

What impact, if any, does profound deafness have on the
formation of the attachment relationship between the
profoundly deaf infant and hearing mother?

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Attestation of Authorship

“I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.”

Signed: _____ Date: _____

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Abstract

This dissertation addresses the question: what impact, if any, does profound deafness have on the formation of the attachment relationship between a profoundly deaf infant and hearing mother? A modified systematic literature review has been employed as the methodology for this research. Literature was gathered from two main sources. First, the body of knowledge of attachment theory with particular emphasis on the developing attachment relationship between the mother/infant dyad during the first 18 months of the infant's life. Second, from the body of knowledge pertaining to the development of hearing and infant deafness. In order to address the dissertation question it was necessary to consider risks to the development of the attachment relationship between the hearing mother/deaf infant dyad. The study found that risks might be centred on two specific themes, that of a) communication mismatching, and b) the effects of maternal resolution to the emotional impact of the confirmation of infant deafness. However, insufficient evidence was found to reach firm conclusions about the impacts. It could be expected that the identified risk factors might lead to a higher incidence of insecure attachment. However, this hypothesis was not fully supported by the available literature, which found no significant difference in the distribution of secure and insecure attachment. Reasons for this finding could include adaptation within the mother/infant dyad toward greater use of non-auditory modes of communication.

Chapter 1 – Introduction

The aim of this research is to explore what impact, if any, does profound deafness have on the formation of the attachment relationship between the profoundly deaf infant and his/her hearing mother?

Background to choice of research topic

My interest in this topic first emerged during my work in a support role capacity with hearing parents of profoundly deaf children. My subsequent study in child and adolescent psychotherapy has deepened this interest and inspired the question posed in this dissertation.

Between 2000 and 2006 I worked as a counsellor and family support services co-coordinator with parents and families of profoundly deaf ¹children, ranging in age from infancy to school age. The families attending the service were enrolled in an Auditory-Verbal Therapy (A-VT)² preschool habilitation programme in which the infant or child was enrolled prior to receiving a cochlear implant (CI)³. Typically, my role commenced soon after the parents had received confirmation of their infant's profound deafness. Working closely with these families, I had the opportunity to observe and engage with them as they began to explore the meaning for them and their family of adjusting to deafness. As my role was focused on the parents, predominantly but not exclusively the mother, my initial curiosity was in relation to the parental experience of a deaf infant or child. A number of questions arose for me in relation to these families; for example, did the mothers feel differently toward their child, knowing that they were deaf? Did the mothers wish they had known from birth, or not known until later, and how did the family as a whole manage this transition? As some of these questions began to be addressed in individual conversations and support groups with the parents, my curiosity turned to the infants and children themselves.

I began to wonder how the absence of hearing might influence how infants and children learned to understand themselves in the context of their world, when

¹ Profound deafness denotes the least amount of hearing available naturally (Andrews, Leigh, & Weiner, 2004).

² Auditory-Verbal Therapy (AV-T) is a method for teaching deaf children to listen and speak using their residual hearing, in addition to the constant use of amplification devices such as cochlear implants and hearing aids (Meadow-Orlans, Mertens & Sass-Lehrer, 2003).

³ A cochlear implant is a surgically implanted electronic device that provides hearing sensations to a person who is profoundly deaf or severely hard of hearing (Meadow-Orlans et al., 2003).

much of what I knew and understood, about interpersonal relating both generally and specifically as a mother, involved sound and hearing. It was this questioning, coupled with what I recognised as a layperson's knowledge of infant and child development that sparked a desire for a more theoretical understanding of infants and children. This curiosity and desire for knowledge led me to the study of child and adolescent psychotherapy. The newly formed theoretical understanding that I developed during the course of my study has provided me with a framework to examine hearing mother/deaf infant dyads in their early formation and development, through the process of this review of literature.

Theoretical framework

The concept of attachment is based on the premise that the infant's close affectional bonds underpin healthy infant development with a primary caregiver. Within this paradigm, it is believed that it is in the infant's first relationship, usually with the mother, that the foundation for future relationships is initiated (Karen, 1994). Attachment can be described as an enduring bond to the preferred attachment figure evoking feelings of love, and distance from the preferred attachment figure evoking feelings of sadness and anxiety (Holmes, 1993).

At the core of attachment theory is the notion of a universal human need to form close affectional bonds (Bowlby, 1982). According to attachment theory the quality of attachment begins during the first months of life (Cassidy, 1999; Fonagy, 2001; Holmes, 1993; Karen, 1994) within a mutually interacting system (Brisch, 2002; Stern, 1985). Questions may then arise as to how the attachment relationship develops between the deaf child and hearing mother if this mutual interaction is not activated or is experienced or perceived as not being activated by one partner within the system.

Donald Winnicott and Margaret Mahler's contributions to the school of object relations theory will also be discussed, as these developmental perspectives place specific importance on aspects of the formation of the mother/infant dyad.

Initial literature review and contextualising this study

Initially, literature was sourced from known books and journal articles pertaining to attachment theory and literature specifically focused on infant

deafness. Subsequently, literature was accessed through electronic databases, books and journals available through the Auckland University of Technology (AUT) library including the inter-loan service.

Early in my search, I uncovered a Masters dissertation entitled *The psychosocial impact on hearing children of deafness in their primary caregiver* (Ward, 2009). Although the focus of Ward's dissertation is substantially different from my topic, the reference list cited proved helpful in the initial stage of my research.

As expected, I found extensive literature on the topic of attachment, for example, Ainsworth (1989), Bowlby (1958, 1979, 1988), Brisch (2002), Cassidy, (1999), Fonagy (2001), Holmes (1993), Howe (2006), Karen (1994), Marvin, Cooper, Hoffman and Powell (2002), Sroufe (2005), and Thomson, Kennedy and Kuebli, (2011). Literature pertaining to deaf infants and children from a developmental perspective, however, appeared to be less prevalent.

Initially, I was not able to source literature specifically related to my research question, which is interested in the time period when the attachment relationship between a hearing mother and deaf infant is in its early formation.

Much of the literature involving younger children and infants focussed on qualitative analysis of parents' responses to the identification of their child's deafness (Devise & Loots, 2003; Gilbey, 2010; Hintermair, 2004; Howe, 2006 and Wallis, Musselman & MacKay, 2004), rather than the influence of the child's deafness on the development of the parent-child attachment relationship. Lederberg and Mobley (1990) suggested that, "Although the effect of child hearing impairment on preschoolers' mother-child relationship has been studied, little is known about younger deaf children's relationship with their mothers" (p. 1596).

Over the past three decades increasing interest in the development of deaf infants and children has resulted in research being undertaken in a variety of settings and contexts (Thomson et al., 2011). Most often cited in the literature is a longitudinal study undertaken by Meadow-Orlans, Spencer and Koester (2004). This study, conducted over 15 years, included 80 dyads divided into four equal groups of deaf infants/hearing mothers; deaf infants/deaf mothers, hearing infants/hearing mothers and hearing infants/deaf mothers. The research was designed to describe the social, cognitive and communication development of the infants, while at the same time questioning the impact of hearing loss on the

mother/infant dyads (Meadow-Orlans, Spencer, et al., 2004). Several components of this study are included in later chapters.

The paucity of research primarily focussing on the early attachment relationship between a hearing mother and her profoundly deaf infant may be due in part to the age at which profound deafness is detected. Profound deafness is not generally identified until the child is at least 12 months of age (Harrison, Roush & Wallace, 2003). However, it would appear that this is now changing, and in countries where newborn hearing screening⁴ is in place, deafness may be detected as young as three months of age (Thomson et al., 2011).

Clarification of terms

The World Health Organisation (WHO) and the United Nations Children Fund (UNICEF) classify *infancy* as the first 12 months of life (WHO, 2011; Unicef, 2011). Using this period as a guide, I have extended that definition to 18 months to cover the generally accepted timeframe for the forming of the attachment relationship. My focus is the mother/infant dyad, and the term *mother* has been used throughout this dissertation to indicate the person primarily responsible for day-to-day care of the infant, which may include fathers and professional caregivers. In addition the term *mother* is used interchangeably with the term caregiver. To avoid gender confusion, male pronouns have been used when referring to the infant. As the term *diagnosis* (of deafness or hearing loss) may imply a medical bias, this dissertation will instead use the terms *detection*, *confirmation* and *identification* interchangeably to denote identification of hearing loss.

Context of deafness

Deafness is typically not detected prior to 12 months of age, as has been previously stated. It is for this reason that I consider deafness to stand apart from other congenital disabilities such as blindness, cerebral palsy or Downs Syndrome that are typically identified in the early stages of infancy and therefore present different issues for the formation of attachment in the mother/infant dyad. Prior to detection of

⁴ Newborn hearing screening is a programme for early detection and identification of newborns with hearing loss. In New Zealand (NZ) the newborn hearing screening programme is aiming to assess within the infant's first 18 months (Universal Newborn Hearing Screening and Early Intervention Programme (UNHSEIP), 2011).

hearing loss, the mother may intuitively be aware of some difference in ‘connecting’ with her infant, which may have implications for the quality of relating between mother and infant. Thomson et al. (2011) suggested that the sense of not connecting with her infant may evoke maternal frustration resulting in over involvement or withdrawal from her infant prior to identification of deafness. The mother’s ability to reflect and mentalize (Fonagy, 2001) may be mediating factors in her ability to build an emotional bond with her infant.

If there is a perceived lack of reciprocity on the part of the hearing mother she may, through uninformed assumptions, view herself as less than sufficiently attuned to her infant. This assumption may further lead to, or reinforce, a barrier to a secure mother/infant attachment developing which may in turn result in negative consequences for the infant’s psychological and emotional well being (Karen, 1994) and the on-going mother/child relationship (Stern, 1985).

Dissertation outline

The dissertation is divided into six chapters. The present chapter discusses the research subject, gives the context for the choice of topic and documents the initial literature search. Chapter Two introduces the research methods and techniques employed. Chapter Three provides a general introduction to deafness and examines the influence of deafness on the infant and mother/infant dyad development. Using the theoretical framework of attachment theory and object relations theory, Chapter Four discusses the development of the attachment relationship within the mother/infant dyad focusing on the period from pregnancy through to 18 months of age. Chapter Five is in three sections. The first section examines the aspects of attachment formation that typically involve auditory communication between mother and infant in order to identify areas of potential risk to the attachment relationship. The second section examines the areas of potential risk. Chapter Five concludes with a discussion of the impacts found in the literature search. Chapter Six concludes the dissertation by discussing its relevance and considering the clinical value of the study. It also discusses the limitations, makes recommendations for further research and ends with concluding remarks.

Chapter 2 – Methodology

Introduction

In this chapter, concepts of qualitative research, systematic literature review and evidence based practice will be discussed and linked to the aim of the study. The systematic literature review process will be explained and the reasons for modification of the systematic review will be identified and justified.

Qualitative research

According to Humphris (2005), qualitative research provides a range of methods by which to understand “phenomena in their own environment” (p. 32). Tolich and Davidson suggested that qualitative research aims to interpret and explain behaviour by examining qualities, and is interested in “interpretation and contextualisation” (2003c, p. 123), focusing on “reflecting the quality of something” (2003a, p. 19). The process of enquiry afforded by qualitative research allows events to be understood as they naturally unfold within their own framework without attempting to manipulate variables (Humphris, 2005).

The enquiry process of this study is encapsulated within the paradigms of both deafness and infant development within a relational context, examining, where possible, the psychological experiences of both infant and mother as the attachment relationship forms in the dyad. The purpose of this research is to consider the quality of relationship between the profoundly deaf infant and his hearing mother with particular regard to the impact, if any, of the infant’s profound deafness on this relationship. Furthermore, it is expected that the insight gained from interpretation of the qualitative phenomena of this specific mother/infant dyad will inform clinical practice and identify areas for further research in this field.

It is anticipated that findings from this study may assist health practitioners, for example paediatricians, occupational therapists, general practitioners, clinical psychologists and child and adolescent psychiatrists in addition to child and adolescent psychotherapists working with deaf children and their families. Furthermore it is believed that this study will be relevant to other professions working with infants, children and parents, such as early childhood teachers, social

workers and those specifically working with the deaf, for example, audiologists, teachers of the deaf and auditory-verbal therapists.

Evidence-based practice

Evidence-based practice (EBP) provides the framework for systematic reviews and has its roots in evidence-based medicine (Roseberg & Donald, 1995). The principles of evidence-based medicine have been extended to incorporate non-medical practices, including psychotherapy, with the ultimate goal of supporting practitioners “in their decision making in order to eliminate the use of ineffective, inappropriate, too expensive and potentially dangerous practices” (Hamer, 1999, p 6). EBP is defined as a process of “finding, appraising and applying scientific evidence to the treatment and management of healthcare” (Hamer, 1999, p 6). According to Pearson (2010) “... evidence based practice is not exclusively about effectiveness; it is about basing practice on the best available evidence” (p. 489). Geddes (2000) indicated, “the goal of evidence-based practice is to identify the study design best suited to providing the least biased answer possible to a question” (p. 83).

Within this study, qualitative methodology is better suited to the research question, which is focused on the psychological experiences of both mother and infant, thus meeting the goal of EBP.

Systematic literature review and modified qualitative systematic review

Systematic literature reviews were first applied to quantitative data particularly randomized controlled trials (RCTs) (McDermott & Graham, 2005; Webb & Roe, 2007). However, they are now applied to both qualitative and quantitative research with a growing interest in integrating and synthesizing qualitative research findings (Evans, 2007).

A systematic review of literature aims to appraise and synthesize data gathered from scientific studies (Dickson, 2005). Tolich and Davidson (2003b) indicated that a systematic literature review “places the topic in context and demonstrates its relevance by making connections to an existing body of knowledge” (p.95).

According to Dickson (2005), a systematic review “brings together and assesses all available research evidence” (p. 44). As stated, the question in this study is located within the qualitative framework where data will be extracted and synthesized rather than statistically compiled or quantified as in a traditional systematic literature review. Therefore, this review is a modified qualitative literature review. As Cook, Mulrow and Haynes (1998) posited, “when the results of a study are summarized but not statistically combined, the review may be called a qualitative systematic review” (p. 7).

Systematic review process

Dickson (2005) identified the six components of the systematic review process that this dissertation will follow. First, the research question is defined: specifically, “what impact, if any, does profound deafness have on the formation of the attachment relationship between the profoundly deaf infant and hearing mother?” The main focus of this systematic literature review has been to gather material related to infant deafness and the formation of the attachment relationship between the infant and his mother. Where possible, the dyadic mother/infant relationship has been researched from a psychodynamic perspective in order to contain the study as much as possible within the psychodynamic body of knowledge. This perspective, while aligning with my course of study in child and adolescent psychotherapy entails enquiry into the underlying conscious and unconscious aspects of human behaviour. The psychodynamic perspective in this study includes theoretical perspectives from attachment theory, notably the work of John Bowlby and Mary Ainsworth, as well as perspectives from Donald Winnicott and Margaret Mahler. These theories each present a developmental perspective, with particular focus on the psychological processes in the development of the mother/infant dyad.

Second, a comprehensive search of literature was undertaken. According to Dickson, (2005) the basics of a search include database and hand searching, gathering references of relevant material, contact with relevant researchers and unpublished material. Initially, a thorough search of AUT library databases, including PsychInfo, Psychoanalytic Electronic Publishing (PEP), ProQuest Dissertation and Theses, and Google Scholar was undertaken. The AUT search tool Summon was also used. A

summary of findings is in Table 1 (p. 9). For a more detailed summary of search results, see Appendix A (p. 58). A hand search of the AUT library was also carried out and additional books were accessed from the AUT library database. Each article and book was in turn searched for further references. The literature search continued until references appeared repeatedly, indicating saturation of the available literature. Websites of organisations such as: The National Foundation for the Deaf; Hearing Association of New Zealand; New Zealand Audiological Society; Deaf Aotearoa New Zealand; Ministry of Health and Project HIEDI (Hearing Impairment – Early Detection and Intervention) were searched for data specific to infant deafness in New Zealand. In four cases, direct enquiries were made via email to individuals or organisations in order to clarify sourced material. The Multidisciplinary Health and Development Research Unit at Dunedin School of Medicine was also contacted via email. In this case, the enquiry was made regarding infant deafness in the longitudinal study undertaken by the research unit. Other avenues of search included literature considered relevant by AUT staff.

Table 1: Summary of Database, Journal and Website Search

Database	Number of relevant publication
PsychInfo	37
Psychoanalytic Electronic Publishing (PEP)	17
ProQuest Dissertation & Theses	2
AUT Scholarly Commons	9
Google Scholar	4
AUT Summon	9
Academic Search Premier (EBSCO)	8

Third, selection of literature for inclusion and exclusion was determined. My research question is interested in the period when the attachment relationship is in its early formation, typically beginning within the first months of life (Atwool, 2007; Fonagy, 2001; Keller, 2008; Sroufe, 2005) within a mutually interacting system (Brisch, 2002; Stern, 1985). Therefore, the age of the child referred to in the

literature was an inclusion factor where the age was stated to be 18 months or younger, and included studies cited where infants were 18 months and younger at the outset of the study.

Literature related to deaf infants and children from a developmental perspective was selected, as was literature focusing on the mother/infant dyad from a relational or developmental perspective. Further criteria for inclusion related to psychiatry or psychology and infant or childhood deafness. Literature pertaining to risk factors to attachment development in the deaf infant/hearing mother dyad was also included.

Literature pertaining exclusively to deaf mothers, deaf adolescents, and modes of non-verbal communication were excluded from this review as they fall outside of the specific question. Literature in languages other than English was also excluded.

The fourth element of a systematic literature review requires quality appraisal of the included literature. Due to the qualitative nature of the selected literature, the Critical Appraisal Skills Programme (CASP) tool was used (Humphris 2005). CASP is specifically designed for use in conjunction with qualitative research, presenting a broad guideline and utilising the areas of rigour, credibility and relevance from which to consider principles or assumptions characterising qualitative research (Greenhalgh & Taylor, 1997).

The fifth component is the extraction of the data. Due to the paucity of research on the topic of attachment between deaf infants and hearing mothers, (Lederberg & Mobley, 1990; Thomson, et al., 2011) it has been necessary to locate information from two strands of literature, which will be used in combination to address the research question. First, hearing and infant deafness, with literature accessed from a variety of academic and educational writing. Second, literature pertaining to attachment theory and object relations theory, which encompass infant development and mother/infant dyad development. In keeping with the paradigm of the field of psychotherapy, the theorists included in the latter have been chosen for specificity to inform child psychotherapy practice and research.

The synthesis of these research findings, which is the sixth and final step of the systematic review process, is developed and discussed in Chapter Five. This discussion combines material from the literature review on attachment formation

with the material on deafness, to consider whether and how infant deafness impacts attachment formation. Key findings will be presented and discussed.

Conclusion

This chapter has posed the dissertation question, stated the aim of the study and articulated the methodology adopted for the research. Concepts of qualitative research, systematic literature review and evidence-based practice have been discussed and linked to the aim of the study. Modification of the literature review has also been articulated. The systematic literature review process has been articulated and the literature search has been discussed.

Chapter 3 – Deafness

Introduction

The purpose of this chapter is to explore deafness in the infant. The chapter starts with a general introduction to deafness followed by a section examining the impact of infant deafness on the infant, the mother and in the family.

Introduction to deafness

Aetiology

The 2010 New Zealand Deafness Notification Database (DND) report (Deafness Notification, 2011) cites that 85 percent of all reported hearing losses in New Zealand have an unknown aetiology, with 61 percent reported as having no family history of hearing loss (Digby, Kelly & Purdy, 2011). Andrews et al., (2004) agree that the cause of hearing loss is generally unknown. The suggestion that infant deafness may be unexpected and of unknown cause may have implications for both the age of detection and for the maternal response upon confirmation of her infant's deafness. These implications will be discussed in Chapter Five.

Categories of deafness

Hearing is measured in decibels (dB) and deafness is generally ranked mild, moderate, moderate severe, severe and profound; with profound being the greatest degree of hearing loss (Andrews et al., 2004) see Table 2 (p. 13).

Profound hearing loss, which this study is focused on, describes absence of hearing to the extent where the loudest sounds expected for the human ear are undetectable. An audiogram, shown in Figure 1 on page 14, provides a diagrammatic measurement of the hearing threshold, or the quietest sound detected. The Audiology test, administered by an audiologist, records the quietest sound detected across a range of frequencies (Andrews et al., 2004). Of particular interest to this study is the placement on the audiogram of the sound of the human voices, in particular, the female voice, shown in Figure 1 (p. 14). With the decibel level of profound deafness being >90dB, the female human voice sits well outside the range of sound detection. This is of significant interest in consideration of the profoundly deaf infant/hearing mother dyad relationship.

Table 2: Categories of Hearing Loss

Decibel Level	Degree of Hearing Loss
0 – 15 dB	normal hearing
16 – 25dB	slight hearing loss
26 – 40dB	mild hearing loss
41 – 55dB	moderate hearing loss
56 – 70dB	moderately severe hearing loss
71 – 90dB	severe hearing loss
>90dB	profound hearing loss

(Andrews et al., 2004)

Deafness as a paradigm

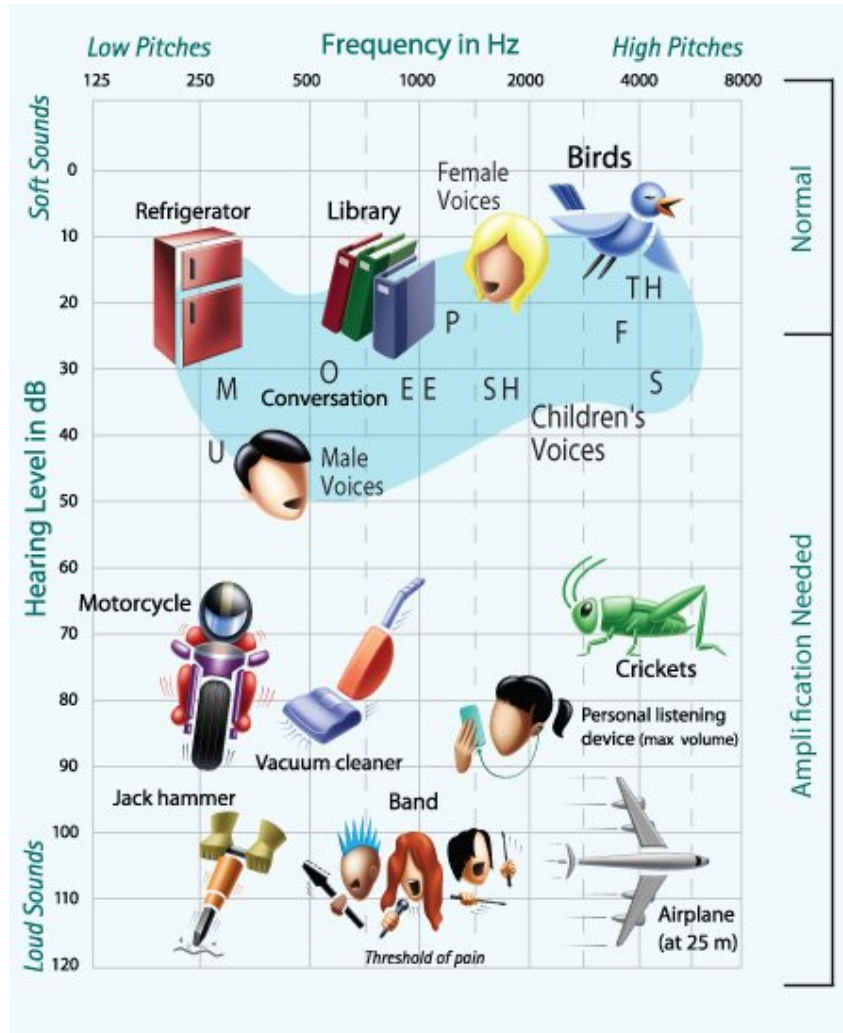
The paradigm of deafness has shifted from being viewed exclusively as a pathological condition, often a medical perspective. Chovaz McKinnon, Moran & Pederson (2004) noted that, “early research considered deafness only from a medical perspective, conceptualizing it as a pathological deficit” (p. 368). Hindley, Hill, McGuigan and Kitson (1994), who contended that deafness was considered from a range of positions, defined deafness as both a medical condition and a sociological and cultural phenomenon. Chovaz McKinnon et al., (2004) contrasted the medical perspective with the perception of those within Deaf culture⁵ as “perceiving themselves as members of a linguistic minority with a rich cultural heritage” (p. 368). This supports the premise suggested by Hauser, Wills and Isquith (2006) that the term deafness is now primarily associated with cultural values or identity.

In relation to language, prior to the 1960s, deafness was largely seen as a disability (Serani, 2001). In many cases, signing was banned, marginalizing those for whom sign language was their primary mode of communication (Padden & Humphries, 2005). The Deaf community emerged during the civil rights movement of the 1960s and gave rise to Deaf culture. Deaf culture, with sign language as the

⁵ For more in depth reading of Deaf culture the reader is directed to Padden & Humphries (1998, 2005), the writing of Lane (1992), notably *The Mask of Benevolence* and Monaghan, Schmalting, Nakamura, and Turner (2003), for a global perspective on Deaf culture.

primary language, encompasses a social framework, history and traditions that has persistently fought for recognition alongside the hearing community (Corina & Singleton, 2009; Serani, 2001). This persistence is evidenced in New Zealand by the status granted to New Zealand Sign Language (NZSL) as an official language in 2006 (National Foundation for the Deaf, 2011).

FIGURE 1 Sample Audiogram



Source: Copied with permission from (Hearing-Aid.com, 2011)

Infant deafness

Having considered deafness in a social context in the previous section, the following discussion will examine the implications of deafness for the infant and the typical maternal experience and response to infant deafness.

Development of hearing in utero and early infancy

Chapter One established the use of the term infant to indicate the first 18 months of life. However, to investigate the implications of profound hearing loss on the attachment relationship between a profoundly deaf infant and his hearing mother, it is important to consider the development of hearing from the point it originates in utero.

It has been well established that the human ear begins to develop from the fourth week after conception (Berk, 2006) and that hearing develops in the human foetus from the 24th week of gestation (Hepper, 2002; Urban, 1989). It is further believed that the human infant is capable of hearing his mother's voice in utero as supported by the findings of Marschark (1993b) and Harris (2000). In Harris' (2000) research on social interaction between deaf children and their parents, the author chronicled the studies of DeCasper and Spence (1986), DeCasper and Fifer (1980) and DeCasper, Lecanuet, Busnel, Granier-Deferre and Maugeais (1994), establishing a common understanding that "external speech sounds, including the mother's voice" (p. 7) are clearly audible in utero. It is further suggested that the foundations for hearing in utero provides the hearing infant with a physical link to the outside world and more specifically to his mother (Urban, 1989). The infant in utero has become accustomed to sounds made by his mother, suggesting that a connection has been established between her and the infant that is unique to them alone. Urban (1989) further contended that the hearing infant is born already familiar with his mother's voice and therefore already in relationship, albeit auditorily, with her.

Having established the infant's ability to auditorily discriminate the mother's voice in utero, Slater, Field and Hernandez-Reif (2002) maintained that due to the maternal voice being the most "intense acoustic signal" (p. 89) found in the foetal amniotic environment, it is unsurprising to find that post-natally, infants show preference for their own mother's voice. DeCasper and Fifer's seminal study (1980) concurred, demonstrating that babies in utero during the latter stage of pregnancy learn to recognise familiar speech patterns, enabling them to identify and discriminate their mother's voices as newborns (Richards, Frentzen, Gerhardt, McCann & Abrams, 1992). For the hearing infant, this discrimination may contribute to the foundation of

the attachment relationship with his mother and will be examined further in Chapter Four.

Infant vocalisation

Typically, by the age of two months, infant's early vocalisations are produced in the form of cooing, which develops into babbling at approximately four months (Berk, 2006). These early babblings may unwittingly indicate to the mother, that the infant's hearing is fully functioning. However, for these vocalisations to develop further, the infant requires auditory input in order to copy what he hears (Berk, 2006; Lederberg, 2003). In the deaf infant these vocalisations do not develop unless intervention in the form of hearing aids or cochlear implants is provided. Even then a delay may occur due to the fitting and customisation of assistive devices (Berk, 2006).

In the case of deafness being identified in this time frame the mother may then commence using sign language to provide continuity of communication with her infant. However, in the absence of identification of deafness, it may not be before seven months, the age when vocalisations would typically develop further, that the mother is alerted to the possibility of her infant's hearing loss (Berk, 2006; Lederberg, 2003).

Wedell-Monnig and Lumley (1980) studied mother/infant dyads, hearing and deaf, observing interactions during free play when the infants were aged between 1.2 years and 2.5 years. The authors suggested in their findings that hearing parents might mistake the range of responses given by the infant as being solely from the parent's vocal stimulation (1980). The hearing parent will typically use vocal communication in conjunction with a range of non-verbal cues, such as facial gesture and movement, all of which the infant will be responding to (Wedell-Monnig & Lumley, 1980). This phenomenon may have implications for the ways in which the infant with undetected deafness is related to by his mother and the natural expectation from his mother that he is able to hear.

Discovery of infant deafness

It is well documented that more than 90 percent of profoundly deaf infants are born to hearing parents (Berk, 2006; Corina & Singleton 2009; Meadow-Orlans & Spencer, 1996; Thomson et al., 2011; Wallis et al., 2004) who may have no prior

experience of deafness. It is widely regarded that it is the mother who is first alerted to the possibility of the infant's hearing loss, suggesting that it may be the subtle disruption to the mother's expectations of reciprocity that initially alerts her (Brinich, 1981; Meadow-Orlans et al., 2003). The length of time for initial suspicions to be aroused and for confirmation of the infant's deafness may impact on the quality of the reciprocal relationship between mother and infant. According to Meadow-Orlans and Steinberg (2004), the age at which the deafness is identified and the availability of parental support services may contribute to a more positive impact on the parents and family.

Mutual communication in the mother/infant dyad

After the birth of her infant, a mother will typically build on the connection begun in utero by using her voice to develop and maintain the relationship with her infant. This may be by singing, speaking or cooing. The term *motherese* is frequently used to describe the particular tone, volume and cadence a mother uses to vocalize with her infant (Koester, Traci, Brooks, Karkowski & Smith-Gray, 2004). The mother is likely to establish a repertoire of sensory modalities with which to communicate with her infant. For instance she may touch, hold, stroke, smile at, rock, cuddle, feed and make eye contact with her infant (Meadow-Orlans, Erting & Moores, 2004). Koester (1994), in a review of studies of attachment behaviour between deaf infants and their caregivers, suggested that maternal vocalisations do not typically occur in isolation from other stimulation. Thomson et al. (2011) concurred, positing that natural maternal behaviours may include "tactile, kinesthetic and visual stimulation" (p. 51). Marschark (cited in Traci & Koester, 2003) noted that in the phase prior to the detection of her infant's hearing loss, the mother may make intuitive accommodations in the ways in which she communicates with her infant. According to Traci and Koester (2003), hearing parents may intuitively accommodate their interactions and are thereby being "trained" (p. 195) by their infant to provide more physical contact or more visual communication. Koester (1992), in her paper reviewing the model of "intuitive parenting"⁶ (p. 366) posited that, "hearing parents may mistakenly interpret the infant's response to visual and vibratory events as responses to their vocalisations" (p. 366). This mistaken interpretation may be a

⁶ Intuitive parenting is defined as "nonconscious behaviours that in fact are ideally suited to support the human infant's natural inclination to adapt to its social world" (Andrews et al., 2004, p. 162).

contributing factor to the time lapse between maternal suspicion of deafness and confirmation of infant deafness by an audiologist.

Infant's early experience of deafness

As shown on the audiogram (Fig.1, p.14), for the profoundly deaf infant, the human voice sits outside the range of naturally available sound. Therefore, the profoundly deaf infant is unlikely to experience the perception via sound of the caretaker's arrival. The gradual disappearing and reappearing of the mother does not occur (Brinich, 1981; Jamieson, 1995; Schlesinger, 2000). For the profoundly deaf infant, the appearance of the maternal figure in his line of sight is perhaps the first perception the infant has of his mother's pending arrival (Schlesinger, 2000).

Andrews et al. (2004) concurred, noting that prior to the identification of deafness, the mother unwittingly deprives her infant of her presence each time she leaves his line of sight. According to Wood, Wood, Griffiths and Howarth (cited in Koester, 1995), the deaf infant relying on non-auditory channels of communication needs to attend sequentially rather than simultaneously, in order to stay in communication. A hearing infant, on the other hand, does not need to pay this much attention to timing and coordination (Koester, 1995). Additionally, Koester suggested the deaf infant may make adaptations to compensate for reduction of sensory contact unbeknown to his mother and may use visual attention to manage the process of communication (Koester et al., 2004).

Maternal and parental responses to infant deafness

It was during the 1970s, the impact of deafness on both the child and the family was initially studied and subsequently documented (Feher-Prout, 1996). Literature focused on the mourning period that parents were believed to experience in response to the detection of hearing loss in their child adding to the current body of knowledge at the time regarding family dynamics (Feher-Prout, 1996). Hearing mothers of deaf infants, according to Schlesinger and Meadow (1973), were generally categorised as "inflexible, controlling, intrusive, disapproving" (p. 107). In consideration of the maternal experience of parenting a deaf infant, Jamieson (1995) proposed that hearing mothers may experience feelings of powerlessness when faced with the detection of their infant's hearing loss, which in turn may lead

to a dominant interactional style and may be evidenced by a maternally controlling style of parenting.

It is widely regarded that maternal feelings aroused at the time of confirmation of her infant's deafness may be due in part to the loss the mother is experiencing (Gilbey, 2010). Furthermore, it is regarded that mothers (parents) experience a wide range of emotions at the time of detection of their infant's deafness. These emotions may include guilt, anxiety, anger, confusion, overwhelm and loss (Andrews et al, 2004; Brinich, 1981; Feher-Prout, 1996; Gilbey, 2010; Koester & Lahti-Harper, 2010; Meadow-Orlans & Steinberg, 1993; Schlesinger, 2000), shock, denial, sorrow and depression (Brinich, 1981; Feher-Prout, 1996; Meadow-Orlans & Steinberg, 1993) and rejection or disappointment in the child (Gilbey, 2010; Pipp-Siegel, Sedey & Yoshinaga-Itano, 2002). In his qualitative study of parents of deaf children with hearing loss identified during early childhood, Gilbey (2010) noted that, parents remembered in detail the meeting at which they were told of their child's hearing loss up to a decade later. Gilbey further noted "the discussion (itself) of the (original) encounter also evoked strong emotional responses" (p. 267). Clements and Barnett (2002) suggested that the experience for parents at the time their infant's hearing loss is detected may be likened to "that of grieving for a lost child" (p. 627). Similarly, Hauser et al. (2006) describe the parents' process as one of grief, with emotional "waves" (p. 121). The authors stated that these unpredictable and often unresolved feelings occur repeatedly over the child's life, and at times of developmental transition, the parents may be more acutely aware of their child's deafness.

In their longitudinal study investigating the impact of child deafness on mother's stress and social support, Lederberg and Golbach (2002) reported that mothers of deaf children experienced stress specifically in relation to the issues of their child's deafness, rather than general parenting stress. The authors concluded that, though the hearing mothers of deaf children reported anxiety related to their infant's communication and projected abilities to be independent adults, it did not seem to affect other areas of their lives in relation to added stressors or anxieties. However, according to Quittner et al. (2010), the necessary adaptation of communication for the family may produce a strain on the existing relationships due to usual and familiar modes of communication not being available. Parents must now learn a mode of previously unknown communication with their deaf infant rather than relying on intuitively based communication (Quittner et al., 2010).

Furthermore, parental stress at the point when their child's hearing loss is identified may include feelings of inadequacy regarding their ability to communicate in a meaningful and understandable way with their deaf infant (Meadow-Orlans, Koester, Spencer & MacTurk, 2004).

Gilbey (2010) concurred in his qualitative study that significantly higher stress levels in the hearing mothers of deaf children were evident. This study included 96 mothers of children with hearing loss compared to a control group with mothers of hearing children. In Gilbey's study, parents noted that their child's deafness and accompanying decisions, for example, regarding choice of communication modality, affected the whole family.

Parents' response may be tempered by their own views of deafness as a disability and their knowledge of deafness (Clements & Barnett, 2002). In addition, factors such as temperament, adult attachment styles, and the child's place in the family may also be components of the parental and family responses (Thomson et al., 2011).

Conclusion

This chapter has discussed deafness, first in general terms and second in relation to the infant including early vocal and reciprocal communication, identification and confirmation of deafness and implications for the deaf infant/hearing mother dyad as well as the implications for the wider family. The following chapter will consider the development of the mother/infant dyad from early beginnings prior to birth, through to 18 months, from the theoretical paradigm of attachment theory.

Chapter 4 – Development of the Mother/Infant Dyad

Introduction

This chapter discusses the development of the mother/infant dyad from the early stages of attachment formation prior to birth. It includes the process of maternal development and the mutual development of the mother/infant dyad. Attachment theory is the principal theoretical paradigm motivating the exploration of this dissertation and has developed from the significant pioneering work of John Bowlby and Mary Ainsworth.

Attachment theory

Attachment theory as originally formulated by John Bowlby, proposes a universal human need to form close affectional bonds with at least one primary caregiver for healthy emotional and social development. At the core of attachment theory is the reciprocity of early relationships, which Bowlby maintained is a precondition of normal development in all mammals, including humans (Bowlby, 1982). This reciprocity is located in the dyadic relating between mother and infant and is the origin of emotional regulation, forming the foundation for later individual emotional regulation (Fonagy, 2001; Howe, 2006; Sroufe, 2005).

John Bowlby, psychologist, psychoanalyst and child psychiatrist, founded the theory of attachment in the 1940s, drawing on ethology and integrating psychoanalytic object relations theory with concepts from evolutionary biology, systems theory and cognitive psychology. Bowlby emphasised the significance of the reciprocity of early relationships on the ongoing development of personality, believing that attachment develops within the mutual mother/infant interactions during the infant's first year of life. Attachment is dyad specific, with the infant's biologically based drive to seek proximity to the caregiver serving as protection from danger and ensuring survival (Bowlby, 1979).

Bowlby conceived the term 'attachment' from whence attachment theory takes its name, to describe the basic human desire for proximity and close affectional bonds building over time, between infant and primary caregiver, through intense day-to-day social interactions (Bowlby, 1979; Fonagy, 2001; Holmes, 1993; Karen, 1994). According to Maher (1989), the mother and infant "form a dyad in which the two are

involved in a continuing reciprocal relationship during all stages of the (infant's) development" (p. 210).

Attachment behaviours, which form the most fundamental aspect of attachment theory, are believed to form an "attachment behavioural system" (Cassidy, 1999, p. 5). A variety of behaviours, with specificity to each dyad, enables each infant to meet his goal in whatever way is suited to him, both developmentally and contextually. Attachment behaviours remain flexible in that the infant is able to utilize a variety of behaviours in order to elicit the desired response of increasing proximity to the preferred attachment figure. For example, when the mother is preparing to leave the infant in an unfamiliar environment, he may, in turn, reach for her, follow her or cry in order to elicit desired proximity to her (Cassidy, 1999; Howe, Brandon, Hinings & Schofield, 1999). It is through repeated interactions, that the infant develops a preferred attachment figure who the infant will turn to when feeling distressed or threatened, thus employing the attachment figure as a 'secure base'.

The term 'secure base' is used in attachment theory to describe the perceived ambience of care provided by the caregiver to whom the infant returns when seeking protection and comfort (Holmes, 1993; Weinfield, Sroufe, Egeland, & Carlson, 1999). The ambience of the secure base created by the mother provides the infant with an experience of the mother being available, responsive and sensitive. When the attachment relationship is created this way, the infant who experiences these core qualities is believed to develop a secure attachment, a pattern of attachment style first defined by Mary Ainsworth.

Ainsworth, a developmental psychologist, worked alongside Bowlby for more than 40 years. Their collaboration included Ainsworth's extension of Bowlby's work outlining phases of attachment and secure base exploration. Ainsworth's extensive observations of mothers and infants enabled her to explore the impact of separation of the infant from the mother, culminating in her hypothesis of phases of attachment development (Karen, 1994). This interest further culminated in Ainsworth's significant contribution to attachment theory: definition of three classifications of attachment patterns of behaviour. These patterns were initially identified as one secure and two insecure patterns, insecure-avoidant and insecure-ambivalent (Karen, 1994). Table 3 (p. 23) describes the patterns of attachment as defined by Ainsworth and includes the fourth category, insecure-

disorganised, which was noted by Mary Main and added later (Main & Solomon, 1986).

Table 3: Patterns of Attachment

Group	Brief Description
Secure attachment (B)	Infant uses mother as secure base during exploration. Signs of missing mother during separation. On reunion, actively greets mother seeking comfort if required, then returns to play.
Insecure-avoidant (A)	Explores with little sign of secure base behaviour. Shows few overt signs of distress at separation. Actively avoids mother on reunion possibly pulling away if mother makes physical contact. Shows active interest in toys, seeks distance from mother.
Insecure-ambivalent (C)	Visibly distressed and unsettled by separation. Not easily pacified on reunion. May seek contact, then actively resists, or displays passivity and clinging behaviour toward mother. Fails to find comfort from mother.
Insecure-disorganised (D)	Behaviour appears to lack observable goal, demonstrates lack of coherent attachment strategy

(Holmes, 1993; Howe et al., 1999)

Patterns of infant attachment styles are identified through the Strange Situation Procedure (SSP) (Ainsworth & Bell, 1970; Crain, 2011), an empirical procedure administered over 20 minutes, involving mother and infant, typically 12 to 20 months old, and an unfamiliar person. The procedure is designed to elicit the

infant's responses to separation and re-union with the mother in an environment of moderate induced stress (Brisch, 2002; Meadow-Orlans, 2004). An outline of the episodes of the SSP is shown in Appendix B (p. 65).

Attachment development is divided into four stages through infancy (Bowlby, 1979) with the first three; pre-attachment, attachment-in-the-making and clear-cut-attachment, taking place during the period of infancy specified in this dissertation. Table 4 (p. 24) summarises the infant's activities associated with each stage. The development of the infant's attachment relationship is illustrated by the gradual increase in attunement with the mother through maternal sensitivity to her infant's behaviours and emotions. It is from this synchrony between mother and infant that the infant learns to regulate his own behaviours and feelings (Howe et al, 1999). Of particular interest to the development of the mother/infant dyad of this study are characteristics of attachment development that are centered on auditory communication and these will be discussed in more detail in Chapter Five.

Table 4: Stages of Attachment Development

Age	Stage	Associated Activities
0 – 2 mths	Pre-attachment: Undiscriminating social responsiveness	Preference for human face and voice, enjoyment of social interaction, tracks carers visually, listening results in physical excitement when engaged
3 – 6 mths	Attachment-in-the- making: Discriminate social responsiveness	Recognition of preferred people and faces by increased vocalisation, smiling, crying, than with strangers, growing interest in preferred caregiver, able to 'read' mother's behaviour and moods allowing increasing competence and effective interactions

7mths – 3yrs	Clear-cut attachment: Active initiative in proximity and contact	Demonstrates selective attachment to one figure, actively seeking out and maintaining contact with attachment figure, beginning to alter behaviour in service of personal needs and purposes, ability to choose attachment behaviours (smiling, crying, following)
3yrs+	Goal-directed attachment:	Development of more sophisticated understanding of own and mother's behaviour, beginnings of cognitive representation of carers' needs and ability to distinguish from own, increasing independence, less need of physical presence of carer, security increasingly a 'felt' experience

(Howe et al., 1999)

The quality of the dyadic relationship plays an important role in the construction of the infant's perception of himself, his environment and the relationship between the two. Attachment theory defines this construct as the 'internal working model' (IWM), which can best be described as a psychological map built from repeated patterns of interaction (Holmes, 1993; Howe et al., 1999). It is generally believed that a securely attached infant will have internalised an IWM of a reliable, nurturing and warm caregiver and will therefore experience himself as lovable, supported and worthwhile, and consequently relationships will be viewed this way in general throughout life. Conversely, it is thought that those infants classified as insecure and disorganised may have internalised distorted representations of self and other, which in turn may lead to insecure attachments (Holmes, 1993; Karen 1994). The importance of the IWM to this study is the timeframe of early infancy when these foundations for stability and coherence are laid (Bowlby, 1979).

Object relations theory

In alignment with attachment theory which focuses on the early dyadic relationship between mother and infant, object relations theory examines

developmental processes and early relationships (St Clair, 2004), placing specific emphasis on the infant's internalised representation of the relationship with his mother, determining that it is this experience that forms the basis for all future relating. Two object relations theorists have been included in this study, Donald Winnicott and Margaret Mahler, due to their specific contributions to the understanding of the development of the mother and the mother/infant dyad.

Donald Winnicott

Donald Winnicott, pediatrician and psychoanalyst from the independent group of the British school of object relations, coined the phrase 'good enough mother' to describe the mother's conscious and unconscious attunement physically and emotionally to her infant, adapting throughout the stages of infancy in order to provide an optimum environment for the emotional development of her infant (Fonagy, 2001; St Clair, 2004). Winnicott (1965) also coined the phrase 'primary maternal pre-occupation' to describe the heightened sensitivity of the mother both to herself and her infant. Winnicott's (1960) statement, "there is no such thing as a baby" (p. 587) emphasised the crucial dyadic nature of mother and infant, and spoke to the importance of the mutuality of their relationship in nurturing the development of the infant. This mutuality between mother and infant is echoed in attachment theory in the term 'dynamic equilibrium' (Bowlby, 1982).

Margaret Mahler

Margaret Mahler, physician, pediatrician and child psychiatrist focused her theory of separation-individuation on the conscious and unconscious maternal attitudes toward the infant. Mahler, from the American school of object relations, contended that the way the infant is cared for is crucial to the way the infant in turn views itself. Mutual cueing, between the mother and infant, which is established in early infancy, is a reciprocal interaction whereby both partners read signs and signals from each other and react to them (Mahler, Pine & Bergman, 1975). Blum (2004) agreed, describing mutual cueing as when "the infant selectively responds to cues for which the mother has shown a preference" (p.541). Blum further posited that mutual cueing is believed to be a forerunner to mutual verbal communication.

Mahler's view of infancy is one in which the infant achieves a sense of self within an early interpersonal relationship, mirroring the reciprocity suggested by Bowlby to be at the heart of attachment theory. While Mahler inferred that serious mismatching between the mother and infant may result in less than optimal development for the infant, she concurred with Winnicott's notion of 'good enough mothering' (Crain, 2011).

Development of the mother/infant dyad

The first part of this chapter discussed the theoretical framework pertaining to the development of the mother/infant dyad. The remainder of the chapter focuses on the development of the mother/infant dyad, beginning with the early stages of attachment formation prior to the infant's birth, including the psychological features of pregnancy, followed by the beginnings of attachment for the developing infant. Second, the process of maternal development, including the impact of the mother's own attachment style and emotional maternal attunement will be discussed. Lastly, the reciprocal processes that take place between mother and infant, including processes of mutuality and reciprocity will be considered.

Pregnancy as a normative crisis and the early formation of attachment

Pregnancy is seen as a time of adjustment, physically, emotionally and psychologically for the mother. A 'normative crisis' a 'period of ambivalence' and 'great psychological change' are each descriptions given to this period when motherhood is forming and foundations are laid for the infant's future relationships (Brazelton & Cramer, 1990; Raphael-Leff, 1993; Stern, 1995). For the infant in utero, this is the very beginning of human development, and for mother and infant, the beginning of a dyadic relationship without which the infant cannot survive, physically, emotionally or psychologically. The ways in which the mother views her infant prior to birth, coupled with her sense of motherhood are seen to influence both the relationship between the mother and her infant, as well as the mother's ability to resolve stress that may arise due to unexpected aspects of motherhood.

During this formation of motherhood, maternal anxieties may rise in the form of fears of the pregnancy ending before term or that the infant may in some way be different from the desired infant. Brazelton and Cramer (1990) suggested that from

approximately five months, when the mother is first aware of her infant physically, she begins to identify with and form attachment to her infant. The authors further posited that the early maternal relationship with her unborn infant is predicated on the mother's prior relationships with an imaginary child and with the developing foetus she carries.

In order for the mother to facilitate the successful development of a healthy infant in the context of a reciprocal relationship, the mother becomes, as Winnicott suggests by his term 'primary maternal preoccupation', preoccupied with the needs of her infant during the latter stages of pregnancy and into the early postnatal period (Cohen & Slade, 2000; Winnicott, 1965). Stern (1995) concurred, using the term 'primary relatedness' to include Winnicott's concept of primary maternal preoccupation. Stern described primary relatedness as one of three themes making up the concept of 'motherhood constellation', which he described as a period of maternal social-emotional engagement with the infant, beginning at birth and extending over 12 months.

Maternal development

The importance of maternal emotional availability is frequently referred to in literature on attachment, and the ability of the mother to attune to her infant's needs is considered to be a central feature of healthy well-adjusted psychological development (Karen, 1994; Maher, 1989). In object relations theory, Stern (1985) referred to this maternal characteristic as 'maternal attunement', which Ainsworth (1984) suggested as the basis for secure attachment.

Research into attachment reveals the key role of the caregiving parent in shaping the infant's attachment behaviours, including the parent's own childhood experiences of being parented, in conjunction with their current systems of support, as major influences on their own capacity to parent (Hopkins, 1999). The mother's family of origin experience of relationships, as well as her current psychological resources, become influencing factors in the quality of attachment relationship the mother creates with her infant (Belsky & Isabella, 1988). Karen (1994) concurred, indicating that maternal attachment style may typically include, both consciously and unconsciously, replication of the ways in which the mother herself was parented.

Mutuality

Mutual cueing (St Clair, 2004) is the term Mahler used to describe the response that evolves between the mother and infant, and is posited as the forerunner to mutual verbal communication (Blum, 2004). The process of mutual cueing occurs when the mother responds to some of the infant's cues regarding needs. The infant then modifies his behaviour in response to the cues chosen by the mother. Similarly, Winnicott (1965) described a "reflective mutuality" (p. 112) between mother and infant in which the mother's responsiveness to her infant gives rise to the infant's reflection of himself in the mother's expression. The responsiveness of the mother in relation to her infant's needs is based on the quality of the relationship between mother and infant, which, according to attachment theory, forms during infancy and develops through the human lifespan (Stern, 1985).

Conclusion

The first section of this chapter discussed the developmental theory of attachment and the body of knowledge provided by prominent theorists in relation to the formation and development of the mother/infant dyad. In the second section, aspects of the developing mother/infant dyad, selected from the review of literature were discussed. The following chapter seeks to directly address the research question through synthesising the literature discussed in Chapters Three and Four.

Chapter 5 - Impacts of Deafness on Attachment

Introduction

In order to assess the potential impacts of infant deafness on the development of the attachment relationship with the hearing mother, it is first necessary to consider the risks that infant deafness may pose to attachment development. Chapters Three and Four introduced the separate strands of literature on Deafness and Attachment Development. Chapter Five combines these strands to examine, in the first instance, aspects of attachment development that typically involve auditory communication between mother and infant in order to identify areas of potential risk to attachment formation. The second section discusses the literature that addresses these areas of potential risk. The chapter concludes with a discussion of the evidence from the literature regarding the impacts of infant deafness on the development of attachment in the mother/infant dyad.

Potential risks

Risks during pregnancy and newborn

Hearing begins to develop in the human foetus from the 24th week of gestation (Hepper, 2002), and the ability of the foetus to experience the mother's voice is well documented (Marschark, 1993b). Brazelton and Cramer (1990) claimed that attachment begins forming in utero with the mother typically bonding with her infant auditorily throughout the latter stages of pregnancy. The authors posited that the infant's involvement in this relationship is through auditory recognition of the mother's voice for whom the infant has developed a preference by birth.

Marvin and Britner (1999) posited that newborn infants are soothed in response to gentle auditory stimuli and that they show a preference for the human voice. Simpson (1999) concurred, pointing out that the newborn's preference for the human voice is a normative feature of attachment formation. Further, the seminal work of DeCasper and Fifer (1980) found that newborn infants show a clear preference for the sound of their mother's voice.

It appears that, during the newborn phase, maternal expectation would typically include an auditory channel of communication with her infant. While attachment theory does not specify the necessity of hearing in mutual relating for the

foetus and the newborn with the mother, the absence of this channel of communication may suggest a barrier to mutuality developing between the hearing mother and deaf infant, specifically when the mother is unaware of the infant's deafness.

Risks during early infancy

Attachment theory suggests that, during the first two months, infants are indiscriminating in their social responsiveness (Howe et al., 1999) and although in general not selectively or preferentially responding to their mothers, they do exhibit prosocial behaviour from birth (Howe et al., 1999). For example, the infant shows a preference for the human face and voice, demonstrated around three or four weeks by the social smile (Crain, 2011; Mahler, et al., 1975) and is capable of recognising the mother's voice (Richards et al., 1992). The infant's physical excitement during early infancy is considered to be in response to both visual and auditory input (Bowlby, 1979) as the mother establishes a repertoire of sensory modalities with her infant (Koester, 1994; Koester et al., 2004). This heightened maternal sensitivity is described as maternal attunement by Stern (1985) and is likely to form the basis of secure attachment (Ainsworth, 1984). In this beginning phase of mutuality the mother becomes attuned to a selection of her infant's cues and responds accordingly, which the infant in turn will, over time, respond to as a forerunner to mutual verbal communication (St Clair, 2004).

In order to remain in contact with her infant when not in visual contact, the mother may use vocalisation in the belief that this maintains a connection. However, without an auditory channel of communication, the deaf infant may not, as the mother may typically expect, be experiencing her presence and departure as a gradual disappearing and reappearing (Schlesinger, 2000). The risk to the developing attachment relationship may be that the appearance of the mother is a sudden and unexpected event, perhaps disrupting the infant's sense of trust and felt sense of security typically experienced as a consequence of maternal predictability (Howe et al., 1999). A felt sense of security in the infant, according to Weinfield et al. (1999) predicates favourable outcomes across all realms of functioning, continuing throughout the development of the person.

Furthermore, during this stage of early infancy, the mother may typically remain unaware of her infant's deafness. This is unsurprising, given, that as identified, the majority of deaf infants are born into hearing families (Meadow-Orlans & Spencer, 1996; Thomson et al., 2011). As maternal sensitivity develops, the mother may rely, both consciously and unconsciously, on her own family of origin experience of relationships for guidance, as she adapts to her maternal role (Karen, 1994). For instance, if her experience is that verbal communication has been encouraged and delighted in, this sensory channel of stimulation is likely to become a feature of maternal sensitivity. Unbeknown at this time, the infant who is deaf may be accommodating the hearing mother by adapting to not being comforted by auditory responses, thus contributing to a delay in maternal awareness of infant deafness (Lederberg & Mobley, 1990).

Conversely, the mother whose infant participates in newborn hearing screening (Thomson et al., 2011) may gain awareness that verbal communication will not be a source of mutuality. This awareness may, in turn, provide the mother with the opportunity to develop alternative forms of communication.

It would appear that during this stage of early infancy when it is unlikely the mother will be aware of her infant's deafness, that misattunement in their mutual cueing may create barriers to the process of attachment development.

Risks between two and six months

By the time the infant reaches the middle of the first year, typical development includes greater discrimination, demonstrating particular preference for the primary caregiver. Within this preference the infant is also responding to the behaviours of others, for example, through increased levels of vocalisation, smiling and crying (Howe et al., 1999). From around three months of age, the infant's babbling serves to maintain proximity (Berk, 2007) and encourage social interaction with recognised people (Crain, 2011). However, the deaf infant's babbling may continue to reinforce the hearing mother's belief that her infant is hearing, masking apparent risks to the development of the attachment relationship (Lederberg, 2003).

Conversely, the mother who is sensing that expected ways of communicating with her infant may not be eliciting the responses she is expecting, may provide more auditory input, rather than be aware that what may be needed is a different mode of

communication. The mother who begins to suspect that something is not quite as she would be expecting, fits with the observation that it is usually the mother who is first alerted to the possibility of infant deafness (Meadow-Orlans et al, 2003), though it may take some months for this to be confirmed (Andrews et al., 2004). The mother may, as Traci and Koester (2003) suggested, make “intuitive accommodations” (p. 195) seemingly in response to the infant’s proficiency in directing parental behaviours to include more visual and physical communication.

The risks to the developing attachment relationship may be different for the mother and infant who are involved in newborn hearing screening as the assessment may be completed during this period (Digby et al., 2011; Greville, 2001). For this mother/infant dyad, the risks to attachment development may become apparent earlier as the maternal experience will include her responses to the possibility of her infant’s deafness.

The experience for the mother of the infant who is screened at birth and subsequently found to have a profound hearing loss may create in the mother’s mind “the disappointing infant” (Brazelton & Cramer, 1990, p. 161). The authors used this term to describe the potential parental emotional response to the infant who may be perceived to be less than the ideal fantasised infant and thus becomes the object of projected parental disillusionment. The risk to the attachment relationship may be that the mother is mourning the absence of a shared communication with her infant (Meadow-Orlans & Spencer, 1996), which may be a factor in the delayed acquisition of language (Serani, 2001).

As discussed by Mitchell and Black (1995) and St Clair (2004), maternal adaptation to the needs of the infant is necessary for successful growth of the infant’s emotional life. Attunement between mother and infant increases demonstrably, during the early months, with the infant able to ‘read’ maternal behaviours and moods more readily than those of others. As a result of these developments, the infant is now interacting with the mother with increasing effectiveness and competency (Bowlby, 1979).

In summary, during the early months there is growing emphasis on the verbal and auditory channels of communication between mother and infant; also it is possible that a greater number of infants will have been screened for deafness. However, the two key potential risks, misattunement and maternal response to confirmation of deafness, are similar to the key risks in the previous period.

Risks between six months and 18 months

From six months of age, the infant's preference for a preferred attachment figure becomes "increasingly intense and exclusive" (Crain, 2011, p. 54). Stranger anxiety typically develops early in this phase, with the infant demonstrating preferred exclusiveness to their primary attachment figure, and with the secure base effect becoming noticeable toward 18 months (Bowlby, 1988). Separation anxiety, which Bowlby (1988) identified as a key feature defining attachment relationship, is demonstrated by the infant in response to real or perceived separation from the mother, with the aim of restoring the threat to the attachment bond and to prevent further separation (Holmes, 1993). As the deaf infant enters this later stage of infancy, risks to the development of attachment become more apparent and more likely to be experienced by both partners in the dyad.

Greenspan (1988) suggested that when the mother becomes aware that her verbal communication is not producing the expected responses, she may simply increase attempts to communicate vocally, which may manifest in the form of overly controlling behaviours (Brinich, 1981). This assertion appears to be echoed by Lederberg (2003) who posited that cessation of infant babbling may elicit feelings of maternal rejection and that the mother may instinctively attempt to reinstate this most endearing form of mutual communication with over-stimulating auditory input.

For the deaf infant, separation anxiety behaviours may be moderated by a lack of recognition on the infant's part that separation has occurred. Marschark (1993a) proposed that lack of auditory information might be a factor in reduced responses to separation. The mother's return may evoke heightened distress in the infant, who may have been unaware through auditory information that there had been a separation, which in turn may increase the infant's level of distress on reunion Marschark (1993a). This may, then, in turn elicit distress and cause confusion for the mother, who may have used her voice to indicate her leaving and be unaware of potential miscuing (Koester & Meadow-Orlans, 2004a).

The risk to attachment development most apparent during this phase relates to the range of maternal responses likely to occur when the infant's deafness is confirmed. A commonly held understanding is, that rather than the deafness itself, it is the way in which confirmation is received, managed and worked through,

emotionally and psychologically by the mother, that impacts on the mother and may be seen as the source of stress occurring at this time (Koester et al., 2004; Lederberg & Golbach, 2002). Maternal response to infant deafness typically will include a variety of contributing factors, unique to each mother. For example, the mother's own attachment style, maternal temperament, spousal support, financial stability, and access to social and psychological support will be influential (Thomson et al., 2011). The range of maternal emotional responses is variable (Brinich, 1981; Feher-Prout, 1996; Gilbey, 2010; Pipp-Siegel et al., 2002) however, what does appear to be a generally held view is that a sense of loss and a period of mourning is likely (Andrews et al., 2004; Clements & Barnett, 2002; Hauser et al., 2006; Hindley, 2005; Serani, 2001). Koester and Lahti-Harper (2010) and Russ et al. (2004), concurred that the maternal experience at the time of identification of her infant's profound deafness typically included strong emotions and resulted in a process of mourning.

Lax (1972) proposed that confirmation of infant deafness may evoke maternal feelings of failure alongside destruction of maternal hopes and fantasies which, as discussed in Chapter Four, are formed during pregnancy. The mother who had feared an imperfect or damaged infant may experience this impairment as being her fault, perhaps connected in her mind with something she may or may not have done during her pregnancy (Clements & Barnett, 2002; Gilbey, 2010). Brazelton and Cramer (1990) posited that the parents' process of coming to terms with the real, rather than the fantasised or imaginary infant, becomes more difficult when the infant is impaired in some way. Lederberg and Golbach (2002) and Hauser et al. (2006) suggested that, for the mother whose infant is subsequently identified as deaf, ambivalent feelings experienced during pregnancy may be re-activated.

The ways in which the mother is affected by the confirmation of her infant's profound deafness contribute to the influences on the infant's ability to master the sense of trust during this phase of infancy (Schlesinger, 2000). Though persistent parental feelings of loss and grief may affect the attachment relationship, it is argued that it is the lack of resolution of a traumatic experience that is most likely to contribute to the quality of the care-taking experience (Hindley, 2005; Marvin & Pianta, 1996). In addition, Serani (2001) suggested that unresolved maternal grief and loss may be a factor in the acquisition of language. Furthermore, the confirmation of infant deafness may temporarily alter the rhythm of reciprocal interactions; creating a change to the mother/infant dynamics until the re-establishment of mutuality when

both members of the dyad are more easily able to interpret each other (Traci & Koester, 2003). It has been further suggested that maternal understanding of deafness and the ability of the mother to believe she and her family are able to provide the environment the infant needs, may be factors in support of the mother's provision of a secure base for her infant (Holmes, 1993).

Maternal responses will typically include the responses to the way in which the professional conveys the information to them. As Hindley (2005) posited, skilled psychological support, especially in the shortened timeframe from newborn screening through to confirmation of infant deafness, is important in support of the maternal experience.

During this later phase, risk factors to the development of the attachment relationship between the mother/infant dyad may be more pronounced, as is the complexity of the maternal experience when infant deafness is confirmed.

Summary of potential risks

In summary, two key risks have been identified which have the potential to impact the development of attachment in the hearing mother/deaf infant dyad. They each manifest differently at different stages, however they are present in each stage. First there is the potential for maternal misattunement as the mother may fail to adjust over time to the atypical responses of her infant. Second is the effect of the maternal emotional response upon identification of the infant's deafness.

Assessment of Impacts

In order to consider the potential risks and their impact on the attachment relationship, the discussion will now turn to studies where mutuality in the deaf infant/hearing mother dyad has been examined, either directly, as for example, using the SSP (Ainsworth & Bell, 1970) or indirectly, where behaviours or experiences that correspond to dyad development or the paradigm of attachment have been studied. The studies have been summarised and split into three groups, each group with a similar focus of study. The groups of studies will be considered in turn, and the findings discussed at the end of this chapter.

Mother/infant dyad and attachment development studies

This group contains studies focusing on mother/infant dyads, two of which utilise Ainsworth's SSP (Ainsworth & Bell, 1970). Four of the studies were conducted within the Gallaudet Infancy Study⁷, which will be discussed first.

Koester (1995) studied patterns of face-to-face interactions, revealing that in the deaf infant/hearing mother dyads, the infants used more repetitious physical activity, made fewer attempts to re-engage with the mother, spent more time looking continuously at the mother, demonstrated less overt signalling behaviours and appeared to self-comfort when presented with the Still Face⁸ during the procedure. Utilising the SSP (Ainsworth & Bell, 1970), Koester and Meadow-Orlans (2004b), reported no significant difference in distribution of secure/insecure attachment categories across the matched⁹ and unmatched dyads. In a further study, Koester et al., (2004), reported that the hearing mothers using vocal communication with their six-month old deaf infants had, by nine months, adapted to the infant's deafness which was reported as an increased use of maternal visual-gesture input. Similarly, Koester and Lahti-Harper (2010) who studied intuitive parenting behaviours, rated higher usage of maternal vocal communication in hearing mothers of deaf infants, noting however, that all the deaf infants of hearing mothers in their study were wearing hearing aids from the age of nine months.

Koester, Karkowski and Traci's (1998) findings, which were similar, indicated hearing mothers placed greater emphasis on vocalisation strategies to gain the infant's attention, regardless of the infant's hearing status. However, Lederberg and Mobley (1990) utilising Ainsworth's SSP (Ainsworth & Bell, 1970) concluded that language development is not a barrier to secure attachment, and that the accompanying non-verbal aspects of maternal communication are sufficient for the development of secure attachment.

⁷ Gallaudet Infancy Study is a longitudinal research study based at Gallaudet University in Washington DC (Gallaudet University of Washington, 2011). Eighty families participated in this 15-year study with participants divided across the four possible deaf and hearing dyad combinations.

⁸ Still-Face episode may be incorporated into observational studies of mothers and infants. It is an episode in which the mother is instructed to be unresponsive for a short period of time, for example two minutes with the intention of creating a scenario of mild stress in which to observe the infant's responses, drawing inferences regarding social expectancies (Brazelton & Cramer, 1990; Koester et al, 2004).

⁹ The term *matched dyad* refers to a dyad in which both members are either deaf or hearing, while an *unmatched dyad* refers to one in which one member is hearing and one is deaf.

In consideration of potential obstacles to sensitive parenting, Meadow-Orlans and Spencer (1996) concluded that obstacles in the deaf infant/hearing mother dyad may include maternal feelings of difference between their infant and themselves and the lack of common mode of communication. And, in a second study, Meadow-Orlans (1997) found that the unmatched dyads ranked less ‘positively’ than the matched dyads for interactive behaviours.

Parental stress studies

The Parenting Stress Index (PSI)¹⁰ was administered (Meadow-Orlans, 1994) with results showing no difference between matched and unmatched dyad groups of parents, regarding parental stress. Further indications showed that lower parental stress is directly linked to access to social support. In a later study, (Pipp-Siegel et al., 2002) utilising PSI with hearing mothers of deaf children, it was suggested that parental stress levels are not clinically higher in the mothers of deaf children.

Parental experience upon confirmation of infant’s deafness studies

Meadow-Orlans and Steinberg (1993) reported on research in relation to positive effects of social support on mother/infant interactions. The authors concluded that support received closer to the confirmation of infant deafness appeared to contribute to a higher rating in mother/infant relationship behaviours. This finding appeared to be important in view of later studies which revealed “powerful parental emotions at diagnosis including denial and shock” (Russ et al., 2004, p. 353) and Gilbey’s (2010) report of parental “shock and upset” (p. 265) at the time of confirmation of infant deafness.

Attachment Assessment

The SSP (Ainsworth & Bell, 1970), according to Grossmann, Grossmann and Zimmermann (1999), has become “the central methodology of attachment research in infancy” (p. 762) and is generally accepted as a reliable and valid assessment for determining attachment style (Solomon & George, 1999). However, as a result of implementing the SSP (Ainsworth & Bell, 1970), in their longitudinal

¹⁰ Parenting Stress Index (PSI), is a 120 item self-report questionnaire (Abidin, 1990).

study with deaf and hearing mother/infant dyads, Meadow-Orlans, Spencer and Koester (2004) cautioned the use and interpretation of the procedure when either member of the dyad is deaf. The infant's lack of response to the mother leaving may typically be coded as indifferent. However, for the deaf infant, the response may be due to a lack of knowledge. Marschark (1993a) concurred, noting that during the SSP (Ainsworth & Bell, 1970), for the deaf infant, the lack of auditory information may result in an atypical set of behaviours. For instance the infant may notice the mother's absence without an auditory awareness of her actually leaving, which in turn may contribute to the infant's heightened distress on the mother's return, which may lead to further miscoding.

Mediating Factors

Alongside the findings from the selected studies, the qualitative nature of the mother/infant dyad plays an important role in considering the impacts of the identified risks of infant deafness on the formation of the deaf infant/hearing mother attachment relationship. Mother/infant mutuality with vocal and auditory cues typically plays a key role in establishment of the reciprocal relationship (Vaccari & Marschark, 1997). The infant's repertoire of instinctual responses may also include non-auditory cues such as smiling, sucking, clinging and following. Smiling may be one of the first ways in which the mother experiences the bond directly with her infant (Crain, 2011; Karen, 1994). The power of the infant's smile in establishing the maternal bond is claimed by Crain (2011) as "an electrifying moment" in a parent's life providing the parent "with proof of the baby's love" (p. 50). This supports Bowlby's (1982) proposition that smiling promoted attachment through maintaining proximity to the caregiver. Furthermore, indices of mutual affect and synchrony between mother and infant may be observed as eye contact, gaze aversion, cooing or babbling, touching and physical comforting as well as expressions of pleasure and distress (Koester, 1995). The infant's experiences that regulate the feelings of attachment, for example cuddling, being held and being looked at are all mutually created, an assertion that Koester (1994) posited and suggested that researchers have recognised that both members of the mother/infant dyad mutually influence each other in their interactions with consequences of change in both members of the dyad.

Discussion of Impacts

The research showed that mismatching of communication does occur and does appear evident at each phase of the development of the attachment relationship, especially prior to detection of deafness. Mismatching is variously described in the studies as maternal insensitivity (Lederberg & Mobley, 1990; Meadow-Orlans & Spencer, 1996), undue emphasis on vocalisation strategies (Koester et al., 1998; Koester et al., 2004; Koester & Lahti-Harper, 2010) or less ‘positive’ interactive behaviour (Meadow-Orlans, 1997).

In the group of studies relating to mother/infant dyad and attachment development, mismatching of communication emerged as a factor, however this risk to secure attachment appeared to be unsubstantiated. In the reported findings from Lederberg and Mobley’s (1990) SSP (Ainsworth & Bell, 1970), language development was not found to be a barrier to secure attachment.

Furthermore, no discernible difference could be found in the distribution of secure or insecure attachment categories between the hearing mother/deaf infant dyad and the hearing dyads (Lederberg & Mobley, 1990; Koester & Meadow-Orlans, 2004b).

In the event of early identification of deafness, possible through newborn screening, the risk of mismatching appeared to change, as the maternal response to confirmation of deafness became a more apparent factor. The risk of misattunement through unawareness may be thought to be present only for the duration of infancy prior to detection of deafness. However, once the maternal emotional impact of infant deafness is also apparent, then mismatching may still continue, though now influenced by choices of modes of communication and choices of assistive devices, a discussion of which are beyond the scope of this study.

In the group of studies relating to parental stress, it appeared that while maternal stress was found to be a risk, it was also mediated by parental support and therefore no clear conclusion could be made from the reported findings. In the group of studies relating to parental experiences upon confirmation of infant’s deafness however, parental stress with specificity to the time of identification of the infant’s deafness was posed as a risk with potential impact, as no mediating aspects were revealed.

Powerful parental emotions typically rose upon confirmation of infant deafness (Gilbey, 2010; Russ et al., 2004). In the body of knowledge relating to infant deafness, a range of strong, maternal emotional responses were discussed, however, there was widespread agreement that a period of maternal mourning is likely (Clements & Barnett, 2002; Hindley, 2005; Serani, 2001).

There appeared to be no significant difference in the distribution of secure and insecure attachment categories in spite of the reported power of the parental response. Furthermore, in considering parental stress, studies using the standardised PSI tool found no significant parental stress levels in the parents of deaf infants.

The limitations of the studies appeared to be primarily the small number of studies and second, the small cohort in each. For example, in no study were there more than 41 hearing mother/deaf infant dyads. In view of the risks revealed from the perspective of attachment, where a stable and consistent maternal presence, in addition to reciprocity and mutual cueing are deemed crucial for the infant's psychological and emotional well being (Karen, 1994) and on-going mother/child relationship (Karen, 1994; Stern, 1985), then the findings related to the impact of infant deafness on the development of the hearing mother/deaf infant dyad were understandable. Limitations of the body of research of this dissertation will be discussed further in Chapter Six.

Conclusion

Chapter Five has combined the separate strands from Chapter Three, which considered infant deafness, and Chapter Four, which considered the development of the attachment relationship in the mother/infant dyad. In combining these two strands, the aspects of attachment development that typically involve audition and auditory engagement have been identified as potential risk factors. In the second section the risk factors have been further examined by discussing studies that address areas of potential risk to the formation of the attachment relationship in the hearing mother/deaf infant dyad.

The chapter has included material relating to the assessment of infant attachment and discussed the findings from the areas of potential risk as well as discussed the impacts and concluded with findings related to the dissertation question:

what impact if any does profound deafness have on the formation of the attachment relationship between the profoundly deaf infant and the hearing mother?

Chapter 6 – Conclusion

Introduction

Chapter Six concludes the dissertation by discussing its relevance and considering the clinical value of the study. It also discusses the limitations, makes recommendations for further research and ends with concluding remarks.

Relevance of the study

The population of congenitally deaf infants is a relatively small proportion of the general population (Ammerman, 2009). With the growing awareness of deafness in infancy, due in part to the advent of newborn screening programmes, these infants can now be studied. Prior to newborn hearing screening, the age of detection of deafness typically occurred beyond the age of both infancy and of early attachment formation.

The current study has relevance to professionals working with mothers and their deaf infants. This may comprise those working in psychotherapeutic and psychosocial settings as well as areas of education, medicine and research.

A specific area of growth in the field of deafness is newborn screening. While this study has not included data related to newborn hearing screening, this approach to early detection of deafness has emerged and is becoming widespread. For example, in the state of Victoria in Australia, a screening programme was implemented in 1992 (Russ et al., 2004); over the past ten years in the United States of America (USA) guidelines and mandates for Early Hearing Detection and Intervention (EHDI) have been introduced (Thomson et al., 2011); and in New Zealand, the implementation of Universal Newborn Hearing Screening and Early Intervention Programme (UNHSEIP) was completed in 2010 (Digby et al., 2011). The research undertaken in this dissertation has relevance to those utilising newborn screening programmes, in particular, programmes where monitoring of maternal impact is included in the programme design and implementation.

The study has significance not only for the health practitioner who delivers the confirmation of infant deafness but also for other health practitioners who may be in regular contact with the mother and her infant around the time of confirmation, for example paediatricians, general practitioners, and Plunket nurses. As identified in

Chapter Five, the revelation of the infant's deafness has psychological impact for the mother, parents and family, which in turn appears to impact the maternal relationship with the infant (Koester & Lahti-Harper, 2010). Furthermore, Gilbey's (2010) study of parental responses to ways in which the confirmation of their infant's deafness was delivered and the subsequent parental responses suggested that strategies for the ways in which this information is delivered to parents be included in newborn screening programmes.

Limitations of the study

I acknowledge that this study has been framed by the literature uncovered, which was entirely from the western viewpoint. In the context of Aotearoa, New Zealand, no literature was found to include a Maori perspective, and therefore I acknowledge that this research is solely from a Pakeha perspective.

The research is limited primarily by the paucity of literature that directly addressed the dissertation question (Andrews et al., 2004; Thomson et al., 2011). While there is a wide range of literature available pertaining to attachment development and formation of mother/infant dyad from a variety of disciplines, the range of information available pertaining to deaf infants in this context is limited.

The variation in time-frame within which infant deafness is confirmed presents a limitation when seeking to understand the attachment formation between the hearing mother and deaf infant. The quality of attachment formation is known to develop over early infancy, which may or may not match the timing of confirmation of infant deafness. This limitation may be ameliorated in the future if there is more uniformity in the age of detection.

The study has focused on one aspect of the hearing mother/deaf infant dyad formation, that of the reciprocity of attachment development. Family context, cultural ethnicity, infant's place in the family, number and ages of siblings and socio-economic status, are factors that may impact on the broader environment of the development of the hearing mother/deaf infant dyad.

Clinical implications

It would be remiss to expect that even though the population of deaf infants and hearing mothers is small in number, they do not present as clients in clinical

practice where they may be attended to by child psychotherapists. The practice of child and adolescent psychotherapy invariably includes working with parents and other immediate family. It behoves clinicians working psychotherapeutically with infants and families to recognise difference, to manage transferential issues that may arise and to notice personal bias. The critical thinking this research offers, serves as a prompt to remain culturally sensitive to difference, specially in the case of deafness, when that difference may not be immediately visible. This would also be relevant in educational settings and other settings where deaf infants and their hearing mothers are professionally attended to.

Suggestions for further research

The topic of attachment formation in hearing mother/deaf infant dyads would suit an extended observational method of research. Participation observation, otherwise known as ethnography (Tolich & Davidson, 2003b), which involves observation and unstructured interviewing, may be the most appropriate methodology with which to gather data through observation of mothers and infants, primarily once the deafness has been confirmed. Child psychotherapists who are a body of professionals trained specifically, though not exclusively, in mother infant observation would be well suited to undertake this research approach.

As has been asserted in Chapter Four, the methodology most widely acknowledged as the assessment of attachment is Ainsworth's SSP (Ainsworth & Bell, 1970). However Marschark (1993a) and Koester & Meadow-Orlans (2004b) proposed that methodological and theoretical issues surfaced with the use and interpretation of the SSP when one or both members of the dyad in the procedure is deaf. While assessment may be most efficacious when a control group is also measured, in this case a matching hearing dyad, this raises questions regarding the merit of an assessment where culturally based difference, in this case deafness, may not be taken into account in the findings in the assessment. The current study informing this dissertation is primarily concerned with the development of the attachment relationship, and is largely informed from the field of child psychotherapy.

The recent advent of newborn hearing screening in New Zealand (Digby et al., 2011) affords an opportunity for investigating the impact of the screening process, including early identification of infant deafness, on the mother/infant attachment

relationship. Further research may justifiably include monitoring maternal experience through the course of the screening programme to confirmation of infant deafness. The information collected could provide valuable data for a comparative study between parents of infants screened at birth and subsequently identified in infancy, with those parents of children identified when older.

Concluding remarks

This dissertation began by posing the question: what impact, if any, does profound deafness have on the formation of the attachment relationship between the profoundly deaf infant and hearing mother? The question originated from my former work alongside hearing mothers and their deaf infants and children. Drawing on the theoretical paradigm of attachment with which to examine the dissertation question, this research has implemented a modified systematic literature review. Through this methodology, the findings suggest that profound infant deafness does impact on the auditory aspect of the developing attachment relationship between infant and mother, however, those impacts are mediated by other modes of communication, maternal support and the qualitative nature of the developing attachment itself. The essential components of mutuality and reciprocity feature in the developing dyadic relationship in such a way that it appears possible to contend, that there is sufficient resilience in the mother/infant dyad to mediate the lack of an auditory channel of mutual communication between them.

Throughout the process of writing this dissertation I have been reminded that the population of infants who are known to be deaf is small and that this may raise questions about the efficacy of such a dissertation question as this. In response, I deem it important to acknowledge that during the research and writing of this dissertation, it has also become a personal synthesis, both of my former work and newly forming self as child psychotherapist and a more symbolic synthesis on a personal level.

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Appendix A: Details of Database Search

PsychInfo

Search Words	Results	Selected	Relevant
Hearing loss	4371	refined search terms	
Hearing loss + attachment	148	refined search terms	
Infant + attachment + hearing loss	101	20	17
Infant + deaf	1819	refined search terms	
Infant + attachment + deaf	192	23	14 (1) ¹¹
Deaf child + hearing mother	37	19	6 (3)

¹¹ brackets () denote number of repeated articles

Psychoanalytic Electronic Publishing (PEP)

Search Words	Results	Selected	Relevant
Infant attachment + hearing loss	41	11	4
Infant attachment + deaf	174	14	6
Attachment + sensorineural hearing loss	0		
Attachment + deafness	111	10	2
Deaf infant + hearing mother	3	3	3
Deaf child + hearing mother	4	4	2 (2)
Attachment formation + deaf infant	2	0	

ProQuest Dissertation and Theses

Search Words	Results	Selected	Relevant
Attachment in infants + deaf	2144	refined search terms	
Deafness in infants + attachment	677	refined search terms	
Deafness in infants + infant attachment	677	refined search terms	
Deafness in infant + infant attachment + hearing mother	511	2	2
Deaf infant + hearing mother	3492	refined search ¹²	
Deaf infant + hearing mother	1721	refined search terms	
Deaf infant + hearing mother – language	24	0	

¹² Last 2 years and English only

Academic Search Premier (EBSCO)

Search Words	Results	Selected	Relevant
Infant + hearing loss	601	refined search terms	
Infant + deaf	235	10	6 (4)
Infant + deaf + hearing mother	4	4	2 (2)
Deaf infant + attachment	0		
Infant attachment + hearing loss	0		

AUT Scholarly Commons

Search Words	Results	Selected	Relevant
Deaf infant	20	1	1
Infant attachment	139	6	6 (1)

Google Scholar

Search Words	Results	Selected	Relevant
Hearing mother deaf infant	7	7	4(2)

AUT Summon

Search Words	Results	Selected	Relevant
Resilience in deaf children 2010 - 2011	29	1	1
Resilience in deaf children 2007 - 2011	145	5	2(1)
Attachment formation deaf infant	120	2	0
Attachment behaviour deaf infant hearing infant	401	25	6(6)

Appendix B: The Strange Situation

Table 5: Episodes of Strange Situation

Episode	Duration	Description
1	1m	Parent, infant introduced to room
2	3m	Parent, infant. Infant settles, explores, parent assists only if necessary
3	3m	Parent, infant, stranger. Intro of stranger who plays with infant during final 1m
4	3m	Infant, stranger. Parent leaves (first separation)
5	3m	Parent, infant. Parent returns, stranger leaves quietly (first reunion)
6	3m	Infant. Parent leaves infant alone (second separation)
7	3m	Infant, stranger. Stranger enters room, stays with infant, interacting as necessary
8	3m	Parent, infant. Parent returns. Stranger leaves quietly (second reunion)

(Solomon & George, 1999)