moderator of the relationship between child communication competence and child social-emotional competence, although child communication competence accounted for 12.04% of the variance in child social-emotional competence and parent stress level accounted for 17.4% of the variance in child social-emotional competence in the second regression model of the moderation analysis $\Delta R^2 = .265$, $\Delta F(5, 47) = 12.30$, $p < .001$, $f^2 = .78$. There was a statistically significant indirect effect of parental stress in two mediation models where parent stress level was a possible mediator between child communication competence and child social-emotional competence. The mediation models controlled for (a) the effects of gender and socioeconomic status ($B = .50$; $CI = .15$ to 1.12), and (b) functional hearing status and socioeconomic status ($B = .44$; $CI = .11$ to 1.00).

Discussion of General Findings

Children in this sample were rated slightly lower on average than the standardization sample of the *DESSA* on their social-emotional competence ($.5 SD$). This is consistent with previous research suggesting that children and adolescents with hearing

loss are at risk for adverse outcomes related to social competence (Barker et al., 2009; Mitchell & Quittner, 1996; van Eldik et al., 2004; Quittner et al., 2010). Notably, 28.3% of the current sample fell within the need for instruction range in social-emotional competence compared to 16.1% in the *DESSA* standardization sample, which suggests that more children in this sample were at risk of exhibiting and developing social-emotional problems than in typical populations. Similarly, parent stress level for the sample as a whole was slightly elevated on average compared to the normative sample for the *PSI*, although still within normal ranges. This finding aligns with previous research showing that parents of children who are DHH may not show elevated stress levels on the *PSI* when compared to parents of hearing children (Åsberg et al., 2008; Meadow-Orlans, 1994; Pipp-Siegel et al., 2002). This underscores the importance of measuring context-specific stressors in parents (with typical hearing) of children who are DHH, such as communication difficulties with their children (Quittner et al., 2010).

The finding that increased parent stress is related to lower child social-emotional outcomes is also consistent with previous literature on hearing children and those children who are DHH (Crnic & Low, 2002; Hintermair, 2006, Quittner et al., 2010; Watson et al., 1990). Slowed language development has been suggested as a specific characteristic of parenting children who are DHH (Pipp-Siegel et al., 2002). Thus, a finding that an increase in child communication competence predicted a decrease in parent stress levels is in line with previous research. Finally, a positive relationship between child communication ability and social-emotional outcomes was also observed by Barker et al. (2009), who found that language was associated with behavior problems both directly and indirectly through effects on attention. The finding in this study that

gender had an effect on social-emotional competence is consistent with children in hearing samples. Girls tend to score higher than boys on measures of social and emotional behavior in typically developing samples of children (Rudasill & Rimm-Kauffman, 2009).

Although parent stress level was not found to be a statistically significant moderator of the relationship between child communication competence and social-emotional competence, the variance that child communication (12.04%) and parent stress (17.4%) contributed to social-emotional competence are notable. Parent stress level was found to be a statistically significant and partial mediator of the relationship between child communication and social-emotional competence in models where control variables of gender and functional hearing status were not combined (Figures 4 and 5). One explanation of this finding is that there may be a suppression effect of functional hearing status on gender in the overall model.

Strengths and Limitations

Previous research that has examined social-emotional development in children who are DHH has largely focused on behavior problems rather than social-emotional skills (Hintermair, 2006, Quittner et al., 2010). This study looked at the unique social and emotional skills of DHH children, as rated by their parents. By focusing on strengths rather than deficits in children, a strengths-based approach can create a sense of accomplishment, and promote social and academic development (Epstein & Sharma, 1998). A focus on positive traits may provide a different portrait of an individual's psychological functioning (McConaughy & Ritter, 2002; Reid, Epstein, Pastor, & Ryser, 2000). Another strength of this study is its online administration format that enabled

participants to be included who are typically more difficult to reach from this low-incidence population (Mitchell & Karchmer, 2006). Finally, the sample was comprised of children attending school in a mainstream school setting (81.1%) which builds on previous research that has focused on children in separate schools for children who are DHH (Hintermair, 2006).

The use of home size (number of bedrooms in the home) as a proxy for socioeconomic status is a unique feature of this study. Previous studies in this area have used parent income as a proxy for socioeconomic status. For the purposes of this study, home size (number of bedrooms) was used as an alternative variable that would be linked to household income, and was an indirect way to assess the environment in which a family system exists. Previous research has linked personal space to stress (Vine, 1982). However, there may be other variables linked to socioeconomic status that are not captured by reports of the number of bedrooms in a home.

The main limitation of this study is its single-informant design. Because the study is based on parent report only, study results are limited to this perspective. Parenting stress may also impact parental perceptions of child adjustment (Crnic & Low, 2002). Future research should include multiple raters or observations of children's behavior in context to provide a more broad view of children's functioning. Because this study is cross-sectional rather than longitudinal, results are also limited to one time period in a child and family's life cycle.

The measures used in this study were chosen based on previous research, and were psychometrically sound. One limitation of the PSI (Abidin, 1995, 2012) is that it measures general parenting stress rather than context-specific stress to parenting a child

who is deaf or hard of hearing (Quittner et al., 2010). Thus, stress levels may have been more elevated in some cases than *PSI* scores revealed because the *PSI* may be missing items that measure stress related to parenting a child who is DHH, such as communication difficulty between the parent and the child. Finally, the measure used for child communication competence did not have many items and was not standardized, which may limit study findings.

Children in this sample were rated lower than the standardization sample of the *DESSA* on their social-emotional competence (.5 *SD*). Similarly, parent stress level for the sample was slightly elevated compared to the normative sample for the *PSI* although still within normal ranges. Although these findings are in line with previous research on social-emotional competence and parent stress in this population, the mean values for the sample were not markedly lower in child social-emotional competence or clinically elevated in parent stress levels as a whole. One explanation for these findings is that the analysis for this study was based on mean values, which mask individual differences in the sample. As previously mentioned, nearly one third of the sample (28.3%) fell within the need for instruction range in child social-emotional competence compared to 16.1% in the *DESSA* standardization sample which suggests that this portion of child participants was at risk in social-emotional competence overall. Parent stress levels were high or clinically elevated in 11.3% of the sample, and 20.8 % of parents scored a high level of defensive responding. This suggests that the stress level in this portion of the sample might have been higher than reflected in total stress scores. Participant demographics may have also influenced the findings. For example, the majority of the

children in this sample were functionally hard of hearing, which differs from similar studies where the majority of child participants were deaf (Hintermair, 2006).

Theoretical Implications

This study supports previous research that child social-emotional development of children who are deaf or hard of hearing is at risk, and highlights the contribution of child communication ability and parental stress variables to child social-emotional development. The role of gender and functional hearing status have emerged as important demographic variables to consider in future research. Given the effect of gender found on social-emotional competence in this study, it might be that hearing status is a more complicated risk factor for boys' development of social and emotional competence. This underscores the importance of early identification and amplification for all children, and especially boys who are DHH.

Practical Implications

If both child communication ability and parental stress contribute to overall child social-emotional competence, they serve as important foci for helping professionals working with these children and families. For example, in addition to supporting communication in developing children, optimal parenting strategies for deaf children could be further identified to support parents in keeping healthy stress levels (DesJardin, Eisenberg, & Hodapp, 2006).

Suggestions for Future Research

Future studies that consider multiple perspectives on child and family development over time would add to this body of research. The functional hearing status

of 28.8% of the current sample was in the typical ranges. If a similar study examined a sample of children whose hearing loss had been identified early through newborn hearing screening, the results could be compared. An early-identified sample would likely have a higher functional hearing status proportion than was represented in this study. Future research that seeks to understand contextual factors contributing to child social-emotional outcomes in this population would be valuable. For example, might there be a threshold level of parental stress that impacts child social-emotional competence in children who are deaf or hard of hearing over time? Ongoing research on social-emotional development in this vulnerable population will be important.

Conclusion

Counsellors working with families of children with disabilities need to be equipped to work to support both children and parents. A greater understanding about how to foster positive social-emotional development in children who are deaf or hard of hearing is needed. This study sought to investigate the relationships between child social-emotional competence, child communication competence, and parental stress level. Although it is important not to generalize these findings to all families with children who are deaf or hard of hearing, this research suggests that efforts to improve child communication competence and support parents in reducing their own stress may positively impact children's social and emotional development. Counsellors working with these families should give extra attention to stress reduction strategies that are unique to parenting children who are deaf or hard of hearing.

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Appendix A. Consent Form

THE UNIVERSITY OF BRITISH COLUMBIA



Faculty of Education
Department of Educational & Counselling
Psychology & Special Education
2125 Main Mall
Vancouver, B.C. Canada V6T 1Z4
XXX Tel
XXX Fax

Consent Form

Children who are Deaf or Hard of Hearing: Child Social-Emotional Competence, Child Communication Competence, and Parental Stress

Principal Investigator: Dr. Lynn Miller, Associate Professor
Department of Educational and Counselling Psychology and Special Education
University of British Columbia
Phone: XXXX

Co-Investigator: Brita Colero, Graduate Student, Counselling Psychology
Department of Educational and Counselling Psychology and Special Education
University of British Columbia
Phone: XXXX

Sponsor: Social Sciences and Humanities Research Council of Canada, J.A. Bombardier Canada Graduate Master's Scholarship

Purpose: The purpose of this study is to examine the relationships between child social-emotional development, child communication competence and parental stress level in families with children with hearing loss. You are invited to participate as a parent of a child with hearing loss between the ages of 5 and 12. This study is being conducted for a Master's thesis.

Study Procedures: The online questionnaire will take approximately 25-35 minutes to complete. As a participant, you will have an opportunity to be entered into a draw for a \$100 Visa gift card.

Confidentiality: All information entered will be stored on a secure site within Canada. You will not be identified by name in any reports of the completed study.

Potential Risks and Benefits: Because questions ask about aspects of parenting stress and child development, you may experience a variety of feelings ranging from positive to those of discomfort while completing the questionnaire. A list of resources will be

provided should any feelings of discomfort arise. Should you wish to receive study results, you will have an option to indicate your interest at the end of the questionnaire.

Contact for information about the study: If you have any further questions or desire further information, please contact Brita Colero at XXXXX, or XXXXX.

Contact for concerns about the rights of research subjects: If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line at the UBC Office of Research Services at XXXX or if long distance e-mail to XXXX.

Consent: Your participation in this study is entirely voluntary and you may refuse to participate or withdraw at any time by clicking “exit this questionnaire”. If the questionnaire is completed, it will be assumed that consent has been given.

Appendix B. Counselling Resources

THE UNIVERSITY OF BRITISH COLUMBIA



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COUNSELLING RESOURCES

Australia

<http://www.lifeline.org.au/>

Canada

http://www.mcf.gov.bc.ca/contact_us.htm

http://www.child.alberta.ca/home/local_offices.cfm

<http://www.socialservices.gov.sk.ca/contacts>

<http://www.gov.mb.ca/healthyliving/mh/index.html>

<http://www.familyserviceontario.org/>

http://www.gov.ns.ca/health/mhs/find_help.asp

<http://www.gnb.ca/0055/contacts-e.asp>

<http://www.healthpei.ca/mentalhealth>

<http://www.health.gov.nl.ca/health/departement/contact.html#mha>

http://www.hlthss.gov.nt.ca/english/services/addictions/contact_us.htm

http://www.hss.gov.yk.ca/mental_health.php

<http://www.hss.gov.nu.ca/en/Your%20Health%20MHA.aspx>

<http://www.suicideprevention.ca/in-crisis-now/find-a-crisis-centre-now/>

Europe

<http://www.samaritans.org/>

United States

National Hopeline Network (1-800-SUICIDE, 1-800-784-2433)

Other International Online Resources

<http://www.befrienders.org/>

Appendix C. Recruitment Advertisement

THE UNIVERSITY OF BRITISH COLUMBIA



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Vancouver, B.C. Canada V6T 1Z4
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RECRUITMENT ADVERTISEMENT FOR WEBSITES AND/OR SNOWBALL SAMPLING

Do you have a child with hearing loss (who is deaf or hard of hearing) between the ages of 5 and 12?

As a mother of a young child with hearing loss, I know how important it is to foster healthy social-emotional development in our children. Not much is known about factors contributing to positive social-emotional development in children with hearing loss and so I need your help. Please consider participating in a study for my Master's thesis that will consider relationships between child social-emotional competence, child communication competence and parental stress.

Details:

- 25-35 minute electronic survey (you will not be identified by name)
- A chance to win a \$100 Visa gift card
- To participate e-mail [XXX](#) and you will be sent a unique online link

For more information contact:

Brita Colero
XXXX
XXXX

Appendix D. Third Party Recruitment Email

THE UNIVERSITY OF BRITISH COLUMBIA



Faculty of Education
Department of Educational & Counselling
Psychology & Special Education
2125 Main Mall
Vancouver, B.C. Canada V6T 1Z4
XXX Tel
XXX Fax

THIRD PARTY RECRUITMENT EMAIL

Dear XXXX,

As a mother of a small child with hearing loss, I know how important it is to foster healthy social-emotional development in our children. As my Master's thesis at the University of British Columbia, I am conducting a study examining the relationships between child social-emotional development, child communication competence and parental stress levels in families of children with hearing loss.

I am looking to recruit parents with children who are deaf or hard of hearing between the ages of 5 and 12 to complete a 25-35-minute online survey. Study participants will be offered the opportunity to be entered into a draw for a \$100 Visa gift card. The study can be found at www.tba.

I wonder if you would be willing to forward an e-mail advertisement to parents you think may be interested, or post it on your website.

I would be happy to speak with you further about this study should you have questions.


Sincerely,

Brita Colero

XXXXXX
XXXXXX

Appendix E. Recruitment Poster

THE UNIVERSITY OF BRITISH COLUMBIA



Faculty of Education
Department of Educational & Counselling,
Psychology & Special Education
2125 Main ~~Unit~~
Vancouver, B.C. Canada V6T 1Z4
XXX Tel
XXX Fax

Do you have a child with hearing loss (who is deaf or hard of hearing) between the ages of 5 and 12?

As a mother of a young child with hearing loss, I know how important it is to foster healthy social-emotional development in our children. Not much is known about factors contributing to positive social-emotional development in children with hearing loss and so I need your help. Please consider participating in a study for my Master's thesis that will consider relationships between child social-emotional competence, child communication competence and parental stress in a sample of parents of young children who are deaf or hard of hearing.

Details:

- 25-35 minute electronic survey (you will not be identified by name)
- A chance to win a \$100 Visa gift card
- To participate e-mail [XXXX](#) and you will be sent a unique online link

For more information contact:
Brita Colero
XXX
XXX

To participate in an online study on social-emotional development in children 5-12 who are deaf or hard of hearing please email [XXXX](#)

To participate in an online study on social-emotional development in children 5-12 who are deaf or hard of hearing please email [XXXX](#)

To participate in an online study on social-emotional development in children 5-12 who are deaf or hard of hearing please email [XXXX](#)

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To participate in an online study on social-emotional development in children 5-12 who are deaf or hard of hearing please email [XXXX](#)

Appendix F. Demographic Information Form

(Questions were entered in Fluid Surveys that contained boxes for participants to check)

INFORMATION ABOUT YOU

What is your role in your child's life...

Mother

Father

Other, please specify...

Are you...

Single

Married

In a long term/common-law relationship

Other, please specify...

What year were you born? (drop down menu)

What month/day were you born? (MM-DD)

Your first language is...

English

Other, please specify...

Where do you live? (check one)

Australia/New Zealand

Canada

China

Europe

India

United States

Other, please specify...

How many children are in your family?

1

2

3

more than three (please specify):_____

Which of the following best describes your living space?

Basement suite

Apartment/condo

Townhouse

Detached home

How many bedrooms are in your home? (check one)

1

2

3

4

more than four (please specify): _____

Do you...

Rent your living space

Own your living space

How would you describe your hearing status?

Hearing

Deaf

Hard of Hearing

INFORMATION ABOUT YOUR CHILD

What year was your child born? (drop down menu)

What month/day was your child born? (MM-DD)

Your child is...

Female

Male

What is your child's aided hearing status?

Normal

Mild Loss

Moderate Loss

Severe Loss

Profound Loss

Other, please specify...

What is your child's un-aided hearing status?

Slight loss

Mild Loss

Moderate Loss

Severe Loss

Profound Loss

Other, please specify...

At what age was your child diagnosed?

- < 6 months
- < 12 months
- < 36 months
- ≥ 36 months

At what age did your child begin using amplification?

- < 6 months
- < 12 months
- < 36 months
- ≥ 36 months
- N/A

What is the cause of your child's hearing loss?

- Genetic
- Other
- Unknown

Does your child have any additional identified disabilities?

- Yes
- No

What is your child's preferred way to communicate with others?

- Speech only
- Sign only
- Simultaneous speech and sign
- Other, please specify...

Which best describes your child's educational setting:

- Fully or partially mainstreamed/integrated
- Separate class in the mainstream
- Separate school for the deaf or hard of hearing
- Other, please specify...