Mother-infant interaction during book sharing across socioeconomic status groups

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Abstract

Book sharing is a key literacy activity in the early years that predicts children's subsequent literacy and language abilities, and a wealth of evidence illustrates socioeconomic status (SES) differences in early childhood abilities. However, whilst research has examined book sharing frequency in depth, far less is known about how the quality of verbal and non-verbal interactions varies by the SES of the parent. This thesis addresses this question by considering the quality of book sharing interactions between mothers and their infants or children across three studies. In the first, longitudinal study, mother-infant dyads ($N = 44$) were filmed book sharing at 12 and 18 months ($N = 34$), and infant development was measured. A novel coding scheme identified a wide range of verbal and non-verbal book sharing behaviours. High SES dyads produced more positive behaviours at 12 and 18 months and these predicted infants' linguistic and cognitive abilities at 18 months. Differences in infants were observed only at 18 months, with low SES infants disengaging more frequently. To examine the link between book sharing, SES and emotional functioning in older children, the second study considered mother-child book sharing behaviours in a preschool aged sample ($N = 46$). There were SES differences in verbal, but not non-verbal book sharing behaviours. A small number of maternal book sharing behaviours were associated with children's social and emotional abilities, suggesting children's behaviour influenced the book sharing interaction. In the final study, a book sharing intervention was designed and delivered predominantly to low SES mothers ($N = 24$) to explore whether mothers' book sharing behaviours could be enhanced, and increases were found in all targeted behaviours. In conclusion, book sharing behaviours that have been found to provide a more enriched interaction were seen more in high SES dyads, and predicted infants' abilities. Encouraging low SES mothers to use these enhanced interactions was successful, indicating that higher quality book sharing can be increased via a short intervention.

Overview of Thesis

The current thesis examines the link between socioeconomic status (SES) and dyadic book sharing interactions, providing evidence for differences in the quality of interaction, and illustrating the positive impact of a targeted intervention on maternal book sharing techniques. This thesis contains five chapters.

Chapter 1 contains a review of the literature, exploring the impact of SES on the early learning environment and how this affects children's subsequent developmental abilities, before examining the influence of book sharing frequency in infancy on development. The review continues by considering the role of a variety of verbal and non-verbal communication types on infant and child abilities, and finally integrates current literature exploring the quality of book sharing across SES to-date.

Chapter 2 presents longitudinal analyses exploring SES differences in mother-infant verbal and non-verbal behaviours produced during book sharing interactions at 12 and 18 months. It also investigates the stability of these behaviours, following infants over time and considers whether book sharing behaviours predict concurrent and future infant cognitive and linguistic abilities.

Chapter 3 explores SES differences in verbal and non-verbal book sharing behaviours in an older sample of four year olds, and considers the influential impact of children's social and emotions skills in relation to the book sharing interaction.

Chapter 4 includes the development and evaluation of a book sharing intervention targeting low SES mothers designed to encourage low SES mothers to use more enriching book sharing behaviours to enhance the dyadic interaction.

Chapter 5 provides a general discussion, including a summary of the findings from each chapter, identifying their limitations, and compares these to the previous literature. The implications of the findings are discussed, and suggestions for future research are given.

Chapter 1: Literature Review

1.1 Introduction

This thesis examines verbal and non-verbal differences in mother-infant interaction during book sharing across different socioeconomic status (SES) backgrounds. Research to-date has not yet explored how verbal and non-verbal book sharing behaviours differ across SES backgrounds in infant samples and this thesis will therefore explore this further. This thesis will review the current literature exploring the influence of the early learning environment, including verbal and non-verbal behaviours, on infant abilities. This will include the impact these differences in interactions have on school readiness, and the influence of SES on the early learning environment.

In recent decades, book sharing has been promoted during children's early years (i.e. before they begin formal education) in an attempt to reduce the gap in the developmental abilities of children starting school, particularly literacy and language (State of the Nation, 2014). Children arrive at school at different developmental stages, meaning they vary in their school readiness. When children start school, a large proportion of their development and learning has already occurred (Duncan, Ziol-Guest & Kalil, 2010). Ofsted (2014) report that, when starting school, only 50% of children are ready developmentally, and this figure is greatly lower in some socially deprived areas. To further this evidence, Roy, Chiat & Dodd (2014) have reported that a large proportion of low SES children arrive at pre-school without basic language skills expected at their age. Whilst there has been an awareness of this problem for many years, research indicates that this issue is long-standing and current reports still detail this shortfall. As a result, Ofsted (2014) state that making children more equal in their readiness to learn when arriving at school has been a high priority in recent years.

A number of children's abilities and skills need to be ready for them to continue to learn at school, including their social, emotional, literacy and language skills. In a government report, Allen (2011) called for all children to achieve a good degree of school readiness. Allen defines school readiness as "having the social and emotional foundation skills to progress in speech, perception, ability to understand numbers and quantities, motor skills, attitude to work, concentration, memory and social conduct; having the ability to engage positively and without aggression with other children and the ability to respond appropriately to requests from teachers" (p.9). Most definitions appear to include aspects of social and emotional abilities, language, literacy and maths skills, imaginative and creative abilities, and physical competency (Ofsted, 2014; Tickell, 2011).

These aspects of early development that form school readiness do not happen on their own; children need the right home environment where they feel safe and secure, and have sufficient stimulation, attention, support and affection available to them. From birth, infants are not only receptive to the environment around them, but learn actively from this environment. The early learning environment provides infants with learning opportunities before they begin school, and their capacity to learn when they arrive at school is a reflection of this environment (Feinstein, 2003; Linver, Brooks-Gunn & Kohen, 2002; Rodriguez et al., 2009). Research by Bernstein (1960, 1961) indicates that infants and young children from low SES backgrounds have less opportunity to interact with their mothers, and in childhood are subject to interaction in the form of instructions and discipline. Consequently, the interactions low SES children partake in do not lend themselves to extended or exploratory interaction. Evidence has continued to support this notion suggesting that children who have a more enriched early learning environment will be more school ready than those who have come from a less fortunate background, and this will continue to affect these children's

success throughout their school life and into their future (Hart & Risley, 1995; Heckman, 2006; Kiernan & Huerta, 2008; Roy, Chiat & Dodd, 2014).

A key activity in the infant's early learning is book sharing, which is known to have a significant impact upon infants' literacy and language abilities (Fletcher & Reese, 2005). Book sharing, as opposed to book reading, refers to the experience of looking at books with another person interactively. Book sharing is an important early learning interaction between mothers and infants that provides a more enriching interaction than comparative mother-infant interactions (Hoff, 2006). It is therefore essential to understand the book sharing interaction in infancy to determine the impact of these interactions on infants' concurrent and predictive developmental abilities. Book sharing is an enriched early learning opportunity, though the mechanisms within this activity and how these differ across SES backgrounds are still unknown.

This thesis will focus on traditional book sharing, where mother-infant dyads have a physical book, rather than digital book sharing (i.e. an iPad). Differences in mother-child interactions have been observed across book sharing forms (Kim & Anderson, 2008). Researchers have stated that the impact of digital sources on mother-child interactions are so far limited (Kucirkova, Messer, Sheehy & Flewitt, 2013). Thus, traditional book sharing has a more informative evidence base for its impact on developmental outcomes (Fletcher & Reese, 2005) which this thesis aims to build upon.

This chapter will continue to review the following topics:

- *Theoretical perspective*
- *The impact of socioeconomic status on the early learning environment*
- *The impact and explanations of book sharing frequency on development*
- *The impact on speech on development*

- *Verbal quality during book sharing*
- *The impact of non-verbal behaviour on development*
- *Non-verbal quality during book sharing*
- *Defining socio-economic status*

1.2 Theoretical Perspective

This thesis will take a social-constructivist perspective; that social interaction facilitates one's learning, and this view is supported by the literature considering the impact of book sharing on subsequent development (Fletcher & Reese, 2005; Mol, Bus, de Jong & Smeets, 2008). This approach considers learning as a social process whereby infants' experiences and knowledge are greatly enhanced by their more competent partner (Vygotsky, 1978). The zone of proximal development (Vygotsky, 1978) illustrates how infants can go beyond what they currently know, and what they are capable of learning alone, to a more complex level of understanding which is guided and facilitated by a more cognitively knowledgeable partner. This view encompasses the notion that adults provide scaffolding for infants in order to move from what they already know to what they can achieve and learn given additional support (Wood, Bruner & Ross, 1976). This process often involves adults breaking down complex new information into more manageable simplified concepts, thus facilitating infants' learning and redefining their existing knowledge. This process, as well as further influential factors in the social environment, fosters language development (Bronfenbrenner, 1979; Bruner 1981). Book sharing is an opportunity for mothers to teach their children about new concepts and words, developing their current abilities beyond their individual capabilities. Book sharing allows mothers to provide their children with enrich knowledge and guide them to understanding.

1.2.1 The impact of socioeconomic status (SES) on the early learning environment

SES is a construct traditionally defined by an individual's education and job status, where a higher level of education and a high social ranking career would generate a higher SES score (Hollingshead, 1975). Evidence indicates that children from high SES backgrounds have a more enhanced early learning environment in comparison to low SES children, who have fewer and less enriched learning opportunities (Bernstein, 1960; Hart & Risley, 1995; McLoyd, 1998). Bernstein (1960,1961) suggests that the interactive experiences infants and children have with their mothers are different in nature and function in low SES families in comparison to high SES families. The author details that low SES families have less time to interact with their children due to leading a more chaotic lifestyle with more immediate demands and constraints, thus the interactions are limited to necessary interactions, whereas high SES families have more exploratory interactions.

The SES background of a child contributes to their early life experiences, which subsequently impacts upon their developmental abilities (Bradley & Corwyn, 2002; Hoff, 2003). Mistry, Benner, Biesanz, Clark and Howes (2010) examined the impact of SES from infancy into early childhood on subsequent achievement, and highlighted the negative consequences of children coming from low SES families on school readiness. The authors emphasised that the timing (infancy or preschool age) that children experienced risk factors associated with SES in the early learning environment were important, observing more profound effects in infancy. These risk factors were defined predominantly by measures of economic resources. The authors found that risk factors observed in lower SES infants measured in the first year of life predicted lower cognitive and academic achievement (including maths, reading, literacy and language measures), lower self-regulatory abilities and more problem behaviours at age three than higher SES infants. These results have been replicated by many researchers

with young children, demonstrating the robust influence of SES on children's life outcomes (Duncan et al., 2010; Hart & Risley, 1995; Pungello et al., 2010; Sektan, McClelland, Acock & Morrison, 2010). A number of studies provide further evidence that a combination of experiences in the early learning environment and SES impact both the infant and child brain. Specifically, low SES children have been found to have less developed brain areas, affecting memory, language, learning, cognitive control, and social-emotional processing (Hackman, Farah & Meaney, 2010; Hanson, Chandra, Wolfe & Pollak, 2011; Noble, Houston, Kan & Sowell, 2012). However, these results do not determine causality; there are a number of factors, such as nutrition, which could account for differences. The authors suggest these findings are the results of a combination of factors associated with low-SES, such as the stimulation in the early learning environment and stress.

A number of models have been proposed to explain why SES impacts upon child development. Research suggests that SES in terms of income impacts greatly upon a number of factors relating to an infant's environmental stimulation, maternal distress and parenting practices which in turn affect developmental outcomes (Linver et al., 2002). The family stress model (Conger et al., 1990; Conger & Conger, 2002) proposes that economic hardship in terms of low income, debt and little assets, leads to economic pressure on the family due to the financial burdens of bills and debts which cannot be paid. This pressure impacts upon the emotions and behaviours of parents, particularly when cutbacks must be made, leading to parental distress. This adversely affects family relationships between parents, and with children, which leads to more negative parenting practices and impacts on the child's development. As a consequence, the mother-infant attachment within these families suffering from economic hardship may be affected. Attachment theories suggest that an infant must maintain a strong and long-lasting bond with a primary caregiver for normal development to occur (Bowlby, 1969), and this has been strongly implicated to be affected by SES (Shaw &

Vondra, 1993; Cyr, Euser, Bakermans-Kranenburg & Van Ijzendoorn, 2010). Furthermore, the maternal deprivation hypothesis put forward by Bowlby (1951) suggests that, without this attachment, social and emotional development may be diminished. In contrast, the family investment model (Mayer, 1997) suggests that higher SES families have the economic resources to invest in appropriate developmental materials and experiences for their infants that they associate with the developmental success of their infant, whereas lower SES families must invest in more immediate needs (Becker & Tomes 1986; Bradley & Corwyn, 2002).

Both models are supported by research exemplifying differences in infants' home environments, including fewer educationally stimulating toys in the home, and a more disruptive home life, such as family separations and violence (Hart & Risley, 1995). Magnuson, Meyers, Ruhm and Waldfogel (2004) also suggest that low SES families often experience multiple intertwining factors causing their situation. Such difficulties are hard to overcome with low SES families often lacking income, education or adequate employment, and therefore mobility to create a change in circumstance appears improbable.

The problems which have been identified in low SES families include a lack of access to educative resources and guidance in the years leading up to children starting school (Magnuson et al., 2004), as well as the home environment being less stimulating and more variable compared to high SES homes (Van Steensel, 2006). An enriched early learning environment consists of appropriate materials and stimulation, in addition to positive interactions, which leads to positive attachments being developed and subsequently positive developmental outcomes (Hart & Risley, 1995; Kalil & DeLeire, 2004; Pitman & Chase-Lansdale, 2001). Thus, the evidence suggests that lower SES infants have a less enriched early learning environment, with fewer developmental opportunities, such as book sharing interactions that are a primary opportunity for fostering infant development.

1.2.2 The impact of book sharing frequency on development

Extensive research advocates the importance of dyadic book sharing activities for infant development (Fletcher & Reese, 2005). Firstly, the frequency of book sharing is of particular interest as a higher frequency of caregiver-infant book sharing during infancy predicts later literacy and language skills (Bus, van Ijzendoorn & Pellegrini, 1995; Debaryshe, 1993; Deckner, Adamson & Bakeman, 2006; Farrant & Zubrick, 2012; Karrass & Braungart-Rieker, 2005; Maulik & Darmstadt, 2009; Raikes, Pan, Luze, Tamis-LeMonda & Brooks-Gunn, 2006; Scarborough & Dobrich, 1994; Wade & Moore, 2000).

Notably, the first review to explore the impact of book sharing on language abilities by Scarborough and Dobrich (1994) suggested there were both correlating and casual links between book sharing and verbal skills with preschool aged children, and this was later supported by Bus et al. (1995). These authors both suggested that approximately eight percent of the variance in preschool aged children's later language and literacy abilities could be explained by book sharing. These findings have been supported by many recent studies which have replicated such assertions and, additionally, this association has been documented in younger samples (Karrass & Braungart-Rieker, 2005; Raikes et al., 2006). For example, Karrass and Braungart-Rieker (2005) examined the effect of book sharing with infants aged four and eight months old on infants' development longitudinally at 12 and 16 months. The results revealed that the frequency of shared reading at eight months (but not four months) predicted language abilities at 12 months, and at 16 months old where this relationship become stronger, demonstrating the long term impact upon infants' language skills. Similarly, the frequency of book sharing continues to have an impact when it is measured in older children. Senechal, Pagan, Lever and Ouellette (2008) illustrate that shared book reading at age four predicted both children's verbal outcomes and more advanced literacy

skills independently. Thus, the evidence to support the notion that the frequency of sharing books strongly impacts language and literacy ability is abundant.

Additionally, it is important to consider evidence that suggests SES has a robust effect on the frequency of book sharing. Raikes et al. (2006) found that book sharing frequency was higher in mothers that were better educated, thus affecting lower SES children's developmental opportunities and outcomes. In addition, extensive evidence illustrates that lower SES families have fewer books and other stimulating items in the home (Feitelson & Goldstein, 1986; Kreider, Morin, Miller & Bush, 2011; Linver et al., 2002; Payne et al. 1994; Teale & Sulzby, 1986). It has also been found that they read less frequently to their infants, illustrating again the how SES can influence early communicative input with infants (Adams, 1990; Raikes et al. 2006; Senechal, LeFevre, Hudson & Lawson, 1996; Teale & Sulzby, 1986). Further evidence demonstrates that simply giving families free children's books led to an increase in looking at these books with their infants, which later impacted upon their children's development (Wade & Moore, 2000). Research demonstrating the impact of the frequency of book sharing supports current government-backed initiatives such as Book Start which aims to increase the number of books families own and access.

1.2.2.1. Explanations for the impact of book sharing frequency

Book sharing is a good opportunity for caregivers and infants to share attention and focus upon the same objects and concepts. Tomasello and Farrar (1986) demonstrate how joint attention is necessary for infants to learn new words. The authors examined mothers' use of words with their infants, at age 15 and then again aged 21 months old. The results indicated that mothers' words used during episodes of joint attention predicted their infants' vocabulary at 21 months old, whereas words used outside of the joint attention episodes were not related to infants' language abilities. This learning, which only occurred within a joint attention episode, exemplifies the importance of joint attention to facilitate language learning in infants

(Tomasello & Farrar, 1986). Book sharing further allows a relatively unambiguous opportunity, where the mother's focus is substantially clearer than in other contexts, for infants to map words onto objects as mothers' label these in the book. Additionally, object labelling occurs more frequently during book sharing than other mother-infant interactional contexts, allowing this learning opportunity to be even more evident during book sharing above other contexts (Hoff, 2003). This object-mapping may additionally be aided by the use of maternal gesture which enhances the joint attention episode further and is a known facilitator of later vocabulary abilities (Liszkowski, Carpenter, Henning, Striano & Tomasello, 2004; Rowe & Goldin-Meadow, 2009a). The book sharing interaction also elicits a more complex range and enhanced sophistication of language from the mother in comparison to other mother-infant interactions (Hoff, 2003; Hoff-Ginsberg, 1991; Weizman & Snow, 2001). Often books will lead to conversations and include topics not normally in the infant's everyday environment, thus increasing the range of words infants hear (Hoff-Ginsberg, 1991).

The explanations for the impact of the frequency of book sharing on infants' language development implicates both the verbal and non-verbal quality of the interaction being of particular importance in facilitating infant development. Thus, the quality of maternal verbal and non-verbal behaviours will be further explored for their impact upon infant development, and whether these behaviours have been investigated during book sharing interactions.

This thesis focuses on mothers' interactions with their child, rather than parents, as mothers are most often the primary caregiver, providing the most interaction to their child in her or his first year of life, which influences infants' subsequent development (Ainsworth, 1969). Furthermore, previous research has focused more on the relationships between maternal verbal and non-verbal input in the first years on life, which provide the foundation for the research questions addressed in this thesis.

1.2.3 The impact of maternal speech on infant and child development

1.2.3.1 The impact of maternal speech on infant and child linguistic abilities

In an infant's early learning environment, the mother's verbal communication is essential to enhancing the infant's developmental capacity, and influences the infant's abilities in later life (Hart & Risley, 1995; Weizman & Snow, 2001). Early interactions in the form of verbal input affect the infant considerably, especially in relation to vocabulary development (Pan, Rowe, Singer & Snow, 2005). Infants from low SES backgrounds are often slower in their language development in terms of the amount and complexity of their language abilities in comparison to their higher SES peers (Hoff, 2003; 2013). This impoverished language development seen in low SES infants is a cause for concern as infant's language skills have implications for their school readiness and, subsequently, their future progression and success throughout their school life (Duncan, Yeung, Brooks-Gunn & Smith, 1998; Rowe & Goldin-Meadow, 2009a). These differences in language development place higher SES children in a more advantageous position as they progress through life with a larger vocabulary, and thus, greater success across developmental domains (Duncan et al., 1998; Hoff-Ginsberg, 1998). Infants' vocabulary at a young age can predict their later vocabulary, with large vocabularies staying larger in comparison to those infants who started with a smaller vocabulary (Huttenlochner, Haight, Bryk, Seltzer & Lyons, 1991; Weinman & Snow, 2001).

Differences observed in high and low SES infants' language is a consequence of the educational attainment of the primary caregiver of the infant, resulting in disparity in the amount and complexity of language that the infant hears (Hart & Risley, 1995; Hoff, 2006; Pan et al., 2005). This language acquisition reflects onto the infant's own verbal abilities (Bornstein, Haynes & Painter, 1998; Hoff-Ginsberg, 1991; Huttenlocher, Waterfall, Vasilyeva, Vevea & Hedges, 2010), and research advocates that differences in verbal

communication can be attributed to the amount of time spent talking to infants by parents, and the complexity of this speech (Hart & Risley, 1995; Snow, Burns & Griffin, 1998; Weizman & Snow, 2001; Hoff & Naigles, 2002; Pan et al., 2005). Thus, higher SES infants receive more complex and a higher amount of verbal input at an early age from parents. As a result, the infant's language is developed more extensively (Hoff, 2003), and this continues throughout life (Rowe & Goldin-Meadow, 2009a).

Hart and Risley (1995) demonstrated the extent of the relationship between SES and children's language by examining the differences in the amount and types of verbal communication parents had with their infants from seven months to three years old. The results revealed that high SES infants were exposed to 90,000 more words per week than mid SES infants, who in turn were exposed to 63,000 more than low SES infants per week. Low SES infants heard roughly half the words of mid SES infants and, similarly, mid SES infants heard almost half the words high SES infants were hearing a week. Over the first three years of life, this led to low SES children being at a 30-million-word disadvantage in comparison to their high SES peers. Additionally, the high SES infants were privy to a larger variation in words types. The variation and amount of speech the infants were exposed to subsequently predicted infants' language at age three, with around 90% of the infant's speech coming from their parent's spoken repertoires. Furthermore, at follow up, aged ten, children's literacy and language abilities were predicted strongly by their vocabularies at age three, illustrating the long-term implications of early verbal input.

1.2.3.2 The impact of maternal speech on infant and child social-emotional abilities

When mothers speak to their young children, it has a pronounced influence on their literacy and language abilities. However, the impact of maternal speech goes beyond these skills to developing children's socio-cognitive understanding. Mothers produce many different types of speech that provide children with a more advanced understanding of the concepts

presented before them than learning labels and words, such as understanding social and emotional concepts.

Parental mind-mindedness (MM) refers to the proclivity of a caregiver to treat their infant like they have a mind rather as opposed to an entity that has needs which must to be fulfilled (Meins, Fernyhough, Fradley, & Tuckey, 2001). For example, by a mother commenting on her infant 'liking' the ducks, or 'feeling' upset, or 'wanting' a cuddle she is commenting and relating to her infant's mind, these are referred to as appropriate mind-related comments (AMRCs). In contrast, a mother who comments on her infant's thoughts and feelings in a way that is incongruous with the infant's cues would produce a non-attuned mind-related comment (NAMRCs). Research in recent years has shown that MM (operationalized by AMRCs) is a stronger predictor of attachment status than maternal sensitivity (Meins, Fernyhough, Russell & Clark-Carter, 1998; Meins et al., 2001).

The Theory of Mind (ToM) literature supports the idea that mothers who are more in-tune with their infants provide them with a more complex and enhanced verbal early learning experience that strongly influences later developmental abilities. Meins and Fernyhough (1999) illustrated that MM from 20 to 36 months was stable over time and predictive of children's ToM abilities at age five. To support this further, Meins and colleagues maintained and provided evidence that AMRCs at six months were a positive independent predictor of MM at 48 months old and of ToM performance at 45 to 55 months old (Meins et al., 2002; Meins et al., 2003). More recent research has extended this relationship further showing that MM before aged one predicts early aspects of ToM at age one and two, age four, and age five and six years (Kirk et al., 2015; Laranjo, Bernier, Meins & Carlson, 2010; Meins, Fernyhough, Arnott, Leekham & de Rosnay, 2013).

Similarly, mothers' mental-state talk (MST) to their three to five-year-old children has been shown repeatedly to predict later ToM abilities (Hughes & Dunn, 1998; Peterson & Slughter, 2003). Ruffman, Slade and Crowe (2002) illustrated that mothers' MST to their preschool aged children as measured at three time points over one year, predicted these children's ToM understanding at age four, after controlling for children's previous ToM ability and own MST. Moreover, MST with younger children aged two years old is a predictor of ToM at age four, five and ten years (Ensor, Devine, Marks & Hughes, 2013; Jenkins, Turrell, Kogushi, Lollis & Ross, 2003; Symons, Fossum &Collins, 2006). This evidence exemplifies that the speech mothers expose their children to at a young age predicts their later social and emotional understanding. Whilst SES has been shown to relate to ToM reasoning (Shatz, Diesendruck, Martinez-Beck & Akar, 2003), much of the evidence, including that described above does not report SES differences in MST, or control for these differences, thus not fully exploring these differences. Additionally, SES differences in MM have not been observed to-date and, as a result, this thesis will examine both MST and MM for SES differences during book sharing. Additionally, to date, a large wealth of research on MM and MST has focused primarily on maternal speech which further justifies the focus on mothers in this thesis.

1.2.4 The quality of maternal verbal interaction during book sharing: infant and child linguistic and social-emotional outcomes.

Book sharing provides a rich context for scaffolding infants' developing linguistic and socio-cognitive understanding (Hoff-Ginsberg, 1991). The types of speech that mothers' produce during book sharing has been under-addressed in current literature. Little is known about the variations in mothers' speech across SES backgrounds during book sharing, and how the mothers' use of speech changes with children's age. Research examining speech types produced during book sharing is more substantial with preschool aged children than infants.

However, this evidence currently does not identify a comprehensive understanding of many verbal and non-verbal behaviours and does not address whether these behaviours differ across SES backgrounds. Additionally, far less evidence is available for infant samples. Previous research has identified individual or small groups of verbal behaviours used during book sharing and their impact on children's development. The current evidence for the impact of different speech types during book sharing will therefore be examined.

1.2.4.1. Complexity of maternal speech

In a review of maternal speech, and mother-infant conversations produced in the early learning environment, Hoff (2006) indicates that book sharing interactions induce a more multifaceted dialogue by mothers in comparison to other day-to-day mother-infant interactions. Hoff (2006) further suggests that SES has a robust impact upon infant language development, as high SES mothers read more to their infants and this speech, produced during book sharing, is recognised as being more sophisticated.

1.2.4.2 Labelling and elaborations

Ninio (1980) examined book sharing behaviours produced by mothers to their infants aged 17 and 22 months old across two socially diverse groups. The results illustrated that low SES mothers used fewer words overall during book sharing and these included fewer labels. This is supported by more recent research by Hoff (2006). Hoff proposed that these more complex types of speech mothers produce during book sharing than other contexts are known to include labels and questions. Further, Ninio (1980) found that low SES mothers produced less accompanying speech that gave additional detail to their labels, thus producing less descriptive elaboration to the labels they produced. Furthermore, upon measuring infant development, low SES infants were less developmentally advanced than their higher SES peers were. Similarly, Peralta de Mendoza (1995) examined book sharing interactions across

SES groups with mothers and their 12 to 24 month old infants, and found that lower SES mothers produced fewer elaborations as well as less infant-directed questions. Although this sample was slightly younger than that reported by Ninio (1980), Peralta de Mendoza found no differences in labelling across different SES mothers. The differences in maternal labelling behaviour observed in these studies will be re-examined in this thesis to address this disparity.

The impact of mothers' labelling and elaborations on children's development is supported by Reese and Cox (1999), who examined the impact of different book sharing styles on children's language and literacy skills at age four. The findings revealed that a 'describer style', defined as focusing on describing the pictures, was most facilitative of infants' language and literacy skills in comparison to other styles which focused more on the story's meaning. Deckner, Adamson and Bakeman (2006) also observed the use of qualitative book sharing strategies mothers used longitudinally with their 18 to 42 month old children. The authors focused on mothers' use of metalingual speech, which they defined as requests for labels, prompts for children to repeat labels or their own repeating of the child's labels. The results showed that mother's use of metalingual speech predicted their child's language development.

To summarise, evidence illustrates that low SES mothers demonstrate a less complex book sharing interaction, which encompasses fewer elaborations and, as some research illustrates, fewer labels and infant-directed questions. Additionally, an elaborative style has been established to predict literacy and language abilities. Whilst the current literature has gone some way to examining the impact of labelling and descriptive elaborations on subsequent children abilities, the evidence with young infants is sparse and the predictive relationships between these book sharing behaviours and later development has not yet been explored. This thesis aims to address the questions raised here.

1.2.4.3 Social, emotional and cognitive themes

In addition to the impact of the verbal book sharing quality on children's linguistic skills, the impact on social and emotional development must be considered. Leseman and de Jong (1998) examined the longitudinal relationship concerning book sharing interactions between parents and their four-year-old children and how this predicted later achievement at age seven. The quality of the book sharing interaction was observed; specifically, instructional and socio-emotional techniques during book sharing, and book sharing frequency. The results showed that language and achievement measures at age seven were predicted by earlier book sharing practices. Interestingly, the authors found that the children's attainment differences, related to family SES, were mediated by the home literacy environment and home language use. Furthermore, after controlling for home language use and prior attainment, the quality of book sharing still predicted children's language and school achievement.

In support of social and emotional techniques, Aram, Fine and Ziv (2013) examined how effective encouraging parents to use socio-cognitive speech types during book sharing would be on both the parent and children's own speech types. In both the intervention and control condition, parents were instructed to read four books, one book per week, four times a week to their preschool aged children. Additionally, those in the intervention group were instructed on appropriate conversations to have with their child whilst looking at the books together. This included focusing on the story's content and describing this, followed by exploring the socio-cognitive themes, such as mental state language and personalisation of the content to the child. The results indicated that both parents and children who were in the intervention subsequently referred to the targeted types of speech more than the control participants did. These findings have implications for increasing the quality of both caregiver and child speech during book sharing, though this has not been researched in a younger sample and therefore cannot be assumed similar results would be obtained within a younger sample. However, this

does have significant ramifications for future research wishing to change mother and child book sharing behaviours, and further research should explore this in younger samples.

To complement this research, Adrian, Clemente, Villanueva and Rieffe (2005) examined the frequency of MSTs mothers used during book sharing with their children between the ages of four and five. The analysis revealed that both book sharing frequency and MSTs predicted children's later ToM abilities, specifically cognitive and emotion-related terms were strong predictors. Similar results regarding the impact of MST during book sharing on ToM abilities have been obtained in older samples (Adrian, Clemente & Villanueva, 2007; Symons, Peterson, Slaughter, Roche & Doyle, 2005). These findings suggest that encouraging mothers to use MST would lead to developmental gains in ToM. Thus, the effects of encouraging this behaviour during book sharing will be examined in this thesis.

Research has revealed the positive impact of mothers' social and emotional references during book sharing on children's development. Previous research however has lacked focus on how these behaviours relate to younger samples and vary by SES differences in a book sharing context. Therefore, this thesis will address the gaps outlined.

1.2.4.4 Demand of interactive style

Heath (1982) recognised early on that book sharing between parents and their preschool aged children consisted of a variety of techniques. Some of these were more detailed and interactive in style, including reference to emotions and personalising the content, and others far less enriched often involving little interaction. Heath noted that these differences were related to SES, with high SES parents using the more interactive styles and low SES parents using the less interactive strategies. Heath provided a descriptive account of these findings, providing a good starting point to understanding differences in the verbal input during book sharing.

The content of maternal book sharing speech was further explored by Haden, Reese and Fivush (1996) who categorised mothers based on their speech during book sharing with their children aged three to six years old as either 'describers', 'comprehenders' or 'collaborators'. Describers mostly labelled and described pictures, whereas comprehenders mostly related to the story meaning and more in-depth conservations, and the collaborators' style changed as the child progressed. The book sharing interaction was measured frequently over 18 months and mothers' styles were consistent over time. The results illustrated that those who demonstrated a comprehender or collaborator style of book sharing, had children who scored higher on vocabulary and story comprehension at age six. This supports findings by Heath (1982) who previously illustrated differences in parental strategies involving the level of demand during book sharing. To support this further, Reese and Cox (1999) found implementing a describer style technique during book sharing at age four best predicted developmental advances, though this was dependent on the child's initial abilities. Children with higher initial abilities were best facilitated in their development by a more advanced book sharing technique.

These findings illustrate that the prediction of children's language and literacy is multifaceted, and that there are many book sharing behaviours that mothers use with their children that predict their subsequent development abilities. Thus, one must consider the importance of the contingency of a mother's behaviour, adapting her interaction according to her infant's level of understanding and interest.

1.2.4.5 Dialogic Reading

To add to these already extensive types of behaviours seen during book sharing interaction, a series of influential studies support the use of dialogical reading strategies during book sharing with both preschool children and older children, for enhanced language and literacy

outcomes. The dialogic approach teaches parents to encourage their child to become the storyteller and for the parent to assist and prompt this where needed. The specific techniques include asking open-ended questions, expanding on their child's input where necessary but attempting to encourage children to expand and develop progressively themselves, and repeating children's speech. This technique has been widely used with children age two to six years old (Mol et al., 2008). The first of these studies by Whitehurst et al. (1988) trained half of the parents to use the dialogic techniques and the other half were given no instructions. After a six-week period where parents were asked to read to their two-year old children every day for the first four weeks, children's development was measured. Results revealed that, in comparison to the pre-test measures of development, those in the experimental condition scored significantly higher at post-test than those in the control condition for vocabulary gains. At follow up a number of months later, these differences were still salient, though not as robust.

This initial study was replicated and many variations tested for the impact of dialogic reading on language skills (Hargrave & Senechal, 2000; Lonigan & Whitehurst, 1998). For example, Arnold, Lonigan, Whitehurst and Epstein (1994) replicated Whitehurst and colleagues' (1988) findings using two experimental groups (video versus in-person trained) and a control group who received no training. To extend this, these findings have been replicated with older children and across different cultures (Reese, Sparks & Leyva, 2010), as well as with more adequate control conditions where parents still received some type of training for book sharing (Huebner, 2000) though infrequently. The evidence described on dialogic book sharing suggests it is effective for increasing child abilities.

Mol et al. (2008) reviewed the literature on the use of dialogic reading and its effect on children's development, incorporating 16 studies and 626 participants with the mean age ranging from 28 to 72 months. Mol and colleagues concluded that dialogic reading explains

eight percent of the variance in children's expressive vocabulary but only four per cent of overall vocabulary abilities. The review also highlights that the technique is less effective with older children, only accounting for one per cent of variance in four to five year olds. Similarly, the effectiveness of dialogic reading is reported to be substantially lower in at-risk children, again only explaining one percent of variance, and not supportive of low SES samples. Thus, whilst some gains in vocabulary can be seen as a result of dialogic techniques, these are to be approached with caution due to the evidence suggesting that advances were only observed in selective samples, indicating a lack of applicable findings.

1.2.4.6 Elaborative reminiscing

Research further indicates that talking to children about their past experiences outside of a book sharing context, referred to as elaborative reminiscing, as opposed to dialogic parent-child book sharing, enhances children's literacy skills over and above dialogical reading techniques (Reese, Leyva, Sparks & Grolnick, 2010). Reese and colleagues (2010) assigned families randomly to one of three interactive conditions; elaborative reminiscing (non-book sharing condition), dialogic reading during book sharing, or a control condition. Mothers were defined as low income, and children were aged four. In the two experimental groups, mothers were taught the verbal techniques to use and children's literacy and language development was measured before the intervention, at the start of the school year, and again at the end of that year. Results demonstrated that reminiscing training led to advanced literacy skills, but no difference was seen in vocabulary skills. This supports previous research by Reese (1995) that reminiscing styles used by mothers whilst talking about a shared past event with their child predicted later literacy and language skills in their children over an 18-month period. The findings also illustrated that mothers' verbalisations during the dialogic book sharing condition predicted later child abilities, however this was not as strong a model as the reminiscing speech from the past event episodes.

Reese et al. (2010) reviewed a wealth of research on elaborative reminiscing outside of a book sharing context. The authors highlight a paucity of research with low SES samples and encourage further examination of the efficacy of elaborative reminiscing as an intervention with low SES families. It is noteworthy that, whilst there is extensive literature comparing the use of verbalisations relating to past experiences outside of a book sharing context, to dialogic reading during book sharing, no evidence considers reminiscing style during book sharing in relation to any outcome measure. Therefore, the comparisons made between book sharing styles such as dialogic reading and elaborative reminiscing outside of a book sharing context do not consider reminiscing speech during book sharing and the effect this may have on children's development.

Similarly, previous research has examined a range of maternal book sharing speech styles as well as dialogic reading techniques in comparison to reminiscing speech outside of book sharing. For example, Reese (1995) considers speech types such as descriptions and inferences during book sharing. However, when examining the impact on these maternal verbal behaviours on language and literacy abilities during book sharing, in comparison to mothers reminiscing during past events (Reese, 1995), there is a failure to observe whether reminiscing occurs during book sharing. This evidence therefore suggests that mother-child reminiscing during book sharing has not been compared in this literature for its impact on children abilities, and thus warrants further investigation.

1.2.4.7 Personalised speech

Research has examined the effect of personalising aspects of a book to a child on a number of child outcomes (Kucirkova, Messer & Sheehy, 2014a:2014b; Kucirkova, Messer & Whitelock, 2010). Kucirkova et al. (2014a) explored the effect of having personalised and non-personalised text in a storybook on the acquisition of new target words. A number of

target words that children were not familiar with were embedded into the storybook, in both the personalised and non-personalised sections, and children's knowledge of these words was assessed. The preschool aged children were read the storybook a total of two times one week apart, and their word knowledge was assessed after the first reading session, as well as before and after the second session. The results indicated that the children learnt significantly more of the target words from the personalised than the non-personalised section of the book, illustrating the impact of personalisation on the child's vocabulary skills. The results indicate that children find it easier to learn novel words when they are more strongly associated to themselves, perhaps giving them more meaning. Personalised speech during book sharing has been demonstrated to be facilitative of infants' spontaneous speech and vocabulary abilities in preschool aged children. Thus, the impact of personalised speech on infant outcomes will be explored in this thesis.

1.2.5 The impact of maternal non-verbal behaviour on infant and child development

Infants often use non-verbal means to communicate, such as gesture, with others around them before they grasp speech. Non-verbal communication, in the forms of pointing and symbolic gesture, has been found to influence vocabulary growth (Brooks & Meltzoff, 2008; Pan et al., 2005; Rowe & Goldin-Meadow, 2009a), as well as mothers' sensitivity to their infant (Kirk et al., 2013). Non-verbal behaviours can also be used as a measure of infant engagement, such as eye gaze, and this has also been linked to language development. The literature exploring how non-verbal behaviour is beneficial to infant development will be considered.

1.2.5.1 The impact of maternal non-verbal behaviours on infant and child linguistic outcomes

Children's gestures were, for many years, overlooked, with the primary concern being language production as this was thought to be the key to linguistic and other domains of development. However, research began to look more broadly at the communicative efforts

between mother-infant dyads from an earlier age and how these initial instances were so important (Iverson, Capirci, Longobardi & Caselli, 1999; Iverson & Goldin-Meadow, 2005). These informative occurrences of gesture between the dyad start from a few months old, and are predictive of later vocabulary (Rowe, Özçalıskan & Goldin-Meadow, 2008; Rowe & Goldin-Meadow, 2009a).

Infant gesture is a naturally occurring form of communication that infants start to produce at around ten months old (Bates, Benigni, Bretherton, Camaioni & Volterra, 1979). The first gestures appear to be for indicative purposes (deictic gestures) and include declarative gestures (pointing to share attention with another) or imperative gestures (pointing to indicate wanting something). At around 12 months of age, infants' gestures adopt more complex representations and usually involve an action (for example, an infant pretending to brush their teeth with their index finger), and are often referred to as symbolic gestures. Gestures allow mother-infant dyads to share an understanding of something through joint attention, which is functioning as a shared system of communication before speech is fully functional for communication (Iverson & Goldin-Meadow, 2005; Liszkowski et al., 2004). Once infants begin to use words, they often continue to use gestures, combining gestures with words to communicate more complex meanings than they can convey with singular words, before the two-word combination stage has been reached (Iverson & Goldin-Meadow, 2005). For example, saying 'dog' and pointing to the dog's food bowl is more informative and reveals a considerably different understanding of an infant's thoughts than if they just pointed to the dog or the food in the bowl.

Rowe et al. (2008) found that parental gesture use at 14 months predicted infant gesture use at 14 months, which was a significant predictor of infant vocabulary size at 42 months. Interestingly, there was no direct effect of parental gesture use at 14 months on infant vocabulary at 42 months suggesting infant gesture is key. Similarly, Rowe and Goldin-

Meadow (2009a) found that the number of meanings conveyed in gesture at 18 months by infants predicted their vocabulary size at 42 months. Additionally, findings showed the number of gesture and speech combinations predicted the infant's later sentence complexity. Iverson and Goldin-Meadow (2005) found that the age that infants combined their first gesture plus word communication predicted the age infants produced their first two-word combinations.

Research in this area has continued to consider non-verbal communication and its impact on development, and many reasons were attributed to why gesturing facilitates a larger vocabulary. Research has proposed that more adult gesturing leads to more infant gesturing (Goodwyn & Acredolo, 1998; Rowe et al., 2008) and, as has already been established, the more a child gestures, the larger their later vocabulary. Iverson and Goldin-Meadow (2005) considered the link between gesture and language development and described gesture in this context as an infant's way of communicating when words were not available to them. During this process, infants produce gestures as a means to get their mothers to translate the gestures into words, which facilitates their learning (Goldin-Meadow, Goodrich & Sauer, 2007). Without the non-verbal communication in the form of a gesture, the infant cannot communicate that they want to know the name of an object and that they are ready to learn words (Pan et al., 2005). This illustrates the importance of joint attention between mother and infant for this labelling process to occur (Tomasello & Farrar, 1986). Moreover, pointing has been shown to increase joint attention episodes (Bruner, 1975) and evidence from a review demonstrates that pointing is a key joint attention behaviour which increases language development (Colonnesi, Stams, Koster & Noom, 2010).

Just as the quality and quantity of maternal speech varies as a function of SES, recent research has identified similar variations in maternal gesture. Research demonstrates that maternal gesture use is an expression of SES (Rowe & Goldin-Meadow, 2009b). Therefore,

higher SES mothers produce more gesture in mother-infant dyadic interactions than in low SES dyads (Rowe & Goldin-Meadow, 2009b). This evidence suggests that gesture may be a possible mechanism to enrich early mother-infant interaction in low SES dyads by means of an intervention.

Interventions have been developed in an attempt to facilitate language development in infants with the use of gestures (Goodwyn, Acredolo & Brown, 2000; Kirk, Howlett, Pine & Fletcher, 2013; Vallotton, 2012). However, despite extensive evidence illustrating that gestures facilitate language development, researchers carrying out gesture interventions, often with class-bound higher SES participants, have found mixed results in terms of advanced linguistic development. However, more recent research demonstrates that it is necessary for the increase in gesture to be specific to the infant, rather than the mother only (LeBarton, Goldin-Meadow & Raudenbush, 2015) which is often the focus of interventions, and previous research has overlooked and not reported, possibly explaining the mixed findings.

LaBarton and colleagues examined the impact of encouraging infants to point on infant verbal abilities, measuring infant pointing after intervention directly. Their results revealed that infants who were instructed to point produced more meanings in gesture during the intervention trial, exhibiting their understanding through gesture. Subsequently, they also gestured more with their caregiver than before the intervention compared to when only the experimenter pointed, or neither pointed. A follow up illustrated that the increase in infant gesture that resulted from experimenter instruction, led to larger vocabularies in those infants, illustrating the impact of gesture on infant language.

Infant eye gaze has also been indicated to be predictive of later vocabulary development in infants aged ten and eleven months old (Brooks & Meltzoff, 2008). Infants were measured for their visual response to an adult turning and looking at an object. The results showed that

infants who followed the visual gaze of the adult, and looked at this for a more substantial period of time, had larger vocabularies at a two-year follow-up study. Additionally, this observation was still apparent when controlling for maternal education.

In summary, non-verbal behaviours including gesture and eye gaze predict infants' subsequent language abilities. These behaviours will now be considered for their influence on social and emotional outcomes in infants.

1.2.5.2 The impact of maternal non-verbal behaviours on infant and child socio-emotional outcomes

Non-verbal behaviour is also important for the developing relationship between mothers and their infants, and helping both parties to understand one another. The early relationships that infants develop have a lasting effect on the relationships they continue to build throughout life, and on their social and emotional development (Raver & Knitzer, 2002). Evidence demonstrating that gesture helps mothers' sensitivity and responsiveness to their infants will be presented.

Kirk et al. (2013) performed an in-depth analysis to examine the impact of maternal gesture use on the mother-infant relationship, when infants were between 8 and 20 months. The findings revealed that there were more positive and closely bound interactions between the dyads using gestures in comparison to those who were not. Some aspects of MM were identified to differ in those using gesture, though there was no significant difference in MM as a whole, and AMRCs were not significantly different.

Vallotton (2012) examined the effect of an infant signing intervention on low SES families, which resulted in a positive effect on the mother-infant relationship, as well as increasing mother and infant gesture use. Vallotton concluded that those in the infant signing intervention group were significantly more attuned to changes in infant affect, and maternal

responsiveness to distress cues increased. However, some aspects of Vallotton's research could be considered problematic. The sample of low SES families included parents with managerial occupations, and education levels beyond high school (for 24% of mothers and 33% of fathers within the sample) with no further details, making the assessment of a low SES sample questionable. Additionally, results showed that mothers were responsive to their child's social cues/bids for attention 66% of the time before the intervention and with only a non-significant six percent increase it is questionable whether these parents were greatly impacted by the intervention.

Gongora and Farkas (2009) considered the relationship between gesturing and interactions between the mother and infant, specifically what effect a gesture programme had on synchrony. The programme involved mothers receiving two home visits, three months apart, where they were provided with a demonstration of a number of symbolic gestures, and given supporting materials to reinforce the use of gesture. Infants were on average 23 months at the first visit, and the dyads were filmed during a free-play interaction as part of these sessions. The results showed that there was an increased frequency of synchronic behaviours for those mother-infant dyads using gesture programmes during the filmed interactions. This evidence illustrates that gesturing increases the mothers understanding of her baby.

Aspects of MM, encouraging infant autonomy and maternal responsiveness, can be amplified by gesture use (Kirk et al., 2013), as can other aspects of mother-infant interactions such as maternal synchrony (Gongora & Farkas, 2009). These behaviours are thought to be elicited by gesture use, as gesture use by the mother draws her attention to possible non-verbal communication responses from her infant (Kirk et al., 2013; Vallotton, 2009; 2012). By considering how gesture allows a communication path between the mother-infant dyad (Goldin-Meadow et al., 2007; Iverson & Goldin-Meadow, 2005), it is possible to understand why gesture facilitates socio-emotional development as well as linguistic development. From

a socio-emotional viewpoint, gesture enables critical communication between the mother and infant, allowing the infant to explore thoughts, feelings and ideas with their mother that they are unable to do through speech. Likewise, a mother can respond to her infant through gesture or speech, which allows their development to continue to improve more rapidly them without gesture, before words are available.

Kirk et al. (2013) found that aspects of MM did improve in high SES participants during a gesture intervention. However, previous research illustrates that AMRCs are the key dimension of MM related to subsequent developmental abilities, such as ToM capabilities (Kirk et al., 2015; Laranjo et al., 2010; Meins et al., 2002; Ruffman et al., 2002) and these have not been shown to improve with gesture interventions to date. Thus, in review of previous literature, it is imperative to investigate whether these factors; speech, AMRCs, gesture and other non-verbal behaviours intertwine within a low SES sample, and to what extent they predict infant development. This thesis aims to synthesize these areas and explore the impact on development.

1.2.6 The quality of maternal non-verbal interaction during book sharing

Many of the non-verbal behaviours identified to facilitate infant development have been examined in a book sharing setting, though few have measured non-verbal behaviour using objective measures, or across SES. The evidence examining non-verbal behaviours during book sharing will be explored.

Ninio (1980) reported measuring gesture production during book sharing interactions, however they did not clearly report the nature of these gestures, nor whether these were maternal or infant gestures being measured. Nevertheless, the results illustrate that gestures were predictive of vocabulary comprehension, but only in high SES families. Thus, this area that has not yet been fully explored in book sharing.

Book sharing provides an optimal opportunity for joint attention and research indicates that both book sharing and joint attention predict children's later linguistic skills. Farrant and Zubrick (2012) examined a number of measures, including family SES, book sharing behaviours and joint attention from when infants were 9 months to 34 months were their impact on children's vocabulary was examined. The findings revealed that both joint attention and book sharing were predictive of children's later language abilities, however all the measures taken were from maternal self-reports and all of these were ratings that were subject to the mothers' personal perception. Furthermore, Farrant and Zubrick (2013) extended these initial findings to examine the effects of these measures on children's school readiness at age 58 months. The findings illustrated that lower levels of children's joint attention and less book sharing at 9 months old predicted lower levels of language attainment at 58 months. However, as mentioned previously, these results are a reflection of asking mothers about their infants' joint attention at nine months and these mothers' perceptions of their infants' capabilities, as rated on a scale.

Crain-Thoreson and Dale (1992) investigated infants' engagement in a book sharing activity as measured at 24 months old and the impact of this on later developmental skills. The researchers gave infants an engagement rating based on a number of verbal and non-verbal behaviours observed during book sharing. The results indicated that the engagement at 24 months old predicted the infants' language abilities at both 30 and 54 months, as well as on literacy measures when the children were age 54 months. Additional follow up analysis on these infants indicated that these language and literacy differences increased over time, with infant engagement at 24 months old predicting development at age six and a half years old (Dale, Crain-Thoreson & Robinson, 1995).

Further research by Bus and van Ijzendoorn (1997) illustrates that book sharing is a social process which changes as infants get older and are able to be more responsive in the book

sharing interaction. Bus and van Ijzendoorn (1997) explore a number of key behaviours that occur naturally during book sharing and look at how these behaviours relate to one another. Furthermore, they examine how these behaviours relate to the mothers' attachment with their infant, especially the differences in infant attention and the mothers' reaction to this. A sample of 82 months and infants, aged between 10 and 15 months old, were examined while looking through a book. The findings demonstrate that engagement was predicted by the child's attachment status, with insecure attached children being less engaged. Additionally, insecure attached children had mothers who used more discipline during the book sharing which further supported previous findings of these behaviours in an older preschool-aged sample (Bus & van Ijzendoorn; 1995). The authors also revealed that mothers of insecure attached infants were also more restrictive of their infants and allowed them little opportunity to explore whilst book sharing. The authors suggest that this may explain the loss of interest in these infants and further speculate that this could be the result of mothers responding to infant disengagement in a more negative manner. Bus and van Ijzendoorn (1995) also examined difference during mother-infant dyads book sharing experiences in dyads classed as frequent and infrequent readers at age three years old. Results revealed that in the infrequent reader group, mothers spent more time disciplining and in irrelevant discussions whilst book sharing than frequent readers.

1.2.7 Defining socioeconomic status (SES)

SES has been assessed in subjective and diverse ways, with no single agreed upon measure (Bornstein & Bradley, 2003). Measures are often made up of a composite score based on a number of factors such as, education, occupation, income, housing, geographical location, family size and family relationships. However, these composite scores can be calculated on

any number of the factors above and their weighting can be very different, meaning the scores reflect different facets. Thus measuring SES is problematic.

A well documented, widely used, valid and reliable measure, which has been used for many years, is the Hollingshead Index (1975). This measure is believed to focus on the two most central aspects of SES, education and occupation, and has been reported to be the most commonly used standard measure of the construct of SES in child development research (Ensminger & Fothergill, 2003). In this thesis the Hollingshead Index (1975) was used to obtain SES scores for each dyad, to allow comparison to previous research.

Furthermore, previous research has conceptualised SES by examining low, middle and high SES groups, usually considering two of these groups by separating SES scores into these groups. However, evidence suggests that creating dichotomous variables is unrepresentative, inaccurate and in almost all cases unacceptable (MacCallum, Zhang, Preacher & Rucker, 2002). Thus, this thesis will primarily focus on analyses using SES scores, but will also consider SES groups to produce comparable data to previous research.

1.3 Summary

In this review, a number of verbal and non-verbal behaviours have been identified which predict later developmental abilities during book sharing. However, the methods used to examine these interactions in previous research are at times questionable; lacking objectivity, validity and reliability. For example, studies have relied on maternal self-report of book sharing frequency (Bracken & Fischel, 2008; Farrant & Zubrick, 2012; Farrant & Zubrick, 2013).

Many behaviours have only been explored with older children or preschool aged children, and often in a class-bound sample. This is a concern as, by this age, there are striking

differences in the size of vocabularies of high and low SES peers (Rowe & Goldin-Meadow, 2009b). More so, this leaves a long stretch of time where parents could be in need of, or would be open to, ways in which to maximise book reading for both the caregiver and the infant. Additionally, targeting children at a later age, as much of the research has done so far, means that children may already have difficulties with their literacy and language abilities. Therefore, these differences are already present by the time of intervention, and programmes work to change these difficulties rather than preventing them which recent policy reports call for (Field, 2010a). By considering whether these differences are evident in mother-infant book reading at an earlier stage of development, future interventions can serve to prevent developmental delays rather than simply reverse them. The influence of SES on the mother-infant book sharing interaction is a factor that has been consistently under addressed in the literature. The majority of research has focused on high to middle SES families when examining the differences in the quality of book sharing behaviours and the impact of these on development.

While research has identified a range of different behaviours that contribute to child outcomes (with varying magnitude), these behaviours have not all been explored in an infant sample during a book sharing context, neither have they been considered collectively to allow for the importance of different behaviours to be directly compared. More so, where non-verbal interaction behaviours are considered and measured appropriately in the literature, there is still a lack of focus upon gesture use in book reading and its effect upon language development. Consequently, gesture which facilitates language development (Rowe & Goldin-Meadow, 2009a), socio-emotional development (Gongora & Farkas, 2009; Kirk et al., 2013), and joint attention (Liszkowski et al., 2004), is being overlooked and has not been investigated adequately in mother-infant dyads during a book sharing activity, which could facilitate further development. By exploring differences in gesture use in the mother-infant

dyadic interaction specifically during book sharing, we can identify what impact this has upon infant development.

1.4 Research Questions

The literature reviewed has identified a number of gaps relating to differences in mother-infant book sharing interactions across SES backgrounds. This thesis aims to synthesize the findings from research in the areas of book sharing, verbal and nonverbal communication and SES differences, and their impact upon a number of key developmental domains important for school readiness. Thus, the following questions will be addressed in this programme of research:

1) Are there differences in the quantity and quality of verbal and non-verbal behaviour during mother-infant book sharing as a function of SES?

   a. Do infants' home learning environments differ across SES?

   b. Does SES predict maternal background variables and book sharing behaviours? And if so, are maternal background variables related to the book sharing interaction?

   c. Are infant book sharing behaviours associated with SES, and if so what features of mother-infant interaction during book sharing are associated with infant language proficiency and cognitive outcomes?

   d. Are SES-differences in book sharing interactions stable over time?

2) Are there SES differences in the quantity and quality of mother-child verbal and non-verbal book sharing interactions at age four?

   a. Does SES predict mother and child book sharing interactions, and are these differences associated with children's social and emotional skills?

   b. Are SES-differences stable from infancy to childhood across two samples?

3) To what extent can book sharing be enhanced via a targeted intervention?

These questions will be addressed using longitudinal and cross-sectional designs, across three studies, as summarised below:

A longitudinal exploration of mother-infant interaction during book sharing in different socioeconomic status families.

A longitudinal analysis of mother-infant book sharing behaviours at 12 and 18 months old is presented. Mother-infant dyads from high, mid and low SES families were video-recorded book sharing for ten minutes, and a micro-analysis performed on the videoed interactions to examine the differences in both mother and infant verbal and non-verbal behaviours. Mothers were asked to look at the books with their infant as they would do normally at 12 and 18 months old. A wordless storybook with pictures was provided by the research team to ensure consistency between dyads. These videos were analysed using the Observer XT (a computer aided coding system) to allow a fine-grained analysis of both mother and infant behaviours, following a user-defined coding scheme. Maternal and infant non-verbal behaviours were coded for; declarative and symbolic gesture, eye gaze, infant disengagement and maternal reengagement strategy. The verbal behaviours included, total maternal and infant speech, and the following specific verbal categories for mothers; labelling, descriptive and personalised elaboration, emotion-related speech, encouraging autonomy, labelling with sounds, infant-directed questions, and mind-mindedness (Meins, Fernyhough, Fradley & Tuckey, 2001). In addition to this, SES differences in infant development were investigated at 12 and 18 months using the Oxford Communicative Developmental Inventory (CDI) and Gestures, Actions and Pretend Play checklist (GAPP), and additionally at 18 months using the Bayley's Measure of Infant and Toddler Development, and the Preschool Language Scale (PLS 3-UK). The infant's home environment was also measured using the STIMQ. Infants' cognitive (Bayley's

scale) and language (PLS) skills, measured at 18 months, that were identified to differ by SES were examined for their relationship to book sharing behaviours.

Exploring mother-child interaction during book sharing across socioeconomic status families at age 44 months.

Mother-child dyads, both low and high SES, were previously filmed book sharing at 44 months old as part of a larger study. In this chapter, these videos were examined for both verbal and non-verbal differences in book sharing behaviours using the coding scheme described above to examine how the book sharing interaction changes between mothers and preschool aged children. Alongside the videos, children's social and emotional skills were measured in the larger study using the Strengths and Difficulties Questionnaire (SDQ). This measure was utilised to examine their association to the book sharing behaviours found to differ by SES. By considering children's social and emotional skills, this provided some insight into what the mechanisms underlying these differences across SES could be.

Can encouraging an enriched book sharing interaction change mothers' behaviours?

Based on the findings from Chapters 2 and 3, a short intervention programme was designed and delivered to low SES mothers, as these families were identified in the previous chapters to be lacking a sophisticated book sharing interaction style, as well as being supported by previous research. The targeted intervention focused on encouraging both verbal and non-verbal behaviours that differed by SES in the previous chapters. Mothers' book sharing behaviours were filmed and analysed both before and after the delivery of the intervention, to examine whether their book sharing behaviour has changed as a result. A secondary control week was included before the intervention to ensure mothers' behaviours were not altered due to factors other than the intervention. Child and infant development was measured using

the Oxford Communicative Developmental Inventory (CDI) and Gestures, Actions and Pretend Play checklist (GAPP), and the infant's home environment using the STIMQ. These measures were taken at week 1 (before intervention) and again at week 3 (after intervention).

The intervention was delivered at week 2 and consisted of mothers being informed of the importance of the target book sharing behaviours on their child's development. Mothers were shown a video of three mothers modelling these behaviours and the researcher continuously explained and reinforced the mothers understanding throughout the video. Mothers were given two wordless picture books with prompts on each page to assist them using the target behaviours when looking at the books with their child. Mothers were asked to look at these with their child as they normally would other books before week 3.

Chapter 2: A longitudinal exploration of mother-infant interaction during book sharing in different socioeconomic status families.

2.1 Introduction

Extensive research has illustrated that infants from lower SES backgrounds have a more impoverished early learning environment than their higher SES peers which impacts on their readiness to learn at school age as well as their overall success at school (Bradley & Corwyn, 2002; Brooks-Gunn & Duncan, 1997; Field, 2010; Feinstein, 2003; Rowe, Raudenbush & Goldin-Meadow, 2012). This is a concern as children who start school at lower levels of readiness rarely catch up with their school-ready peers by the end of their education, implicating their potential to succeed in the future (Ofsted, 2014). School success is known to impact upon later life outcomes (Johnson & Kossykh, 2008).

Before infants begin formal education, book sharing is a key home literacy activity that has been linked to subsequent cognitive and linguistic development (Fletcher & Reese, 2005; Karrass & Braungart-Rieker, 2005; Raikes et al., 2006; Sonnenschein & Munsterman, 2002). A number of home literacy factors have been shown to influence a child's educational attainment, including the regularity of book sharing in the home and the number of books in the home (Bus et al., 1995; Field, 2010a; Fletcher & Reese, 2005; Rodriguez et al., 2009). Both of these variables have been reported to vary as a function of SES (Field, 2010a; Hart & Risley, 1995; Whitehurst et al., 1994). Book sharing is a primary opportunity for a joint attention interaction in which caregiver and child share attention. Joint attention refers to two social partners together focusing and attending to a shared object or goal, as well as each other, and research has shown joint attention to be beneficial to infant development (Tomasello & Farrar, 1986). Therefore, SES has a direct effect on book sharing which is a

known facilitator of infant development and consequently this has implications for infants' school readiness.

Early research into book sharing between mothers and infants focused on the change in the book sharing interaction over time, particularly how mothers build up their behaviours over time to what they believe their infants can respond to appropriately (DeLoache & DeMendoza, 1987; Ninio, 1983). This early research demonstrates mothers' abilities to provide scaffolding (Vygotsky, 1978), meaning mothers could provide appropriate tasks beyond their infants' current abilities but within the infant's grasp. Research continued in this area by looking at how book sharing was predictive of infants' later language abilities, with substantial evidence indicating that reading with infants impacts upon infants' language and literacy (DeTemple & Snow, 2003; Topping et al., 2013).

Research has identified SES related differences in a number of book sharing behaviours with infants including labelling (Ninio, 1980), questions (Peralta de Mendoza, 1995), elaborations and total speech (Peralta de Mendoza, 1995; Ninio, 1980). Additionally, research has recognised the impact of maternal interaction during book sharing on infant language development, including labelling (Deckner et al. 2006; Ninio, 1980). However, research to date that examines differences in book sharing interactions across SES groups indicates a lack of agreement on how mothers label pictures across SES groups. Peralta de Mendoza (1995) reported no differences in the amount of labelling speech in high and low SES mothers with their 12 to 24 month old infants whereas Ninio (1980) reported SES differences in this behaviour with infants aged 17 to 22 months. To explain this discrepancy, the infants were slightly different ages, and it is also possible that these behaviours change over time. This chapter will examine infants longitudinally from 12 and 18 months, which represent the ages identified to show disagreement, in an attempt to address this disparity.

While the evidence described this far has gone a great way to identify features of parent-infant behaviour in a book sharing context that contribute positively to child outcomes, much of the research has focused on a single verbal or non-verbal behaviour produced by either mothers or infants rather than looking at both (Fletcher & Reese, 2005). Additionally, when research has examined a group of behaviours, the role of each of these has not been considered individually, only as a collective set of behaviours on outcome measures. Therefore, research to date has reduced the book sharing experience to singular, isolated behaviours and has not considered the broad range of verbal and nonverbal behaviours of both partners and how these relate to one another. There are a number of non-verbal behaviours known to facilitate infant development that have not been explored during a book sharing activity. For example, infant pointing is predictive of language development (Colonnesi, Stams & Noom, 2010). However, pointing and other types of gesture have rarely been explored in a book sharing context (Fletcher & Reese, 2005; Murphy, 1978; Topping et al., 2013), despite the fact that this context elicits gesture production (Pan et al., 2005). More so, there are limited studies that have looked at how verbal and non-verbal behaviours during a book sharing interaction are different across SES backgrounds (Fletcher & Reese, 2005). Additionally, research so far has focused on older children who are already at school or pre-school, and researchers have highlighted the lack of evidence that has looked specifically at book sharing interactions in infants (Debaryshe, 1993; Fletcher & Reese, 2005). It is important to address this gap and study infants to explore the magnitude of the differences at an earlier age than much of the current research has. Additionally, examining whether book sharing practices are already having an impact on infants' development at such a young age will contribute to knowledge in this area. Research has also not fully considered the child's role in the book sharing interaction, often focusing on the parent's behaviours only and ignoring the child or infant behaviours (Fletcher & Reese, 2005). The longitudinal

relationship between the dyadic verbal and non-verbal behaviours produced during book sharing have also rarely been investigated in-depth with a young sample across SES groups, also exploring the impact of these behaviours on cognitive and linguistic development. By addressing this, researchers and policymakers can grasp a more informed understanding of these early differences in dyadic interaction across SES groups, and will contribute to evidence suggesting more substantial action needs to be taken to improve early learning.

In light of these points, the current study aims to build on the existing literature to examine mother and infant verbal and non-verbal behaviours produced during a book sharing interaction and to explore how these change over time. The purpose of this study is to examine the differences in the quality and quantity of verbal and non-verbal behaviours produced by high, mid and low SES mother-infant dyads during book sharing. Additionally, this study will explore whether these behaviours are stable over time by considering this dyadic interaction when infants are 12 and 18 months old. When infants are 12 months they are capable of understanding words and phrases to some extent and often begin to start using expressive language. At this age, they have typically also started to use a pointing gesture and understand pointing in relation to joint attention (Liszkowski et al., 2004). Therefore, this is an appropriate age to explore the first book sharing interaction between the mother and infant. At 18 months, infants have undergone a rapid growth in all developmental domains, thus this six-month latency will examine how these changes have impacted upon the book sharing interaction and if these differences have increased. Furthermore, at 18 months, it is anticipated that there will be greater variation in infants, thus allowing the impact of SES to be identified across domains. Consequently, the relationship between the observed book sharing behaviours at 12 and 18 months, and measures of children's linguistic and cognitive ability at 18 months can be addressed. Current research illustrates that infants' cognitive abilities at 12 and 18 months old are affected by SES (Roberts, Bornstein, Slater & Barrett,

1999) and this research hopes to advance these findings by considering how book sharing behaviours are impacting this. Additionally, by observing how the infant may play a part in this interaction, this study will explore how maternal reading style changes as a function of child age and ability.

2.1.1 Further considerations

There are a number of variables that may affect the quantity and quality of dyadic book sharing interactions, thus we will consider the impact of depression and stress which will be measured and examined in relation to the mothers' interactions in this chapter. Research demonstrates maternal depression has a negative impact on mother-infant interactions at six months old and this in turn affects infants' cognitive abilities at 42 months (Milgrom, Westley & Gemmill, 2004). Reissland and Burt (2010) found that mothers with postnatal depression produced a number of negative behaviours during two book sharing interactions with their infants aged seven months, and then later at ten months. Depressed mothers were more likely to restrict their infant and withhold the book from their infant. Additionally, infants were more likely to push away the book and close the book. These negative behaviours were reported to increase over the three-month period between visits, leading the authors to suggest that the maternal behaviours were the cause the infant behaviours. In a review, Field (2010b) reported that maternal postnatal depression has a negative impact on mother-infant interactions, and these are common across SES backgrounds. The author suggested that the consequences on interaction are mothers reduced sensitivity and infants being less responsive. Furthermore, Keirnan and Huerta (2008) demonstrated that maternal depression predicts child cognitive development at age three years. Research additionally illustrates that the negative impact of maternal depression on children is larger in lower SES families (Stein et al., 2008). Thus, this is an important factor which may affect mother-infant

book sharing interactions in this study. Consequently, it is desirable that this chapter examines the role of maternal depression on book sharing interactions, with the previous research suggesting that it will have a negative impact on dyadic interactions, especially in low SES dyads. Mothers' depressive symptoms will be measured across SES to check for any differences that may affect the results using the Edinburgh Postnatal Depression Scale (Cox, Holden & Sagovsky, 1987).

The family stress model (Conger et al., 1990) proposed that economic adversity that is often seen in lower SES families causes financial worries, debt, and marital problems which impacts on the mothers' stress, and this leads to more negative parenting practices. In support of this, Coyl, Roggman and Newland (2002) found that maternal stress affects the mother-infant interaction and attachment status. This study will measure maternal stress as this may impact the book sharing interactions, and is suggested to be more prevalent in low SES samples (Conger et al., 1990). The Parenting Stress Index Short Form (Abidin, 1995) will be used to capture this.

Mother's own language skills are rarely accounted for as a measure that may affect mothers' interactions with their infant, and research indicates it has a huge impact on subsequent infant abilities (Hart & Risley, 1995; Hoff, 2003). Whilst mothers' education level is often seen as an indicator, maternal vocabulary was also measured in this study independently using a more direct measure. The vocabulary subscale of the Wechsler Adult Intelligence Scale (Wechsler, 1981) was used to measure mothers' own language abilities.

2.1.2 Developing a Coding Scheme for Mother-Infant Book Reading Interaction

During mother-infant book sharing, a number of behaviours can be observed. Many of these have already been identified to affect infant development, though often these behaviours have not been explored fully in a book sharing setting. A number of mother and infant verbal and

non-verbal behaviours were identified from the literature to be included in a coding scheme that would capture the full range of behaviours observed during dyadic book sharing episodes. A judgement was made regarding the valence of each behaviour to distinguish positive from negative behaviours based on evidence from the literature. All behaviours below were coded directly from the book sharing video-recording, and coded for every occurrence of each behaviour for the whole duration of the video.

Non-Verbal Behaviours

Engagement

Infant engagement during book sharing has previously been measured using a number of methods, for example by maternal self-report of infant interest in book sharing (Lyytenin, Laakso & Poikkeus, 1998), and by coding infant verbal and non-verbal responsiveness to their mother during book sharing interactions (Crain-Thoreson & Dale, 1992; Laakso, Poikkeus, & Lyytinen, 1999). Infant engagement has been related to attachment status (Bus & van Ijzendoorn, 1988) and to literacy and language abilities (Crain-Thoreson & Dale, 1992; Dale et al., 1995). Infant engagement is also necessary for establishing joint attention and this is a known facilitator of infant development (Tomasello & Farrar, 1986). In the present study, infant engagements were measured by coding infants' eye gaze. Given the positive outcomes associated with infant engagement, this was included in the coding scheme. A positive behaviour was considered as when the infant was engaged in the book sharing interaction, including when the infant was gazing at the book or their mother (as detailed in eye gaze below). The infant's positioning in this study was dictated by their mother and often changed as the book sharing episode progressed. A typical position was on the mother's lap facing the book, or next to the mother facing both the mother and the book.

Infant eye gaze: Infant eye gaze was considered in this chapter as the measure of infant engagement and a predictor of infant vocabulary ability (Brooks & Meltzoff, 2008). This study identifies infant engagement by coding infants' eye gaze as the following; *gazing at book, gazing at mother, and disengage* (to include gazing at anything else not already identified for more than 10 seconds). *Infant disengagement* was coded when an infant disengages from the book sharing episode, and the method the mothers employ to try to reengage their infant was also coded. *Maternal reengagement strategy*: Mothers use a variety of strategies to attempt to reengage their infant in previous studies. Research illustrates that mothers with insecure attachments to their infants use more discipline whilst reading (Bus & van Ijzendoorn, 1988) and they use more motor restricting behaviours on their infants (Bus & van Ijzendoorn, 1997). The different reengagement strategies that mothers implement were explored in this study, considering both positive (e.g. *positive and positive alternative*) and negative (*forced,* and no attempt to reengage, named *negative*) strategies.

Maternal eye gaze: mothers eye gaze was also examined, as maternal gazing at the infant facilitates joint attention with the infant which, subsequently, is beneficial to infant development (Tomasello & Farrar, 1986). Mothers eye gaze was coded as follows; *gazing at infant, gazing at book, or other gaze.* Gazing at the infant or book was considered positive to the book sharing experience. It was predicted that lower SES mothers would have children who disengage from the book sharing more frequently, and would use more negative reengagement strategies than higher SES mothers.

Gesture

Maternal gesture is a communicative tool that facilitates joint attention between mother and infant during book sharing (Tomasello & Farrar, 1986). Furthermore, maternal gesture is a known facilitator of infant gesture (Iverson & Goldin-Meadow, 2005) and infant gesture

predicts an infant's later vocabulary (Brooks & Meltzoff, 2008; Rowe et al., 2008). Additionally, SES related differences in maternal gesture have also been observed (Rowe & Goldin-Meadow, 2009b). Based on this evidence, mother and infant gesture were measured during book sharing and SES differences were explored in this setting. The types of gestures that were coded for mothers and infants were; *declarative, symbolic, and imperative*. Gesture was considered a positive non-verbal behaviour because of its documented contribution to children's subsequent literacy and language abilities (Rowe & Goldin-Meadow, 2009a). It was predicted that lower SES mothers would gesture less with their infants than higher SES mothers. Consequently, lower SES infants were predicted to gesture less frequently than higher SES infants.

Verbal Behaviours

The verbal behaviours that were coded for mothers during book sharing are identified below. Infant verbalisations were also coded, but not grouped, due to the lack of clear identifiable speech at this age.

Labelling

Maternal labelling during book sharing has been measured in a number of studies and has been identified to predict infant vocabulary positively (Olson & Masur, 2015; Ninio, 1980). Little research has explored SES differences in labelling behaviours during book sharing with no research examining how these differences change over time. Additionally, research is limited to understanding the impact of this behaviour to concurrent linguistic differences (Ninio, 1980). Thus, maternal labelling was measured in the current coding scheme to examine further whether labelling differed across SES groups, and to observe the use of labelling over time. Labelling was considered a positive behaviour, and was predicted to be observed for a shorter duration in lower SES mothers than higher SES mothers.

Research also advocates that mothers label in response to their infants' gesture (Olson & Masur, 2015). Furthermore, the more mothers gesture, the more their children gesture, and this is related to SES (Rowe & Goldin-Meadow, 2009b). Thus, it may be that higher SES mothers have infants that gesture more and this might account (in part) for higher labelling rate. Given the relationship between these behaviours, the intricate interplay between gesture and labelling variables was also investigated.

Descriptive elaboration

Maternal speech which goes beyond simply labelling during book sharing to elaborations and further description have also been explored within a book sharing context (Reese, 1999), and has been shown to vary as a function of SES (Ninio, 1980; Peralta de Mendoza, 1995). Mothers who produced more elaborations had children with larger vocabularies (Ninio, 1980; Peralta de Mendoza, 1995), though research has not explored the predictive nature of this behaviour over time. The stability of this behaviour over time has also not been explored across SES groups. The coding scheme therefore included maternal elaborations and descriptions that go beyond labelling speech to examine this further in relation to; SES differences over time, and predictive infant abilities. Descriptive elaboration was considered as a positive behaviour, and was predicted to vary across SES backgrounds, with higher SES mothers producing more descriptive elaborations than lower SES mothers.

Personalised elaboration

Elaborations to speech are also personalised, and are beneficial to children's understanding and development (Fivush, Haden & Reese, 2006). However, the majority of research focused upon personalised elaborations has not taken place in a book sharing environment and has been primarily with older children, though the impact upon multiple aspects of child development is clear, including literacy and language abilities (Fivush et al., 2006; Ornsteina,

Haden & Hedrick, 2004). Researchers have further recognised one of the limitations of the literature to date is a lack of exploration of SES differences in personalised elaboration (Fivush et al., 2006). More recently, research has examined the impact of personalisation during book sharing in an older sample and has demonstrated its impact upon children's speech and language (Kucirkova et al., 2014a:2014b). Therefore, this will be coded in the current coding scheme to bridge the gap in a younger sample. Personalised elaboration will be considered as a positive behaviour, and it is predicted that higher SES mothers will personalise their speech to their infants more than lower SES mothers.

Infant-direct questions

Asking infants questions during book sharing is known to facilitate children's literacy and language development at age three to four years old (Blewitt, Rump, Shealy & Cook, 2009; Wasik & Bond, 2001). However, there is a lack of research investigating this in younger children. Research has also examined the impact of encouraging parents to use more questions whilst book sharing known as one of the 'dialogic strategies' and illustrates its effectiveness in increasing child language development (Whitehurst et al., 1988). This research examines a number of responsive techniques together, including questions and elaborations, which lead to developmental gains, but the influence of asking questions has not been examined individually (Whitehurst et al., 1988). Furthermore, this technique has been developed and evaluated on older children than in the sample in this chapter (Mol et al., 2008), and the impact of SES on mothers' use of infant-directed questions during book sharing has not been considered. The coding scheme for this study therefore includes infant-directed questions, and considers them as a positive behaviour. It was predicted that infant-directed questions would be used more by higher SES mothers.

Emotion-related speech

Emotion-related speech in everyday conversations between family members and children aged three leads to a better understanding of emotions for these children at age six (Dunn, Brown & Beardsall, 1991). More recently, research has illustrated that mothers' emotion related speech to children at 24 months during book sharing predicts children's mental state talk at 33 months (Taumoepeau & Ruffman, 2008). There is a lack of research investigating emotion-related speech in younger infants or for SES differences. Therefore, emotion-related speech will be explored in this study, and was considered as a positive behaviour in the coding scheme. It was predicted that higher SES mothers would produce more emotion-related speech than lower SES mothers.

Maternal mind-mindedness

Mothers' mind-mindedness (MM) is predictive of a number of child outcomes, including language and play abilities (Meins et al., 2013), and behavioural problems (Meins, Centifanti, Fernyhough & Fishburn, 2013). Both Appropriate Mind-Related Comments (AMRCs) and Non-Attuned Mind-Related Comments (NAMRCs), which are the main measures of MM, predict infant attachment type (Meins et al., 2012), AMRCs are positively associated, and NAMRCs negatively (Meins et al., 2012). MM also predicts later developmental abilities including theory of mind (ToM; Kirk et al., 2015; Meins et al., 2003). Kirk et al. (2015) illustrated that mothers MM when infants are just one and two years old predicts children's ToM abilities aged five and six. The coding scheme for this research included both main aspects of MM as stated above, as well as encouraging autonomy, another dimension of MM. This research furthers the current research on MM to observe whether MM varies by SES in a book sharing context, as previous research in other setting has not found SES differences in MM, and whether MM predicts book sharing behaviours, and infant abilities related to school

readiness. AMRCs and encouraging autonomy was considered positive and NAMRCs negative. It was predicted that AMRCs, NAMRCs and encouraging autonomy would differ across SES, with higher SES mothers producing more AMRCs and comments encouraging autonomy and less NAMRCs than lower SES mothers.

Maternal response to infant utterances

Maternal responsiveness to infant utterances is thought to be indicative of MM (Meins, Fernyhough, Russell & Clark-Carter, 1998). This responsiveness focuses on the mothers' attention to infants' attempts to vocalise and then responding. An example of this would be the mother acknowledging the infant's attempt in some way or attributing meaning to an infant's utterance (Meins & Fernyhough, 1999). These maternal responses are predictive of later development abilities in childhood. For example, maternal responsiveness to infant utterances at 20 months predicts those infants mentalising abilities at 3 years (Meins & Fernyhough, 1999). Based on this evidence the coding scheme measured mothers' responsiveness to her infant's utterances. Positive responsiveness measures included, *acknowledging, repeating and attributing meaning* to infant utterances, and negative responsiveness were measured when mothers *ignored* their infants' utterances. It was predicted that higher SES mothers would produce more positive and less negative responses to their infants than lower SES mothers.

To summarise, the following behaviours were included as *positive* behaviours:

Mother and infant behaviours

- Eye gaze; at mother/infant, or book
- Gestures; declarative, symbolic and imperative

Maternal behaviours

- Reengagement strategies; positive and positive alternative
- Speech; labelling, descriptive elaboration, personalised elaboration, emotion-related speech, infant-directed speech, labelling with sounds, AMRCs, encouraging autonomy, and acknowledging, repeating and attributing meaning to infant utterances

Infant behaviours

- Verbalisations

The following were coded as *negative* behaviours:

Maternal behaviours

- Reengagement strategies; forced and negative
- Speech; NAMRCs
- Other gaze

Infant behaviours

- Disengagements

2.1.3 Current Study

In this study, mothers were filmed looking at two novel picture-storybooks for ten minutes with their infants at age 12 and 18 months. It was predicted that there would be SES related differences in the verbal and non-verbal quality and quantity of mother and infant behaviours produced during book sharing at 12 months. It was also predicted that these differences would be consistent over time when measured again at 18 months. Based on the evidence reviewed above, it was also predicted that the positive behaviours mothers and infants

produced at 12 and 18 months would contribute to infants' cognitive and linguistic abilities at 18 months. Mothers' MM perceptions were also predicted to affect the book sharing interaction. Furthermore, this study aimed to explore whether SES differences in book sharing interactions were related to maternal depression and stress, and the infants' stimulation in the home environment.

2.2 Method

2.2.1 Participants

Forty-four mother-infant dyads were recruited for the study[1]. Mothers were recruited from a number of local children's centres and children's groups; as well as using adverts on social media, the National Childbirth Trust, and a University-wide staff email. At Phase one, the mean age of infants was 11.75 months (*SD* = 1.45) and mothers' ages were as follows; 14% were 21-25, 20% were 26-30, 20% were 31-35, and the modal age group (45%) was 36+. The opportunity sample consisted of 13 low SES dyads (five female, eight male), (*M* = 12.20 months, *SD* = 1.33), nine mid SES dyads (five female, four male), (*M* = 12.25 months, *SD* = 1.69), and 22 high SES dyads (nine female, 13 male), (*M* = 11.29 months old, *SD* = 1.31). Low SES participant's scores (Hollingshead, 1975) ranged from 8 - 27 (*M* = 24.23, *SD* = 5.85), mid SES scores ranged from 28 - 47 (*M* = 45.44, *SD* = 3.97), and high SES scores ranged from 48 - 66 (*M* = 59.00, *SD* = 4.33) demonstrating a representative range from deprived to affluent families. All mothers were fluent in English.

The dyads were visited six months later for Phase 2 (mean age 18.03, *SD* = 1.36). Ten dyads did not take part due to being unresponsive when contacted, therefore 34 dyads were followed up from Phase 1. However, when participants were recruited initially they only

[1] An a priori power analysis was conducted using G*Power, with an effect size estimate of 0.25, and power of 0.70 with 3 groups. The required sample size required was 129 mother-infant dyads.

consented to participate in Phase 1 and were not asked to take part in both phases. The missing participants were three low, two mid and five high SES dyads, with six male and four female infants. The Phase 2 sample consisted of ten low SES dyads (four female, six male), (*M* = 18.00 months, *SD* = 1.27), seven mid SES dyads (four female, three male), (*M* = 18.42 months, *SD* = 1.88), and 17 high SES dyads (six female, eleven male), (*M* = 17.89 months, *SD* = 1.22). Low SES participant's scores (Hollingshead, 1975) ranged from 8 - 27 (*M* = 24.10, *SD* = 6.47), mid SES scores ranged from 35 - 47 (*M* = 45.00, *SD* = 4.47), and high SES scores ranged from 53 - 66 (*M* = 59.47, *SD* = 4.73),

2.2.2 Design

The study used a between-subjects design. The independent variable was the SES background of the dyad, with participants being assigned as either low, mid or high SES. Participant's SES score was calculated using the Hollingshead Index (Hollingshead, 1975) and then participant's scores were separated into three categories, based on the possible range of scores (please note, possible range not range of sample divided by three), which reflected the combinations of the education and job status. In the subsequent analyses, SES is treated as both a categorical variable (low, mid and high) and a continuous variable (Hollingshead scores, out of 66). The dependent variables were; maternal and infant behaviours produced during book sharing at Phase 1 (*n* = 42) and 2 (*n* = 30), measured as durations (seconds) and frequencies. Raw data were used to compare book sharing behaviours as opposed to proportion scores, as proportion scores fail to provide an indication of the duration of different experiences. For example, the proportion of personalised elaboration could be the same for a high and low SES dyad, however the high SES child hears five times more (five minutes compared to one minute) due to the book sharing interactions being five times longer than the low SES child's interaction. Maternal self-report measures of infant language

abilities were measured at Phase 1 and 2, and infant developmental abilities were also assessed at Phase 2 by the researcher. It was predicted that there would be a difference in the amount of verbal and non-verbal behaviour produced by low, mid and high SES mother-infant dyads during book sharing, and that the differences would remain stable from 12 to 18 months. Additionally, it was predicted that the mother and infant behaviours measured at 12 and 18 months, associated with positive outcomes in previous research, would predict infants' cognitive and linguistic abilities at 18 months. It was also predicted that maternal variables, depression and stress, and environmental variable, home stimulation, would affect the book sharing interaction.

2.2.3 Materials

The materials in this section include two books used in the book sharing activity, a coding scheme devised for this study, and a range of cognitive and demographic measures for mothers and infants.

2.2.3.1 Book Sharing

Dyads were filmed in the home whilst participating in a ten-minute book sharing activity. The dyads were given two novel wordless picture story-books which were produced by the research team to ensure consistency between dyads, and to remove any familiarity effects that could have occurred with pre-existing books. Book one was made up of ten familiar objects to infants which are often seen in infants' first words (Appendix A), and book two contained ten everyday routines which infants would be accustomed to (Appendix B). The books had no words to accompany the illustrations.

The videos were analysed to examine the differences in quality and quantity of mother-infant verbal and non-verbal interactions using the Observer XT (a computer aided coding system).

The Observer allowed a fine-grain micro analysis to be performed of both mother and infant behaviours, and these were coded with a user-defined coding scheme.

2.2.3.2 Book Sharing Coding Scheme

The verbal and non-verbal elements of the coding scheme described were initially developed prospectively after a thorough review of the current literature. The majority of the behaviours coded in this scheme were decided this way. In addition, after observing the dyadic interactions, further elements were added into the coding, specifically, distinguishing between mothers' responses to infant disengagements by identifying their reengagement strategies.

Maternal Behaviours

Type of maternal speech

All maternal utterances were coded and further identified as either; (a) *labelling*, naming an object or item in the picture. (b) *Descriptive elaboration*, describing in more detail such as naming individual aspects of the overall picture or making links such as contextual to other stimuli not in the book. (c) *Personalised elaboration*, referring to the picture in a personalised context to the infant, e.g. "we go in the car to go to grandmas". (d) *Labelling with sounds*, making the noise associated to the picture to describe it, e.g. "it's a woof-woof", "brmm-brmm, beep-beep". (e) *Encouraging autonomy*, trying to promote independent action of the infant, e.g. "you turn the page". (f) *Emotion-related talk*, describes emotions or feelings of characters or other people. (g) *Infant directed questions*, asking the infant wh- questions in relation to the book, e.g. "what is that outside of the window?" (h) *Other*, other speech that was not in one of the above categories. All of these maternal speech types were measured as durations in seconds.

Mind-mindedness

MM was coded according to the coding scheme (Meins et al., 2001; Meins & Fernyhough, 2006) which involves coding maternal speech that refers to the infants' thoughts, feeling, knowledge and desires. Each MM comment was defined as either; (i) *Appropriate mind-related comments* (Meins et al., 1998; Meins et al., 2001), the mother describes her infants' thoughts, feelings, desires or knowledge accurately (they appear to be in-tune with what the infants' internal states), or mothers link the book sharing to previous or future experiences or events relevant to the infant. E.g. "you like bananas", "this is your favourite", "do you remember we saw a cat at the park". (j) *Non-attuned mind-related comments* (Meins et al., 1998; Meins et al., 2001), the mother incorrectly describing infants' thoughts, feelings, desires and knowledge. E.g. "you want to turn the pages" when the infant clearly has no interest in the book. Similarly, the mother makes reference to an event or experience in the infants past or future that does not relate to the book sharing topic. Mind-mindedness was coded as frequencies rather than durations to coincide with previous research involving these behaviours.

Maternal Responsiveness

Mothers' response to each utterance made by the infant was coded as a frequency and either (a) *acknowledges infant utterance*: the mother acknowledges her infant is making a contribution verbally. For example, when the infant has labelled the dog in the picture book correctly the mother responses with "yes that's right". (b) *Attributes meaning to infant utterance*: the mother believes her infant's utterance represented a word or meaning, for example the infant verbalises something that meanings banana though they have not managed to articulate this yet, such as "nana-nana", and the mother response with, "Well done, it's a banana". (c) *Repeats infant utterance*, the mother repeats what the infant said.

Maternal gesture

Maternal gestures were coded as frequencies, and as one of the following; (a) *declarative*, to share attention with the other, e.g. pointing to the pictures in the book (b) *symbolic*, a gesture with a specific meaning, e.g. a hand gesture for duck by touching the thumb to fingers and then apart (c) *imperative*, to indicate a want, e.g. pointing to the other book for the infant to get it.

Maternal gaze

Mother eye gaze was coded as a frequency as well as duration. The duration was measured to look at overall, what the mother was looking at more frequently during the interaction. Also, the frequency was recorded to get an indication of the regularity of the mothers' change in gaze which would give an idea of the responsiveness to her infant, as well as the relationship between them and the book during the interaction. Eye gaze was measured when it changed from and to the following; (a) *gazing at the book*, (b) *gazing at the infant*, (c) *other gaze*, for example looking at something else in the room.

Maternal reengagement strategies

During the book sharing task, infants often became disengaged from the activity and mothers responded as they felt necessary. There were a variety of methods mothers employed to attempt to reengage their infant, and these fit into four categories; (a) *positive*, where mothers were able to reengage their infants back into the same episode of book sharing using the same page and topic that the infant became disengaged from. (b) *Positive-alternative*, involved mothers being able to reengage their infant into the book sharing episode by changing the page and changing the topic in order to refocus their infants' attention to the book sharing episode. The positive techniques outlined (positive and positive alternative) led to positive

infant reengagement, where infants chose to reengage and this was followed by a more attentive and overall focused book sharing experience from both mothers and infants. In both positive reengagements the infant comes back to the book of their own will, without force. The negative strategies mothers used were; (c) *forced*, which refers to the mother forcing the infant to return to the book in an attempt to reengage them. This was often done by restricting the infant from moving away from the book or physically moving them back to the book. (d) *Negative*, refers to mothers not attempting to reengage the infant into the book sharing episode, either the mother knowing the infant is disengaged, but not attempting to reengage the infant, or the mother is oblivious to her infants' disengagement. All reengagement strategies were measured as frequencies of occurrences.

Infant Behaviours

Infant Verbalisations

The duration of infant utterances were coded in seconds, and the frequencies of utterances were also coded. Due to infants having very little speech and often the mother interpreting their speech, no subcategories were coded.

Infant gestures

Infant gestures were coded as the following; (a) *declarative*, to share attention with the mother, e.g. pointing to the pictures in the book (b) *symbolic*, a gesture with a specific meaning, e.g. a hand gesture for drink by forming a C-shape with the hand and moving this towards the mouth (c) *imperative*, to indicate a want, e.g. pointing to the other book for the mother to get it.

Infant gaze

Infant eye gaze was coded as a frequency as well as duration, as per mothers' gaze. Eye gaze was measured when the infant looked at one of the following; (a) *gazing at the book*, (b) *gazing at mother*, (c) *other gaze*, for example looking at something else in the room that the mother has spoken of, such as the infants toy train. (d) *Disengage*, when the infant was no longer either; sharing attention with the mother in relation to the book, or sharing attention with the mother in relation to another item in relation to the book. Disengage was only measured as a frequency, as the duration would not reflect upon the infant but the type of reengagement strategy the mother employed, some of which took longer than others, e.g. forced reengagement was often shorter in duration.

To ensure the reliability of the coding scheme, inter-rater reliability analyses were performed, with intra-class correlations (ICCs) and confidence intervals (CIs) inspected for each coded behaviour for both mothers and infants (Table 2.1). These were double-coded blind and independently by a trained second coder for ten percent of the total number of videos (n = 8).

Table 2.1: ICCs and CIs for coding reliability across two independent coders for mother and infant book sharing behaviours.

Maternal Behaviour	**ICC**	**CI**
Labelling	.90	-2.24, .99
Descriptive elaboration	.83	-1.62, 1.00
Personalised elaboration	.90	-.59, .99
Labelling with sounds	.93	-.08, 1.00
Encouraging autonomy	.81	.16, 1.00
Emotion-related talk	.94	-.01, 1.00
Infant-directed questions	.95	.17, 1.00
AMRCs	.95	.18, 1.00
NAMRCs	1.00	.47, 1.00
Acknowledges infant utterance	.98	.69, 1.00
Repeats infant utterance	.80	-.52, 97
Attributes meaning to infant utterance	.85	-1.27, 99
Ignores infant utterance	1.00	-2.24, .99
Declarative gesture	.97	.58, 1.00
Symbolic gesture	.96	.38, 1.00
Imperative gesture	1.00	.72, 1.00
Gazing at book	.90	-.57, .99
Gazing at infant	.89	-.26, .99
Positive reengagement	.87	-1.03, 99
Positive alternative reengagement	.83	-1.57, .99
Forced reengagement	1.00	-2.24, .99
Negative reengagement	1.00	-2.24, .99
Infant Behaviour		
Verbalisations	.87	-.97, .99
Declarative gesture	.82	-1.80, .99
Symbolic gesture	.99	.82, 1.00
Imperative gesture	1.00	1.00, 1.00
Gazing at book	.82	-1.80, .99
Gazing at mother	.95	.15, 1.00
Disengagements	.86	-1.22, 99

2.2.3.3 Cognitive and Demographic Measures

Oxford Communicative Developmental Inventory (CDI)

Infant receptive and expressive vocabulary were assessed via maternal report using the Oxford Communicative Developmental Inventory (Appendix C), a British Adaptation of the MacArthur-Bates CDI (Hamilton, Plunkett & Schaffer, 2000). This comprises categories of words and mothers are asked to indicate whether their infant either understands, or understands and says each word. The measure has three sections; first signs of understanding, things children understand and the word list. For the first two sections mentioned above, mothers are asked to indicate only if their infants understood. An item from first signs of understanding is, 'responds to no', and an item from things children understand is, 'be careful'. The item categories include sounds, animals, vehicle, toys, food and drink, body parts, clothing, furniture, small household items, outside, people, games and routines, actions, describing words, questions, words about; time, people and things, places and amounts.

Gestures, Actions and Pretend Play (GAPP)

Infant gesture production was assessed via maternal report using the Gestures, Actions and Pretend Play checklist (Appendix D), adapted and extended from the words and gestures section of the MacArthur-Bates CDI (Fenson et al., 1994; by Zammit & Schafer, 2011). The first section, first communicative gestures, has three response options, not yet, sometimes and often. A typical item in this section is, 'reaches out and gives you a toy or some object that she or he is holding'. The remaining sections had yes or no response options. The next section was games and routines, an example item is, 'claps hands', this is followed by actions with objects, an item is, 'throw a ball'. The final two sections are, pretending to be a parent, an example, 'try to feed a doll or animal with a spoon', and imitating other adult actions, 'try to put a key in a door or lock'.

STIMQ Cognitive Home Environment

Infant home stimulation and environment were measured via maternal report using the STIMQ (Dreyer, Mendelsohn & Tamis-LeMonda, 1996; Appendix E). This measure asks mothers to respond yes or no to whether they have, or do, the listed items. The STIMQ has four subscales as follows; *Availability of Learning Materials*, *Reading-Verbal Scale*, *Parental Involvement in Developmental Advance* and *Parental Verbal Responsivity*. The Availability of Learning Materials scale is broken down into three further sections; Infants First Toys, an example item is, 'small cloth toys or card with bright black-and-white patterns', Activity/Manipulative Toys, an example is, 'set of wooden or plastic blocks for the infant to bang or stack'. The last section is Imaginative Toys and an example item is, 'toy telephone'. The Reading-Verbal Scale explores whether mothers read at home to their infants, further details the particulars of this reading, including how often and the number of books in the home. An item from this subscale is, 'do you read books to your child especially made for infants that teach about body parts?' An example of an item from the Parental Involvement in Developmental Advance scale is, 'do you have the opportunity to point to things around the house and name them for your child?' Finally, an example on the Parental Verbal Responsivity scale is, 'do you play pretend games using stuffed animals or puppets to talk to your child'.

Wechsler Adult Intelligence Scale (WAIS)

Maternal vocabulary was evaluated using the vocabulary subscale of the Wechsler Adult Intelligence Scale – Revised (WAIS–R; Wechsler, 1981; see Appendix F). Mothers had to explain the meaning of the thirty words presented to them and these became progressively more complex. This was to assess the mothers' own vocabulary abilities, and was measured out of sixty. Some examples of this task are, 'winter' being at the start and reflecting a very

common and well-known word, ‘reluctant’ being in the middle and becoming a more complex word for some and, to reflect the less common words, ‘tirade’ was the final word.

Parenting Stress Index Short Form (PSI-SF)

Maternal stress was measured using the Parenting Stress Index Short Form (PSI-SF; Abidin, 1995) and consisted of 36 items (Appendix G). An item on this measure is *“I feel trapped by my parenting responsibilities”* and this can be answered on a five-point scale, with the options, strongly agree, agree, neither agree or disagree, disagree and strongly disagree.

Edinburgh Postnatal Depression Scale (EPDS)

Post-natal depression was measured using the Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987; see Appendix H). This scale asks mothers to respond to ten statements in relation to their feelings in the last seven days. An item on this scale is *“I have been anxious or worried for no good reason”* and mothers could respond on a four-point scale that differed slightly on each item to reflect the question. For the above question, the options were; *no not at all, hardly ever, yes sometimes* and *yes very often*.

Preschool Language Scale (PLS 3-UK)

Infants’ language abilities were measured at 18 months old using the Preschool Language Scale (Zimmerman, Steiner & Pond, 2002, see Appendix I) which consists of two subscales to measure both infants’ expressive communication and auditory comprehension. The scales give guidelines of the tasks for each age range. The researcher observed the infants perform a number of tasks that were given to them verbally to assess their auditory comprehension. For example, an item for the auditory scale is; indicates body parts on self, “Where is your...?” (a) hair, (b) eye, (c) nose, (d) foot, (e) ear, (f) hand, (g) mouth, (h) tummy. The spoken vocabulary of the infants was also examined by the researcher and recorded on the expressive

vocabulary scale. An example item from the expressive scale is; has a vocabulary of at least ten words.

Bayley's Measure of Infant and Toddler Development

Infants' cognitive capabilities were examined using the Bayley's Measure of Infant and Toddler Development (Bayley, 2005) at 18 months (Appendix J). As this study focused on infants' cognitive and linguistic abilities, the cognitive subscale was used only. The scale has guidelines to indicate the age appropriate tasks. An example task is to give the infant a blue plastic board that has nine shapes cut out (circles and squares) and the infant is required to put the corresponding plastic shapes in the correct place. The scores to assess this appear across ages depending on the ability of the child, there are different levels for different ages. For example, infants at 19 months are expected to place two squares and two circles in the correct places.

Demographics

A demographic questionnaire (Appendix K) identified whether English was the primary language spoken by the dyad and whether infants had any developmental delays. The mothers' use of gesture and the number of siblings to the infant were measured. Parental education and employment was gauged from this measure and this allowed the SES of the dyad to be calculated using the Hollingshead Index (Hollingshead, 1975).

2.2.4 Procedure

Phase 1

The researcher arrived at the participant's home, and gave the mother and infant time to feel acquainted with them before starting the research. Once the mother and infant were comfortable and familiar with the researcher the mother was video-recorded engaging in

book sharing with their infant for 10 minutes in a setting of their choice. Mothers were free to decide on the setting for this activity to make it as natural as possible and to ensure the mother and infant felt comfortable during the activity. Mothers were given the choice of where they would like to do the book sharing activity, such as the infant's bedroom, the kitchen or living room, and dyads were video-recorded completing the activity. Mothers were asked to look at the picture books with their infant as they felt comfortable or how they would normally. Mothers were informed they would be filmed for around ten minutes. All book sharing sessions were completed with the mother and the infant only, with the researcher recording. The camera was discrete, about the size of a mobile phone and was held by the researcher throughout the filming. Dyads often moved around the room and therefore the camera was moved and positioned accordingly to capture the mother and infant at all times. Mothers then answered the questionnaires with the researcher. The total duration of each home visit was between one and two hours.

Phase 2

Dyads were again acquainted with the researcher, and subsequently filmed for 10-minutes for the book sharing activity where they felt comfortable, as per Phase 1 (with the same stimuli). Mothers then completed the questionnaires with the researcher which again took approximately one to two hours. Infant abilities were assessed using the Preschool Language Scale (Zimmerman et al., 2002) and the Bayley's Measure of Infant and Toddler Development (Bayley, 2005). The infant abilities measures took between 30 and 60 minutes depending on the infant's co-operation. The total duration of each home visit was between two and three hours.

2.3 Results

The results in this chapter consist of two phases, Phase 1 when infants were 12 months (N = 44) and Phase 2 when these infants were 18 months (N = 34). In each phase, mother-infant interactions across different SES backgrounds were examined during a ten-minute dyadic book sharing activity. Mother and infant verbal and non-verbal behaviours were coded from videotaped observations at both phases. Mother and infant eye gaze was not coded at Phase 2 due to time constraints and the majority of video footage focused on capturing gestures (mothers often held the books towards them and it was challenging to capture both gesture and eye gaze throughout the session).

Additional maternal variables were collected at Phase 1 including, mothers' vocabulary (WAIS), stress (PSI), and post-natal depression (EPDS). At both Phases 1 and 2 the following environmental variables were also measured; the availability of home stimulation for the infant (STIMQ), number of children's books in the home (item on the STIMQ), and the reading frequency to the infant per week (item on the STIMQ). These maternal and environmental variables were collected to ensure there were no differences observed across the different SES dyads, and if so, they could be controlled for. Additionally, at both Phases 1 and 2, infant measures of development were collected including vocabulary (CDI), and gestures and play (GAPP). At Phase 2, infant cognitive (Bayley's scale) and language (PLS) abilities were also measured.

This results section includes:

- Preliminary analyses for mother and infant behaviours during book sharing at Phase 1 and 2.
- Correlational analyses for SES score differences (continuous analyses) in mother and infant behaviours during the book sharing activity for Phase 1 and 2. Additional

maternal and environmental variables, and infant developmental measures are reported.

- Further correlations between book sharing behaviours to consider:
    - The impact of maternal reengagement strategy at Phase 1 on infant disengagements at Phase 2.
    - The impact of gesture on maternal labelling.
    - The impact of MM on book sharing behaviour.
- Further Phase 1 and 2 analyses, defining SES categorically.

The main focus in this results section is on the correlations, however group differences were additional analysed to remain consistent and comparable to previous research, and to consider differences between continuous and categorical analyses.

2.3.1 Preliminary analyses

A preliminary analysis of all the dependent variables is presented to examine the distribution of the overall data. The majority of mother and infant behaviours produced during the book sharing interaction are not normally distributed at Phase 1 when infants were 12 months (see Table 2.2), thus non-parametric measures were used for all mother and infant behaviours in Phase 1.

Table 2.2: Descriptive statistics and normality (Sharpiro-Wilk Test) of mother and infant behaviours produced during book sharing at Phase 1 ($N = 44$).

Maternal Behaviour	**Mean (*SD*)**	**Range**	**Normality**
Overall speech duration	335.05 (*110.35*)	431.35	.036*
Labelling duration	201.89 (*91.81*)	351.33	.475
AMRCs frequency	9.20 (*7.10*)	33.00	.001**
NAMRCs frequency	.48 (*1.39*)	7.00	<.001**
Infant-directed questions duration	92.08 (*61.52*)	257.10	.014*
Descriptive elaboration duration	71.54 (*64.24*)	239.15	.002**
Encouraging autonomy duration	18.60 (*16.29*)	57.37	.002**
Personalised elaboration duration	41.45 (*43.00*)	241.11	<.001**
Emotion-related speech duration	5.88 (*13.81*)	76.57	<.001**
Labelling with sound duration	28.98 (*28.04*)	117.53	<.001**
Acknowledging infant utterance frequency	4.14 (*4.98*)	19.00	<.001**
Attributed meaning to infant utterance frequency	1.43 (*2.78*)	16.00	<.001**
Repeat infant utterance frequency	1.36 (*2.16*)	9.00	<.001**
Ignore infant utterance frequency	.18 (*.81*)	5.00	<.001**
Not speaking duration	253.07 (*105.31*)	418.59	.003**
Symbolic gesture frequency	6.84 (*7.34*)	43.00	<.001**
Declarative gesture frequency	32.14 (*19.38*)	95.00	.012*
Imperative gesture frequency	.05 (*.21*)	1.00	<.001**
Positive reengagement frequency	1.93 (*2.35*)	10.00	<.001**
Positive alternative reengagement frequency	2.32 (*1.88*)	8.00	.002**
Negative reengagement frequency	.55 (*1.97*)	11.00	<.001**
Forced reengagement frequency	2.02 (*3.35*)	14.00	<.001**
Mother looking at infant frequency	59.00 (*25.69*)	121.00	.077
Mother looking at book frequency	59.45 (*25.49*)	121.00	.039*
Infant Behaviour			
Symbolic gesture frequency	1.36 (*2.24*)	11.00	<.001**
Declarative gesture frequency	4.84 (*8.44*)	39.00	<.001**

Imperative gesture frequency	.59 (*3.07*)	20.00	<.001**
Disengagement frequency	6.84 (*5.03*)	20.00	.007**
Speech duration	33.32 (*45.27*)	219.70	<.001**
Speech frequency	15.59 (*16.64*)	73.00	<.001**

*p <.05, **p <.01

Correlations were inspected for all control variables in relation to the book sharing behaviours at Phase 1. The control variables include maternal vocabulary, depression, and stress. Significant correlations were found between maternal vocabulary (WAIS) and the following maternal book sharing behaviours: *total speech* (r_s = .59), *labelling* (r_s = .58), *descriptive* (r_s = .63) *and personalised elaboration* (r_s = .52), *infant-directed questions* (r_s = .56), *emotion-related speech* (r_s = .39), *encouraging autonomy* (r_s = .40), *labelling with sound* (r_s = .40). Correlations were also found for: *eye gaze looking at book* (r_s = .45) *and infant* (r_s = .47), *symbolic gesture* (r_s = .42), *AMRCs* (r_s = .42), *NAMRCs* (r_s = -.46), *ignoring infant utterance* (r_s = -.33), *negative* (r_s = -.35) *and positive* (r_s = .34) *reengagement strategies*, *and not speaking* (r_s = -.47). Maternal depression (*EPDS*) was significantly correlated with *NAMRCs* (r_s = -.32). No significant correlations were found for maternal stress (PSI) and book sharing behaviours. Consequently, the identified variables will be controlled for in partial non-parametric correlations that will be performed for the above book sharing behaviours at Phase 1.

A preliminary analysis of all the dependent variables examined the distribution of the overall data for Phase 2 when infants were 18 months. Table 2.3 illustrates that many mother and infant behaviours produced during book sharing were not normally distributed at Phase 2. As a result, the mother and infant behaviours produced during book sharing will be explored using non-parametric methods in Phase 2.

Table 2.3: Descriptive statistics and Normality (Sharpiro-Wilk Test) of Mother and Infant Behaviours Produced during Book Sharing at Phase 2 ($N = 34$).

Maternal Behaviour	Mean (*SD*)	Range	Normality
Overall speech duration	585.82 *(285.71)*	1131.02	.823
Labelling duration	153.17 *(75.17)*	263.71	.149
AMRCs frequency	9.35 *(6.56)*	26.00	.011*
NAMRCs frequency	.18 *(.72)*	4.00	<.001**
Infant-directed questions duration	119.20 *(67.03)*	229.28	.104
Descriptive elaboration duration	123.74 *(76.57)*	274.72	.281
Encouraging autonomy duration	54.38 *(43.86)*	156.73	.014*
Personalised elaboration duration	40.57 *(44.92)*	221.04	<.001**
Emotion-related speech duration	2.14 *(3.64)*	14.73	<.001**
Labelling with sound duration	24.16 *(16.85)*	60.15	.017*
Acknowledging infant utterance frequency	4.47 *(3.58)*	12.00	.024*
Attributed meaning to infant utterance frequency	2.82 *(3.15)*	11.00	<.001**
Repeat infant utterance frequency	8.56 *(10.98)*	39.00	<.001**
Not speaking duration	282.76 (*65.47)*	248.31	.634
Symbolic gesture frequency	7.35 *(11.31)*	56.00	<.001**
Declarative gesture frequency	39.79 *(24.77)*	95.00	.086
Positive reengagement frequency	.82 *(1.47)*	7.00	<.001**
Positive alternative reengagement frequency	2.85 *(3.05)*	12.00	<.001**
Negative reengagement frequency	.03 *(.17)*	1.00	<.001**
Forced reengagement frequency	.65 *(1.32)*	5.00	<.001**
Infant Behaviour			
Verbalisations duration	42.55 *(38.12)*	131.82	.005**
Symbolic gesture frequency	2.15 *(3.20)*	13.00	<.001**
Declarative gesture frequency	17.76 *(12.71)*	49.00	.038*
Imperative gesture frequency	.03 *(.17)*	1.00	<.001**
Total disengagements frequency	4.44 *(4.47)*	14.00	.001**

*p <.05, **p <.01

Correlations were inspected for all control variables in relation to the book sharing behaviours at Phase 2. Significant correlations were found between maternal vocabulary and the following maternal book sharing behaviours: *total speech* (r_s = .70), *labelling* (r_s = .68), *descriptive* (r_s = .65) *and personalised* (r_s = .47) *elaboration, infant-directed questions* (r_s = .58), *emotion-related speech* (r_s = .46). Correlations were also found for *labelling with sound* (r_s = .41), *encouraging autonomy* (r_s = .53), *AMRCs* (r_s = .48), *attributes meaning to infant utterance* (r_s = .41), *forced reengagement strategies* (r_s = -.54). Significant correlations were found for both maternal stress (r_s = -.38) and depression (r_s = -.38), for mothers' *positive reengagement strategies*. Thus, these variables were controlled for in partial non-parametric correlations that were performed for the above book sharing behaviours at Phase 2.

2.3.2 Are there differences in the quantity and quality of verbal and non-verbal behaviour during mother-infant book sharing as a function of SES? SES scores: Phase 1 & 2.

The main analyses first examine the relationship between maternal book sharing behaviours at Phase 1 and 2 in relation to SES scores using the mother's raw SES score (Hollingshead Index score). These were conducted to answer whether maternal SES predicted the maternal behaviours produced during the book sharing when infants were 12 and 18 months old.

The following correlational analyses for SES differences (using SES scores) were explored:

- *Home learning environment*: STIMQ, infants' experience of books and book sharing at home.
- *Maternal variables:* Mothers' verbal and non-verbal behaviours during book sharing, and additional maternal measures; WAIS scores, PSI and EPDS.

- *Infant variables:* Infant verbal and non-verbal behaviours during book sharing, and additional infant developmental measures; Bayley's scale, PLS, CDI and GAPP.

In addition the following questions will be addressed using correlational analyses:

- Do maternal reengagement strategies at 12 months predict infant disengagement at 18 months?
- Do infant gestures predict maternal labelling?
- Is MM associated to mothers' book sharing behaviours?

2.3.2.1 Do infants' home learning environments differ by SES?

Factors that may affect the infants' early learning were considered for analysis. These variables may be influential upon the dyadic interaction and therefore should be checked for SES differences and controlled in future analyses if necessary. Mothers' reading frequency and number of books in the home were positively predicted by SES at Phase 1 and 2, with the correlations becoming stronger over time. The home stimulation that mothers provide for their infants (STIMQ) was predicted positively by SES at Phase 1, although this association was no longer present at Phase 2 (see Table 2.4).

Table 2.4: Spearman's rank correlation between infant environmental learning variables and maternal SES scores.

Learning Environment Variables	**Hollingshead Index Score Spearman's r_s**	
	Phase 1 ($N = 44$)	Phase 2 ($N = 34$)
Maternal reading frequency to infant per week	**.31***	**.58****
Number of infants books in the home	**.29***	**.46****
STIMQ scores	**.30***	.19

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

2.3.2.2 Does SES predict maternal background variables and book sharing behaviours? And if so, are maternal background variables related to the book sharing interaction?

Correlations between SES score, maternal variables and behaviours during book sharing at Phase 1 and 2 were conducted (Table 2.5). Control measures were taken from each mother to ensure the differences in interactions being observed were due to SES, and could not be readily accounted for by other variables, such as the impact of depression. From mothers' additional measures taken at Phase 1 only, WAIS scores were highly positively associated to SES, although EPDS and PSI were not correlated with SES (Table 2.5).

A number of maternal book sharing behaviours were positively predicted by SES and these correlations increased in strength over time from Phase 1 to Phase 2, *including total speech, labelling, infant-directed questions, descriptive and personalised elaborations, AMRCs, emotion-related speech, labelling with sounds, encouraging autonomy, and declarative and symbolic gesture*. SES also negatively predicted *forced reengagements* that too became stronger over time, and *NAMRCs* which remained relatively stable over time, even slightly decreasing in strength. There were SES differences in maternal book sharing behaviours at Phase 1 that were not significantly correlated at Phase 2. The positively predicted factors were; *positive and positive alternative reengagements,* and negative associations were *not speaking, ignore infant utterance, and negative reengagements.* Only one maternal behaviour revealed SES differences at Phase 2 but not Phase 1; *mother attributes meaning to infant utterance*.

Maternal vocabulary (WAIS) was positively correlated with SES (Table 2.5) and a number of book sharing behaviours. Therefore, additional partial correlations controlling for mothers' vocabulary (WAIS) were performed between SES and all book sharing behaviours. The results demonstrate that maternal WAIS mediated the relationship between SES and a

substantial number of the book sharing behaviours, with no remaining significant correlations at Phase 2 (Table 2.5). The following relationships remained consistent at Phase 1: *AMRCs, emotion-related speech, symbolic and declarative gestures, and positive and positive alternative reengagement strategies.*

Maternal stress and depression were not significantly different across SES backgrounds. However, these control measures were associated to a minority of maternal book sharing behaviours and, consequently, partial Spearman's correlations were performed for these book sharing behaviours.

At Phase 1, maternal depression (EPDS) was significantly correlated with *NAMRCs*. A partial Spearman's Rank correlation controlling for maternal depression revealed a significant association between SES and *NAMRCs*, $r_s(81) = -.36$, $p = .001$. By controlling for maternal depression, the relationship between SES and *NAMRCs* remained stable.

Table 2.5: Spearman's Rank Correlation between maternal variables, book sharing behaviours and SES scores.

Maternal Variables	**Hollingshead Index Score Spearman's r_s**		**Hollingshead Index Score Partial WAIS Spearman's r_s**	
	Phase 1 ($N = 44$)	Phase 2 ($N = 34$)	Phase 1 ($N = 44$)	Phase 2 ($N = 34$)
WAIS	**.72****	-	-	-
EPDS	-.11	-	-	-
PSI	-.04	-	-	-
Maternal Book Sharing Behaviours				
Overall Speech	**.55****	**.85****	.11	.02
Labelling	**.56****	**.80****	.13	.02
Infant-Directed Questions	**.49****	**.79****	.18	.02
Descriptive Elaboration	**58****	**.76****	.08	.01
AMRCs	**.45****	**.62****	**.23***	.02
Personalised Elaboration	**.43****	**.60****	.13	.01
Forced Reengagement	**-.31***	**-.60****	.18	-.10
Encouraging Autonomy	**.36***	**.58****	.11	-.02
Labelling with Sound	**.35***	**.51****	.19	.01
Symbolic Gesture	**.32***	**.48****	**.24***	.04
Attributes meaning to infant utterance	.01	**.41***	.19	-.04
NAMRCs	**-.49****	**-.40***	.07	-.11
Emotion-Related Speech	**.37***	**.38***	**.36****	-.05
Declarative gesture	**.31***	**.36***	**.38****	.00
Ignore infant utterance	**-.34***	**-**	.07	-
Positive Alternative Reengagement	**.33***	-.24	**.53****	-.08
Acknowledges infant utterance	.11	.23	.05	-.02
Negative Reengagement	**-.44****	-.20	.03	-.05
Not speaking	**-.42****	-.17	.11	-.05
Repeat infant utterance	-.18	.10	.02	-.07

Positive Reengagement	**.51****	-.01	**.56****	-.06
Eye gaze looking at infant	.24	-	-.09	-
Eye gaze looking at book	.22	-	-.10	-

*p <.05, **p <.01

At Phase 2, maternal depression and stress (PSI) were correlated with maternal *positive reengagement strategies*. A partial Spearman's Rank correlation controlling for maternal depression and stress indicated a significant association between SES and *positive reengagement strategies*, $r_s(69) = .99$, $p < .001$. By controlling for maternal depression and stress, the strength of the association increased between SES and *positive reengagements*.

2.3.2.3 Are infant book sharing behaviours associated with SES, and if so what features of mother-infant interaction during book sharing are associated with infant language proficiency and cognitive outcomes?

Correlations between SES score, infant book sharing behaviours at Phases 1 and 2 and infant developmental measures were performed (see Table 2.6). Infants' cognitive abilities were measured at 18 months using a number of age-appropriate tasks from the cognitive subscale of the Bayley's Measure of Infant and Toddler Development. Infants' language abilities were measured at 18 months using age-appropriate tasks from the Preschool Language Scale (PLS), using both the auditory and comprehension subscales as a total score. For both tests of infant development, the standardised scores have been calculated based on infant age and reported for the analyses. Infant development was additionally measured at both 12 and 18 months using maternal self-report measures for infant vocabulary (CDI) and infants' gestures, actions and play (GAPP).

Infants' book sharing behaviours were not predicted by SES scores at Phase 1, however, SES negatively predicted *infant disengagements* at Phase 2. In addition, infant cognitive and linguistic development were predicted by maternal SES score at Phase 2.

Maternal SES and WAIS were significantly correlated (Table 2.5), thus partial Spearman's Rank correlations were additionally performed to examine the impact of WAIS on infant development and book sharing behaviours for Phase 1 and 2 (Table 2.6). *Infant imperative gestures, disengagements* and *gazing at the book* became significantly correlated to SES at Phase 1 as a result of controlling for WAIS scores. Infant cognitive and linguistic abilities were no longer significantly correlated with SES when controlling for WAIS scores, suggesting that maternal WAIS mediated the relationship measured between SES and infant development.

Table 2.6: Spearman's rank correlation between infant developmental variables, book sharing behaviours and maternal SES scores.

Infant Development Variables	**Hollingshead Index Score Spearman's r_s**		**Hollingshead Index Score Partial Spearman's r_s WAIS**	
	Phase 1 ($N = 44$)	Phase 2 ($N = 34$)	Phase 1 ($N = 44$)	Phase 2 ($N = 34$)
Bayley's scale	-	**.54****	-	-.02
PLS	-	**.50****	-	-.03
CDI	.06	.17	.20	-.06
GAPP	-.11	.07	.15	-.07
Infant Book Sharing Behaviours				
Child disengagement	.08	**-.33***	**.38****	.07
Gaze at mother	**.29***	-	**.40****	-
Gaze at the book	.26	-	**.47****	-
Symbolic gesture	.17	.12	.17	-.05
Declarative gesture	.17	.08	.16	-.07
Total speech duration	.05	.06	.17	-.07
Total verbalisation frequency	-.08	.02	.08	-.06
Imperative gesture	.18	.02	**.32****	-.07

*p <.05, **p <.01

2.3.2.4 Summary of SES score differences at Phase 1 & 2

The data indicates that the quantity and quality of verbal and non-verbal mother-infant interaction during book sharing varied as a function of SES. To summarise:

Learning environment factors

- Low SES mothers had fewer books in the home, and read less frequently at Phase 1 and 2, and had lower STIMQ scores than high SES mothers at Phase 1.

Maternal factors

- Low SES mothers scored significantly lower on the WAIS vocabulary subscale than high SES mothers.
- Low SES mothers spoke less to their infants and their speech contained fewer examples of; *labelling*, *AMRCs, comments to encourage autonomy, descriptive and personalised elaboration, sounds to accompany their descriptions, infant-directed questions, emotion-related speech,* and *symbolic and declarative gestures* than high SES mothers at Phase 1 and 2. Low SES mothers also produced less *positive and positive alternative reengagements* at Phase 1, and less *attributing meaning to infant utterances* at Phase 2 than high SES mothers.
- Additionally, low SES mothers exhibited more examples of *NAMRCs and forced reengagements* than high SES mothers at Phase 1 and 2. Low SES mothers also produced more *negative reengagements, not speaking, and ignoring infant utterances* than high SES mothers at Phase 1.
- Controlling maternal vocabulary illustrated that few relationships remained between SES and book sharing behaviours indicating that maternal vocabulary mediates SES.

Infant factors

- Low SES infants *gazed at their mothers* fewer times at Phase 1 and disengaged more times at Phase 2 than high SES infants.
- Controlling maternal vocabulary resulted in a greater number of infant book sharing behaviours having significant correlations to SES.

2.3.2.5 Are infant disengagements at Phase 2 predicted by maternal reengagement strategies at Phase 1?

Table 2.5 illustrates that there was a relationship between SES and the reengagement strategy used by mothers at Phase 1. The Spearman's correlations revealed positive significant relationships between mothers' SES and positive reengagement strategies (both p*ositive and positive alterative*). Additionally, significant negative relationships were observed between mothers' SES and negative reengagement strategies (both *forced and negative*). Infants' total *disengagements* were significantly different at Phase 2, indicating low SES infants disengaged more frequently than high SES infants (Figure 2.1). Analyses were performed to explore the extent to which the strategies mothers' employed in Phase 1 influenced the frequency of infants' disengagements in Phase 2.

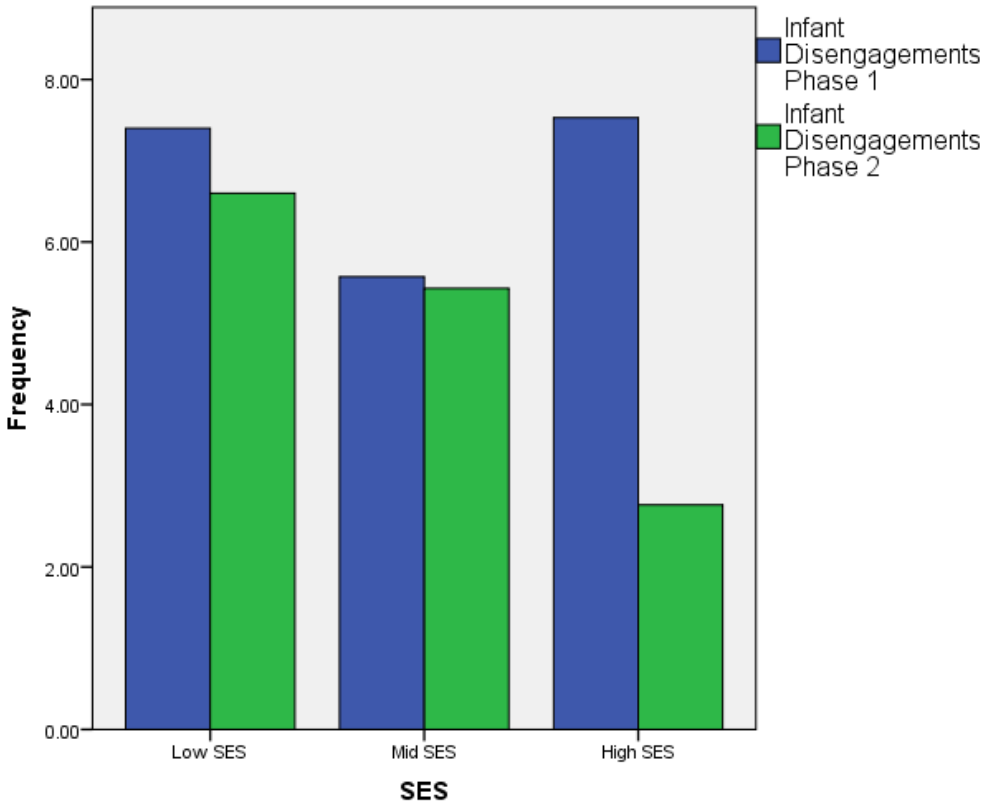

Figure 2.1: Total frequency of infant disengagement from Phase 1 to Phase 2 by SES group.

A Spearman's correlation demonstrated that mothers' use of the *positive reengagement* strategy at Phase 1 was significantly negatively related to *infant disengagements* at Phase 2, r_s = -.40, p = .021. This indicates that the more *positive reengagement* strategies mothers used at Phase 1 the fewer infant *disengagements* infants produced at Phase 2. Data from Phase 1 revealed that *positive reengagement* was positively correlated with SES, thus lower SES mothers are less likely to *positive reengage* their infant and subsequently their infants were more likely to be *disengaged* during the book sharing task when assessed six months later. Infant disengagements were not significantly correlated with any other types of maternal reengagement.

2.3.2.6 Do infant gestures predict maternal labels?

Infant gesture at Phase 1 and 2 were examined in relation to maternal labelling and overall speech. Infant *declarative gesture* at Phase 1 and 2 were positively associated to mothers' *total speech* at Phase 2, r_s = .46, p = .007, and r_s = .48, p = .004, respectively. Infant *symbolic gesture* at Phase 2 was positively associated to mothers' *total speech* at Phase 2, r_s = .34, p = .048. No relationships were established for Phase 1 *total speech*.

Infant gesture was not found to be associated with maternal labelling. However, further analysis revealed a relationship between infant gesture and maternal descriptive elaborations. Infant *declarative gesture* at Phase 1 was positively associated with concurrent *descriptive elaborations*, r_s = .34, p = .024, and *descriptive elaborations* at Phase 2, r_s = .38, p = .028. Additionally, maternal *descriptive elaborations* at Phase 2 were predicted by *symbolic gesture* at Phase 2, r_s = .40, p = .020, and *declarative gesture* at Phase 2, r_s = .36, p = .039.

2.3.2.7 Do maternal MM perceptions predict book sharing behaviours at Phase 1?

Table 2.7 illustrates that mothers' MM perceptions at Phase 1 predicted a number of book sharing behaviours, including a number of maternal speech types, total speech, gesture and reengagement strategies. Maternal MM also predicted infants' gesture.

Partial correlations were performed to explore the extent that SES mediates the relationship between MM and book sharing behaviours (Table 2.12). The findings revealed that many of the associations between MM and behaviours remained, with only a few speech types changing to no longer show significance, including *labelling, and total speech*. When controlling for SES a substantial number of book sharing behaviours showed significant correlations to MM that did not previously (Table 2.12). Thus, the relationship between MM and book sharing appears to have been mediated by SES.

Table 2.7: Associations between maternal MM and book sharing behaviours at 12 months (*N* = 44).

Maternal Book Sharing Behaviour	**Spearman's r_s**		**Partial Spearman's r_s SES**	
	AMRCs	NAMRCs	AMRCs	NAMRCs
Not speaking	**-.30***	.27	**.47****	**.92****
Descriptive elaboration	**.36***	**-.50****	**.33****	.07
Personalised elaboration	**.61****	**-.37***	**.62****	**.26***
Emotion-related speech	**.40****	**-.36***	**.36****	**.52****
Encouraging autonomy	**.29***	**-.37***	**.52****	**.51****
Infant-directed questions	**.40****	**-.36***	**.49****	**.53****
Labelling	.25	**-.40****	.06	.16
Labelling with sound	**.35***	**-.38***	**.53****	**.43****
Total speech	**.34***	**-.41****	.13	.08
Acknowledge infant utterance	**.37***	.04	**.73****	**.79****
Ignore infant utterance	**-.32***	**.41****	**.39****	**.94****
Negative reengagement	**-.43****	**.32***	**.31****	**.92****
Forced reengagement	**-.43****	**.37***	.18	**.89****
Positive reengagement	**.44****	-.20	**.35****	**.62****
Symbolic gesture	.27	**-.30***	**.29****	**.60****
Declarative gesture	.10	-.22	.13	**.59****
Imperative gesture	.20	-.09	**.58****	**.76****
Positive alternative reengagement	.18	-.20	.17	**.66****
Attribute meaning to infant utterance	.24	-.11	**.60****	**.75****
Repeat infant utterance	-.04	.15	**.48****	**.86****
Gazing at infant	.27	-.17	**.38****	**.63****
Gazing at book	.25	-.17	**.39****	**.64****
Infant Book Sharing Behaviour				
Symbolic gesture	**.33***	-.23	**.64****	**.67****
Declarative gesture	.19	-.26	**.53****	**.67****
Imperative gesture	.17	-.12	**.48****	**.74****
Infant verbalisation duration	.12	.14	**.44****	**.81****
Infant verbalisation frequency	.13	.13	**.57****	**.82****

Gazing at mother	-.03	-.25	.07	**.64****
Gazing at book	-.08	-.05	.02	**.69****
Disengagements	-.16	.14	.09	**.78****

*p <.05, **p <.01

2.3.2.8 Do maternal MM perceptions predict book sharing behaviours at Phase 2?

Mothers' MM at 12 and 18 months predicted a number of concurrent and future book sharing behaviours, measured at 18 months. MM continued to predict a number of maternal book sharing behaviours at 18 months, including a number of speech types, reengagement strategies and gesture (see Table 2.8). Additionally, MM at both 12 and 18 months predicted infant disengagements at 18 months during the book sharing.

The results earlier in this chapter demonstrated that MM and SES were correlated (Table 2.5), thus additional partial non-parametric correlations were performed to distinguish whether the relationship between MM and book sharing behaviours was independent of SES. The findings illustrated that SES did mediate the relationship between MM and maternal book sharing behaviours at Phase 2. Controlling for SES at 12 and 18 months led to MM predicting substantially more book sharing behaviours at 18 months (Table 2.9).

Table 2.8: Spearman's correlations between maternal MM at 12 and 18 months and book sharing behaviours at 18 months.

	Spearman's r_s			
	Phase 1 (N = 44).		**Phase 2 (N = 34).**	
Maternal Book Sharing Behaviour	AMRCs	NAMRCs	AMRCs	NAMRCs
Descriptive elaboration	**.40***	**-.54****	**.51****	**-.46****
Personalised elaboration	**.53****	**-.34***	**.65****	-.31
Encouraging autonomy	**.55****	**-.43***	.29	-.26
IDQ	**.53****	**-.51****	**.56****	**-.34***
Labelling	**.38***	**-.47****	**.66****	**-.35***
Labelling with sound	.15	-.17	**.42***	-.23
Total speech	**.52****	**-.54****	**.66****	**-.39***
Attribute meaning to infant utterance	**.39***	-.21	**.33***	-.11
Forced reengagement	**-.53****	**.44****	**-.40***	.27
Positive alternative reengagement	**-.39***	.00	-.31	-.04
Declarative gesture	.00	.08	**-35***	-.17
Symbolic gesture	.21	-.21	**.45****	**-.36***
Not Speaking	-.14	-.08	-.25	-.15
Emotion-related speech	.10	-.28	.02	-.12
Acknowledge infant utterance	.32	-.30	.32	-.24
Repeat infant utterance	.21	-.07	.06	-.13
Positive reengagement	-.02	-.23	-.18	-.06
Negative reengagement	-.29	-.08	-.27	-.05
Infant Book Sharing Behaviour				
Disengagements	**-.40***	.03	**-.37***	.03
Verbalisation duration	.10	-.12	-.01	-.06
Verbalisation frequency	.23	-.15	.03	-.11
Declarative gesture	.26	-.26	-.07	-.09
Symbolic gesture	.19	-.01	.13	-.04
Imperative gesture	.06	-.08	-.07	-.05

*p <.05, **p <.01

Table 2.9: Partial Spearman's correlations between maternal MM at 12 and 18 months and book sharing behaviours at 18 months, controlling for SES.

	Partial Spearman's r_s SES			
	Phase 1 (*N* = 44)		**Phase 2 (*N* = 34)**	
Maternal Book Sharing Behaviour	AMRCs	NAMRCs	AMRCs	NAMRCs
Descriptive elaboration	-.01	**.28***	-.08	**.29***
Personalised elaboration	**.55****	**.52****	**.53****	**.52****
Encouraging autonomy	**.66****	**.43****	.05	**.47****
IDQ	**.47****	.13	.09	.17
Labelling	-.13	**.42****	**.25**	**.41****
Labelling with sound	.07	**.73****	**.47****	**.67****
Total speech	.20	.01	.03	.05
Attribute meaning to infant utterance	**.71****	**.56****	**.40****	**.57****
Forced reengagement	**.43****	**.95****	**.46****	**.94****
Positive alternative reengagement	**.31***	**.85****	**.32***	**.84****
Declarative gesture	**.31***	**.74****	.20	**.75****
Symbolic gesture	.24	**.70****	**.50****	**.62****
Not Speaking	**.49****	**.86****	**.32****	**.85****
Emotion-related speech	**.37****	**.77****	.09	**.80****
Acknowledge infant utterance	**.69****	**.63****	**.47****	**.62****
Repeat infant utterance	**.71****	**.67****	**.36****	**.67****
Positive reengagement	**.39****	**.76****	.21	**.79****
Negative reengagement	**. 38****	**.88****	**.39****	**.87****
Infant Book Sharing Behaviour				
Disengagements	**.35****	**.86****	**.32***	**.86****
Verbalisation duration	**.69****	**.72****	**.40****	**.72****
Verbalisation frequency	**.74****	**.69****	**.40****	**.69****
Declarative gesture	**.67****	**.74****	.22	**.78****
Symbolic gesture	**.70****	**.80****	**.44****	**.80****

*p <.05, **p <.01

2.3.2.9 Summary of additional correlational analyses:

- Mothers' *positive reengagement* strategies at Phase 1 (observed more frequently by high SES mothers) predicted less infant *disengagement* at Phase 2.
- Mothers' speech was associated positively to infant gesture at Phase 1 and 2.
- Maternal MM at Phase 1 and 2 predicted a number of mother and infant verbal and non-verbal behaviours during book sharing at Phase 2. These relationships changed when controlling for SES, thus MM at both 12 and 18 months strongly predicted book sharing behaviours at Phase 2. A substantial number of behaviours strengthened their relationship to MM when SES was controlled, demonstrating the mediating affect SES had on MM.

2.3.3 Are there differences in the quantity and quality of verbal and non-verbal behaviour during mother-infant book sharing as a function of SES? SES group differences Phase 1 & 2.

In the subsequent analyses, SES will be treated as a categorical variable, characterised by low, mid and high SES groups, to enable comparison to previous research. This section will present the differences in the following measures by SES group for Phase 1 and 2:

- The infants' home learning environment; STIMQ, infants' experience of books and book sharing at home.
- Maternal verbal and non-verbal behaviours during book sharing, and additional measures; WAIS scores, PSI and EPDS.
- Infant verbal and non-verbal behaviours during book sharing, and additional developmental measures; Bayley's scale, PLS, CDI and GAPP.

2.3.3.1 Do infants' home learning environments differ across SES at Phase 1?

The number of books and STIMQ scores were significantly different at Phase 1, which supports the continuous SES analyses. However, the reading frequency was not significantly different when treated as a categorical variable, and so yielded a different result to the continuous SES analyses (see Table 2.10).

Table 2.10: Kruskal-Wallis analysis for SES differences in the infants' learning environment ($N = 44$).

Learning Environment Variable	**Low ($N = 13$)**		**Mid ($N = 9$)**		**High ($N = 22$)**		**Sig.**	**Effect size**
	Mdn	*M (SD)*	*Mdn*	*M (SD)*	*Mdn*	*M (SD)*		
Number of books	20.00	21.31 (*26.41*)	20.00	22.33 (*17.90*)	35.00	45.36 (*32.04*)	**.015***	**.195**
STIMQ scores	28.00	29.45 (*5.97*)	36.00	33.00 (*7.26*)	34.00	34.23 (*4.65*)	**.037***	**.153**
Reading frequency	4.00	4.62 (*2.47*)	7.00	5.56 (*2.51*)	7.00	6.36 (*1.47*)	.085	.115

*p <.05, **p <.01

Follow-up tests were conducted (the Mann-Whitney U test) to evaluate pairwise differences in the medians among the three groups for the tests that are significant in Table: 2.11. There were SES differences in infants leaning environment, for both the number of books and STIMQ scores low and high SES dyads differed significantly (see Table 2.11).

Table 2.11: Mann-Whitney U comparisons for SES-related differences in the infants' early learning environment ($N = 44$).

Learning Environment Variable	**Low vs Mid**			**Mid vs. High**			**Low vs. High**		
	U	p	r	U	p	r	U	p	r
Number of infants books in the home	-2.726	1.00	.105	-9.389	.190	.330	-12.115	.020*	.458
STIMQ scores	-10.765	.159	.413	-.139	1.00	.005	-10.904	.045*	.410

* = $p < .05$, ** = $p < .01$

2.3.3.2 Does SES predict maternal background variables and book sharing behaviours at Phase 1?

The following analyses consider all mothers' book sharing behaviours at Phase 1, alongside additional measures that include, the WAIS, EPDS and PSI (presented in Table 2.12). Low SES mothers produced the lowest overall speech, and less of the different speech types in comparison to mid and high SES mothers who produced more speech and more types of speech.

As with the continuous analyses, maternal WAIS scores were significantly different across SES groups, and PSI and EPDS showed no differences across SES. A number of maternal book sharing behaviours remained significantly different when considering SES as a categorical variable, including: *total speech, labelling, infant-directed questions, descriptive and personalised elaborations, AMRCs, NAMRCs, emotion-related speech, labelling with sounds, encouraging autonomy, symbolic gesture, positive and negative reengagements, ignoring infant utterance, and not speaking.* However, some behaviours were no longer significant when considering SES categorically; *forced and positive alternative*

reengagements and *declarative gesture*. Additional book sharing behaviours showed significant findings when examining SES categorically that were not significant for SES scores; *eye gaze looking at infant and book*.

Table 2.12: Mean, median and Kruskal-Wallis analyses for SES differences in maternal measures (*N* = 44).

Maternal Variable	Low (*N* = 13)		Mid (*N* = 9)		High (*N* = 22)		Sig.	Effect size
	Mdn	*M (SD)*	*Mdn*	*M (SD)*	*Mdn*	*M (SD)*		
Mothers' WAIS Scores	30.00	29.69 (*11.15*)	41.00	41.33 (*6.71*)	52.00	50.14 (*6.76*)	**<.001****	**.559**
EPDS	2.00	2.31 (*2.06*)	3.00	3.33 (*3.00*)	2.00	1.68 (*1.29*)	.367	.047
PSI	2.00	3.08 (*3.23*)	4.00	5.22 (*5.31*)	2.00	2.18 (*1.47*)	.667	.019
Maternal Book Sharing Behaviours								
Overall speech	239.38	226.87 (*95.28*)	395.22	372.83 (*107.22*)	391.36	383.51 (*71.05*)	**<.001****	**.372**
Labelling	119.53	116.40 (*62.34*)	228.38	235.72 (*84.72*)	228.38	238.56 (*76.69*)	**<.001****	**.401**
NAMRCs	.00	1.54 (*2.26*)	.00	.11 (*.33*)	.00	.00 (*.00*)	**.001****	**.308**
AMRCs	4.00	4.92 (*3.43*)	6.00	6.89 (*5.04*)	12.00	12.68 (*7.78*)	**.002****	**.291**
Infant-directed questions	40.49	50.86 (*43.51*)	94.61	93.86 (*55.96*)	103.27	115.70 (*61.94*)	**.002****	**.284**
Descriptive elaboration	13.03	23.05 (*26.52*)	56.42	68.88 (*48.39*)	99.94	101.29 (*69.07*)	**.002****	**.299**
Symbolic gesture	3.00	2.85 (*2.23*)	6.00	6.00 (*5.43*)	8.00	9.55 (*8.86*)	**.003****	**.270**
Encouraging autonomy	3.49	7.32 (*7.75*)	20.73	21.54 (*16.77*)	21.14	24.06 (*16.96*)	**.006****	**.241**
Personalised elaboration	5.97	19.48 (*27.06*)	24.96	38.10 (*28.28*)	47.54	55.81 (*50.43*)	**.010***	**.215**
Positive reengagement	.00	.92 (*1.85*)	.00	1.22 (*1.56*)	2.00	2.82 (*2.59*)	**.010***	**.215**
Emotion-related speech	.00	1.25 (*2.29*)	.00	2.31 (*6.94*)	3.25	10.08 (*18.22*)	**.014***	**.198**
Labelling with sound	9.07	13.23 (*11.78*)	28.36	34.42 (*32.81*)	26.08	36.06 / (*30.04*)	**.016***	**.192**
Eye gaze looking at infant	43.00	49.54 (*22.78*)	47.00	47.00 (*12.38*)	61.50	69.50 (*21.84*)	**.021***	**.180**
Ignores infant utterance	.00	.62 (*1.45*)	.00	.00 (*.00*)	.00	.00 (*.00*)	**.024***	**.174**
Not speaking	316.96	316.08 (*116.81*)	206.57	248.40 (*116.93*)	199.26	217.75 (*76.99*)	**.028***	**.167**

Eye gaze looking at book	44.00	49.92 (*21.84*)	46.00	47.56 (*11.92*)	63.00	69.95 (*27.77*)	**.030***	**.164**
Negative reengagement	.00	1.15 (*3.02*)	.00	1.00 (*2.35*)	.00	.00 (*.00*)	**.031***	**.162**
Positive alternative reengagement	2.00	1.77 (*1.59*)	1.00	1.44 (*1.33*)	3.00	3.00 (*2.02*)	.062	.130
Forced reengagement	3.00	3.77 (*4.59*)	.00	1.44 (*2.60*)	.00	1.23 (*2.39*)	.089	.113
Declarative gesture	20.00	24.08 (*11.77*)	31.00	37.44 (*24.03*)	31.50	34.73 (*20.27*)	.252	.064
Acknowledging infant utterance	1.00	3.08 (*4.84*)	3.00	4.67 (*4.77*)	2.50	4.55 (*5.27*)	.257	.063
Imperative gesture	.00	.00 (*.00*)	.00	.11 (*.33*)	.00	.05 (*.21*)	.477	.034
Attributed meaning to infant utterance	.00	.85 (*1.63*)	.00	1.44 (*1.74*)	.00	1.77 (*3.58*)	.883	.006
Repeat infant utterance	1.00	1.38 (*2.47*)	.00	1.56 (*2.35*)	1.00	1.27 (*1.98*)	.959	.002

* = $p < .05$, ** = $p < .01$

Mann-Whitney U follow-up tests were performed to evaluate pairwise differences for mothers' background factors and book sharing behaviours that are significant in Table: 2.13. There were SES differences between low and high SES mothers for the following; WAIS, *overall speech, labelling AMRCs, NAMRCs, infant-direct questions, symbolic gestures, encouraging autonomy, personalised and descriptive elaborations, positive and negative reengagements, labelling with sounds, ignore infant utterance and not speaking.* There were significant differences in mid and high SES mothers for WAIS and *emotion-related speech*, and between low and mid SES for *overall speech and labelling* (Table 2.13).

Table 2.13: Mann-Whitney comparisons for SES-related differences in maternal variables ($N = 44$).

Maternal Variable	Low Vs. Mid			Mid Vs. High			Low Vs. High		
	U	p	r	U	p	r	U	p	r
WAIS	-.9.641	.249	.370	-.12.030	.053*	.426	-21.671	<.001**	.816
Maternal Book Sharing Behaviours									
Overall Speech	-16.573	.009**	.634	-.571	1.00	.020	-17.143	< .001**	.644
Labelling	-17.701	.004**	.678	.096	1.00	.003	-17.605	< .001**	.662
NAMRCs	8.085	.068	.486	2.222	1.00	.123	10.308	.001**	.609
AMRCs	-4.987	1.00	.191	-10.280	.128	.364	-15.267	.002**	.575
Infant-directed questions	-11.692	.107	.448	-3.909	1.00	.138	-15.601	.002**	.586
Descriptive elaboration	-10.880	.152	.417	-5.207	.917	.184	-16.087	.001**	.605
Symbolic gesture	-8.662	.356	.333	-6.563	.586	.232	-15.226	.002**	.574
Encouraging autonomy	-12.577	.072	.482	-1.432	1.00	.051	-14.009	.005**	.527
Personalised elaboration	-10.274	.195	.393	-3.293	1.00	.116	-13.566	.008**	.510
Positive reengagement	-3.406	1.00	.135	-9.124	.189	.334	-12.530	.012*	.488
Emotion-related speech	2.368	1.00	.100	-11.490	.037*	.449	-9.122	.074	.379
Labelling with sound	-10.556	.174	.404	-2.126	1.00	.075	-12.682	.014*	.477
Eye gaze looking at infant	1.962	1.00	.075	-11.841	.059	.418	-9.879	.083	.372
Ignores infant utterance	5.077	.111	.445	.000	1.00	.000	5.077	.029*	.437
Not speaking	8.453	.387	.324	3.551	1.00	.125	12.003	.023*	.451
Eye gaze looking at book	2.423	1.00	.093	-11.568	.068	.409	-9.145	.125	.344
Negative reengagement	1.598	1.00	.103	5.056	.286	.299	6.654	.039*	.419

* = p <.05, ** = p <.01

2.3.3.3 Are infant book sharing behaviours and language proficiency associated to SES at Phase 1?

Infant developmental measures (CDI and GAPP) and book sharing behaviours were compared for differences across SES for Phase 1 (Table 2.14). There were no significant differences for developmental measures or book sharing behaviours, thus *infant gazing at mother* did not remain consistent from the continuous SES analysis.

Table 2.14: Kruskal-Wallis analysis for SES differences in infant measures ($N = 44$).

Infant Variable	**Low ($N = 13$)**		**Mid ($N = 9$)**		**High ($N = 22$)**		**Sig.**	**Effect size**
	Mdn	*M (SD)*	*Mdn*	*M (SD)*	*Mdn*	*M (SD)*		
CDI	45.00	70.15 (*58.35*)	110.00	113.33 (*71.18*)	64.50	76.77 (*63.64*)	.271	.061
GAPP	19.00	22.85 (*9.52*)	27.00	25.78 (*12.64*)	22.00	21.36 (*7.35*)	.665	.019
Infant Book Sharing Behaviours								
Declarative gestures	.00	2.00 (*4.36*)	4.00	7.44 (*11.71*)	3.50	5.45 (*8.64*)	.073	.121
Eye gaze looking at mother	3.00	3.08 (*3.66*)	1.00	3.78 (*4.63*)	3.50	5.27 (*4.32*)	.170	.082
Infant disengagements	6.00	7.69 (*5.07*)	4.00	5.00 (*5.22*)	6.50	7.09 (*4.98*)	.250	.064
Symbolic gestures	.00	.46 (*.66*)	.00	2.44 (*3.88*)	1.00	1.45 (*1.82*)	.368	.047
Eye gaze looking at book	9.00	10.08 (*5.91*)	8.00	10.11 (*7.22*)	12.50	12.82 (*6.56*)	.406	.042
Total verbalisations duration	18.36	47.59 (*71.27*)	6.87	18.76 (*22.89*)	22.17	30.84 (*29.51*)	.462	.036
Imperative gestures	.00	.00 (*.00*)	.00	2.22 (*6.67*)	.00	.27 (*.94*)	.499	.032
Total verbalisations frequency	10.00	18.23 (*19.82*)	6.00	14.00 (*15.32*)	7.00	14.68 (*15.70*)	.686	.018

*p <.05, **p <.01

2.3.3.4 Summary: SES group differences in comparison to SES scores at Phase 1

The data from Phase 1 indicates that many of the findings about maternal control variables, book sharing behaviours and infant development measures remained consistent across SES, measured either as a score or in a group. Despite this, SES scores demonstrated overall more verbal and non-verbal differences during the mother-infant interaction during book sharing. To summarise the differences:

Learning environment factors

- SES groups failed to show that lower SES mothers read less frequently than higher SES mothers

Maternal factors

- The analysis of SES groups failed to show that lower SES mothers produced less *declarative gestures and positive alternative reengagements*, and more *forced reengagements* than higher SES mother

Infant factors

- SES groups failed to demonstrate that lower SES infants *gazed at their mothers* fewer times during book sharing than higher SES infants.

2.3.3.5 Do infants' home learning environments differ across SES at Phase 2

Analyses were conducted to determine the contribution of environmental variables on book sharing behaviours observed at Phase 2 (see Table 2.15). The number of times mothers read to their infants and the number of books in the home showed significant differences across SES groups. Mothers STIMQ scores did not differ across SES groups. These findings are consistent with the SES scores (data can be seen in Table 2.4).

Table 2.15: Kruskal-Wallis analysis for SES differences in the infants' learning environment at Phase 2 ($N = 34$).

Learning Environment Variable	**Low ($N = 10$)**		**Mid ($N = 7$)**		**High ($N = 17$)**		**Sig.**	**Effect size**
	Mdn	*M (SD)*	*Mdn*	*M (SD)*	*Mdn*	*M (SD)*		
Reading frequency	5.00	4.70 (*1.95*)	7.00	7.44 (*11.71*)	7.00	6.94 (*.24*)	**.001****	**.425**
Number of books	15.00	16.90 (*14.43*)	20.00	3.78 (*4.63*)	35.00	50.71 (*45.70*)	**.014***	**.261**
STIMQ scores	33.00	32.60 *(4.38)*	37.00	5.00 (*5.22*)	36.00	35.29 (*4.78*)	.148	.116

*p <.05, **p <.01

Follow-up tests were conducted (the Mann-Whitney U test) to evaluate pairwise differences in the medians among the three groups (see Table 2.16). The number of days per week mothers reported reading to their infants was significantly lower in the low in comparison to the high SES group who read every day (U = -11.915, p =.001, r = .719). The number of children's books in the home was significantly lower in the low compared to the high SES group (U = -11.418, p =.011, r = .558).

Table 2.16: Mann-Whitney U comparisons for SES-related differences in the infants' early learning environment ($N = 34$).

Learning Environment Variable	**Low vs Mid**			**Mid vs. High**			**Low vs. High**		
	U	p	r	U	p	r	U	p	r
Number of infants books in the home	-11.418	.011	.558	-9.389	.190	.330	-12.115	.020*	.458
Reading frequency	-11.915	.001	.719	-.139	1.00	.005	-10.904	.045*	.410

* = p <.05, ** = p <.01

2.3.3.6 Does SES predict maternal book sharing behaviours at Phase 2?

Mothers' behaviours produced during book sharing were analysed for SES-related group differences (Table 2.17). Book sharing behaviours at Phase 2 showed SES group differences consistently to SES scores, including: *total speech, labelling, infant-directed questions, descriptive and personalised elaborations, AMRCs, NAMRCs, emotion-related speech, labelling with sounds, encouraging autonomy, symbolic gesture, forced reengagements*, and *attributing meaning to infant utterance*. *Declarative gestures* were no longer significant when considering SES categorically (see Table 2.17).

Table 2.17: Kruskal-Wallis analyses for SES differences in maternal book sharing behaviours (*N* = 34).

Maternal Book Sharing Behaviour	**Low (*N* = 10)**		**Mid (*N* = 7)**		**High (*N* = 17)**		**Sig.**	**Effect size**
	Mdn	*M (SD)*	*Mdn*	*M (SD)*	*Mdn*	*M (SD)*		
Overall speech	247.79	252.77 (*104.18*)	601.31	624.22 (*139.05*)	769.20	765.93 (*214.32*)	**<.001****	**.657**
Labelling	85.14	77.03 (*32.10*)	154.40	156.66 (*52.24*)	228.38	196.52 (*66.52*)	**<.001****	**.535**
Infant-directed questions	38.50	43.46 (*30.98*)	122.83	125.77 (*51.70*)	174.72	161.05 (*47.53*)	**<.001****	**.578**
Descriptive elaboration	43.00	44.46 (*33.07*)	146.37	122.02 (*35.25*)	171.10	171.07 (*68.58*)	**<.001****	**.529**
AMRCs	4.50	3.60 (*2.37*)	13.00	11.29 (*7.02*)	10.00	11.94 (6.*14*)	**.001****	**.432**
Personalised elaboration	7.35	9.23 *(7.72)*	29.33	44.04 *(38.43)*	47.35	57.58 *(51.46)*	**.001****	**.398**
Forced reengagement	1.00	1.40 (*1.58*)	.00	1.00 (*1.91*)	.00	.06 (.*24*)	**.003****	**.349**
Encouraging autonomy	12.83	22.67 (*25.05*)	24.10	54.80 (*55.99*)	72.32	72.86 (*38.05*)	**.004****	**.330**
Labelling with sound	7.17	11.96 (*10.58*)	29.46	26.26 (*15.00*)	28.04	30.47 (*17.34*)	**.006****	**.313**
Symbolic gesture	1.00	2.00 (*2.98*)	2.00	3.71 (*5.68*)	5.00	12.00 (*14.15*)	**.008****	**.291**
NAMRCs	.00	.60 *(1.26)*	.00	.00 (.00)	.00	.00 (.00)	**.022***	**.232**
Attributes meaning to infant utterance	.50	.80 (.*92*)	1.00	3.00 (*3.96*)	4.00	3.94 (*3.19*)	**.033***	**.206**
Emotion-related speech	.00	.09 (.*28*)	.00	1.95 (*2.54*)	2.50	3.42 (*4.53*)	**.037***	**.200**
Positive alternative reengagement	3.50	3.90 (*3.38*)	4.00	3.57 (*2.44*)	.00	1.94 (*2.95*)	.090	.146
Acknowledges infant utterance	2.00	2.40 (*2.27*)	6.00	5.86 (*4.53*)	5.00	5.12 (*3.44*)	.100	.140
Negative reengagement	.00	.10 (.*32*)	.00	.00 (.00)	.00	.00 (.00)	.301	.073
Declarative gesture	30.00	35.60 (*27.83*)	29.00	32.71 (*20.65*)	38.00	45.18 (*24.62*)	.423	.052
Repeat infant utterance	2.00	4.50 (9.*05*)	13.00	11.00 (*11.08*)	6.00	9.94 (*11.90*)	.485	.044
Positive reengagement	.00	.90 (*1.29*)	1.00	.86 (.*90*)	.00	.76 (*1.79*)	.547	.037
Not speaking	296.23	296.78 (*88.94*)	284.38	274.67 (*57.60*)	276.48	277.84 (*54.48*)	.772	.016

* = p <.05, ** = p <.01

Follow-up tests were conducted (the Mann-Whitney test) to evaluate pairwise differences in the medians among the three groups for the above significant differences. The results indicated SES differences for low and high SES mothers for; *overall speech, labelling AMRCs, NAMRCs, infant-direct questions, symbolic gestures, encouraging autonomy, personalised and descriptive elaborations, forced reengagements, labelling with sounds, attributing meaning to infant utterance and emotion-related speech*. There were differences in low and mid SES mothers for: *overall speech, labelling AMRCs, infant-direct questions,* and *personalised elaboration* (see Table 2.18).

Table 2.18: Mann-Whitney comparisons for SES-related differences in maternal factors ($N = 34$).

Maternal Book Sharing Behaviours	Low Vs. Mid			Mid Vs. High			Low Vs. High		
	U	p	r	U	p	r	U	p	r
Overall Speech	-13.643	.016*	.675	-.4739	.868	.216	-18.382	< .001**	.891
Descriptive elaboration	-11.243	.066	.556	-5.328	.701	.243	-16.571	< .001**	.803
Labelling	-12.829	.009**	.634	-3.689	1.00	.168	-16.518	< .001**	.800
NAMRCs	5.100	.104	.513	0.000	1.00	.000	5.100	.027*	.502
AMRCs	-12.829	.026*	.637	-1.689	1.00	.077	-14.518	.001**	.707
Infant-directed questions	-11.886	.046*	.588	-5.420	.677	.247	-17.306	< .001**	.839
Symbolic gesture	-3.236	1.00	.161	-8.332	.180	.384	-11.568	.010*	.566
Encouraging autonomy	-8.514	.248	.421	-4.580	.917	.209	-13.094	.003**	.634
Personalised elaboration	-11.857	.047*	.586	-2.261	1.00	.103	-14.118	.001**	.684
Emotion-related speech	-7.021	.327	.389	-1.987	1.00	.102	-9.009	.033*	.498
Labelling with sound	-10.329	.106	.511	-2.218	1.00	.101	-12.547	.005**	.608
Attributes meaning to infant utterance	-6.136	.610	.309	-4.038	1.00	.190	-10.174	.027*	.502
Forced reengagement	4.718	.567	.319	6.079	.369	.315	10.797	.002**	.651

* = $p < .05$, ** = $p < .01$

2.3.3.7 Are infant book sharing behaviours predicted by SES at Phase 2

Infants showed SES group differences for book sharing behaviours at Phase 2, where no differences were observed at Phase 1 (not consistent with SES scores). Infants showed significant differences for *disengagements* (Table 2.19), which is consistent with the SES score data (Table 2.7).

Table 2.19: Kruskal-Wallis analysis for SES differences in infant measures ($N = 34$).

Infant Book Sharing Behaviour	**Low ($N = 10$)**		**Mid ($N = 7$)**		**High ($N = 17$)**		**Sig.**	**Effect size**
	Mdn	*M (SD)*	*Mdn*	*M (SD)*	*Mdn*	*M (SD)*		
Infant disengagements	7.00	6.6 (*4.17*)	4.00	5.43 (*4.08*)	.00	2.76 (*4.29*)	**.030***	**.213**
Total verbalisations duration	19.68	27.91 (*25.36*)	44.76	48.28 (*37.15*)	42.77	48.80 (*43.90*)	.534	.038
Total verbalisations frequency	23.50	27.70 (*22.09*)	51.00	44.14 (*33.71*)	35.00	39.12 (*29.34*)	.591	.032
Imperative gestures	.00	.00 (*.00*)	.00	.00 (*.00*)	.00	.06 (*.24*)	.607	.030
Symbolic gestures	.50	2.10 (*3.45*)	.00	1.14 (*1.86*)	1.00	2.59 (*3.54*)	.637	.027
Declarative gestures	15.00	17.10 (*10.80*)	12.00	13.86 (*10.29*)	16.00	19.76 (*14.72*)	.700	.022

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

A follow-up test (the Mann-Whitney test) to evaluate pairwise differences in the medians among the three groups indicated that the number of times infants disengaged was significantly higher in the low compared to the high SES infants ($U = 9.391$, $p = .049$, $r = .462$).

2.3.3.8 Summary: SES group differences in comparison to SES scores at Phase 2

In Phase 2 SES group differences were consistent with the findings involving SES scores for the majority of analyses. However, SES scores showed additional verbal and non-verbal differences in mother-infant book sharing interactions. These findings demonstrate how interpretations can differ based on whether SES is considered as grouped data. To summarise:

Maternal factors

- Analyses involving SES groups failed to detect SES related differences in dec*larative gestures and NAMRCs*.

Infant factors

- Analyses involving SES groups failed to demonstrate that low SES infants *gazed at their mothers* fewer times during book sharing than high SES infants.

2.3.4 Are SES-differences in book sharing interactions stable over time?

The next analyses assess the stability of the book sharing behaviours and additional measures over time. Additionally, the analyses also consider how these measures vary as a function of SES. A series of mixed factorial ANOVAs were conducted to test the interaction of each book sharing behaviour or variable, Phase (Phase 1 to 2) and SES. The following tests of interaction will be examined:

- Learning environment variables
- Maternal book sharing behaviours
- Infant book sharing behaviours

2.3.4.1 Stability in early learning environment variables across SES

Analyses were conducted to determine the stability of the early learning environment of infants within SES groups. There were no significant interactions indicating that the learning

environment did not change significantly, demonstrating stability within SES groups from Phase 1 to 2 (Table 2.20).

Table 2.20: Mixed model ANOVA analyses for the stability of within SES differences in infants' early learning experiences ($N = 34$).

Learning Environment Variable	Sig.
STIMQ scores	.181
Number of infants books in the home	.732
Maternal reading frequency to infant per week	.848

* = $p < .05$, ** = $p < .01$

2.3.4.2 Stability of book sharing behaviours across SES

The stability of mother and infant book sharing behaviours, measured as durations and frequencies, within SES groups were examined from Phase 1 to 2: overall speech, infant-directed questions and not speaking. There was a significant decrease in positive reengagements and NAMRCs. Thus, the majority of maternal behaviours were stable over time, although some appeared to change over time. There were no differences in infant behaviours within SES groups over time, indicating some stability (Table 2.21).

Table 2.21: Mixed model ANOVA analyses for the stability of mother in book sharing behaviours within SES groups from Phase 1 to 2 ($N = 34$).

Maternal Book Sharing Behaviours	**Sig.**
Overall speech	**<.001****
Not speaking	**.005****
Positive reengagement	**.045***
NAMRCs	**.055**
Infant-directed questions	**.057**
Ignore infant utterance	.066
Positive alternative reengagement	.081
Declarative gesture	.090
Labelling	.099
Encouraging autonomy	.119
Descriptive elaboration	.127
AMRCs	.200
Emotion-related speech	.238
Negative reengagement	.258
Attributes meaning to infant utterance	.375
Repeat infant utterance	.431
Symbolic gesture	.464
Imperative gesture	.493
Labelling with sound	.841
Forced reengagement	.847
Personalised elaboration	.896
Acknowledges infant utterance	.998
Infant Book Sharing Behaviours	
Declarative gestures	.311
Infant disengagements	.237
Symbolic gestures	.120
Total verbalisations frequency	.380
Total verbalisations duration	.356
Imperative gestures	.196

* = $p < .05$, ** = $p < .01$

2.3.4.3 Summary: Are SES- differences in book sharing interactions stable over time?

- Infants' learning environments and infant book sharing behaviours remained stable over time.
- Maternal book sharing behaviours did show some change over time, however most behaviours remained stable. Behaviours that changed were: *overall speech, infant-directed questions not speaking, positive reengagements and NAMRCs*.

2.3.5 What features of mother-infant interaction during book sharing are associated with infant language proficiency and cognitive outcomes?

Infants cognitive development, measured using the Bayley's scale, and language development, measured by the PLS, were only assessed at Phase 2. Tests for normality for the whole sample on the infant developmental abilities are displayed in Table 2.22. Both infant cognitive and language abilities indicate a normal distribution, thus parametric measures were used for infant cognitive and language abilities.

Table 2.22: Descriptive statistics and Normality (Kolmogorov-Smirnov Test) of Standardised Infant Abilities Measured at Phase 2 ($N = 34$).

Infant Ability Test	**Mean *(SD)***	**Range**	**Normality**
Bayley's scale	121.09 *(26.06)*	102.00	.060
PLS	100.10 *(17.87)*	78.00	.200

*p <.05, **p <.01

A Levene's test of homogeneity of variances was performed and the data met the assumptions for a one-way ANOVA for both the Bayley's scale and the PLS measures. The findings illustrate that infants' cognitive and language abilities were significantly different across SES groups (see Table 2.23).

Table 2.23: ANOVA Results for SES Related Differences in Infant Abilities at Phase 2, Measured as Standardised Scores (*N* = 34).

Infant Ability Test	**Low (*N* = 10)**	**Mid (*N* = 7)**	**High (*N* = 17)**	**Sig.**
Bayley's scale	94.90 *(24.96)*	125.00 *(17.81)*	134.88 *(17.16)*	**<.001****
PLS	86.85 *(11.73)*	100.86 *(14.44)*	107.59 *(18.26)*	**.011***

*p <.05, **p <.01

Bonferroni post-hoc comparisons were conducted which revealed that low SES infants scored significantly lower on the Bayley's measure of cognitive ability than both high SES infants (*p <.001)* and mid SES infants (*p =.013)* and low SES infants scored significantly lower on the PLS than high SES infants (*p =.008).* These findings are consistent with the SES scores for SES differences in infant cognitive and language abilities presented in Table 2.6.

Next, analyses were conducted to explore whether infant cognitive and language abilities were predicted by maternal behaviours at Phase 1 and 2. Table 2.24 explores the predictive and concurrent relationships between the mothers' behaviours during book sharing at Phase 1 and 2 and infant language and cognitive abilities when infants were 18 months old. Infants' cognitive ability at 18 months was significantly associated with 11 out of 19 of the behaviours measured at Phase 1, and 15 out of 19 of the behaviours measured concurrently. Infant language skills at 18 months were significantly associated with 9 out of 19 of mothers' book sharing behaviours at Phase 1 and 2.

Table 2.24: Spearman's Rank Correlation exploring predictive and concurrent relationships between maternal behaviours produced during book sharing at Phase 1 and 2 and infant abilities at Phase 2.

Maternal Variable	Bayley's scale		PLS	
	Phase 1 (*N* = 44)	Phase 2 (*N* = 34)	Phase 1 (*N* = 44)	Phase 2 (*N* = 34)
WAIS score	**.51****	-	**.45****	-
SES score	**.54****	-	**.50****	-
Maternal Book Sharing Behaviour				
Encouraging autonomy	.32	**.64****	.17	**.60****
Infant-direct questions	**.49****	**.57****	**.36***	**.52****
Overall speech	**.36***	**.56****	**.45****	**.50****
Attributes meaning to infant utterance	**.42***	**.53****	.21	**.61****
Acknowledges infant utterance	**.49****	**.53****	.29	**.49****
Repeats infant utterance	.21	**.52****	-.05	**.50****
Forced reengagement	-.04	**-.52****	-.05	**-.50****
Labelling	.32	**48****	**43***	**.37***
Descriptive elaboration	**.41***	**44****	**.37***	**.38***
Emotion-related speech	**.38***	**.43***	.27	.33
AMRCs	**.60****	**.42***	**.42***	.23
Personalised elaboration	**.37***	**.35***	**.33***	.31
NAMRCs	**-.51****	**-.35***	**-48****	-.31
Positive alternative reengagement	.19	**-.35***	.06	-.29
Symbolic gesture	**.36***	**.34***	**.37***	.29
Negative reengagement	-.25	-.28	-.11	-.17
Labelling with sound	.31	.12	.14	.01
Not speaking	-.21	.09	**.38***	.01
Positive reengagement	**.40***	-.08	.27	-.02

*p <.05, **p <.01

2.3.5.1 Summary: What features of mother-infant interaction during book sharing are associated with infant language proficiency and cognitive outcomes?

- Infant cognitive and language abilities were predicted by SES group, with low SES infants scoring lower on the Bayley's scale and PLS than high SES infants, and were also lower on the Bayley's scale than mid SES infants. This is consistent with the SES scores analyses.
- A number of maternal book sharing behaviours identified to be positive in the literature positively predicted infant abilities, and those identified to be negative were negatively associated to infant abilities.

2.3.6 Overall Summary

To summarise, there were significant differences in the quality and quantity of maternal interaction as a function of SES.

- Low SES mothers spoke less to their infants and their speech contained fewer examples of positive speech types compared to high SES mothers, and these relationships became more strongly associated at Phase 2. However, maternal responses to infant utterances did not differ across SES.
- Low SES mother's speech was characterised by more behaviours identified to be negative during book sharing than high SES mothers.
- Lower SES mothers produced fewer gestures and were less likely to use positive reengagement strategies, and used more strategies considered to be negative than higher SES mothers. Maternal book sharing behaviours were mostly stable over time. There were five behaviours that indicated change over time (*overall speech*, *infant-directed questions not speaking*, *positive reengagements* and *NAMRCs*).

- When controlling for maternal WAIS, few relationships remained between SES and book sharing behaviours. SES and WAIS were highly correlated indicating that they measure very similar constructs.

Infant non-verbal behaviour did differ during book sharing across SES.

- Low SES infants *gazed at their mothers* fewer times, and *disengaged* more frequently.

A number of additional factors were compared to book sharing behaviours and relationships were identified.

- Maternal positive reengagement strategy at Phase 1 (seen by high SES mothers most often) predicted less infant disengagement at Phase 2.
- The relationship between MM and book sharing behaviours was found to be mediated by SES. Thus, when controlling for SES MM became more strongly predictive of book sharing behaviours.
- Infant gesture was significantly associated with maternal speech.

Additionally, infants' early learning opportunities in the home were significantly different across SES groups.

- Low SES mothers scored significantly lower on the WAIS vocabulary subscale than high SES mothers.
- Low SES infants had a less stimulating early learning environment than high SES infants, and this remained stable over time.

Predicting infant language and cognitive abilities

- Infant cognitive and language abilities were predicted by the majority of the maternal book sharing behaviours across Phase 1 and 2.

- Behaviours identified as positive were positively associated, and those found to be negative in the literature negatively predicted the abilities.
- Maternal behaviours predicting infant abilities increased in their magnitude from Phase 1 to 2, indicating that these relationships became more powerful.

2.4 Discussion

The aim of this chapter was to explore whether there were SES differences in the amount and types of verbal and non-verbal behaviours mothers and infants produced during book sharing, and whether these were stable over time. The results illustrate that there are differences in both verbal and non-verbal behaviours produced by mothers and infants. Interestingly, almost all significant SES differences in maternal behaviour at Phase 1 remained significant at Phase 2. Low SES mothers produced less in terms of quantity and quality of interactions in a book sharing activity in comparison to high SES mothers at Phase 1 and 2, with the majority of correlations becoming more powerfully associated across time. Thus the strength of the relationship between SES and maternal behaviours appeared to get stronger, indicating that these differences in dyadic interactions are growing across different SES families, getting significantly greater in a six-month period. This demonstrates the importance of early intervention to reduce these interactional differences across SES rather than them widening.

Early learning variables are considered to influence the infant's early learning environment and were measured via the STIMQ. STIMQ differences identified across SES in Phase 1 were no longer significant by Phase 2, suggesting that low SES mothers had improved the home learning opportunities for their infants overall. However, when examining the stability of scores, mothers' STIMQ scores did not change significantly with SES groups, suggesting that low SES mothers had not significantly improved the early leaning opportunity for their infants. Additionally, low SES mothers continued to score significantly lower on home

literacy practices and books in the home at Phase 2. This illustrated that they were not reading as frequently and that there were less opportunities for infants to interact with books in the home. This alone suggests that low SES infants has fewer experiences with books, and due to this lack of familiarity mothers and infants were less positively engaged in this experience. Despite government initiatives such as Book Start promoting the importance of books, there is a lack of guidance in what techniques parents could foster for them to feel adequately prepared to introduce the activity to their infant. This may lead to mothers feeling unable to deliver a good book sharing experience and thus avoid book reading. This again highlights the importance for more interventions with parents to prepare them for book sharing with their infant.

Mothers' WAIS scores were significantly different across SES groups and were highly correlated to maternal SES, suggesting they were measuring related constructs. This was confirmed by performing partial correlations between SES and book sharing behaviours controlling for WAIS, which resulted in fewer significant relationships. Thus, when mothers' vocabulary is controlled for many of the differences in book sharing disappear. Interestingly, the remaining significant findings were for gesture, positive reengagements, and a few verbal behaviours that were dependent on thought (emotion-related speech and AMRCs). This suggests that a lack of verbal knowledge was accounting for fewer variations in mothers' speech during book sharing, though these did not need to be overly complex, e.g. relating to items in the book to their child's experiences to 'personalise'. However, mothers' lack of verbal ability appears to have hindered their expression during the book sharing. Furthermore, negative and forced reengagements that were previously negatively correlated were no longer associated, indicating that removing the lack of verbal competency of the mother alleviated this difference. This may suggest that mothers lacking verbal competence did not know how to try to reengage their infant. These findings together suggest the

relevance of supporting the development of verbal abilities in low SES mothers to enhance their interactions with their infants. Alternatively, helping low SES mothers realise the potential they have to extend their verbal communication based on their existing verbal ability could have significant ramifications. For example, mothers could personalise and elaborate the books content using their existing vocabulary.

Mothers across SES did not differ on the measures of postnatal depression or stress, however, maternal depression and stress were correlated to a small number of book sharing behaviours. When controlling for maternal depression and stress in subsequent analyses, the findings were consistent, thus not affecting the link between SES and those book sharing behaviours.

The verbal differences seen across different SES mothers was not unexpected in terms of previous research in relation to the types and the complexity of maternal speech infants hear (Hart & Risley, 1995; Hoff, 2003). However, with book sharing being a particularly interaction-rich context there was the possibility of this being different to other day-to-day interactions that infants' experience. Furthermore, little research has looked at infants of this age. These findings support previous findings for SES differences in labelling and descriptive elaborations and infant-direct questions (Ninio, 1980; Peralta de Mendoza, 1995). This study has extended these findings by exploring how these behaviours relate to future abilities, as well as concurrent. In previous research, personalised elaboration during book sharing had mostly focused on older children and not considered SES differences (Kucirkova et al., 2014a; 2014b), thus this study has furthered our understanding of how presonalised elaboration differs in infants across SES backgrounds.

MM refers to a mother treating her young infant as having a mind with thoughts and feelings. These results illustrate that high and low SES mothers do think and treat their infants significantly differently at this age, with high SES mothers being more mind-minded. There

was a significant correlation between MM and SES, thus analyses were conducted to assess the mediating effect of SES on the relationship between MM and book sharing behaviours. The findings illustrated that controlling for SES increased the associations between MM at Phase 1 and 2 and book sharing behaviours at Phase 1 and 2. This indicates that a mother's perception of her infant had a strong influence on the way she looked at books with them even when SES was controlled. This indicates the association between MM and SES to be complex when explaining their influence on book sharing interactions.

Infant cognitive and language abilities were both predicted by MM, illustrating the impact of MM on infant development. These findings support previous research demonstrating that MM is known to implicate developmental abilities in the future, for example AMRCs are known to predict later theory of mind abilities (Kirk et al. 2015; Meins et al., 2002). Thus, higher SES infants will be at a developmental advantage in areas such as theory of mind, as well as in cognitive and linguistic domains, as MM was associated to SES background. Interestingly, MM has not been found to differ across SES groups in previous research. This could be explained by examining MM in a book sharing context, which contrasts previous MM research contexts, which are based on free-play. The book sharing activity is a particularly focused and interactive context that is known to facilitate joint attention and, as such, may be a prime opportunity for mothers to produce a more enriched interaction with their infants. Consequently, this may allow for differences in more complex interactions to be observed. Thus, future research may benefit to extend and compare MM from observations of book sharing, in addition to the free-play.

Mothers from higher SES backgrounds produced consistently more symbolic and declarative gestures during book sharing than low SES mothers. Evidence supports the use of maternal gesture on infants' gesture use, and on infants' language development (Rowe & Goldin-Meadow, 2009a). Furthermore, previous research has demonstrated that using symbolic

gestures makes mothers more in-tune with their infants' non-verbal behaviours (Kirk et al., 2013). This could therefore be a contributing factor to why high SES mothers were more responsive to their infants, for example when using different techniques to reengage their infants.

The relations between labelling and gesture was examined, seeking to identify the mechanisms by which SES impacts upon infant language, and consequently school readiness (via differences in interaction). Infant symbolic and declarative gestures at 12 and 18 months led to more total maternal utterances and descriptive elaborations concurrently and predictively. Labelling was not related to infant gesture, although descriptive elaborations can be viewed as an extension to labelling and may explain the discrepancy between these findings and previous research to differences in coding criteria (Olson & Masur, 2015). To extend these findings, this study aimed to explore whether higher SES mothers used more labelling behaviour as a result of their infants' gestures. The results revealed no association between maternal labelling and infant gesture, thus this does not explain the larger use of labelling in high SES mothers.

Low SES infants spent more time negatively disengaged from the book sharing than high SES infants at Phase 1, meaning that, irrespective of what mothers are doing, the infant does not share their attention and the mother does not attempt to reengage the infants' attention. This observation suggests that the mother influences the infant in the book sharing process and, for those with low SES, mothers are less concerned with book sharing with their infants. This lack of engagement does not send a positive message to their infant about the value of book sharing. Consequently, this could account for why these verbal and non-verbal differences do not disappear. Despite this, at Phase 2 there were no longer differences in the number of negative reengagement strategies used, though low SES mothers were the only remaining mothers to produce any of these behaviours.

Maternal forced reengagement strategies showed significant differences in Phase 1 (SES scores only) and Phase 2, with low SES mothers producing significantly more than high SES mothers. This could possibly explain the alternative strategies to negative reengagement that low SES mothers are now using. Forced reengagement strategies do not engage the infant back into the book sharing experience as a positive reengagement strategy would thus not promoting the book sharing experience that high SES infants are given. Consequently, high SES mothers, who reengaged their infants significantly more times at Phase 1 with the positive strategy, had infants who disengaged significantly fewer times at Phase 2. Thus, high SES infants produced significantly fewer disengagements at Phase 2 than low SES infants and, in addition, high SES infants were the only group whose number of disengagements significantly reduced from Phase 1 to 2. This is indicative that positive reengagement strategies reduce the infants' inclination to disengage from book sharing over time. An explanation for this relationship could be that by mothers' attention remaining positively and relentlessly on the book and on the same joint attention episode the infant left as the mother remains on the same page. For future research, it would be interesting to study whether the mother changes the page or topic rather than remaining on the same picture when a forced reengagement takes place. This could indicate to the infant that the picture or topic they disengaged from is not worth conversing about. Furthermore, future research could examine maternal attitude towards the book sharing interaction, and consider if a more positive or negative attitude leads to the infant disengaging. Additionally, by forcing the infant to reengage in the book, the infant does not observe the mother continue to enjoy the book without them. Instead, the mother makes the interaction appear something the infant has to do, rather than something to do for fun. Future book sharing interventions and guidance could encourage mothers to use more positive reengagements strategies when their infants disengage, based on findings about the effectiveness of this technique revealed in this study.

Maternal book sharing behaviours at Phase 1 and more so at Phase 2 were predictive of infant cognitive and language abilities. This further demonstrates the importance of early book sharing experiences to the contribution of infant abilities and thus school readiness. High SES infants disengaged fewer times than low SES infants at Phase 2, illustrating that, by 18 months old, infants are greatly influenced by their early interactions and that mothers' behaviours influence these interaction changes. Additionally, these early interactions have demonstrated their benefits on subsequent infant abilities. Consequently, with low SES infants engaging less in book sharing, this will hinder their subsequent development, and thus their school readiness. With the school readiness gap being a huge concern to schools and government officials, this again implicates the importance of encouraging effective book sharing through guidance and intervention to reduce these gaps.

Book sharing and mother-infant interaction research has a lack of focus on multiple factors or considering SES, and research has also failed to consider the role of the infant in the book sharing process (Fletcher & Reese, 2005; Topping et al., 2013). More so, very little research has considered the book sharing experience in this detail and considering the above issues in such as young sample. This research has contributed to addressing these problems. This research has established some of the verbal and non-verbal behaviours that impact upon the early learning environment and which, as a result, influence infants' early developmental opportunities and subsequently their school readiness. These findings are supported by research that has found differences in infants' language and cognitive abilities as young as 14 months of age that are accounted for by the early learning environment (Rodriguez et al., 2009).

The mother-infant book sharing interaction should continue to be explored further with pre-school children to examine how these behaviours progressively change over time. There is a

lack of substantial evidence in the early mother-infant, and mother-child interactions during book sharing and whilst this study has provided some evidence, sample sizes were small.

Mothers eye gaze was measured as a frequency, indicating how many times the mother turned to look at the book or infant. Eye gaze was predicted by SES group in Phase 1, with high SES mothers gazing at the book and their infant significantly more than low SES mothers. However, this was very difficult to measure with mothers' eye gaze often changing very briefly and little movement is required to change eye gaze, thus making it hard to measure accurately. Often mothers would have their heads turned away from the camera, faced towards the infant, or looking down at the book. With the recording trying to capture a number of non-verbal behaviours, and mothers often moving around within the room they were being observed, it became difficult to position correctly for eye gaze at all times. Furthermore, attempting to record mother and infant eye gaze accurately could be problematic depending on the positioning they chose to sit in, especially if moving around the room. Whilst the eye gaze reached good reliability from a second coder, in parts of the videos it was not possible to code gaze, and was therefore not reliable to include as a variable. In the interest of maintain reliable data, this was not coded for Phase 2. Eye gaze was not related to SES when examining SES scores suggesting this may have been an effect on grouping the data with small groups, rather than a true representation of the data. Additionally, pairwise comparisons indicated that the differences between the groups did not reach significance.

Whilst there are limitations to the results, as mentioned above, the findings have addressed the questions asked in this chapter, beginning to address the gap in the current literature. The findings illustrate that despite a growing concern in recent years about the inequality of early learning environments, which subsequently impact children's readiness to learn, these differences still exist. Additionally, indicating that this concern has not resulted in effective early intervention, or sufficient changes in policy, which have enabled these differences to be

alleviated. Thus today, the differences that SES create in children still exists, giving these children a disadvantage when arriving at school. Furthermore, these findings demonstrate how SES is manifesting upon infants' developmental abilities as early as 18 months old. These findings can aid the development of interventions attempting to enhance mother-infant interactions, as well as guidance for mothers before these differences appear. The positive behaviours identified in this study have been positively linked to developmental abilities in the literature and within this study. This study demonstrates that low SES mothers are producing fewer of these positive behaviours, even with infants of a very young age, and could benefit from guidance to improve their book sharing behaviours. These findings facilitate knowledge on how early in an infant's life these differences can be seen in interactions and how quickly that impact infant abilities, and additionally infants' own book sharing behaviours, such as disengaging behaviours.

Chapter 3: Exploring mother-child interaction during book sharing across socioeconomic status families at age 44 months.

3.1 Introduction

This chapter aims to extend the findings of Chapter 2 by examining the difference in verbal and non-verbal behaviours during a mother-child book sharing interaction in an older sample of children across different SES backgrounds. Chapter 2 demonstrates large SES differences in maternal behaviour, and shows that these differences become more prominent in infant behaviour by 18 months. Whilst infants began to show differences across SES backgrounds, their input into the book sharing interaction was limited by their capabilities at this age in infancy. It is therefore necessary to examine any patterns in behaviour across SES background during book sharing interactions as infants become more advanced cognitively. Furthermore, as children become older the way they interact with their main caregiver (mother) as well as materials presented to them changes. It is of interest to examine what happens as this activity becomes more familiar, and often a routine or a source of enjoyment to some children, whereas this may be a less frequent activity in other children. This chapter will therefore consider how children become more involved and their interactions change in book sharing and how this affects the mothers' role in the book sharing process.

This chapter will outline the key contextual issues that elucidate the importance of exploring mother-child book sharing behaviours across SES groups. This will be followed by a review of the current literature exploring verbal and non-verbal book sharing interactions across SES groups and how SES is related to children's developmental abilities and skills. The chapter will then present the current study and discuss the findings independently before exploring them in comparison to the findings in Chapter 2 with a younger sample.

A recent report by Save the Children (2015) highlights that in children aged eleven on free school meals (an indicator of low SES), only four out of ten are competent at reading. This statistic raises concerns regarding how able these children are to learn if they cannot read. Save the Children (2015) go on to illustrate that, at age three, there is already an 18-month gap in developmental abilities of these children. This is supported by research that demonstrates that, by age five, children show over a year's difference in their vocabulary abilities (Hansen & Joshi, 2008). Research indicates that some early abilities (i.e. at pre-school age) are predictive of continual development. For example, Hansen and Joshi (2008) report that verbal and cognitive abilities at age three are predictive of these abilities at age five. Additionally, high cognitive functioning at age five was negatively associated to behavioural problems at age three. The findings illustrate the long-term impact of SES on children's abilities, via their learning opportunities. Book sharing practices were more strongly predicted by SES, measured as reading frequency and library visits, and this had a significant impact on children's subsequent cognitive abilities at age three.

Book sharing is a key literacy activity for pre-schoolers and is well documented to be important to children's developmental success (Bus et al., 1995, Reese et al., 2010). Therefore, it is important to understand the differences in the early book sharing experiences of preschool children. Both the frequency and the quality of the book sharing experience affect the extent of the developmental advances (Bus et al., 1995; Leseman et al., 2007; Whitehurst et al., 1988). Notably, SES affects these book sharing experiences, with high SES children receiving more opportunities and these being more enriched for literacy learning than low SES children (Chazan-Cohen et al., 2009; Linver et al., 2002). As part of a large-scale study, Kiernan and Huerta (2008) examined the early learning environment of nearly 14,000 UK children from nine months to three years old. The findings illustrate the long-term impact of SES on children's abilities, via their learning opportunities. Book sharing practices

were predicted most strongly by SES, and were measured as reading frequency and library visits. This had a significant impact on children's subsequent cognitive abilities at age three.

A number of qualitative book sharing strategies have been identified as being used with preschool children. Dialogic reading has been shown to increase pre-schoolers' language abilities (Lonigan & Whitehurst, 1998). However, in a recent review of 16 studies using dialogic reading strategies, the reviewers suggest that the findings are less powerful with those at risk of a language delay (Mol et al., 2008). Research demonstrates that the level of demand of the interactive style of book sharing impacts children's development. Findings reveal that a high level of demand leads to increased literacy and comprehension (Haden et al., 1996). In support of this, Hindman, Connor, Jewkes and Morrison (2008) found that parents used mostly labelling and descriptive talk during book sharing, which were only weakly related to later vocabulary. In contrast, demanding talk, such as predicting, drawing conclusions, personalising and recalling, were used less frequently but were more strongly predictive of vocabulary abilities. Personalisation during shared reading has further been examined by Hockenberger, Goldstein and Haas (1999). Mothers were instructed to relate the book back to their child by personalising the content, and it was revealed that some of the children showed improved literacy skills as a result of this. More recently, research has supported the impact of personalisation on children's literacy abilities with preschool aged children using aspects of a book which were designed with personalised passages in the story book (Kucirkova et al., 2014a). Research to-date illustrates many book sharing behaviours used with preschool aged children facilitate their language and literacy skills, although research has not identified differences in the use of these behaviours, specifically SES differences.

Research on non-verbal behaviours produced during book sharing with pre-schoolers is far less extensive. There is little evidence of the use of gestures during pre-schoolers book

sharing experiences. However, Senechal, Thomas and Monker (1995) illustrate that children who used pointing during book sharing saw an increase in their vocabulary knowledge in comparison to those children who did not point or label verbally. Evans, Williamson and Pursoo (2008) also found that parental pointing during book sharing with their children aged three to five years old increased children's attention to the book, specifically the print, as well as enhanced recognition of print in children aged four. The mechanism proposed to explain this association is through children pointing. When children point, it provides mothers the opportunity to label the item and, as attention is focused on the same items, this facilitates children opportunities to build up associations, potentially leading to object-word mapping (Goldin-Meadow et al., 2007). Additionally, the impact of maternal mind-mindedness (MM) on development has been explored in older samples, with research demonstrating that MM at age three years predicts children's later theory of mind abilities at age five (Meins & Fernyhough, 1999).

Whilst research has identified the importance of the qualitative nature of book sharing, little research to date has examined the book sharing experience as a whole considering both the mother and child in the interaction. Similarly, research has failed to examine both verbal and non-verbal behaviours in a socially diverse sample. Chapter 2 identified substantial SES differences in the amount and quality of the book sharing at 12 and 18 months, which contributed to infants' cognitive and language abilities. The magnitude of the effect may have been exacerbated by the fact that, at this time, infants lacked verbal skills and mothers were required to take the lead in the interactions. This may have exacerbated differences between mothers. Indeed, many of the lower-SES mothers reported that having few books in the home and rarely reading with their infants. Therefore, for many of the mothers, this may have not been a typical activity for them to engage in with their child. On the other hand, it is more likely that with older children, who are verbal and more interactive in book reading, mothers

may have more experience reading with their children and may find it easier as they can respond to their child rather than direct the exchange. As such, it was of interest to investigate whether the magnitude of the effect of SES on book sharing practices would be similar when explored in an older sample of children. Furthermore, research illustrates the importance of early reading between mother and child on children's subsequent vocabulary (Bus et al., 1995), and this predicts school success (Snow et al., 1998). Thus, the mechanisms at work warrant further investigation.

The present chapter will consider the SES differences in verbal and non-verbal book sharing behaviours in dyads of mothers and their four-year old children. Additionally, the contribution of children's social and emotional functioning to the book sharing interaction will be considered to determine whether children's behaviour affects maternal behaviours observed during this interaction. This will address the gap in the literature by exploring a wide range of verbal and non-verbal behaviours during book sharing in a preschool aged sample.

To support this, a recent report examining difference in children's school readiness revealed that children who come from lower SES backgrounds are more than twice as likely to have problems with their social, emotional, and communication development, as well as 40% more likely to have problems with their cognitive development (Thrive at Five, 2012). Given that lower SES children are likely to have social and emotional difficulties it is important to account for how this might impact upon the book reading interaction. Taken together, these findings highlight the significant contribution of the early learning environment to school readiness and subsequent progress. The aim of this chapter is to examine the verbal and non-verbal differences mothers and their 44-month-old children produce during a book sharing interaction across SES groups. The chapter also aims to explore how these differences in

book sharing behaviours may be affected by these children's social and emotional functioning.

Coding scheme alterations

Measuring mothers MM comments during book sharing is not possible in an older sample, thus mothers mental state talk (MST) will be measured. Research illustrates that MST in families with their two-year-old child predicts the child's MST at age four and five (Jenkins et al., 2003; Symons et al., 2006). To extend this, mothers' use of desire-specific mental talk with their infants aged 15 months predicts infant mental state talk and emotional understanding at 24 months (Taumoepeau & Ruffman, 2006). Mothers' use of MST also predicts infants' theory of mind (ToM) abilities over one year, even when controlling for infant's initial ToM ability and their use of MST (Ruffman et al., 2002). Hughes and Dunn (1998) further demonstrate that children's MST aged four to five was predictive of these children's concurrent ToM abilities. The magnitude of this relationship is further demonstrated by Ensor et al. (2014), who illustrate that mother's use of MST to their children at age two predicted their ToM abilities at age ten. Thus, a clear positive relationship can be construed from mothers' use of MST to their young children's emotional development, demonstrating its importance. It is expected that MST will be related to the pre-existing positive speech types, as appropriate mind-related comments (AMRCs) did.

3.1.1 The current study

Data were available from a larger cohort study where mothers were video-recorded performing a book sharing activity with their preschool aged children in a lab setting. A subsample of 46 mother-child dyads was selected randomly, with equal numbers of high and low SES dyads. A micro-analysis of these videos was conducted to scrutinise the SES differences in verbal and non-verbal behaviours that the mothers and children produced.

Additional measures from the original study were also available for analysis, including MM measured at 8 and 44 months, and children's social and emotional functioning measured using the strengths and difficulties questionnaire (SDQ; Goodman, 1997). This study aimed to examine whether SES differences in book sharing behaviours seen earlier (in Chapter 2), would be present at age 44 months (note a different method of identifying SES groups was used in these analyses). Furthermore, this study aimed to address whether children's SDQ scores were associated to the book sharing behaviours, giving insight into what may be affecting the behaviours observed. Additionally, book sharing behaviours will be explored in relation to MM, examining whether SES has an impacts on the association. Based on the findings in Chapter 2 and previous research, it was predicted that there would be SES differences in the verbal and non-verbal behaviours produced by mothers and children at age 44 months, and these would be comparable across samples to infants aged 12 months. Additionally, it was predicted that there would be an association between children's social and emotional functioning (SDQ scores) and the book sharing behaviours. It was also hypothesized that MM would be associated to book sharing behaviours.

3.2 Method

3.2.1 Participants

Data were available from a longitudinal cohort study (The Teeside Valley Baby Study, ESRC number RES-000-23-1073, $N = 206$). A subsample of videos of 46 mother-child dyads completing a book sharing task at age 44 months were selected randomly for inclusion in the present study, fulfilling a representative quota of low and high SES families. Children were eight months old at initial recruitment into the cohort study and mothers were aged between 18 and 39 years old (low SES mothers mean age was 26.39, $SD = 6.05$, and high SES mothers mean age was 30.78, $SD = 3.77$). All children were 44 months old (+/- eight weeks),

with the low SES sample consisting of eleven females, and the high SES group, twelve females. Low SES participant's scores (Hollingshead, 1975) ranged from 14 - 29 (M = 23.26, SD = 5.84), and high SES scores ranged from 30 - 66 (M = 45.70, SD = 10.81), demonstrating a representative range from deprived to affluent families. All mothers were fluent in English.

3.2.2 Design

The study used a between-subjects design. The independent variable was the SES background of the mother, with participants being either low or high. Participant's SES score was first calculated using the Hollingshead Index (Hollingshead, 1975) and then participants' scores were separated into two categories, according to whether or not the scores were above or below ??, with ?? being the mid-point of the range of SES scores (0-??).). This grouping combined the mid and high SES category from Chapter 2 to form a single category. This decision was based on there being very little differences seen between mid and high SES in Chapter 2 and the decision to prioritise focusing on SES scores throughout this thesis rather than SES groups. SES is treated as both a categorical variable (low and high) and a continuous variable (SES scores out of 66) for the data analysis, however the focus is on the SES score, SES groups serve as a comparison to previous research. The dependent variables were; *maternal and child behaviours* produced during book sharing (n = 23), measured in seconds and also frequencies, as well as the *overall book sharing duration*, measured in seconds. Raw data were used to compare book sharing behaviours across different SES dyads, this was believed to provide a more representative indication of the nature of the book sharing interaction (see also Chapter 2). It was predicted that there would be a difference in the amount and complexity of verbal and non-verbal behaviours produced by mothers and children across SES during book sharing, and these would be similar across samples to

behaviours established at 12 months. It was also hypothesized that there would be an association between the book sharing behaviours observed and children's SDQ scores, and it was predicted that book sharing behaviours would be associated to MM.

3.2.3 Materials

3.2.3.1 Book Sharing

Dyads were filmed in the baby lab whilst participating in a book sharing activity. The dyads were given a picture storybook named 'Frog On His Own' by Mercer Mayer. The books had no words to accompany the illustrations. The book depicts the story of a frog that gets lost and causes mischief whilst at the park. The video-recordings were then coded using the Observer XT for the mother and child verbal and non-verbal behaviours define in the coding scheme.

3.2.3.2 Book Sharing Coding Scheme

The types of behaviours observed in a mother-infant book sharing context were identified in Chapter 2. The present study will examine book sharing in older children, thus it was necessary to make age-appropriate alterations to the coding scheme. All behaviours were included with the exception of appropriate mind-related comments (AMRCs) and non-attuned mind-related comments (NAMRCs). As children become more expressive with age, AMRCs and NAMRCs are no longer valid measures. Alternatively, mothers' mental state comments were coded. MST refers to the mothers' use of cognitive state language, in relation to the child, herself and others, as well as any mention of the desires or preferences of these people.

The coding scheme detailed below is a revised version of that used in Chapter 2. Please refer to the coding scheme on pages 58-62 for more detailed descriptions of behaviours.

Maternal Behaviours

Type of maternal speech

Maternal utterances were coded as durations in seconds and as one of the following; (a) *labelling*, (b) *descriptive elaboration*, (c) *personalised elaboration*, (d) *labelling with sounds*, (e) *emotion-related talk*, (f) *infant-directed questions*, (g) *other*. Overall speech duration was also noted.

Mental State Talk (MST)

Mothers' mental state talk was coded as frequencies and as either; (a) *cognitive*, mothers' talk about 'knowledge', or other thought processes such as 'think' and 'remember'. (b) *Desires and preferences*, mothers' talk which relates to 'wants', 'likes', 'dislikes' and similar terms.

Maternal gesture

Maternal gestures were coded as a frequency and as one of the following; (a) *declarative*, (b) *symbolic*, (c) *imperative*.

Maternal reengagement strategies

Mothers' attempts to reengage their infants were coded as frequencies and as follows; (a) *positive*, (b) *positive-alternative*, (c) *forced*, (d) *negative*.

Infant Behaviours

Child verbalisations

The duration of child utterances were coded in seconds, and the frequency of child utterances were also coded.

Child gestures

Child gestures were coded as frequencies and as one of the following; (a) *declarative*, (b) *symbolic*, (c) *imperative*.

Child gaze

Children's disengagement was measured when the child disengaged from the book sharing as a frequency.

Inter-rater reliability checks and intra-class correlations (ICCs) were conducted by a second blind, independent coded for ten percent on the videos (n = 5). The ICCs and confidence intervals (CIs) are reported in Table 3.1.

Table 3.1: ICCs and CIs for coding reliability across two independent coders for mother and infant book sharing behaviours.

Maternal Behaviour	ICCs	CIs
Labelling	.98	1.00, .79
Descriptive elaboration	.9	1.00, .92
Personalised elaboration	.90	.99, .02
Labelling with sounds	.91	.99, .13
Emotion-related talk	.99	1.00, .92
Infant-directed questions	.99	1.00, .85
Cognitive MST	.95	1.00, .55
Preference/desire MST	.89	.99, .72
Declarative gesture	.96	1.00, .15
Symbolic gesture	1.00	1.00, 1.00
Imperative gesture	1.00	1.00, 1.00
Positive reengagement	1.00	[1.00, 1.00]
Positive alternative reengagement	1.00	[1.00, 1.00]
Forced reengagement	1.00	[1.00, 1.00]
Negative reengagement	1.00	[1.00, 1.00]
Infant Behaviour		
Verbalisations	.99	[1.00, .67]
Declarative gesture	.96	[1.00, .60]
Symbolic gesture	.89	[.99, .12]
Imperative gesture	1.00	[.94, .88]
Disengagements	1.00	[1.00, 1.00]

3.2.3.3 Cognitive and Demographic Measures

Existing data were available on a range of measures taken from the larger cohort study and will be used in the analyses in this chapter. The variables that have been included are described below.

Maternal Mind-Mindedness (MM) Interaction

Previous measures of AMRCs and NAMRCs were available from the existing data from when the children were assessed at eight months old, where children were filmed in a free play context with their mothers. MM was measured by coding the mother's AMRCs and NAMRCs. See Chapter 2 for a full description of these behaviours.

Maternal Mind-Mindedness (MM) Interview

Another method has been identified to assess MM when examining an older sample, known as the MM interview (Meins et al., 1998). This assessment also takes place outside of the book sharing context and was used to assess maternal MM when their children were 44 months old. Mothers were asked to describe their child and their responses were coded. From this interview all maternal responses were coded, including mental attributes. The proportion of mothers' mental attributes were then calculated and used as a score of MM at 44 months.

Beck Depression Inventory

The Beck Depression Inventory (BDI; Beck, Steer & Brown, 1996) was used to assess maternal depression. The measure consists of 21 items each relating to a different aspect of depression, including sadness, pessimism, guilty feelings, past failings, and worthlessness. Each item has four responses that are indicative of strong agreement to strong disagreement and are worded to be appropriate for the item topic. An example item is worthlessness, which has the following four responses; 'I do not feel I am worthless', 'I do not consider myself as worthwhile and useful as I used to', I feel more worthless as compared to other people', 'I feel utterly worthless'. Low scores are reflective of disagreeing with the item, in this case 'I do not feel I am worthless' and show low levels of depression. Whereas higher overall scores (above 14) are suggestive of depression.

Strengths and Difficulties Questionnaire

Children's social and emotional functioning was measured using the strengths and difficulties questionnaire (SDQ; Goodman, 1997) at 44 months old. The total questionnaire has 25 items, with five subscales each containing five items, each measuring different characteristics of a child's behaviour. The questionnaire has a three-point response scale consisting of, 'not true', 'somewhat true', and 'certainly true'. The internalising behaviours were defined using two subscales, emotional and peer problems. An example item for the emotional subscale is 'many fears, easily scared', and from the peer problems scale, 'picked on or bullied'. The externalising behaviours were from the hyperactivity and conduct problems subscales. An example of an item in the hyperactivity scale is 'restless, overactive', and from the conduct problems scale, 'can be spiteful to others'. High scores on this measure are associated with behaviour problems such as conduct disorder and, sometimes, psychiatric disorders.

3.2.4 Procedure

Dyads arrived at the baby lab where they took part in a number of activities. The present study focuses only on a book sharing episode in which mothers were asked to look at a book with their child as they normally would at home and the researcher left the room. All videoed sessions were of the mother and their child only, with no one else in the room. The duration of these sessions typically lasted between five and ten minutes.

3.3 Results

A preliminary analysis of the sample is reported, followed by an exploration of SES difference in mother-child behaviours during book sharing, and mothers' current and historical mind-minded perceptions (measured as AMRCs and NAMRCs at eight months, and MM perceptions at 44 months). Additionally, mother and child book sharing behaviours

were examined in relation to the children's SDQ scores, reflecting their social and emotional skills. Finally, cross-sectional analyses are reported which examine the stability of dyadic book sharing behaviours from 12 to 44 months.

3.3.1 Preliminary analyses

Each of the behaviours produced by mothers and children during the book sharing are presented below to identify to what extent they are normally distributed. Table 3.2 indicates clearly that many of the mother and child behaviours were not normally distributed. Consequently, non-parametric tests were conducted for the analysis of this sample.

Table 3.2: Descriptive statistics and normality (Sharpiro-Wilk test) of mother and infant behaviours produced during book sharing ($N = 46$).

Maternal Behaviour	**Mean (*SD*)**	**Range**	**Normality**
Overall book reading duration	405.37 (*164.44*)	786.36	.029*
Total speech duration	540.61 (*284.86*)	1340.59	.030*
Labelling duration	172.05 (*88.08*)	346.08	.024*
Infant-directed questions duration	103.83 (*77.77*)	335.49	.002**
Descriptive elaboration duration	169.26 (*94.06*)	416.43	.097
Personalised elaboration duration	6.36 (*12.86*)	57.24	<.001**
Emotion-related speech duration	27.55 (*19.90*)	81.80	<.001**
Labelling with sound duration	3.08 (*10.54*)	52.66	<.001**
MST cognitive frequency	11.66 (*10.55*)	46.00	<.001**
MST preference frequency	.71 (*.81*)	2.00	<.001**
Not speaking duration	169.92 (*84.35*)	395.49	<.001**
Symbolic gesture frequency	1.07 (*3.28*)	16.00	<.001**
Declarative gesture frequency	36.39 (*15.26*)	75.00	.408
Positive reengagement frequency	.56 (*.78*)	3.00	<.001**
Positive alternative reengagement frequency	.41 (*.84*)	4.00	<.001**
Negative reengagement frequency	.07 (*.47*)	3.00	<.001**
Forced reengagement frequency	.07 (*.35*)	2.00	<.001**
Infant Behaviour			
Symbolic gesture frequency	.80 (*2.28*)	11.00	<.001**
Declarative gesture frequency	6.73 (*6.84*)	27.00	<.001**
Imperative gesture frequency	.34 (*1.02*)	5.00	<.001**
Disengagement frequency	1.04 (*1.32*)	6.00	<.001**
Speech duration	52.21 (*41.30*)	165.79	.001**
Speech frequency	34.85 (*23.17*)	101.00	.019*

*p <.05, **p <.01

Correlations between children's SDQ scores, maternal depression (BDI) and book sharing behaviours were examined. Significant correlations were displayed between the total SDQ scores and mothers cognitive *MST* (r_s = -.41), *not speaking* (r_s = -.30), and *infant verbalisations* (r_s = -.32). *Maternal depression* also correlated significantly with *cognitive MST* (r_s = -.35). Additionally, *maternal SES* showed a significant correlation with children's total SDQ scores (r_s = -.34). Thus, non-parametric partial correlations were conducted for the book sharing behaviours identified above. In addition, the extent to which maternal SES mediated the relationship between SDQ scores and book sharing behaviours was considered.

3.3.2 Does SES predict mother and child book sharing interactions, and are these differences associated to children's social and emotional skills?

3.3.2.1 Examining SES scores

Initially, book sharing behaviours are presented in relation to SES, when SES is a continuous score. This prevented losing the true nature of the data that can occur by grouping this data into dichotomous categories. These data are presented in a correlation matrix (Table 3.3) to allow an examination of how these book sharing behaviours relate to SES, MM and children's social and emotional skills (SDQ scores).

High SES mothers had longer book sharing durations, however the purpose of this research was to examine the differences in quantity as well as quality of book sharing. Thus, these differences were not controlled for (proportion scores were not used) for the rest of the maternal book sharing behaviours.

An inspection of the correlation matrix reveals that SES was significantly associated with a number of behaviours. Mothers' SES score was significantly correlated with mothers' AMRCs (8 months), though no other MM measures correlated with SES (as shown in Table 3.3). SES score predicted a number of book sharing behaviours, including mothers' overall

speech duration, silence, the overall book sharing duration, emotion-related and mental state talk, labelling, description elaboration and infant-directed questions (see Table 3.3). Mothers' SES score also predicted the amount of speech children produced.

Mind-mindedness was found to correlate significantly with book reading behaviours, although this was only the case for the observational measure of MM taken during infancy. AMRCs (8 months) were significantly associated with the overall book sharing duration, mothers' total speech, not speaking, descriptive elaboration, emotion-related speech, labelling and cognitive MST. MM at 44 months was only significantly associated with maternal symbolic gesture use.

Next, the association between children's SDQ scores and book reading behaviours were examined. There was a negative correlation between mothers' lack of speech (silence) and the total SDQ score. This suggests that children who scored higher on the SDQ had mothers who spoke more during the book sharing. There was a negative correlation between mothers' cognitive and preference/desire MST, and the overall SDQ scores, indicating that children who scored higher on the SDQ had mothers who produced less MST, both cognitive and preference/desire related. There was a negative correlation between verbalisation duration and total SDQ score, such that children who scored higher on the SDQ spoke less.

Table 3.3: Spearman's rank correlation between mother and child variables and behaviours during book sharing and SES scores ($N = 46$).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.SES score																	
2.AMRCs 8m	**.31***																
3.NAMRCs 8m	.08	-.03															
4. Mind-mindedness 44m	.25	**.43****	.22														
5.SDQ internalising 44m	-.18	-.07	.02	.17													
6.SDQ externalising 44m	**-.32***	-.22	-.07	**-.33***	.19												
7.SDQ total 44m	**-.34***	-.25	.01	-.20	**.54****	**.90****											
8.Duration of book sharing	**.52****	**.40****	-.01	.09	-.12	-.06	-.14										
9.Mother symbolic gesture	.16	.10	.05	**.44****	.02	-.21	-.15	.21									
10.Mother declarative gesture	.15	.09	.11	.16	-.07	.03	.01	**.44****	**.43****								
11.Mother imperative gesture	-.05	-.06	.22	.25	.25	-.19	.09	-.09	.27	.19							
12.Mother not speaking (silence)	**.33***	**.39****	.15	-.02	-.26	-.18	**-.30***	**.74****	.07	.16	-.17						
13.Descriptive elaboration	**.45****	**.32***	-.13	.10	-.01	.15	.06	**.75****	.19	**.45****	-.14	.29					
14.Personalised elaboration	-.01	-.20	.16	.04	.11	.17	.17	**.30***	.20	**.41****	.11	-.05	.28				
15.Emotion-related	**.59****	**.30***	-.03	.06	-.11	-.08	-.11	**.58****	.13	.28	-.03	.22	**.68****	.09			
16.Infant directed questions	**.49****	.23	-.02	.06	-.14	-.16	-.22	**.77****	.11	**.38****	-.05	**.42****	**.71****	**.43****	**.50****		
17.Labelling	**.39****	**.35***	-18	.14	-.03	.13	.07	**.64****	**.31***	**.47****	-.03	.12	**.88****	**.31***	**.72****	**.60****	
18.Label with sound	.10	-.08	.17	.14	.03	.03	.09	.06	**.54****	**.47****	.27	-.10	-.06	**.31***	.09	-.04	.17

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
19.MST cog	**.58****	**.36***	-.01	.17	-.22	**-.35***	**-.41****	**.62****	.03	.19	-.02	**.41****	**.53****	.02	**.48****	**.65****	**.37***
20. MST pref	.05	-.22	.08	.04	.11	**-.33***	-.20	.19	**.37***	**.31***	.27	.08	.10	.19	.16	.20	.08
21.Mother total speech duration	**.52****	**.35***	-.13	.16	-.05	.03	-.05	**.83****	**.29***	**.49****	-.10	**.35***	**.95****	**.38****	**.66****	**.83****	**.88****
22.Positive reengage	.25	.13	-.06	.01	-.05	.03	-.04	.22	.05	.05	-.12	.01	**.32***	.22	.27	.20	.28
23.Positive alternative reengage	.11	.13	.05	.26	.10	.01	-.03	.10	-.04	-.15	-.08	.25	-.01	-.01	-.16	-.07	-.17
24.Forced reengage	.15	.11	-.05	-.07	-.18	.15	.07	.07	.05	-.21	-.03	.18	-.11	-.20	-.15	-.10	-.21
25.Negative reengage	-.24	-.23	-.20	-.11	-.02	.24	.24	-.22	-.10	-.08	-.02	-.24	.02	-.14	.03	-.24	.04
26.Child verbalisation duration	**.32***	.15	.08	-.09	-.24	-.22	**-.32***	**.36***	-.14	-.04	-.24	**.58****	-.01	.04	.06	**.35***	-.11
27.Child verbalise frequency	**.35***	.20	.05	-.05	-.22	-.17	-.27	**.42****	-.04	.05	-.21	**.60****	.09	.12	.07	**.38****	-.04
28 Child symbolic gesture	.06	.05	-.10	.11	-.11	.01	-.03	.01	**.44****	.11	-.08	-.02	-.09	-.03	-.03	-.08	.05
29.Child declarative gesture	.06	.14	-.15	-.17	-.11	-.19	-.22	.24	-.11	-.14	-.23	**.36***	-.10	-.01	-.01	.22	-.08
30.Child imperative gesture	.00	-.14	-.05	-.08	.01	-.01	.06	-.08	**.35***	.15	**.32***	-.05	-.20	-.01	-.23	-.11	-.28
31.Child disengage frequency	.16	.08	.01	.11	.01	.13	.06	.13	-.09	-.12	-.15	.05	.19	.17	.10	.02	.05

	18	19	20	21	22	23	24	25	26	27	28	29	30
19.MST cog	-.18												
20. MST pref	**.34***	.08											
21.Mother total speech duration	.08	**.58****	.17										
22.Positive reengage	.14	.17	-.09	**.31***									
23.Positive alternative reengage	-.06	-.03	.03	-.02	.05								
24.Forced reengage	.11	.01	-.22	-.10	**.36***	.17							
25.Negative reengage	-.08	-.22	-.15	-.15	-.12	-.08	-.03						
26.Child verbalisation duration	-.09	.27	-.10	.09	.19	.16	.21	-.22					
27.Child verbalise frequency	-.05	.27	-.09	.19	.23	.12	.28	-.23	**.92****				
28 Child symbolic gesture	**.56****	-.12	.08	.02	.25	.06	**.39****	-.08	.19	.23			
29.Child declarative gesture	.05	.12	-.03	.01	.09	-.05	.21	-.09	**.72****	**.59****	**.36***		
30.Child imperative gesture	**.34***	-.07	.14	-.18	.16	-.07	**.54****	-.06	.05	.06	.22	.07	
31.Child disengage frequency	.03	.04	-.12	.12	**.72****	**.57****	**.36***	.23	.20	.22	.15	.02	.06

*p <.05, **p <.01

Children's SDQ scores correlated with SES (Table 3.3) as well as a number of book sharing behaviours, therefore partial correlations controlling for maternal SES were performed to assess the impact of children's SDQ scores on book sharing behaviours. Partial correlations were also performed to consider the impact of MM on book sharing, controlling for SES, and for the impact of depression on cognitive MST (Table 3.4).

SDQ scores were significantly associated to book sharing behaviours when controlling for SES. There were a number of behaviours which showed significance here which had not before controlling for SES, including a large number of maternal verbal and non-verbal behaviours. This illustrates that SES mediated the relationship between SDQ scores and book sharing behaviours. Children's verbalisations remained significantly associated to SDQ scores when controlling for SES.

Mothers' AMRCs at eight months were associated to a number of verbal and non-verbal behaviours when controlling for SES. There were a number of relationships which did not show significance before controlling for SES, including mothers' non-verbal behaviours.

Table 3.4: Spearman's Rank Correlations between book sharing behaviours, children's SDQ scores, and MM at 8 months, controlling for maternal SES scores ($N = 46$).

Maternal Book Sharing Behaviours	**SDQ total**	**AMRCs**
	Partial (Hollingshead Index Score)	**Partial (Hollingshead Index Score)**
	Spearman's r_s	**Spearman's r_s**
Book sharing total duration	.08	**.27***
Overall Speech	.18	.18
Labelling	.46**	**.28***
Infant-Directed Questions	.01	.06
Descriptive Elaboration	**.30****	**.25***
Personalised Elaboration	**.75****	.14
Forced Reengagement	**.89****	**.39****
Labelling with Sound	**.73****	.18
Symbolic Gesture	**.63****	**.22***
Cognitive MST	**-.28***	.18
Preference/desire MST	**.59****	.06
Emotion-Related Speech	**.33****	.18
Declarative gesture	**.63****	**.23***
Imperative gesture	**.78****	**.24***
Positive Alternative Reengagement	**.72****	**.42****
Negative Reengagement	**.68****	**.39****
Not speaking	.15	**.44****
Positive Reengagement	**.70****	**.33****
Infant Book Sharing Behaviours		
Verbalisations	**.26***	**-**

*p <.05, **p <.01

Maternal depression was not significantly different across SES. However, it was associated with cognitive MST. Consequently, partial Spearman's correlations were performed for this book sharing behaviour. A partial Spearman's Rank correlation controlling for maternal depression revealed a significant association between SES and cognitive MST, $r_s(79) = -.97$,

$p < .001$. By controlling for maternal depression, the relationship between SES and NAMRCs remained significant.

3.3.2.2 Examining SES groups

For the following analyses, SES will be considered as a dichotomous variable, comparing low ($n = 23$) and high ($n = 23$) SES families on the book sharing behaviours, MM, and children's SDQ scores. Although considering SES as a continuous variable is often preferable, using categorical analyses enables comparisons with previous research.

Maternal book sharing behaviours were significantly different by SES group. Many behaviours identified when considering SES as a continuous variable remained significantly different. There were two maternal behaviours, *labelling* and *not speaking*, which were no longer differed significantly by SES group, though labelling was close to significance.

Table 3.5 illustrates that mother's MM perceptions of their child, as measured by *AMRCs* (8 months) were no longer significantly different when considering SES as a categorical variable, rather than continuous. MM as measured by *NAMRCs* (8 months), and MM at 44 months were not found to be significantly different as a categorical variable, and this was consistent with the SES scores data.

Table 3.5: Mann-Whitney analyses for SES related differences in maternal MM and book sharing behaviours ($N = 46$).

	Mean (*SD*)		*Mdn*			
Maternal MM	**Low**	**High**	**Low**	**High**	**Sig.**	**Effect size**
Proportion of mental attributes 44m	.38 (.31)	.51 (.27)	.43	.50	.516	.096
AMRCs 8m	4.66 (4.03)	5.79 (3.65)	3.17	4.89	.546	.089
NAMRCs 8m	1.93 (1.82)	1.80 (1.95)	1.40	1.48	.783	.041
Maternal Book Sharing Behaviour						
Emotion-related speech	20.80 (19.10)	37.14 (18.04)	16.76	34.19	**<.001****	**.517**
MST cognitive	8.96 (11.62)	14.87 (7.72)	4.00	13.00	**.002****	**.461**
Overall book sharing	366.80 (177.31)	500.36 (218.15)	315.48	461.92	**.010***	**.377**
Total speech	458.06 (301.61)	623.15 (246.50)	406.88	574.03	**.017***	**.352**
Infant-directed questions	85.63 (75.94)	122.87 (68.28)	67.60	106.54	**.029***	**.322**
Descriptive elaboration	149.64 (100.33)	194.18 (77.67)	134.22	171.51	**.047***	**.293**
Labelling	152.58 (*84.97*)	198.48 (*82.31*)	135.82	192.33	.081	.258
Positive reengagement	.35 (*.57*)	.74 (*.92*)	.00	.00	.139	.218
Not speaking	157.45 (*78.71*)	229.89 (*188.06*)	146.47	174.22	.150	.212
Forced reengagement	.00	.13 (*.46*)	.00	.00	.153	.211
Negative reengagement	.13 (*.63*)	.00	.00	.00	.317	.147
Imperative gesture	.04 (*.21*)	.00	.00	.00	.317	.147
Labelling with sound	4.64 (*13.79*)	3.59 (*8.36*)	.00	.00	.543	.090
MST preference	.91 (*1.20*)	1.00 (*1.09*)	1.00	1.00	.655	.066

Positive alternative reengagement	.35 (*.88*)	.39 (*.72*)	.00	.00	.669	.063
Symbolic gesture	1.65 (*4.32*)	.70 (*1.26*)	.00	.00	.685	.060
Personalised elaboration	6.74 (*11.79*)	5.97 (*12.89*)	1.35	.00	.698	.057
Declarative gesture	38.53 (*15.49*)	40.30 (*22.07*)	40.00	41.00	.965	.006

*p <.05, **p <.01

Table 3.6 elucidates the differences in children's book sharing behaviours and SDQ scores by SES group. Children's speech remained significantly different when considering SES as a grouped variable.

Table 3.6: Mann-Whitney analysis for SES related differences in child measures (N = 46).

	Mean (*SD*)		***Mdn***			
Child Book Sharing Behaviour	**Low**	**High**	**Low**	**High**	**Sig.**	**Effect Size**
Total speech frequency	29.57 (*24.49*)	39.70 (*19.02*)	24.00	38.00	**.031***	**.318**
Total speech duration	40.40 (*35.95*)	60.67 (*41.61*)	22.71	46.81	**.040***	**.303**
Symbolic gesture	.26 (*.69*)	1.26 (*2.93*)	.00	.00	.239	.174
Child disengagement	.83 (*1.11*)	1.26 (*1.48*)	.00	1.00	.293	.155
Declarative gesture	5.87 (*5.99*)	7.30 (*7.50*)	4.00	6.00	.627	.072
Imperative gesture	.35 (*1.07*)	.30 (*.88*)	.00	.00	.725	.052

*p <.05, **p <.01

3.3.3 Are SES-differences stable from infancy to childhood across two samples?

A cross-sectional comparison of the findings (from the correlational analyses) for the sample of infants at 12 months in Chapter 2 and the sample of children in this chapter at 44 months were performed. This considered the patterns across the data to establish if maternal and child, and mother and infant verbal and non-verbal behaviours produced during book sharing were similar across age points in the two different samples (see Table 3.7).

Maternal verbal behaviours illustrated consistent significant differences across SES over time from 12 to 44 months, with the exception of personalised elaboration and labelling with sound. The majority of these verbal behaviours demonstrated a similar pattern of associations with SES, with the strength of the relationships being comparable at 12 and 44 months. Maternal silence appeared to be consistent in strength from 12 to 44 months. However, at 12 months, low SES was associated with significantly more silence demonstrated by a negative association whereas, at 44 months, high SES mothers were silent for a longer duration showing a positive relationship, probably reflecting mothers understanding of their children's needs and abilities. The effect of SES on maternal gesture and reengagement strategy were not stable over time, with SES differences strongest at 12 months for gesture and reengagement strategy.

Infant and child verbalisations were not stable over time, with the magnitude of SES being strongest at 44 months. Infant and child gesture were stable, with there being no effect of SES. Infant and child disengagements appeared to be stable over time, with no SES differences at either age. Overall, infant and child book sharing behaviour was not consistent over time, although this may have been a reflection of the different needs and capabilities of children at these ages.

Table 3.7: A cross-sectional comparison (infancy and childhood) of SES differences in book sharing behaviours.

Maternal Book Sharing Behaviour	Age	
	12 months ($N = 44$)	44 months ($N = 46$)
Total speech	.55**	.52**
Labelling	.56**	.39**
Infant-directed questions	.49**	.49**
Descriptive elaboration	.58**	.45**
Emotion-related	.37*	.59**
Personalised elaboration	.43**	-.01
Labelling with sound	.38*	.10
Not speaking	-.42**	.33*
Symbolic gesture	.32*	.16
Declarative gesture	.31*	.15
Positive reengagement	.51**	.25
Positive alternative reengagement	.33*	.11
Negative reengagement	-.44**	-.24
Forced reengagement	-.31*	.15
Child Book Sharing Behaviour		
Verbalisations	-.08	.35*
Disengagements	.08	.16
Symbolic gesture	.17	.06
Declarative gesture	.17	.06
Imperative gesture	.18	.00

*p <.05, **p <.01

3.3.4 Summary

- The following book sharing behaviours differed significantly by SES; *labelling, cognitive MST, emotion-related speech, total speech, descriptive elaboration* and *infant-directed questions, maternal not speaking, children's speech*, and *book sharing duration*. However, *labelling* and *not speaking* failed to show SES differences when considered as a grouped variable.
- Mother and child non-verbal behaviours showed no SES differences.
- When controlling for SES, a large number of verbal and non-verbal book sharing behaviours were predicted by children's SDQ scores, and many non-verbal behaviours were also predicted by MM at eight months.
- Maternal verbal behaviours were the most stable across two samples from one to four years old. Mother and infant non-verbal and infant verbal behaviours were not consistent over time.

3.4 Discussion

This study extended the work of Chapter 2 to consider SES related differences in book sharing at age 44 months old. The quality and quantity of mother and child book sharing behaviours were examined and compared between low and high SES groups. The findings revealed that mother and child verbal behaviours differed by SES, although there were no differences in non-verbal behaviours. These results confirm the experimental hypothesis that SES differences will result in changes to the amount and complexity of verbal book sharing behaviours during book sharing, but not for non-verbal behaviours.

High SES mothers spoke to their children more frequently and their book sharing episodes were longer in duration. Additionally, high SES mothers produced more of almost every speech type regarded to be beneficial for children's developmental abilities. Higher SES mothers produced more cognitive MST and emotion-related speech, known to foster children's ToM (Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Ensor et al., 2014). Similarly, higher SES mothers produced more labelling, descriptive elaborations and infant-directed questions, speech types known to have a positive effect on language and literacy (Hart & Risley, 1995; Whitehurst et al., 1988). Mothers' use of personalised speech did not differ by SES in this sample and was not used very often by any of the mothers overall. Perhaps, for older children, mothers do not personalise speech as they have changed from trying to explain the relevance of an object to the child personally to storytelling. However, parents do often personalise a story to a child so this does not fully explain the lack of personalisation. Thus, further investigation into this would be interesting for future research.

Interestingly, a higher level of maternal silence was found during book sharing in higher SES mothers, which can be explained in relation to the children's behaviours. Higher SES

children spoke more frequently and for longer than their lower SES peers, meaning either; there was less time for high SES mothers to speak, but more time for low SES mothers, or high SES mothers gave their children more opportunities and prompts to speak, but low SES mothers did not. The latter fits well with the idea of scaffolding, such that mothers are allowing their child to lead the interaction and offer comments where appropriate. It is unclear whether mothers' silence led to more child speech as this acted as a prompt for the child to speak, or if the child choosing to speak led to maternal silence. This could be addressed and understood further in subsequent research.

SES-related differences in non-verbal behaviours during the book sharing were not found to be significant. Both mother and child declarative gestures were observed frequently, but these did not differ by SES. This finding contrasts that of previous research which has identified SES differences in both mother and infant gesture use during everyday activities (Rowe & Goldin-Meadow, 2009b). It is possible that the rich contextual interaction of book sharing caused lower SES mothers to use more gesture than they would in other settings, as is found for speech (Hoff, 2003). On the other hand, mothers may find that book sharing restricts the use of their hands, leading to fewer gestures as their hands are not free to produce gestures, or they feel that their child no longer requires additional non-verbal cues to understand the content of the book. There is some support, however, for the latter suggestion, as there were fewer declarative and symbolic gestures used between mothers and their children at this age than in infancy (Chapter 2). This finding supports research that suggests gestures are used as a communication tool when speech is not available (Iverson & Goldin-Meadow, 2005). Additionally, if holding the book caused restrictions to gesturing this would have been more likely seen in Chapter 2 where mothers often also needed to hold their infants, and this was not the case. Additionally, this fits well with the observation that infants gestured less; as this

sample was older than the sample in Chapter 2, there may have been an age-related shift in gesture use, leading to preverbal gestures in high SES infants now being observed as speech. This fits well with the data and illustrates that SES differences in children's speech are now being observed, as high SES children produced more speech than low SES children.

There were similarly no significant SES differences in children's disengagements or mothers' reengagement strategies. To explain this, it is important firstly to recognise that the frequency of disengagements was somewhat lower than in the previous research presented in Chapter 2 with infants. Secondly, when examining the positive reengagements, high SES mothers were twice as likely to reengage their infants using this strategy on average. However, due to the data being unevenly distributed, medians were used in analysis rather than means. Despite this, the differences were not significant and, notably, mothers at this age may have opted to end the book sharing episode if they felt their child was no longer interested or they had finished the book relatively quickly. They appeared to do this rather than attempt to keep their child's attention. Additionally, due to the difficulty in coding eye gaze, this was not coded in the current coding scheme. However, a measure of co-ordinated joint attention may have illustrated SES differences.

Children's social and emotional functioning was measured using the SDQ to examine whether children's social and emotional abilities may be associated to the book sharing experience, explaining why some children may be more difficult to engage during book sharing. Some of the mother and child book sharing behaviours were associated to the SDQ scores at 44 months old. These maternal behaviours were *cognitive* and *preference MST*, and *not speaking*, and the child behaviour was speech. This data suggests that low SES children who are more likely to suffer from social and emotional problems had mothers who spoke less during the book sharing interaction. An explanation for this may be that low SES

mothers find it harder to engage their children during book sharing when these children struggle with their social and emotional skills. Similarly, these children spoke less, which supports the idea that they were less engaged with the book sharing activity. However, whether this was due to mothers being less stimulating or the children being harder to engage is unclear. Additionally, those children who had more social and emotional problems had mothers who produced less MST, both cognitive and preference/desire based. However, only cognitive MST showed SES-related differences. This illustrates that mothers were referring to cognitive states less frequently. However, the meaning of this is unknown, and thus these findings could be addressed and understood further in subsequent research.

Mothers' MM perceptions of her child were measured at a number of time points. A measure of MM, AMRCs, measured when these children were eight months old, were positively predicted by SES when the data were continuous but not categorical. The non-significant finding in the categorical data can be explained by the polarised separation of these SES scores in such a small sample. SES-related differences in AMRCs at eight months in this chapter, along with the same finding in a different sample in Chapter 2, are the first of its kind, though the concurrent measure of MM in this chapter did not differ across SES. Previous research has not identified a significant difference in MM across SES (Meins et al., 1998). However, previous research has not examined MM in a book sharing setting, which is a more enriched interaction (Hoff, 2010). Book sharing is known to be a more focused dyadic interaction, with more complex and varied speech (Hoff-Ginsberg, 1996; Hoff, 2006). This suggests that mothers may demonstrate concepts that are more complex and thus display a deeper understanding of their child. The importance of AMRCs to children's development is evident, with AMRCs predicting ToM abilities (Kirk et al., 2015), and both AMRCs and NAMRCs predicting attachment status (Meins et al., 2012). AMRCs at 8 months were also

predictive of many of the mothers' verbal book sharing behaviours, such that mothers who were more in-tune with their infants at age 8 months exhibited a more positive verbal interaction with their children at age four. Additionally, when controlling for SES, MM also predicted a number of non-verbal behaviours. Interestingly, AMRCs and proportion of mental attributes at 44 months, though they should measure the same construct and are highly correlated, predicted different book sharing behaviours. These findings supporting previous research suggesting that this construct is multi-dimensional (Meins et al., 2001).

The findings illustrate how mothers' behaviours change over time as their children progress with age. All maternal behaviours identified to be different across SES in this sample were also significantly different across SES in Chapter 2 with a younger sample. This indicates a continuation of differences in the quality of book sharing across SES. However, some of the maternal verbal and non-verbal behaviours observed before in infants age 12 months old were no longer present in this older sample. At 44 months, mothers labelling with sound, personalised speech and gesture were no longer significantly different across SES backgrounds. Whilst some of these have already been discussed, labelling with sounds is yet to be discussed. This maternal behaviour is indicative of providing a further channel of communication when children are young to assist their understanding of a word, and can be coupled with a gestural action. When children are more familiar with words and less reliant on subsidiary communication mediums, mothers may be less inclined to use these additional cues. Additionally, infants gesture use showed significant SES differences at 12 but not with children at 44 months, and infant verbalisations were not significantly different but child verbalisations were across SES. These relationships again illustrate a change in channels of communication as children get older, demonstrating a continuation of SES differences.

SES-related differences have been identified in book sharing behaviours, thus the explanations for why these differences exist should be considered further. Evidence from this chapter illustrates possible influential factors on the book sharing process, revealing that low SES children scored higher on the social and emotional functioning test, demonstrating possible social and emotional problems. These differences in book sharing behaviours, which are more enriched than other mother-child interactions, may indicate a trend that is reflected in the mother-infant interactions in other contexts. These behavioural difficulties may hinder the book sharing interaction, making it harder to engage these children. Alternatively, they may be a consequence of less stimulation in the home environment and in dyadic interactions. However, only a very small number of the book sharing behaviours were associated to the SDQ scores, thus alternative explanations may better account for this association. Previous research suggests that lower SES mothers speak less and their speech is less enriched (Hoff, 2003), and this finding was supported in this preschool aged sample. These findings fit with the idea of a cycle of behaviours across generations, where low SES families have less stimulating home environments and consequently their development and life success are limited, which they then continue and replicate in the next generation. This exemplifies the importance of intervention to break the cycle of behaviour and facilitate development in lower SES samples.

This study provides evidence of SES differences in the frequency and duration of children's speech. However, to advance knowledge further, the content of children's speech should also be considered. For example, children's own MST is known to predict their ToM abilities (Hughes & Dunn, 1998). Further research should aim to explore all of the developmental abilities mentioned longitudinally across the first years of life alongside book sharing for a more comprehensive understanding of how these affect school readiness at age five.

Whilst previous research has identified book sharing behaviours that are beneficial to child language and literacy developmental outcomes, they have rarely explored SES differences within this interaction or considered the developmental trend of these behaviours over long time periods. This chapter has observed SES as both a continuous variable, to avoid losing meaningful data, and a categorical variable, to align with previous research. It is noteworthy that some behaviours were not seen as significant when grouping the data, and this illustrates the importance of examining the data ungrouped. A number of book sharing behaviours have been identified to differ continually across SES over time. Additionally, Chapter 2 and previous research demonstrate the importance of these behaviours on children's development. Consequently, there are robust SES effects of mothers' use of books and how they use them in two different samples at different ages. Thus, findings ways to improve book sharing in lower SES mothers should be urgently addressed in government policies, as book sharing may be an important influential factor on subsequent development. Changing the nature of how low SES mothers perceive book sharing with their young children and infants, and providing enriched support to teach these mothers beneficial strategies could decrease these differences. Promoting book sharing quality and frequency should be prioritised, via national campaigns, and with early guidance and interventions to increase awareness of its importance and to attempt to reduce these gaps, which impact on children's school readiness.

Furthermore, with the knowledge that book sharing interactions are more enriched in higher SES samples, encouraging these behaviours in lower SES samples should be a priority. Research must establish whether lower SES mothers, who less frequently demonstrate these behaviours, do so due to a lack of knowledge or a lack of consideration. Are these mothers aware of the importance of the book sharing interaction, and are they not providing a more enriched book sharing experience by choice or by not knowing how? Chapter 4 will examine

this notion further by designing and evaluating a short intervention programme for mothers designed to enhance their book sharing interaction skills.

Chapter 4: Can encouraging an enriched book sharing interaction change mothers' behaviours?

4.1 Introduction

The qualitative and quantitative differences in book sharing interactions across socioeconomic status (SES) groups, and their subsequent impact upon infant and child development have so far been established. This chapter will build on the previous findings in Chapters 2 and 3 by exploring whether mothers who do not naturally produce these book sharing behaviours, known to facilitate developmental advances, can be encouraged to adopt new strategies via a short intervention.

Chapters 2 and 3 identified a number of maternal verbal and non-verbal book sharing behaviours that were predictive of infant cognitive and linguistic development. These findings were consistent with previous research demonstrating that many of these behaviours are beneficial to both child and infant development. These chapters have further demonstrated that some mothers produced more of these positive behaviours than others, and thus give a more enriched book sharing interaction with their child or infant. Typically, these positive behaviours were more likely to be observed in high SES mothers than by low SES mothers. Additionally, high SES mothers spent longer interacting with their child overall during book sharing than low SES mothers. As these positive book sharing behaviours predicted infant cognitive and language abilities in Chapter 2, low SES infants and children could be described as being less school ready than their high SES peers. The aim of this chapter is to investigate whether a mother's style of interaction with her infant or child during book sharing can be enhanced to include more positive behaviours, with the intention of subsequently improving school readiness. This chapter will describe the development and

evaluation of an intervention that aims to encourage positive book sharing behaviours. To begin with, the theoretical approach and previous attempts at enhancing interaction via intervention will be reviewed. This will be followed by details of how the intervention was devised, based on this evidence.

4.1.1 Theoretical approach

Before considering the evidence, it is worthwhile to emphasise this is a parent-focused approach to intervention. Sheridan, Marvin, Knoche and Edwards (2008) highlighted the importance of making parents school ready rather than children, suggesting that parents are the essence to their children's success. The authors developed a model that considers the parent as central to providing an enriched early learning environment and thus emphasises the need to make parents more aware of what is important in their child's development to make them more developmentally advanced. Much research over the last few decades has promoted parents' awareness of their input and stimulation of their children, rather than focusing on children directly in this younger preschool-aged sample (Huttenlocher et al., 1991; Karrass & Braungart-Rieker, 2005; Rowe et al., 2008; Rowe, 2012).

Furthermore, the evidence reviewed and the study in this chapter take a Vygotskian approach to intervention. Vygotsky (1978) proposed that children develop over time with the assistance and guidance of a more capable partner. Vygotsky's social constructive theory suggested that children need a supportive learning space where they can co-construct new knowledge that involves a transition in their current knowledge and beliefs to fit with what they learn alongside their partner. The zone of proximal development suggests that children need scaffolding from a more knowledgeable other to reach their potential that is more advanced than their potential alone. Much of the evidence exploring the impact of book sharing on children takes a Vygotskian approach, implicating children as learning through mothers being

sensitive to their children and providing learning opportunities through spoken words, pictures, and non-verbal cues to guide them (Fletcher & Reese, 2005).

4.1.2 Interventions involving mothers' verbal behaviours

Interventions to-date examining mothers' book sharing behaviours will be reviewed. Two types of evidence will be considered. The first takes a parent-focused approached, aiming to enhance the mothers' skills to become a more knowledgeable partner for their child to learn from, and the second takes a child-centred approach which aims to target children directly. Interventions aiming to encourage the use of a specified maternal behaviour during book sharing have to some extent demonstrated their effectiveness.

Aram, Fine and Ziv (2013) successfully increased parents' use of speech relating to a book's plot and socio-cognitive themes with their children between 40 and 65 months. Additionally, the children's speech increased as a result of the intervention . There were two conditions; the intervention and the control groups, in which all dyads received one book per week for four weeks, and were instructed to read the current book four times during that week. The intervention consisted of a one-and-a-half-hour workshop where parents were given a thorough background into why reading is important and what qualities during book sharing are beneficial to their child's development. This group also attended a second workshop two weeks later, and were visited by a researcher once a week at their home. Parents in the intervention group were given instructions on how to read to read the book progressively with their child; first, to focus on the plot of the story only and, on second read, to focus on the characters' thoughts, desires, intentions and emotions. In the third read, parents were told to relate the story back to their child; specifically, how they would feel if it was them in the story. In the fourth, they were advised to encourage the child to take the lead in explaining the story. After each read, children completed a task which related to the parents' focus

during that session. In the control group, parents were still visited by the researcher in the home at the same frequency but not given any instructions on how to read the book. Each dyad was filmed before and after, and the results indicated a significant effect of the intervention, with parents and children referring more to the plot and socio-cognitive themes in the intervention than the control dyads. Also, children in the intervention referred more to mental states when telling the story in the fourth read than control children did. This demonstrates that parents are amenable to change when instructed on book sharing techniques. While the results were positive, this intervention is considerably resource intensive as it spanned several weeks and included home visits, making this an impractical intervention to deliver on a wider scale. Furthermore, this intervention targeted parents of children aged four, and it is questionable whether the same approach would be as effective for parents of younger children.

Studies have also demonstrated improvements in book sharing interactions with younger samples where the child has been targeted rather than the parent. Kucirkova et al. (2014b) demonstrated the effectiveness of personalising a children's storybook on their spontaneous speech. Children aged between 17 and 56 months were read a storybook by a researcher that had been personalised beforehand with information received from parents. The storybook was devised on an individual basis to include a section that was not personalised to the child, and a section that was personalised to the child. To ensure consistency across the personalised and non-personalised scenarios, the content was matched so the picture depicted the same scenario depicting the child's favourite things. However, these either included a picture of the child (personalised) or an unknown child (non-personalised). The book content referred to a typical day, including routines the child was familiar with, but the individual aspects, such as the type of breakfast cereal, specific to each child. The results showed, firstly that the duration of the personalised section of the book was significantly longer, illustrating

a threefold increase. Secondly, after taking into consideration the unequal durations, children's speech increased in the personalised compared to the non-personalised sections, specifically children's use of self-references, questions and corrections.

In a second study by the authors, Kucirkova et al. (2014a) examined the impact of personalised aspects of a storybook on preschool children's word acquisition. Children, aged between 35 and 56 months old, were read a storybook that contained personalised and non-personalised section twice, one week apart (designed as above in Kucirkova et al. 2014b). These books contained two sets of four target words which the children did not know the meaning of, and these were systematically varied in their placing to either the personalised or non-personalised sections. After each reading session, the children's understanding of these words was assessed as part of a series of tests the children received, and their understanding had also been assessed immediately before the second reading. The results revealed that there was a significant effect of personalisation on the target words being acquired by the children, meaning that the children learnt more of the target words in the personalised than the non-personalised section. This research indicates that personalising a storybook to a child has a positive impact on both children's speech and word acquisition. Interestingly, the sample was recruited exclusively from a preschool at a higher education institute and was reported as consisting of middle-income families, and this may have impacted upon the findings.

Findings reported in Chapter 2 indicated that low SES parents were less likely to engage spontaneously in personalisation when reading with their child, and that personalisation significantly predicted infants cognitive and linguistic outcomes. While there are clear benefits of providing children with bespoke, personalised texts, this again presents a resource intensive intervention that would be difficult to implement in the community. Alternatively, if parents could be encouraged to personalise book sharing by making references between a book's content and the child's own experiences and preferences, this could be applied to any

text. Furthermore, this evidence, whilst informative, takes a child-centred approach that does not target the core mechanisms that need to be addressed to break the cycle of a less enriched dyadic interaction. In contrast, a parent-focused approach aims to facilitate mothers' behaviours with her child. The present study will explore whether it is possible to increase parent's use of personalisation via intervention.

Another parent-focused method that has a large evidence base considers the effectiveness of dialogic reading strategies on young children (Mol et al., 2008). Hueber and Meltzoff (2005) examined the effect of encouraging the use of dialogic reading on parent's use of these behaviours and their child's speech during book sharing, with children aged between two and three years old. Using an intervention design, 95 families were assigned randomly to one of three dialogic reading conditions, and 30 additional families were assessed as a control condition, before taking part in an intervention condition (self-instructed with telephone follow-up), using a within-subjects design. The control condition was used to assess the level of dialogic practices that occur naturally without intervention before being allocated to an intervention condition. In each of the three intervention conditions, two eight-minute videos were viewed across eight weeks. The videos encouraged dialogic practices described to decrease parents verbal input and increase children's verbal input. The recommendations included reducing; reading without the child's involvement, asking questions which the response would be a pointing gesture or a yes/no answer, and negative feedback. The behaviours suggested to be increased were; children's involvement in the book reading process, 'what' questions, questions which require complex answers about attributes and meaning, positive feedback, repetition, imitation, and following the child's lead.

In the first of the three dialogic conditions ('*named in-person instruction'*), parents met with a trainer who first gave an introduction and showed parents the first video. Next, parents tried the practices they had seen (described above) and feedback was given by the trainer on the

parent's use of these with their child. This group were also asked to practice these new techniques every day for four weeks before the second session. In the second session, following the format of the first session, parents were taught more advanced techniques, including seeing the second video. In the second intervention condition ('*self-instruction with telephone contact'*), parents were shown the same two videos to promote dialogic reading practices, and were contacted twice by telephone to ask if they had any questions. These phone calls were four weeks apart to mirror the contact in the first condition. The third intervention condition consisted of parents receiving the two videos, however with no contact with the researchers, ('*self-instruction only'*). The findings revealed that the ratio of desirable (those identified to facilitate dialogic practices) to undesirable dialogic book sharing behaviours (those identified to prevent dialogic practices) significantly increased in favour of dialogic book sharing techniques in all intervention conditions. The control condition illustrated that low levels of dialogic practices are observed naturally without intervention. Additionally, children's speech increased during book sharing. The results further showed that the instruction type did have an impact on the ratio of behaviours, with the in-person condition being the highest in dialogic ratio, but this did not quite reach significance. This illustrates that parents can be encouraged to use new behaviours during book sharing successfully.

Whilst dialogic techniques clearly provide an enhanced learning experience for children, Mol et al. (2008) states that dialogic strategies are not as effective in facilitating language in all samples. More specifically, in a review of this book reading strategy that included sixteen studies and over 600 participants, Mol and colleagues highlight the lack of impact on outcomes measures in at-risk low SES samples. The authors suggested that the techniques that are required for parents to take on are too complex for their understanding based on their educational background. The authors further raise the issue that the techniques do not appear

to be consistently effective across all aged children, with the samples aged between two and six years old. The authors also criticise the lack of information provided and control regarding the intervention and control groups, thus there is a clear need for an intervention that is suitable for both low-SES samples and younger children.

4.1.3 Targeting non-verbal behaviours

Existing book sharing interventions have almost exclusively targeted verbal behaviours (such as personalisation, use of questions etc.), yet book sharing is a rich context for eliciting nonverbal interaction, including pointing and co-ordinated joint attention. As demonstrated in Chapters 2 and 3, parents of infants and children use deictic and other gestures spontaneously to establish attention and to guide the interaction. These nonverbal behaviours were found to correlate with mothers' MM perceptions, speech types, positive reengagement strategies, as well as infants' gesture, eye gaze, disengagements, and cognitive and linguistic abilities, demonstrating their importance in this context.

Pointing gestures encourage joint attention and make object-labelling mapping easier for infants (Tomasello & Farrar, 1986). Pan et al. (2005) found that when comparing mother-infant interactions across a range of activities, dyads who chose to book share for longer also pointed more. This suggests that mothers found pointing to enrich the book sharing interaction. To support this, robust evidence demonstrates that maternal gestures increase infant gesture, which facilitate infant language abilities (Rowe & Goldin-Meadow, 2009a).

Research has begun to consider the impact of encouraging mothers to gesture with their children in contexts outside of book sharing, yielding some positive findings to suggest that enhancing gesture (specifically pointing) during book sharing episodes could benefit the interaction. LaBarton and colleagues (2015) examined the impact of encouraging infants to point on child verbal abilities, directly measuring infant gesture use after a lab-based

intervention. The intervention consisted of three conditions where the use of gesture was manipulated; with both the experimenter and child pointing (after instruction from the experimenter), only the experimenter, or neither pointing. The task consisted of the experimenter labelling a picture and the experimental manipulation (type of gesture use as described above). All conditions were accompanied by identical experimenter speech. The infants' spontaneous use of gesture with their caregiver was then measured in a separate interaction. To ensure infant gesture differences could be detected after intervention, baseline measures of infant gesture with their caregiver were taken. Results showed that those infants who were instructed to point produced more meanings in gesture during the intervention trial as well as afterwards with their caregiver than prior to the intervention. Additionally, a follow up experiment illustrated that the increase in gestures that resulted from experimenter instruction led to larger vocabularies in those infants. These findings illustrate the impact of gesture on infant language, so much so that by simply increasing infant gesture infants' vocabulary consequently increased. These findings, alongside previous research demonstrating that mothers gesturing predicts infant gesture (Rowe et al., 2008), suggests that maternal gesturing could encourage infant gesture and impact infant language abilities. Thus, examining whether encouraging mothers to gesture during book sharing, as this chapter aims to, is valuable to future research.

LeBarton and colleagues (2015) highlighted that measuring the increase in the target behaviour (gesture) is essential to ensure their effectiveness on the outcome (vocabulary). Thus, measuring whether a target behaviour is performed allows an understanding of what is driving a change or a lack of change in outcome measure. Previous research reporting no change in a desired outcome, may not have measured the change in the target behaviour thus reporting inaccurate findings.

4.1.4 Summary

A number of book sharing interventions have been reviewed and, while these offer promising results for enhancing the quality of parent-child interaction and child outcomes, there are limitations in their scope. As highlighted in a review by Mol et al (2008), dialogic reading interventions are not effective for children at risk of language or literacy delay. Furthermore, this technique has been designed for and tested on children aged two and above. Whilst evidence also supports gesture use to advance vocabulary (Rowe & Goldin-Meadow, 2009a), book sharing interventions to-date have not incorporated gesture. This study aims to begin to address these gaps in current research. An intervention was designed to be suitable for lower-SES samples and for infants. Additionally, it was deemed important for the intervention to be simple and easy to administer, requiring few resources. Based on the findings from Chapters 2 and 3, the intervention targeted the following verbal and non-verbal behaviours; labelling, descriptive and personalised elaboration, infant-direct questions, emotion-related speech, cognitive MST, preference and desire based MST, labelling with sounds, and declarative and symbolic gestures. To assess the extent to which it was possible to change mothers' behaviours via the intervention, pre- and post- intervention measures of book sharing were taken and compared.

4.1.5 Development of the book sharing intervention

While a low SES sample was viewed as the most appropriate to benefit from the intervention, this population is difficult to recruit. While attempts were made to recruit from lower-SES samples, interested mothers from other SES samples were permitted to take part too. The target age for the intervention was between birth and 45 months old. By ensuring no child was over 45 months old, none of the children would have entered formal schooling, such as nursery, which may have added unexplained variation into the book sharing. For example,

nurseries may promote book sharing and monitor this. This study was designed to focus on maternal book sharing behaviours, and not the children's behaviour, hence no restrictions were set on the lower age limit of the child. Mothers and their children needed to be English speaking, and no other requirements were established.

The design was chosen as the most achievable and most appropriate for the research question and the time constraints given by the programme of this research. Whilst other designs could have provided a more rigorous understanding of the impact of these behaviours on the findings such as a randomised control trial (RCT), and a latin square design for assigning the books to the mothers, these were not viable design options in the scope of the remainder of the PhD programme. These designs would have required a larger sample, more testing and more preparation for each condition, thus increasing recruitment, design and delivery time. Thus, a non-experimental design was used which limits the conclusions that may be drawn from the study, however was most appropriate for this study, which primarily aimed to explore whether encouraging mothers to use new book sharing behaviours would be feasible.

A within-subjects design was chosen to allow for change within individuals to be observed. The intervention was delivered on a one-to-one basis to ensure mothers fully understood the instructions and had the opportunity to ask any questions. This approach has been found to be the most effective in previous research (Hueber & Meltzoff, 2005). Video-clips were selected to supplement the intervention that modelled the targeted behaviours. These were taken from videos of dyads who completed the study in Chapter 2 (with permission). It was deemed important to ensure that the intervention was not costly in terms of time or other resources. As such, the total contact time was less than one-hour, presenting an intervention that could be easily delivered by health visitors or children's centre workers.

Because the study aimed to recruit lower SES mothers, attrition was a concern. The evaluation was therefore designed to be as brief as possible to maximise adherence to the study. Three weeks was deemed the shortest length of time to deliver and correctly assess the effect of intervention. To evaluate the effectiveness of the intervention, dyads were filmed at pre-test and post-test for the target behaviours to assess changes in mother behaviours. It was predicted that mothers' verbal and non-verbal book sharing behaviours targeted by the intervention would increase after the intervention compared to before the intervention.

4.2 Method

4.2.1 Participants

A sample of 24 mother-child dyads was recruited opportunistically via local children's centres and social media adverts[2]. This was the feasible sample size in the time restrictions given by this programme of research. Child age ranged from 5.47 to 43.60 months (M = 21.81 months, SD = 10.91), with 71% aged two years or below. There was a near equal gender split (54% female). The majority of mothers were aged 21-25 (50%), 21% aged 26-30, 8% aged 31-35 and 21% aged 36+. Low SES mothers were the target sample for intervention, thus the geographical areas considered for recruitment where mindful of this requirement. As a result, 71% of the sample were low SES, with a SES score below 37 (Hollingshead, 1975). SES scores were defined as low SES using an equal split of the potential range of scores obtainable on the Hollingshead measure (Hollingshead, 1975). Participant's SES scores (Hollingshead, 1975) ranged from 8 - 66 (M = 33.50, SD = 14.93). All mothers were fluent in English.

[2] An a priori power analysis was conducted using G*Power, with an effect size estimate of 0.25, and power of 0.70 with 2 groups. The required sample size was 106 mother-child dyads.

4.2.2 Design

To evaluate the effectiveness of the intervention, a within-subjects design was employed. The intervention was delivered over three weeks:

- *Week one (pre-intervention):* Baseline measures of language and home environment and videotaped observation of book sharing.
- *Week two (intervention):* Videotaped observation of book sharing (as per week 1), followed by delivery of intervention.
- *Week three (post-intervention):* Measures of language and home environment and videotaped observation of book sharing (with additional, novel book).

Dyads were filmed at week 2 before the intervention took place. This provided a control comparison for the dyads, such that their behaviours at week 2 could be compared to week 1, and would account for any improvements that occurred over the period of one week not due to the intervention. It was predicted that there would be no significant differences in behaviours from week 1 to week 2, but that there would be significant improvements from week 2 to week 3. A third book was introduced to examine mothers' ability to generalise their acquired knowledge and techniques to a new book.

The independent variable was the time point of the intervention (with three levels: weeks 1, 2 and 3). The dependent variables were maternal behaviours produced during book sharing (N = 11), measured in seconds and also as frequencies, maternal influences (STIMQ, number of books, bedtime stories and reading frequency), and infant development (CDI, GAPP). Raw data and proportion scores for the book sharing behaviours were analysed, due to the additional novel book being introduced at week three (potentially influencing the overall duration). Proportion scores were used to take account of an increase in book sharing. Participants' SES scores were calculated using the Hollingshead Index (Hollingshead, 1975)

and participant scores were separated into two categories based on the possible range of scores. It was predicted that the duration and frequencies of each the maternal behaviour targeted by the intervention would increase after the book sharing intervention, more specifically; labelling, labelling with sounds, descriptive and personalised elaboration, infant-directed questions, emotion-related speech, encouraging autonomy, cognitive and desire/preference MST, and declarative and symbolic gestures.

4.2.3 Materials

4.2.3.1 Picture book stimuli

At all three visits, mothers were given the same two original wordless picture storybooks used in the previous studies (described in Chapter 2). Mothers were also given a third wordless picture storybook called 'Babysitter' by Annie Kubler (see Appendix N) at the final visit only. This book illustrates the story of a young girl who performs a number of activities with her babysitter before going to bed and her parents return. This book was comparable for the number of pages to the original books, all books contained colour, were the same size and felt the same to touch. They depicted similar ideas throughout with the main themes being: eating and drinking, playing with toys, waving, reading books, going to bed, putting clothes on, going to the toilet, and brushing teeth. The babysitter book, however had the following differences: contained the child and an adult in most pictures (rather than just the child), had more detail (often more in the background), included a few more ideas (such as stairs, musical instruments, going to the toilet, and hiding). This book was used to explore whether mothers would be able to decontextualize their newly learnt behaviours and apply them to a novel book.

4.2.3.2 Intervention

The intervention was delivered either in the participant's home or in a room in their local children's centre. Each participant received the intervention on an individual basis, with only the participant and her child present. First, the researcher gave a detailed description of some of the behaviours mothers could use during book sharing and explained their importance to their child's future development (see Appendix L for more detail). During this visit, mothers were given a copy of the two books which they had used in the previous sessions. However, these now included additional prompts on each page that corresponded to the target behaviours (intervention books; see Appendix M). Mothers were asked to look at these with their child as frequently as possible before the next visit one week later. An example of a prompt is *"Can you talk about a time your child went on a car journey?"* alongside the picture of the car (see Table 4.1 for examples of how the prompts were designed to elicit the target behaviours). Mothers were then shown three videos (total duration 12 minutes 50 seconds) using a laptop which depicted several short clips of three separate dyadic book sharing episodes to model the behaviours described by the researcher. These videos contained dyads (that were unknown to the participants) looking at the original books (with pictures and no prompts) providing an enriched interaction. The researcher paused these videos to talk through each of the behaviours observed at every break in maternal speech, and detailed the speech types and gestures the mothers displayed (see Appendix L for more detail).

Table 4.1: Examples prompts used in the books for each target book sharing behaviour.

Target Behaviour	**Prompt**
Labelling	Can you talk about each picture with your baby to each picture and ask your baby what it's called?
Descriptive elaboration	What will the boy do next?
	Where do you think they are going?
Declarative gesture	Can you point to each picture and ask your baby what it's called?
Symbolic gesture	Here is the action for duck (illustration of gesture)
	Let's brush our teeth.
Infant-directed questions	What is the boy doing?
	What noise does the duck make?
Personalised speech	Where are your shoes?
	Can you talk to your baby about a time when they went on a car journey?
MST	Mmmm banana, do you like bananas?
	Does your child like books?
Emotion-related speech	Do you think the bear looks happy?
Labelling with sound	What noise does the dog make?
	What noise does the cat make?

4.2.3.3 Book Sharing Coding Scheme

The video-recordings were coded using the Observer XT for the mothers' verbal and non-verbal behaviours define in the coding scheme. The reliability of the coding scheme was checked independently by a second coder. Inter-rater reliability was conducted on ten percent of the videos (n = 5). For each behaviour the intra-class correlations (ICCs) and confidence intervals (CIs) are reported below (see Table 4.2).

Mothers' Behaviours

Type of maternal speech

Many of the mothers' speech types that were coded are as per those described in Chapter 2 and 3 (please see sections 2.2.3.2 and 3.2.3.2.for further descriptions). Maternal utterances were coded as durations in seconds and as one of the following; (a) *labelling,* (b) *descriptive elaboration*, (c) *personalised elaboration*, (d) *labelling with sounds*, (e) *encouraging autonomy*, (f) *emotion-related talk*, (g) *infant directed questions*, (h) *other*. Mothers' mental state talk was coded as frequencies and as either; (a) *cognitive*, or (b) *desires and preferences*. Maternal gestures were coded as frequencies and as one of the following; (a) *declarative*, or (b) *symbolic*.

Table 4.2: Intra-class correlations (ICCs) and confidence intervals (CIs) for coding reliability across two independent coders for maternal book sharing behaviours.

Maternal Behaviour	**ICC**	**CI**
Labelling	.79,	-2.24, .99
Descriptive elaboration	.82,	-1.74, .99
Personalised elaboration	.94,	.12, 1.00
Labelling with sounds	.86,	-1.14, .99
Encouraging autonomy	.95,	.16, 1.00
Emotion-related talk	.85,	-1.39, .99
Infant-directed questions	.98,	.67, 1.00
Cognitive MST	.75,	-2.86, .98
Desire and preference MST	.97,	.47, 1.00
Declarative gesture	.95,	.15, 1.00
Symbolic gesture	.98,	.72, 1.00

4.2.3.4 Cognitive and Demographic Measures

Chapter 2 provides a full description of the following measures detailed below (see section 2.2.3.3).

Oxford Communicative Developmental Inventory (CDI)

The receptive and expressive vocabulary of children was measured through maternal self-report using the CDI (Hamilton et al., 2000).

Gestures, Actions and Pretend Play (GAPP) checklist

Children's gesture, actions and pretend play were measured via maternal self-report using the GAPP checklist (Fenson et al., 1994; by Zammit & Schafer, 2011).

STIMQ Cognitive Home Environment

The amount and types of home stimulation available to the child in their home was measured through maternal self-report using the STIMQ (Dreyer et al., 1996).

The Wellcome Language and Reading Project Questionnaire

Home literacy was measured using the Wellcome Language and Reading Project Questionnaire (developed at the University of York). This allowed a more detailed understanding of mothers' book use with their children. For this study, only one aspect of this questionnaire was of interest; specifically, the number of bedtime stories mothers read to their children.

4.2.4 Procedure

Week 1 (pre-intervention): At pre-test, dyads were filmed participating in a book sharing activity, either at home or in a room at their local centre. Mothers were asked to look at the

wordless picture books with their child as they would normally or however they felt comfortable doing so. The dyads were given the two picture books and were filmed by the researcher with no one else present in the room. Mothers were asked to look at both books, and once they had completed this, they were asked to look at one of the books again so that three books were read in total. There was no time limit set as it was of interest to measure the spontaneous duration of the book sharing episode. Mothers also completed the questionnaires at pre-test.

Week 2 (intervention): Mothers were visited one week later and dyads were filmed for a second time looking at the original books (three books were read in total). After the book sharing episode, the intervention was delivered to the mothers (as described in the materials section and Appendix L).

Week 3 (post-intervention): One week later at post-test, dyads were filmed looking at the two original books once, as well as a new third book (called 'Babysitter'), and mothers completed the questionnaires again.

Due to mothers being given an additional book in week three, resulting in three books rather than two, an attempt to control for differences that could affect the book sharing duration had to be made. Thus, at week one, once mothers had looked at the two books, they were then asked to look at one of these books again to account for this difference.

4.3 Results

Preliminary analyses for book sharing behaviours pre- and post-intervention (week one and week three) will be presented. Subsequently, differences in book sharing duration from week 1 to week 2 are considered. Due to time restraints, it was not possible to code the full range of behaviours at time 2, thus duration is used as a proxy measure of the interaction. This is

followed by analysing the differences in book sharing behaviour as a result of the intervention, illustrated by analyses of maternal behaviours from week one and three for raw data, followed by proportion scores. Finally, maternal background factors and child developmental measures will be analysed for differences from week one to three.

4.3.1 Preliminary analyses

Maternal book sharing behaviours at week one were examined for their normality. These analyses indicated that many of the book sharing behaviours were not normally distributed (Table 4.3).

Table 4.3: Descriptive statistics and normality (Sharpiro-Wilk Test) of maternal behaviours produced during book sharing at week one (pre-intervention) ($N = 24$).

Behaviour	**Mean (*SD*)**	**Range**	**Normality**
Overall book reading duration	386.14 (*134.49*)	440.36	.169
Labelling duration	67.20 (*30.34*)	106.77	.497
Infant-directed questions duration	103.83 (*77.77*)	335.49	.116
Encouraging autonomy	16.65 (*18.63*)	64.60	.001**
Descriptive elaboration duration	40.50 (*28.56*)	108.87	.138
Personalised elaboration duration	14.31 (*14.84*)	64.80	.001**
Emotion-related speech duration	.06 (*.27*)	1.33	<.001**
Labelling with sound duration	8.91 (*9.08*)	11.35	.003**
MST cognitive frequency	1.96 (*1.85*)	6.00	.007**
MST preference frequency	3.50 (*3.68*)	12.00	.002**
Not speaking duration	243.28 (*79.71*)	253.15	.094
Symbolic gesture frequency	2.75 (*3.45*)	12.00	<.001**
Declarative gesture frequency	27.88 (*28.94*)	131.00	<.001**

*p <.05, **p <.01

The normality of maternal book sharing behaviours for week three were also explored. Again, many of the book sharing behaviours mothers produced were not normally distributed (see Table 4.4) and therefore non-parametric tests were used for the overall analyses for differences in book sharing behaviours before and after the intervention.

Table 4.4: Descriptive statistics and normality (Sharpiro-Wilk Test) of maternal behaviours produced during book sharing at week three (post-intervention) ($N = 24$).

Behaviour	**Mean (*SD*)**	**Range**	**Normality**
Overall book reading duration	741.55 (*292.77*)	1001.49	.085
Labelling duration	202.00 (86.65)	382.24	.083
Infant-directed questions duration	171.34 (*98.07*)	354.27	.204
Encouraging autonomy	78.35 (*71.01*)	247.86	.007**
Descriptive elaboration duration	191.19 (*118.28*)	411.39	.035*
Personalised elaboration duration	98.98 (*60.10*)	191.73	.098
Emotion-related speech duration	8.96 (*9.24*)	31.40	.003**
Labelling with sound duration	21.61 (*17.43*)	64.10	.028*
MST cognitive frequency	7.96 (*9.22*)	43.00	<.001**
MST preference frequency	10.13 (*7.46*)	28.00	.138
Not speaking duration	361.37 (*146.30*)	530.49	.083
Symbolic gesture frequency	11.33 (*11.61*)	41.00	.001**
Declarative gesture frequency	73.67 (*52.64*)	164.00	<.001**

*p <.05, **p <.01

The overall book sharing duration at time one (see Table 4.3) indicates a normal distribution. Analysis of the normality of the book sharing duration at time two (control week) was also examined and revealed a non-significant difference, $p = .096$ (Sharpiro-Wilk Test), again illustrating a normal distribution. Therefore, the correlational analysis presented for the similarity in book sharing duration observed pre-intervention at week one and two will use a parametric analysis.

4.3.2 Differences in maternal behaviour before intervention

Increases in the durations of book sharing episode could be a consequence of being a participant in a research study rather than the intervention itself. To check this possibility, dyads were video-recorded on two separate occasions one-week apart before the intervention. A test-retest design was used to examined whether the duration of the book sharing episodes differed at week one (M = 386.14, SD = 134.49) in comparison to week two (M = 402.46, SD = 148.04), before the intervention occurred. A paired samples t-test revealed that there was no significant difference between the duration from week one and two, $t(23) = -.706$, $p = .488$, two-tailed. This illustrates there was not a difference in book sharing duration from week one to week two.

In comparison, interactions at week one were shorter and lower in quality to week three. A t-test showed that there was a significant difference in the total duration of book sharing from week one to three, $t(23) = 5.453$, $p < .001$, one-tailed.

4.3.3 Differences in maternal behaviour after intervention

Mothers' verbal and non-verbal book sharing behaviours were significantly different after the intervention at week three, in comparison to week one (see Table 4.5). Notably, all verbal and non-verbal behaviours measured were significantly different, as was the overall book sharing duration when considering the raw data.

To account for differences in duration, proportion scores were calculated for each verbal and non-verbal behaviour relative to the overall duration of each of the book sharing interactions for each dyad. These proportional scores were then examined for change before and after intervention. The results indicate that the proportions of each verbal and non-verbal behaviour significantly increased as a result of the intervention (see Table 4.6).

Table 4.5: Mean, median and Wilcoxon analyses for differences in raw scores of maternal book sharing behaviours at week one and three (*N* = 24).

	Mean (*SD*)		*Mdn*		
Maternal Book Sharing Behaviour	**Week One**	**Week Three**	**Week One**	**Week Three**	**Sig.**
Overall book reading duration	386.14 (*134.49*)	741.55 (*292.77*)	364.15	679.63	**<.001****
Labelling duration	67.20 (*30.34*)	202.00 (*86.65*)	67.19	195.12	**<.001****
Infant-directed questions duration	103.83 (*77.77*)	171.34 (*98.07*)	39.87	165.07	**<.001****
Encouraging autonomy	16.65 (*18.63*)	78.35 (*71.01*)	9.78	65.15	**<.001****
Descriptive elaboration duration	40.50 (*28.56*)	191.19 (*118.28*)	35.02	164.09	**<.001****
Personalised elaboration duration	14.31 (*14.84*)	98.98 (*60.10*)	12.31	88.03	**<.001****
Emotion-related speech duration	.06 (*.27*)	8.96 (*9.24*)	.00	8.13	**<.001****
Labelling with sound duration	8.91 (*9.08*)	21.61 (*17.43*)	5.47	18.49	**<.001****
MST cognitive frequency	1.96 (*1.85*)	7.96 (*9.22*)	2.00	6.50	**<.001****
Symbolic gesture frequency	2.75 (*3.45*)	11.33 (*11.61*)	1.00	7.00	**<.001****
Declarative gesture frequency	27.88 (*28.94*)	73.67 (*52.64*)	16.00	53.00	**<.001****
MST preference frequency	3.50 (*3.68*)	10.13 (*7.46*)	1.50	8.50	**.001****
Not speaking duration	243.28 (*79.71*)	361.37 (*146.30*)	228.41	329.63	**.003****

*p <.05, **p <.01

Table 4.6: Mean, median and Wilcoxon analyses for differences in proportion scores of maternal book sharing behaviours at week one and three ($N = 24$).

Maternal Book Sharing Behaviour	Mean (*SD*)		*Mdn*			
	Week One	**Week Three**	**Week One**	**Week Three**	**Sig.**	**Effect size**
Labelling duration	.17 (*.06*)	.28 (*.07*)	.16	.30	**<.001****	**.61**
Infant-directed questions duration	.12 (*.06*)	.23 (*.09*)	.11	.22	**<.001****	**.60**
Encouraging autonomy	.04 (*.04*)	.09 (*.06*)	.03	.10	**<.001****	**.51**
Descriptive elaboration duration	.10 (*.06*)	.24 (*.08*)	.09	.24	**<.001****	**.60**
Personalised elaboration duration	.04 (*.04*)	.13 (*.06*)	.04	.12	**<.001****	**.61**
Emotion-related speech duration	.00 (*.00*)	.01 (*.01*)	.00	.01	**<.001****	**.52**
MST cognitive frequency	.00 (*.00*)	.01 (*.01*)	.00	.01	**.015***	**.35**
Declarative gesture frequency	.07 (*.08*)	.09 *(.04*)	.05	.08	**.019***	**.34**
Symbolic gesture frequency	.01 (*.01*)	.01 (*.01*)	.00	.01	**.021***	**.33**
Labelling with sound duration	.02 (*.02*)	.03 (*.03*)	.02	.03	**.023***	**.33**
MST preference frequency	.01 (*.01*)	.01 (*.01*)	.01	.01	**.046***	**.29**

*p <.05, **p <.01

4.3.4 Maternal influence and child developmental measures

Children's CDI and GAPP scores were significantly different from week one to week three (detailed in Table 4.5). Measures of maternal influence on the child's environment exemplify some differences as follows; a significant difference was observed in STIMQ scores from week one to three, but no other measures were significantly different (see Table 4.8).

Table 4.7: Mean, median and Wilcoxon analyses by week (pre and post intervention) for maternal and child variables.

Child Variable	**Mean (*SD*)**	***Mdn***	**Mean (*SD*)**	***Mdn***	**Sig.**
	Week One		**Week Three**		
CDI	451.57 (*411.47*)	303.00	474.30 (*408.08*)	361.00	**.005****
GAPP	41.17 (*19.38*)	47.00	43.65 (*18.37*)	49.00	**.018***
Maternal Variable					
STIMQ	31.13 (*6.29*)	31.00	32.47 (*5.99*)	31.00	**.046***
Number of infants books in the home	31.63 (*31.31*)	20.00	37.60 (*36.36*)	21.00	.109
Maternal reading frequency to infant per week	4.91 (*2.33*)	5.00	5.24 (*2.23*)	7.00	.141
Number of bedtime stories	1.00 (*1.09*)	1.00	1.17 (*1.15*)	1.00	.102

*p <.05, **p <.01

4.3.5 Summary

- The intervention was associated with significant increases in all maternal verbal and non-verbal behaviours, including *labelling, infant-direct questions, descriptive and personalised elaboration, emotion-related speech, cognitive and preference MST, labelling with sound, encouraging autonomy, declarative gestures* and *symbolic gestures*. There was also a relationship between the intervention and children's performance scores on the CDI and GAPP, and mothers' home stimulation for her child (STIMQ).

4.4 Discussion

A sample of low SES mothers took part in a one-hour intervention aimed to enhance their verbal and non-verbal book sharing interactions with their young child. The intervention was associated with significant changes in mother's behaviours; they demonstrated higher frequencies or longer durations of all the behaviours targeted. These findings remained when proportional scores were calculated which took into account the increase in book sharing duration after the intervention. Mothers' book sharing interactions with their child were measured twice before intervention to ensure there were no significant changes in book sharing duration before the intervention, thus the changes in book sharing duration seen after the intervention were more likely to be due to the intervention. The results showed this to be true, with no significant differences in book sharing duration before intervention as measured at weeks one and two. Thus, this study has begun to address an important gap in existing interventions which failed to target infant samples adequately.

Additionally, scores on a measure of the home environment increased, suggesting that the intervention may have encouraged mothers to perform a higher frequency of stimulating experiences for their children in the home. However, this data was self-reported by mothers and could be an inaccurate measure of change. There was no increase in the number of books mothers reported reading at bedtime. Therefore, the intervention did not impact upon the mothers' reading frequency, but was effective in making them better informed in what they could do with the books that they were already looking at with their child.

While the small sample size limits the extent to which these findings can be generalised, the results are promising. This simple intervention, using an annotated picture book delivered in just one hour, was associated to enhanced quality of book sharing. Mothers were able to apply the principles to a novel picture book, further demonstrating the effectiveness of this

approach. Further research is required to evaluate the intervention in larger samples. Additionally, the evaluation should test longer-term outcomes to assess whether the behaviour change is long lasting and whether this has beneficial effects on child language outcomes.

Mothers reported their children as using significantly more words and gestures after the intervention. It is unlikely that this effect was driven by the intervention in such a short space of time. What is more likely is that mothers' perceived their children as being more cognitively able, noticing their children's communicative acts more after the intervention. Additionally, the time duration of the intervention was relatively short, and any developmental improvements are likely to have been very small. This may also have been due to the nature of continuous development and progression in abilities and may have occurred without the intervention.

This study has built upon previous intervention studies to include a comprehensive range of verbal and non-verbal behaviours that have been under-explored in previous book sharing interventions. The study also explores the applicability of the intervention to mothers with younger children than in previous book sharing interventions and shows that it is successful in this younger sample. Similarly, the intervention successfully targeted lower SES mothers and showed a relationship with changes in their behaviours, where other interventions have not always been effective (Mol et al., 2008).

The intervention provides a cost-effective, quick and easy to implement intervention, in comparison to previous interventions that have often been resource intensive, requiring weeks of training and numerous home visits. Thus, this study has wide spread applicability to be used across children's centres for little cost. The current Book Start initiative encourages mothers to look at books with their children, but does not provide guidance on how to

perform these activities effectively to ensure the child or infant benefits fully from this interaction. Previous research has suggested that giving mothers books is not sufficient to helping them know how to use them effectively (Kucirkova et al., 2010). This intervention would work well alongside Book Start ensuring mothers are prepared, understand what behaviours are appropriate and recognise the importance of book sharing at a young age.

Furthermore, this intervention demonstrates that mothers are willing to change their behaviours, thus their original lack of proficient book sharing techniques is likely to be due to a lack of knowledge and guidance of the importance of this activity and of appropriate techniques to use. This suggests that there is not currently enough resources and information available to mothers to facilitate effective book sharing interactions. Thus, current government initiatives to encourage book sharing are not as effective as they could be. With there being a large concern for children arriving at school below the expected standards of readiness, book sharing interventions should be more widely promoted and available to mothers. It is vital that the cycle of generational norms in low SES families are broken to facilitate infant and child development through book sharing (Hart & Risley, 1995). As already mentioned, mothers did adopt the newly learnt behaviours, and did not shy away from using them. Thus their knowledge and understanding of book sharing, possibly from family norms when they were children need to be developed. Future research could examine mothers' confidence and attitudes towards book sharing with their infants, to examine whether guidance and intervention would led to mothers feeling more positive and confident towards looking at books with their infants and children.

The current study built upon previous interventions, displaying many key differences. Interventions based on the dialogic approach have been successful with older children older children. However, this approach has not been used with younger samples and its effectiveness is limited with lower SES families (Mol et al, 2008). In comparison, the

intervention that mothers received in this study included guidance that was more direct, and this may have facilitated the change in behaviours more effectively. Furthermore, Mol and colleagues (2008) noted that the techniques in the dialogic approach were too complicated for lower SES mothers, thus the additional support given in this study, with mothers always having the books with prompts to remind and guide them, may have facilitated these changes. Additionally, short video clips with mothers modelling the target behaviours were shown to the mothers in this study further reinforcing how to put these behaviours into practice. Previous research has not always included video modelling, or has done so in place of the in-person intervention rather than to supplement it (Hueber & Meltzoff, 2005). This may have helped mothers process all the advice the intervention delivered.

Personalised storybooks have been used effectively for mother-child book sharing interactions to change child outcome behaviours (Kucirkova et al, 2014a). This method of personalisation, whilst effective, would be more difficult to perform on a larger scale due to the time personalising every book. The intervention delivered here would be much easier to conduct at a large scale, offering a viable solution. Similarly, research demonstrating the effectiveness of encouraging socio-cognitive behaviours to preschool aged children spanned over a number of weeks including several home visits (Aram, Fine & Ziv, 2013). This study provides an effective intervention to increase the same behaviours over a shorter time period, with less contact, demonstrating its cost-effectiveness to implement in comparison to alternative interventions.

The intervention led to increases in all the targeted maternal behaviours, although the impact on children's development could not be explored longitudinally. Based on previous research, these maternal behaviours have been shown to increase children's developmental abilities (Hughes & Dunn, 1998; Kirk et al., 2015; Laranjo, Bernier, Meins & Carlson, 2010; Meins, Fernyhough, Arnott, Leekham & de Rosnay, 2013; Ninio, 1980; Peterson & Slughter, 2003;

Reese & Cox, 1999). Increasing these maternal behaviours should lead to improved child outcomes, but research must first examine whether mothers continued to demonstrate the new behaviours over time. The stability in the mothers' change in behaviours must be assessed in order to make more informed predictions. If mothers' behaviours were not changed permanently, these developmental benefits would not be observed. Future research could trial the intervention to examine the long-term impact on maternal behaviour and attitudes towards book sharing and, consequently, the benefits to children's development.

Whilst the intervention led to increases in the targeted behaviours, there are points to consider when interpreting the impact of these findings. Most importantly, due to the non-experimental design no causality can be inferred from these results. Thus this intervention would need to be replicated using an experimental design to confirm these findings. Furthermore, introducing a new book in week three could have introduced a new source of variability which may have increased some behaviours due to the novelty of the book. To attempt to control for this the third book was as similar as possible to the original books in touch, look and content. However, this change cannot be completely disregarded and a latin square design when replicating this study experimentally should account for this.

Additionally, the intervention was effective when delivered on an individual basis, however to make it more cost-effective, it would need to be delivered in groups. Whilst this may not affect the outcome, this would need to be tested to ensure mothers still adopt the target behaviours.

Furthermore, due to the time constraints of this programme of research it was not possible to code maternal book sharing behaviours at week 2 (pre-intervention). Whilst the book sharing duration did not increase significantly before the intervention the content could have changed

and this has not been accounted for. Despite this, the book sharing duration did increase significantly after intervention, suggesting the intervention was successful.

Chapter 5: General Discussion

School readiness is paramount to enabling children to reach their developmental capacity throughout school, and this achievement continues as a parallel for life success (Allen, 2011; Johnson & Kossykh, 2008). When children arrive at school less able than their school-ready peers they often fall behind in their development, and this has been linked to negative life outcomes and crime (Allen, 2011). Children arrive at school varying largely in their levels of school readiness, and this has been raised persistently as a concern over many years (Ofsted, 2014; Thrive at Five, 2012). The underlying mechanisms responsible for children's school readiness have been identified as the early learning environment. The impact of the early learning environment influences children's verbal and non-verbal learning opportunities, thus underpinning their school readiness. Children with lower socioeconomic status (SES) backgrounds have been reported to receive less stimulating interactions with their caregivers in comparison to higher SES families. Parents with high SES backgrounds have been identified to provide a more enriched early learning environment for their children, which facilitates their child's developmental success at school entry and beyond (e.g. Hoff, 2003; Kiernan & Huerta, 2008). Book sharing is a primary early literacy learning activity that children partake in during the early years which is beneficial to their development (Fletcher & Reese, 2005; Topping et al., 2013) and this too is reported to vary across SES, both quantitatively and qualitatively (Bus et al., 1995; Ninio, 1983).

Book sharing is a key literacy based activity that predicts later literacy and language abilities (e.g. Scarborough & Dobrich, 1994). The behaviours mothers produce during book sharing have been explored more often in older children and in class-bound samples (Fletcher & Reese, 2005). Whilst interactional differences have been identified across SES groups in other contexts, this has been researched less extensively in young children and infants in a

book sharing setting, and without a socially diverse sample. The child's role in the book sharing interaction has also been overlooked in much of the literature. Research so far has not identified a comprehensive range of verbal and non-verbal behaviours that mothers and their young children and infants produce during book sharing, done so across a diverse SES sample, and examined the impact of these on linguistic and cognitive development. Furthermore, evidence suggests that few attempts have been made to change multiple aspects of the book sharing interactions between mothers and their infants before age two (Fletcher & Reese, 2005; Mol et al., 2008).

This thesis addressed the following research questions:

1) Are there differences in the quantity and quality of verbal and non-verbal behaviour during mother-infant book sharing as a function of SES?
   - *a.* Do infants' home learning environments differ across SES?
   - *b.* Does SES predict maternal background variables and book sharing behaviours? And if so, are maternal background variables related to the book sharing interaction?
   - *c.* Are infant book sharing behaviours associated with SES, and if so what features of mother-infant interaction during book sharing are associated with infant language proficiency and cognitive outcomes?
   - *d.* Are SES-differences in book sharing interactions stable over time?

2) Are there SES differences in the quantity and quality of mother-child verbal and non-verbal book sharing interactions at age four?
   - *a.* Does SES predict mother and child book sharing interactions, and are these differences associated with children's social and emotional skills?
   - *b.* Are SES-differences stable from infancy to childhood across two samples?

3) To what extent can book sharing be enhanced via a targeted intervention?

The findings for each question will be summarised and examined in relation to previous research. The impact of these findings will be discussed, considering the limitations of the research, and ideas for future research suggested.

5.1 Chapter Summaries

Chapter 2: Are there differences in the quantity and quality of verbal and non-verbal behaviour during mother-infant book sharing as a function of SES?

Chapter 2 was a longitudinal investigation exploring the impact of SES on book sharing quality, which examined both verbal and non-verbal behaviours when infants were 12 and 18 months old. Mothers and infants read the same two picture books at both ages of assessment and, at 18 months, infants' linguistic and cognitive abilities were assessed. This study addressed the gap in the literature by studying such a young sample, and considered a range of verbal and non-verbal behaviours that have been examined in older samples in both book sharing and other contexts. The study also considers these behaviours longitudinally, and assesses their impact on infant developmental abilities. Furthermore, this study considered whether the extent to which mothers viewed their infants as intentional agents (i.e. mind-mindedness) would predict the quality of the book sharing episode. A sample of 44 mother-infant dyads were observed for ten minutes in a book sharing context and were provided with two novel picture books, designed specifically for this study. Differences in mother and infant verbal and non-verbal behaviours were explored by SES. Mother's book related utterances were coded to include labelling, descriptive elaboration, personalised elaboration, emotion-related speech, infant-directed speech, labelling with sounds, encouraging autonomy, acknowledging, repeating and attributing meaning to infant utterances. Additionally, mind-mindedness was measured by coding mother's appropriate (AMRCs) and non-attuned (NAMRCs) mind-related comments. Infant verbalisations and disengagements

from the task were coded, as well as mothers' strategies to re-engage her infant's attention. Mother and infant eye gaze and gesture (symbolic, declarative and imperative) were also coded.

The results revealed that lower SES mothers spoke for less time and produced significantly fewer examples of the following speech types; *labelling, descriptive elaboration, personalised elaboration, emotion-related speech, infant-directed questions, labelling with sounds, and encouraging autonomy* than higher SES mothers. Lower SES mothers also produced fewer *symbolic and declarative gestures*, and were less likely to use *positive reengagement* strategies when their infant became disengaged with the task. Additionally, lower SES mothers were more likely to use reengagement strategies considered to be negative when their infant disengaged from the book sharing, including forcing their infant to reengage, or not trying to reengage them. Lower SES mothers also ignored their infants' utterances more frequently and spent more time in silence. Maternal self-report measures indicated that lower SES mothers read less frequently to their infants at home, had fewer books in the home, and generally scored lower on a measure of infants' home stimulation.

Maternal MM was observed to be significantly different during the book sharing episode, with low SES mothers producing fewer *AMRCs* and more *NAMRCs* illustrating differences in how mothers perceive their infants across SES backgrounds. MM was related to a number of maternal book sharing behaviours, including mothers' total speech and speech types, mothers' reengagement strategies and gesture. MM was also related to infant eye gaze and gesture use. When controlling for SES, the association between MM and book sharing behaviours increased concurrently at 12 and 18 months.

Dyads were revisited at 18 months of age and were filmed again, sharing the same picture books as the previous visit. Overall, lower SES mothers produced fewer positive verbal and

non-verbal behaviours than higher SES mothers, and lower SES infants produced more negative behaviours. The findings revealed that mothers from lower SES backgrounds produced less speech overall during book sharing and these contained fewer speech types. Lower SES mothers produced fewer examples of *labelling, descriptive and personalised elaboration, emotion-related speech, infant-directed speech, labelling with sounds, attributing meaning to infant utterance, and encouraging autonomy* than higher SES mothers. Lower SES mothers also produced fewer *symbolic and declarative gestures*, and when their infant disengaged from the activity, low SES mothers produced more reengagements that involved force than higher SES mothers. Lower SES infants also disengaged more frequently than higher SES infants. Lower SES mothers also read less frequently, and had fewer books in the home than higher SES mothers. Mothers' MM perceptions were also different across SES, with low SES mothers displaying significantly fewer AMRCs and more NAMRCs, signifying a difference in mothers' perceptions of their infant. Additionally, when controlling for maternal vocabulary, many significant associations between SES and book sharing disappeared, indicating the close relationship between SES and vocabulary ability.

The stability of book sharing interactions were measured longitudinally at 12 and 18 months. Behaviours were mostly stable over time for the mother and infant book sharing behaviours. Additionally, the learning environment remained stable. Behaviours that were not stable over time included; mothers' overall speech, infant-directed questions, and not speaking, which increased significantly over time. Mothers positive reengagements and NAMRCs were found to decrease over time.

Interestingly, mothers who reengaged their infant when they became disengaged more frequently used a positive strategy, which involved encouraging the infant to reengage themselves at 12 months, and their infants were disengaged significantly less at 18 months. High SES infants spent significantly less time disengaged overall during the book sharing

activity at 18 months in comparison to 12 months. However, low and mid SES infants did not differ significantly in their disengagement at 18 months compared to 12 months.

The infant's home learning environment, including the number of books in the home, the number of times mothers read to their infant and a measure of home stimulation where stable from 12 to 18 months. Thus, low SES mothers were reading fewer days per week to their infant and had fewer books in the home for their infant than high SES mothers.

Additionally, the effect sizes for SES on book sharing behaviours at Phase 1 and 2 indicate that the differences are getting bigger over time, suggesting that the magnitude of SES on book sharing is becoming larger.

To summarise, SES differences in the quantity and quality of the mother-infant book sharing interaction were substantiated. However, a number of additional intertwining variables were demonstrated to affect this relationship greatly.

Chapter 3: Are there SES differences in the quantity and quality of mother-child verbal and non-verbal book sharing interactions at age four?

The work conducted thus far identified a significant impact of SES on the way in which mothers interact with their infants in a book sharing context and this was found to be associated with cognitive and linguistic outcomes. It was of interest to determine whether the effect of SES would be similar at older ages when the nature of the book sharing interaction would naturally change as the child becomes verbal and more proficient in engaging with the task. Since this thesis is interested on the impact of early home literacy on school readiness, it was deemed important to consider the effects of SES in a pre-school sample. Given time limitations it was not possible to follow the same infants, and therefore a cross-sectional approach was taken to test hypotheses in a sample of three-year-old children. Thus, with little

known about these behaviours, and how they interact in an older preschool sample, the SES differences in dyadic book sharing were explored at 44 months in an older sample.

Chapter 3 addressed the gap in the literature by considering a larger scope of behaviours than in previous research and by examining their impact individually rather than as a group. In Chapter 3, book sharing behaviours were also considered in relation to how children's social and emotional functioning may influence the book sharing interaction, and was measured using the strengths and difficulties questionnaire (SDQ). Data was available from a pre-existing larger cohort study of mothers' book sharing with their children across SES backgrounds. A subsample of 46 dyads was selected randomly, and the coding scheme designed in Chapter 2 was applied with age-appropriate alterations. Maternal MM perceptions were no longer measured using AMRCs and NAMRCs in this older sample, and mental state talk (MST) was coded. A number of additional measures were available on the mothers and children, including previous measures of AMRCs and NAMRCs when this sample were eight months old.

The results illustrated that there were differences in the book sharing interaction in verbal, but not non-verbal domains for mothers and children. Lower SES mothers produced less speech overall and this speech was less complex than higher SES mothers. Lower SES mothers' speech demonstrated fewer examples of *cognitive MST, labelling, emotion-related speech, descriptive elaboration and infant-directed questions.* Additionally, Lower SES mothers spent less time in *silence*, and lower SES children *spoke* less.

Mothers from lower SES backgrounds produced fewer *AMRCs* (assessed previously when their children were 8 months old), and these were associated with children's SDQ scores at 44 months. The SDQ scores were predicted by SES and were negatively associated to the

following book sharing behaviours; mothers *cognitive MST and not speaking,* and children's *speech.*

In general, mothers who did not acknowledge their infants' own thoughts and feelings had children who scored higher on the SDQ three years later, indicating their social and emotional abilities to be underdeveloped, possibly to the extent that these were problematic. Children's SDQ scores were predicted by SES, with lower SES children scoring higher on SDQ. Thus, lower SES children were reported to be struggling with their social and emotions skills, had book sharing interactions that contained fewer *cognitive MST* references by mothers, had mothers who mothers spoke more and spoke less themselves. These are interesting associations, but it is important to recognise that these are not causal and do not link to developmental abilities.

When controlling for SES to consider the impact of both SDQ and AMRCs on book sharing behaviours, associations became stronger between these variables and book sharing behaviours. Additionally, the stability of book sharing behaviours from age one to four were examined. The findings demonstrated that mothers' verbal behaviours were most stable over time, but infant verbal behaviour and mother and infant non-verbal behaviour was not. Taken together, the findings indicate that there are distinct differences in maternal interactional style as a function of SES across infancy and at pre-school age. In particular, the following behaviours were identified to be produced significantly less frequently by low SES mothers compared to high SES mothers at all time points; labelling, descriptive elaboration, emotion-related speech and infant-directed questions.

Chapter 4: To what extent can book sharing be enhanced via a targeted intervention?

A number of intervention studies illustrate the effectiveness of encouraging mothers to implement certain behaviours during book sharing, but these have had little success with

younger samples and in low SES families (Mol et al., 2008). Interventions to-date are resource-intensive and span long durations, often weeks, and this methodology is difficult to implement, particularly with little access to appropriate samples, including low SES families.

An intervention was designed to encourage low SES mothers to use a range of verbal and non-verbal behaviours that were identified in Chapters 2 and 3 to be facilitative of children's development and observed less often in lower SES samples. The sample consisted of 24 dyads, child age ranged from 5.47 to 43.60 months, with 71% of children under two years and 71% representing low SES families (Hollingshead, 1975). The intervention was measured over three weeks, but the intervention itself was delivered to mothers in their homes in one hour. The intervention consisted of mothers being given verbal information regarding the importance of each of the target behaviour and what they entailed, followed by watching a video of three mothers naturalistically modelling these behaviours. Mothers were then given two picture books that were annotated with prompts for each of the target behaviours and were asked to use these over one week.

The intervention was associated with significant increases in all targeted behaviours, including labelling, infant-direct questions, descriptive and personalised elaboration, emotion-related speech, cognitive and preference MST, labelling with sound, encouraging autonomy, declarative gestures and symbolic gestures. The effect of the intervention on these book sharing behaviours were greatest in magnitude for labelling, infant-directed questions, and descriptive and personalised elaboration, with an effect of .60 or more. The intervention also increased maternal self-report scores on children's productive and receptive vocabulary, their gestures and play, and on mothers' scores for home stimulation experiences for their children.

5.2 Implications

Overall, lower SES mothers produced fewer positive verbal and non-verbal behaviours during book sharing than higher SES mothers. This supports findings by Peralta de Mendoza (1995) suggesting that mothers from lower SES backgrounds produce less infant-directed speech and that this speech was less enriched, including fewer elaborations. In comparison, Chapter 2 found that infants' vocalisations did not differ by SES, with very little vocalisations overall, which contrasts the findings of Peralta de Mendoza (1995). The sample in Peralta de Mendoza's study however ranged from 12 to 24 months old, thus the older children would have shown differences in utterances. Additionally, Chapter 2 found large differences in labelling during book sharing across SES, whereas Peralta de Mendoza (1995) did not. These findings further support previous findings that low SES mothers produce less speech and labelling (Ninio, 1980). In addition, Chapter 2 demonstrated differences in infant disengagement across SES, with low SES infants producing this behaviour more frequently. This adds to previous research suggesting that engagement impacts later literacy and language abilities (Crain-Thoreson & Dale, 1992; Dale et al., 1995). Research with pre-school aged children illustrates the impact of personalisation on children's speech production and vocabulary (Kucirkova, Messer & Sheehy, 2014a; 2014b). Thus, differences in a younger sample across SES provide further knowledge to understand the gap in development across different SES children.

This thesis examined the impact of a wide range of verbal and non-verbal behaviours which previous research had not taken into consideration. The results add to current knowledge, and are supported by previous research, suggesting that more complex interactions lead to larger developmental gains in language and comprehension skills (Aram, Fine and Ziv 2013; Haden, Reese & Fivush, 1996). Maternal MST is a later predictor of Theory of Mind abilities

(Adrian et al., 2007; Symons et al., 2005) which showed SES differences in this thesis. Personalised speech is also known to facilitate developmental gains and children's speech (Kucirkova et al., 2014a:b). However, it was not shown to differ across SES at such a young age.

Infant developmental abilities were directly assessed when infants were 18 months old, and low SES infants scored lower on the cognitive measure (Bayley's scale) as well as the language measure (PLS) compared to high SES infants. These findings are indicative of the scale of the problem in SES differences in infant and child developmental advances as young as 18 months old. Thus these gaps are apparent a long time period before children arrive at school.

An effective intervention was designed which was associated to mothers' increased use of positive book sharing behaviours. The intervention benefits from being cheap, requiring few resources and extremely quick to deliver. This intervention could be implemented in children's centres easily alongside the government initiative Book Start. These findings have addressed a gap in the literature, furthering knowledge of what intervention strategies are effective in younger infants and low SES samples. The intervention provides a viable alternative to assist low SES samples by professionals. Additionally, mothers all adopted the new behaviours with ease and with a positive attitude, suggesting that if these interventions are presented in the right way, mothers will seek the guidance to facilitate their knowledge and understanding of book sharing. The implications of these findings are that low SES mothers may not realise that they are hindering their infant or child by providing a less enriched book sharing interaction, as they do not know that their interactions are less enriched. Low SES mothers are likely to have experienced similar basic book sharing interactions as children and do not perceive that it is not the norm. Furthermore, there is not easy access to guidance and support for book sharing techniques thus mothers may feel

unconfident in their abilities and consequently avoid this activity with the infants and children until they start school.

The mechanisms that underlie the strong relationship found between SES and book sharing at a young age are vital and must be understood to enable them to be changed, and for low children to be made more developmental capable as are their high SES peers. Firstly, high SES mothers who are better educated and have higher employment statuses, are more likely to be competent readers, thus being more comfortable with the activity. Additionally, they are likely to value its importance more, understanding the importance of reading to advancing knowledge and consequently making an individual more valuable. These differences will lead to low SES mothers feeling less confident with books and undervaluing the need to look at books with their infants and children from such as young age. These beliefs then influence mothers actions, with high SES mothers prioritising making their infant as cognitively competent as possible, realising the long-term benefits and how capable their infants are to interact from a young age. High SES mothers are likely to realise the early learning environment is important to their child's learning and life outcomes. In comparison, low SES mothers may not realise the importance, understand that their infants need to learn before school, or understand how aware their infant is from a young age. Additionally, low SES mothers often have more stressful and chaotic lifestyles, with less time to dedicate to their children. Consequently, these factors must be considered and tackled in order for interventions and guidance to be effective in reducing gaps in infant and child developmental capabilities before schooling. Book sharing guidance and interventions must be informative and the techniques fully explained and modelled, as well as them being short for these low SES mothers to then easily deliver to their infant or child. Low SES samples are also difficult to engage thus promoting this as a campaign getting local and young youth workers involved

and trained to deliver may help alleviate low SES mothers feeling inadequate, or worried about being engaged with professional services.

5.3 Limitations

This thesis has addressed the questions it proposed, although there are considerations to note before overestimating the extent of the findings. Mothers were from a socially representative sample but, in Chapter 2, the number of dyads per group were not equal, and mothers from higher SES backgrounds were overrepresented compared to those in the mid and low SES groups. The task involved was literacy-based which may have discouraged lower SES mothers who are often less familiar with books, and may not yet have looked at books with their infants at 12 months old. Thus, this study consisted of self-selecting mothers, suggesting that the low SES mothers who did take part may have been different to those low SES mothers who did not show an interest. The nature of the research also involved being filmed, and whilst it was possible to source low SES mothers, many did not want to be filmed. Another constraint when recruiting lower SES dyads was that many of the mothers that attended Sure Start children's centres in more deprived areas were not English-born and did not speak English themselves, or did not speak English to their infants, thus did not meet the inclusion criteria for the study.

Increasing the low and mid SES sample sizes would have been beneficial but, based on the reasons given above, it was not possible in the time permitted for this programme of research. The data collection for this study involved visiting a larger number of children's centres across a wide geographical area to recruit mothers, often with no success and, after recruitment, further involved 78 home visits. Video coding then involved intensive coding for 42 behaviours at Phase 1 and 30 at Phase 2 for the 78 videos. Despite this consideration, the

findings from this study do show large differences across SES groups in dyadic book sharing interactions, with many effect sizes above .60, and some reaching .80.

There was a relatively large attrition rate from Phase 1 to 2 in Chapter 2, losing ten of the original 44 dyads. Every effort was made to contact mothers from Phase 1, although some mothers were unresponsive to emails or telephone messages whilst others declined due to time constraints after returning to work from maternity leave. When mothers were recruited at Phase 1, a follow-up study had not yet been planned and so they were not asked to commit to both time points when recruited.

When delivering the intervention in Chapter 4, the sample size again was small with only 24 dyads. The same difficulties were encountered when recruiting for this study, and involved a total of three home visits across three consecutive weeks for each dyad lasting between one and two hours each, and yielding a total of 72 videos to code. The time limits only permitted two videos per dyad to be coded fully, with the third video at week 2 being used to assess the stability of the dyads book sharing interactions, measuring the duration, before intervention. Despite the small sample size, significant effects were identified, with the magnitude of effect sizes reaching .60.

The book sharing interactions in Chapter 3 were videoed in a lab setting which may have affected the mother or child behaviours due to it being less naturalistic. However, in this setting the mothers were left alone in the room, which was set up to be comfortable with a sofa and children's table. The cameras were less intrusive and, by being fitted in the room, were less noticeable. This could have therefore made little difference to the child and mother, in comparison to the videos in Chapters 2 and 4 which involved the researcher filming the dyad whilst book sharing in the home.

Throughout the research presented in this thesis, there were multiple book sharing behaviours being measured and compared for SES differences. Thus, the chance of a Type 1 error could have been inflated. However, using Bonferroni corrections could have increased the chance of a Type 2 error due to the large number of behaviours being measured and subsequently not used for these analyses. This limitation must be recognised when considering the findings that have been presented.

5.4 Future directions for research

Low SES children arrive at school at a far less developed stage of readiness to learn than high SES children (Thrive to Five, 2012). Therefore, the relevance of this research is important and will contribute to current knowledge on the SES differences in early interactions. However, more concrete evidence is needed to understand these differences and to check the reliability of these findings.

Chapters 2 provides insight into the behaviours mothers produced during book sharing and how these impact on early cognitive and linguistic abilities. It would be beneficial to examine how these developmental abilities continue to change over time up to when children arrive at school, and how these relate to SES and the book sharing interactions. In Chapter 2, the small sizes were not ideal and this could also be better accounted for in a larger scale study.

Whilst Chapter 4 demonstrated an increase in the target behaviours, future research should examine the stability over time of these learnt behaviours to examine the longer-term effects on maternal behaviour. Similarly, conducting this study again on a larger scale, with adequate control groups, would allow the impact of the intervention to be further understood on children's developmental abilities.

Furthermore, a more in-depth understanding of the process that mothers experience by taking part in this intervention would allow researcher to better understand the mechanisms that are important for behaviour change in mothers. This is particularly important to ensure the effectiveness of such an intervention and what factors could affect its successful delivery. Questionnaires or focus groups asking mothers about what they regarded importance may provide useful insight for the future. For example, could the intervention be delivered in groups, or is this a key aspect to their understanding or recognising its importance? Similarly, would it be effective as an online resource that mothers could access freely?

5.5 Final summaries

Mothers and their children from 12 months to 44 months old showed significant differences in both verbal and non-verbal book sharing behaviours across SES backgrounds. The differences in many of these behaviours at 12 and 18 months predicted cognitive and linguistic abilities at 18 months. The findings illustrate that a book sharing interaction at 44 months was associated to children's concurrent social and emotional skills. Mother and children's book sharing behaviours did change over time but the majority of maternal verbal behaviours remained stable. Mothers who took part in a short three-week intervention showed that their book sharing behaviours could be adapted to include more positive book sharing behaviours from just a one-hour intervention session.

The implications of these findings are that it is possible to reduce the gap in the differences in children's early interactional experiences, making the experiences and school readiness of low SES children more similar and closer to their high SES peers. Government policies aim to make children more school ready, and this could provide a starting point for future research and in the future interventions. Book Start is a government initiative that provides books free of charge to families to encourage parents to look at books with their infants.

However, little guidance is provided to parents on how to do look at books effectively. The intervention developed in this thesis could work well alongside Book Start to help guide mothers in optimal ways to engage with their infant when looking at books together.

The intervention was extremely effective in low SES mothers who often provide less enriched early literacy interactions. This intervention suggests that low SES mothers are not uninterested in providing more enriched interactions with their infants, but simply need guidance on how to provide more enriching experiences for their infants. Low SES mothers have lower levels of education than other mothers and may need more guidance to illustrate good practices. Mothers often worry about what they are doing with their infants is correct, and low SES mothers are more likely to lack the support networks needed to guide them on this. The intervention may have been successful for a number of reasons; the video that allowed the mothers to see other mothers modelling these behaviours in different ways may have given them a better understanding of how to put these ideas into practice themselves. This idea is supported by the social cognitive theory (Bandura, 1986) which states that observing external factors, such as role models, can influence behaviour. This theory suggests that mothers would see the benefits of the behaviour and would therefore be more likely to perform the behaviour observed.

When examining the impact of SES on mother-child book sharing interactions some of the relationships change by grouping SES or considering SES as a continuous variable. The true data are represented by the correlational analysis where each dyad's SES scores are considered. However, when grouping dyads as either low, mid and high, or dichotomously, there is danger in polarising SES to two separate groups. With such small sample sizes, this practice should be viewed with caution, and the use of continuous variables in analyses should be considered.

In summary, low SES mothers displayed less enriched book sharing interactions with their infants and children at age 12, 18 and 44 months. Mother-infant book sharing behaviours at 12 and 18 months predicted infant's cognitive and linguistic abilities at 18 months. Crucially, a mother's interaction with her infant at 12 months predicted her infant's level of engagement in book sharing six months later. An intervention which aimed to enhance low SES mothers' verbal and non-verbal book sharing behaviours was designed and delivered successfully, with mothers showing significant improvements in all target behaviours.

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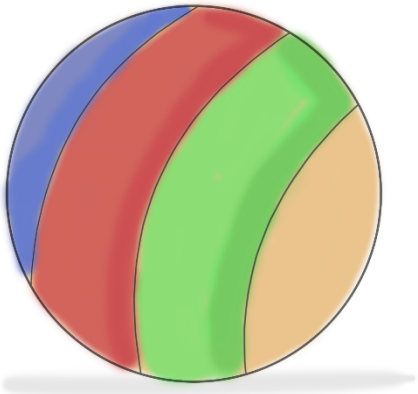
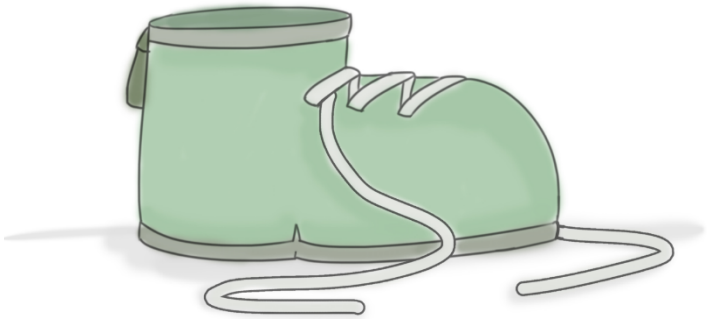
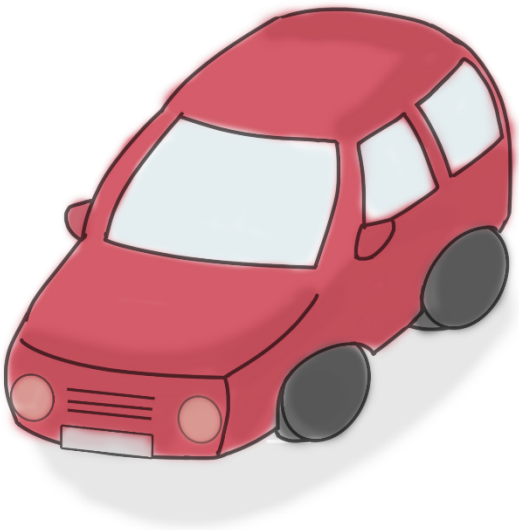
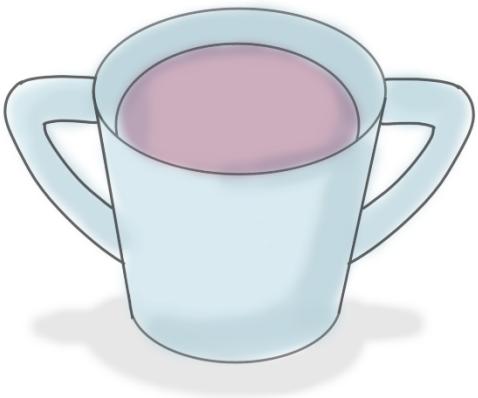
Appendices

Appendix A. Book one images

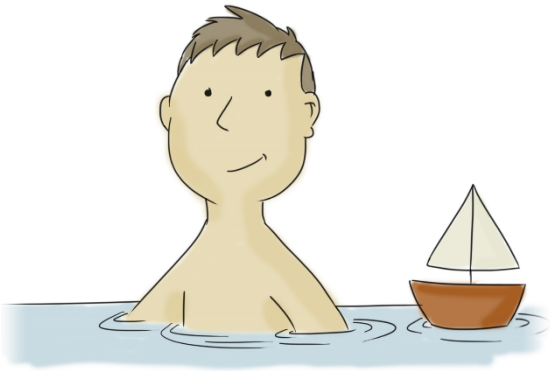


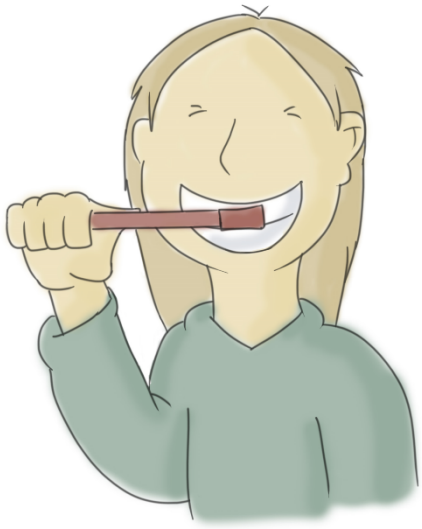


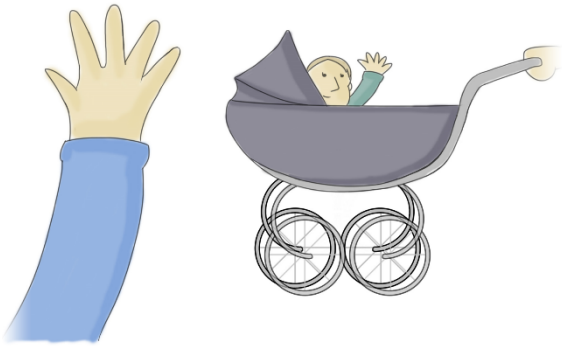


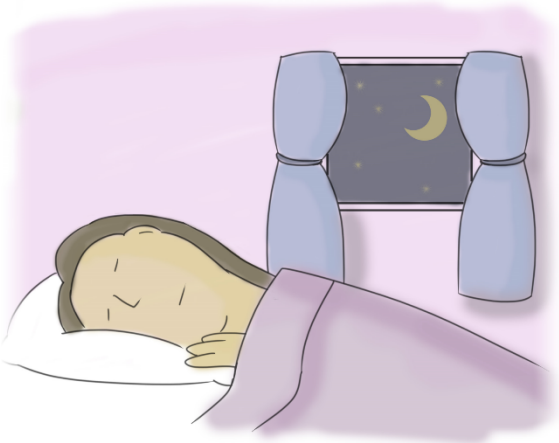


Appendix B. Book two images



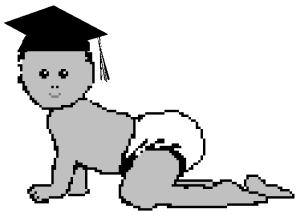






Appendix C. Oxford Communicative Developmental Inventory (CDI)

OXFORD UNIVERSITY BABYLAB



Communicative Development Inventory

- A UK adaptation of the MacArthur CDI * -

Dear parent,

The following is a list of words that are typical in children's vocabularies.

For words that your child **understands but does not yet say**, place a mark in the first column, labelled "**U**".

	U	U/S
crocodile	●	○

For words that your child **understands and also says,** place a mark in the second column, labelled "**U/S**".

	U	U/S
crocodile	○	●

If your child uses a different pronunciation of a word (e.g., 'bickie' for biscuit, or 'telly' for television) - mark the word anyway.

Occasionally we list two alternative forms - please **underline** the one your child understands and/or produces.

	U	U/S
pool/pond	○	●

Please fill in the whole circle exactly as shown above, do not just tick or partly fill the circle.

correct marking - ● incorrect markings - ☑ or ⊙

This inventory is a comprehensive "catalogue" of words that are used by many different children across a wide age range, so do not worry if your child knows only a few of them at the moment!

If you have any additional comments or information that you think we should consider, please add these at the end of this inventory.

Thank you very much!

* For information and original copies of the MacArthur CDI, please contact the Developmental Psychology Lab, San Diego State University, San Diego, CA 92182, USA.

OXFORD UNIVERSITY BABYLAB

Communicative Development Inventory

Subject code

Your name: ……

Child's name: …… Male/female: ……

Birth date of child: ……/……/…… Today's date: ……/……./…….

Animal sounds	U	U/S		U	U/S
baa baa	O	O	ouch	O	O
choo choo	O	O	quack	O	O
cockadoodledoo	O	O	uh oh	O	O
grr	O	O	vroom	O	O
meow	O	O	woof	O	O
moo	O	O	yum	O	O

Animals	U	U/S		U	U/S
animal	O	O	horse	O	O
bear	O	O	kitten	O	O
bee	O	O	lamb	O	O
bird	O	O	lion	O	O
bunny / rabbit	O	O	monkey	O	O
butterfly	O	O	mouse	O	O
cat	O	O	owl	O	O
chicken	O	O	penguin	O	O
cow	O	O	pig	O	O

deer	O	O	pony	O	O
dog	O	O	puppy	O	O
donkey	O	O	sheep	O	O
duck	O	O	spider	O	O
elephant	O	O	squirrel	O	O
fish	O	O	tiger	O	O
frog	O	O	turkey	O	O
giraffe	O	O	turtle	O	O
goose	O	O			
Vehicles	U	U/S		U	U/S
aeroplane / plane	O	O	bus	O	O
bicycle / bike	O	O	car	O	O
boat	O	O	fire engine	O	O
lorry / truck	O	O	pushchair/buggy	O	O
motor-bike	O	O	train	O	O
Toys	U	U/S		U	U/S
ball	O	O	doll	O	O
balloon	O	O	pen	O	O
block / brick	O	O	teddy bear	O	O
book	O	O	toy	O	O
bubble	O	O			
Food and Drink	U	U/S		U	U/S

apple	O	O	food	O	O
banana	O	O	ice cream	O	O
biscuit	O	O	jam	O	O
bread	O	O	juice	O	O
butter	O	O	meat	O	O
cake	O	O	milk	O	O
carrot	O	O	orange	O	O
cereal	O	O	pasta / spaghetti	O	O
cheese	O	O	peas	O	O
chicken	O	O	pizza	O	O
chips	O	O	sweets	O	O
coffee	O	O	tea	O	O
drink	O	O	toast	O	O
egg	O	O	water	O	O
fish	O	O			

Body Parts	U	U/S		U	U/S
arm	O	O	hair	O	O
belly button / tummy button	O	O	hand	O	O
cheek	O	O	head	O	O
ear	O	O	knee	O	O
eye	O	O	leg	O	O
face	O	O	nail	O	O
finger	O	O	nose	O	O
foot	O	O	toe	O	O
tongue	O	O	tummy	O	O

tooth	O	O	mouth	O	O
Clothes	U	U/S		U	U/S
bib	O	O	dress	O	O
boot(s)	O	O	glasses / specs	O	O
button	O	O	hat	O	O
coat	O	O	jacket	O	O
Clothes	U	U/S		U	U/S
jeans	O	O	shoe	O	O
jumper / sweater	O	O	shorts	O	O
nappy	O	O	sock	O	O
necklace	O	O	trousers	O	O
pyjamas	O	O	zip	O	O
shirt	O	O			
Furniture and Rooms	U	U/S		U	U/S
bath / bathtub	O	O	living room	O	O
bathroom	O	O	play pen	O	O
bed	O	O	potty	O	O
bedroom	O	O	refrigerator / fridge	O	O
chair	O	O	rocking chair	O	O
cooker / stove / oven	O	O	settee / sofa	O	O
cot	O	O	sink	O	O
door	O	O	stairs	O	O

drawer	O	O	table	O	O
garage	O	O	TV / television	O	O
high chair	O	O	window	O	O
kitchen	O	O			
Outside	U	U/S		U	U/S
beach	O	O	outside	O	O
bucket	O	O	park	O	O
church	O	O	party	O	O
flower	O	O	pool	O	O
garden	O	O	rain	O	O
house	O	O	school	O	O
moon	O	O	shop	O	O
sky	O	O	swing	O	O
slide	O	O	tree	O	O
snow	O	O	wall	O	O
spade	O	O	water	O	O
star	O	O	work	O	O
stone	O	O	zoo	O	O
sun	O	O			
Household items	U	U/S		U	U/S
bin	O	O	bowl	O	O
blanket	O	O	box	O	O
bottle	O	O	broom	O	O

Household items	U	U/S		U	U/S
brush	O	O	paper	O	O
clock	O	O	penny	O	O
comb	O	O	picture	O	O
cup	O	O	pillow	O	O
dish	O	O	plant	O	O
dummy	O	O	plate	O	O
fork	O	O	purse	O	O
glass	O	O	radio	O	O
hammer	O	O	rubbish	O	O
hoover / vacuum	O	O	scissors	O	O
jug	O	O	soap	O	O
key	O	O	spoon	O	O
lamp	O	O	telephone	O	O
light	O	O	toothbrush	O	O
medicine	O	O	towel	O	O
money	O	O	watch	O	O
mug	O	O			

People	U	U/S		U	U/S
aunt	O	O	girl	O	O
baby	O	O	grandma	O	O
boy	O	O	grandpa	O	O
brother	O	O	lady	O	O
child	O	O	man	O	O

daddy	O	O	mummy	O	O
doctor	O	O	nanny	O	O
friend	O	O	people	O	O
person	O	O	teacher	O	O
policeman	O	O	uncle	O	O
sister	O	O			
Games and Routines	U	U/S		U	U/S
bath	O	O	no	O	O
breakfast	O	O	pat-a-cake	O	O
bye bye	O	O	peekaboo	O	O
dinner	O	O	please	O	O
don't	O	O	shh / hush / shush	O	O
hello	O	O	tea	O	O
hi	O	O	thank you	O	O
lunch	O	O	wait	O	O
nap	O	O	want to	O	O
night night	O	O	yes	O	O
Action Words	U	U/S		U	U/S
bite	O	O	know	O	O
blow	O	O	like	O	O
break	O	O	look	O	O
bring	O	O	love	O	O
bump	O	O	make	O	O
call	O	O	open	O	O

carry	O	O	play	O	O
catch	O	O	pull	O	O
clean	O	O	push	O	O
cry	O	O	put	O	O
cuddle	O	O	read	O	O
cut	O	O	ride	O	O
dance	O	O	run	O	O
draw	O	O	say	O	O
drink	O	O	scratch	O	O
drive	O	O	see	O	O
drop	O	O	show	O	O
eat	O	O	shut / close	O	O
fall	O	O	sing	O	O
feed	O	O	sleep	O	O
find	O	O	smile	O	O
finish	O	O	splash	O	O
get	O	O	stop	O	O
give	O	O	swim	O	O
go	O	O	swing	O	O
have	O	O	take	O	O
hear	O	O	tell	O	O
help	O	O	throw	O	O
hit	O	O	tickle	O	O
hug	O	O	walk	O	O
hurry	O	O	wash	O	O
jump	O	O	watch	O	O
kick	O	O	wipe	O	O

kiss	O	O	write	O	O
Descriptive Words	U	U/S		U	U/S
all gone	O	O	clean	O	O
asleep	O	O	cold	O	O
bad	O	O	dark	O	O
big	O	O	dirty	O	O
blue	O	O	dry	O	O
broken	O	O	empty	O	O
careful	O	O	fast	O	O
Descriptive Words	U	U/S		U	U/S
fine	O	O	old	O	O
gentle	O	O	pretty	O	O
good	O	O	red	O	O
green	O	O	sad	O	O
happy	O	O	scared	O	O
hard	O	O	sick	O	O
hot	O	O	sleepy	O	O
hungry	O	O	soft	O	O
hurt	O	O	thirsty	O	O
little	O	O	tired	O	O
nasty	O	O	wet	O	O
naughty	O	O	yellow	O	O
nice	O	O			

Question words	U	U/S		U	U/S
how	O	O	where	O	O
what	O	O	who	O	O
when	O	O	why	O	O
Time	U	U/S		U	U/S
day	O	O	now	O	O
later	O	O	today	O	O
morning	O	O	tomorrow	O	O
night	O	O	tonight	O	O
Pronouns	U	U/S		U	U/S
her	O	O	my	O	O
his	O	O	that	O	O
I	O	O	this	O	O
it	O	O	you	O	O
me	O	O	your	O	O
mine	O	O			
Prepositions	U	U/S		U	U/S
away	O	O	on	O	O
back	O	O	out	O	O
down	O	O	there	O	O

in	O	O	under	O	O
inside	O	O	up	O	O
off	O	O			
Quantifiers	U	U/S		U	U/S
all	O	O	not	O	O
again	O	O	other	O	O
another	O	O	same	O	O
more	O	O	some	O	O
none	O	O			
Extra words	U	U/S		U	U/S
chase (action)	O	O		O	O
smell (action)	O	O		O	O
	O	O		O	O
	O	O		O	O
	O	O		O	O
	O	O		O	O

Additional Questions:

Does anyone speak to your child in a language other than English (if so, which language)?

Has your child ever had any hearing problems, including glue ear?

Was your child born more than six weeks premature?

Thank you for your help.

If you have any further comments, please write them below.

Appendix D. Gestures, Actions and Pretend Play (GAPP)

Part B: Actions, gestures and pretend play

This is a comprehensive checklist of communicative gestures, actions and pretend play used by children between 10 and 30 months. Do not worry if some sections do not apply to your child at this time.

For each action/gesture please indicate whether your child: never, seldom or often uses the action/gesture by ticking the appropriate box.

Please feel free to add information in the comments box next to each item if required (for example if your child consistently uses a different gesture than the example given to mean 'Hot' please describe your child's gesture).

Conventional or Social gestures	Never	Seldom	Often	Comments
Waves 'bye-bye' on his/her own when saying goodbye				
Hold out his/her arms to be picked up				
Blows kisses				
Shakes head no				
Nods head yes				
Hold finger to lips to say 'Shhh'				
Requests something by extending arm while opening and closing hand				
Smacks lips in 'yum yum' gesture when something tastes nice				
Makes face to indicate 'yuck'				
Shrugs to indicate 'don't know'				
Holds hand up and out to indicate 'all gone' or 'where's it gone?'				
Beckon with finger or hand				
Uses 'Thumbs up' gesture				
Uses 'high 5' gesture				

Indicating gestures	Never	Seldom	Often	Comments
Holds out an object to show you				
Offers an object to you				
Indicate a place using hand or arm				
Point with index finger to show you an interesting object or event				
Games and routines	Never	Seldom	Often	Comments

Plays Pat-a-cake				
Plays peekaboo				
Plays chasing games				
Sings				
Dances				
Joins in with 'incy-wincey-spider'				
Join in with this little piggy				
Join in with round-and-round-the-garden				
Join in with 'the wheels on the bus'				
Any other similar games?				

Playing parents using doll/teddy	Never	Seldom	Often	Comments
Put 'baby' to bed				
Cover with blanket				
Feed baby				
Brush/comb babies hair				
Burp baby				
Push baby in pushchair/pram				
Rock baby				
Kiss/hug baby				
Wash baby				
Talk to baby				
Dress baby				
Change babies nappy				
Imitating adults: does your child…	Never	Seldom	Often	Comments
Sweep with mop/broom				
Put key in door/lock				

Pound with hammer				
Attempt to use saw				
Attempt to use other tools				
'Type' at typewriter/keyboard				
'Read' book				
Vacuum				
Water plants				
'drive' car using steering wheel				
Wash dishes				
Dust using duster				
Dig with shovel				
Put on glasses				
Write with pencil/crayon				
Play musical instrument				
Pretend to cook				
Iron clothes				
Shop				
Play doctors				

Symbolic gestures (gestures your child uses to stand for words)	Never	Seldom	Often	Comments
Eyes closed, hands together under head to indicate sleepy/sleeping				
Hold hands wide apart to indicate 'big'				
Hold hands close together/fingers close together to indicate 'small'				
Blow to show an object is hot				
Make 'snaking' hand gesture for snake				
Consistently use any other gestures to stand for specific words (describe below):				

Please describe any other gestures you have noticed your child using	Seldom	Often	Comments

Please describe any gesture word pairings you have seen your child use	Seldom	Often	Comments

Appendix E. STIMQ

STIM-Q INFANT (BRITISH ADAPTATION)

Name: _____

Date: ___ /___ /___

General Introduction:

Introduce by saying: This questionnaire is designed to find out the different types of toys and games that you have for your child in the home, and the kinds of activities that you and your child do together. These questions will help me to understand what your child's home life is like. I know that many people (including other parents, teachers, relatives, friends, babysitters and siblings) also may have the opportunity to play very important roles for your child. However, in this questionnaire, I am only interested in the kinds of toys and activities that you provide for your child.

ALM Scale -- Availability of Learning Materials:

Introduce by saying: I am now going to name some toys and games and ask you to tell me which ones your child has for himself/herself. Since this questionnaire is given to caregivers of children between 5 and 12 months, many of the toys will be either too easy or too advanced for your child. Nevertheless, I will ask you all the questions on the questionnaire. If your child had a toy or you used a toy or book with your child at a younger age, please tell me about it. Most parents have only some of these toys in their homes, so you should not feel that I expect you to have more than a few of these toys for your child.

Infant's First Toys

Soft clown or other stuffed toy with a human face on it placed in or near their cot	**Y**	**N**
Mirror (attached to the inside of the cot, made for infants to hold, or for you to hold so that the infant can see him or herself)	**Y**	**N**
Small cloth toys or card with bright black-and-white patterns	**Y**	**N**
Soft cloth animals that make noises when child squeezes them	**Y**	**N**
Rattle that makes noises or in some way "does something" when the infant shakes it. How many?_____	**Y**	**N**
Rattles that attach to infant's feet like socks	**Y**	**N**
Plastic or wooden toys that fit on a ring (e.g., keys) that are made for infant to hold and play with	**Y**	**N**
1. Enter total number 'Y' answers from **first infant toys** group		

Activity/Manipulative Toys

Toy in which infant presses a button, opens a door, etc. so that something happens such as a top turning something moving, a noise or music sounding or a picture popping up (e.g. activity centre)	**Y**	**N**
Toy musical instrument such as toy xylophone, toy flute, toy drum or toy piano/keyboard	**Y**	**N**
Large spinning toy that baby presses down on to make balls or pinwheels pop and spin	**Y**	**N**
Set of wooden or plastic blocks for the infant to bang or stack	**Y**	**N**
Stacking toy with coloured plastic rings of different sizes that stack on a pole	**Y**	**N**
Large plastic "beads" or links that snap together to form a chain and then pull or pop apart	**Y**	**N**
Shape sorter (toy container which has openings to fit different shaped blocks such as cube/triangle)	**Y**	**N**
2. Enter total number 'Y' answers from **activity/manipulative toys** group		

Imagination Toys

Toy radio with dials or knobs that the infant can manipulate	**Y**	**N**
Rubber animal made for use as a bath toy (e.g. rubber duckie)	**Y**	**N**
Floating boats (with or without people) made for use as a bath toy	**Y**	**N**
Small car or truck which the infant can push around while sitting or crawling	**Y**	**N**
Toy telephone	**Y**	**N**
Toy which says name or object, letter of alphabet or animal sound when a string is pulled, a lever is pulled or a button is pushed	**Y**	**N**
Stuffed animal	**Y**	**N**
Doll with a human face	**Y**	**N**
3. Enter total number 'Y' answers from **imagination toys** group		

Calculation of ALM Scale Score:

Enter each of the following as directed	**Subtotal**	**Scoring directions**	**Score**
1. Enter **first infant toys**		0-1: *Enter 0*; 2-4: *Enter 1*; 5+: *Enter 2*	
2. Enter **activity/manipulative toys**		0-1: *Enter 0*; 2-4: *Enter 1*; 5+: *Enter 2*	
3. Enter **imagination toys**		0-1: *Enter 0*; 2-4: *Enter 1*; 5+: *Enter 2*	

Total ALM Score (Add all numbers in the score column)

Reading-Verbal Scale:

Introduce by saying: I am now going to ask some questions concerning playing with and reading to your child. We know that mothers have lots to do (if they are working, if they have a career, etc.) around the house (and in caring for the other children in the family). It is often hard to find the time to play with little babies and read to them. Many mothers don't do more than a few of these activities and some mothers can't find the time to do any of them. We are interested in which of these activities you are doing with your baby.

Ask: **Do you ever read baby or children's books to your infant or is she/he too young for that?** *If caregiver answers "**yes**", ask each of the following questions.* *If caregiver answers "**no**" (i.e., she/he does not read to the child), enter an "N" and skip section.*	

1. Name some children's books that you have at home and read to your child. *After parent names some books, ask*: How many books altogether do you have at home that you read to your child? *Enter #*		
2. How many of these books are "board books" (books that are made of hard cardboard and are made especially for a baby)? Can you tell me the names of some of them?		
3. How many days each week do you read children's books to your *child? Enter # from 0 to 7*		
4. Do you read nursery rhymes such as Mother Goose or other simple rhyming books to your child?	**Y**	**N**
Do you read books to your child especially made for infants that teach about:		
5. Activities of an infant's day (such as mealtime, bath time, bedtime, playtime, going places, getting dressed, etc.)?	**Y**	**N**
6. Body parts?	**Y**	**N**
7. Simple shapes such as squares, circle, and triangles?	**Y**	**N**
8. Things around the house (chair, table, bed, book, etc.)?	**Y**	**N**
9. Do you read books to your child that show toys and favourite things (e.g. ball or rattle)?	**Y**	**N**
10. Do you read books to your child about animals?	**Y**	**N**
11. Do you read books to your child that contain photographs of babies?	**Y**	**N**
12. While you read to your child, do you point to pictures and name them or describe them, or is your child too young or distracted for that?	**Y**	**N**

Enter each of the following as directed	**Subtotal**	**Scoring directions**	**Score**
1. Number of books		*0: Enter 0; 1-9: Enter 1; 10-24: Enter 2; 25-49: Enter 3; 50+: Enter 4*	
2. Number of board books		*0: Enter 0; 1-9: Enter 1; 10-24: Enter 2; 25-49: Enter 3; 50+: Enter 4*	
3. Number of days reads books each week		*0-1: Enter 0; 2-3: Enter 1; 4+: Enter 2*	

4-12. Enter total of 'Y' answers	

Total Reading-Verbal Score (Add all numbers in the score column)

PIDA Scale: Parental Involvement in Developmental Advance

1. Do you have the opportunity to point to things around the house and name them for your child? *(Give credit only if done every day)*	**Y**	**N**
2. Do you have the chance to point out the names, the colours or the sizes of items in the supermarket when taking your child there, or are you too busy getting your shopping done? *(Give credit if done at least once a week*	**Y**	**N**
3. Do you play with your child and show her/him how to pile up baby blocks or use other toys that stack up in a tower, or has the baby learned to do this on her/his own? *(Give credit if done regularly, not just once or twice)*	**Y**	**N**
4. Do you teach your child body parts by playing with him/her and touching parts of his/her body while saying the name of what you are touching? (I.e. "Here is baby's nose" or "Here is baby's foot") *(Give credit if done every day or almost every day)*	**Y**	**N**
5. Do you teach your child to press buttons or turn knobs, or has the baby learned to do this on her/his own? *(Give credit done regularly, not just once or twice)*	**Y**	**N**
6. Do you play with your child and show her/him how to put blocks and other things in a container such as a plastic box, beaker or can?	**Y**	**N**
7. Do you play roll-a-ball games with your baby while sitting on the floor or bed with her/him?	**Y**	**N**

Total PIDA Score (total number of "Y" answers from questions 1 to 7)

PVR Scale: Parental Verbal Responsivity

1. Do you play with your child with bath toys or with water play when she/he is in the bathtub? *(Do not give credit for "splashing" unless mother is in bath with the child or unless she spontaneously describes a specific game that she plays. Most frequently, credit will depend on using cups or beakers for filling or boats, waterwheels, etc. for playing. Give credit if done every day or almost every day)*	**Y**	**N**
2. Do you play peek-a-boo games with your infant such as by hiding your face and then revealing yourself? *(Give credit if done every day or almost every day)*	**Y**	**N**
3. Do you play games with your infant in front of a mirror on a wall in which you and your child sit or stand and look at the mirror? *(Give credit if done every day or almost every day)*	**Y**	**N**
4. Does your baby ever practice making sounds? If so, does she/he practice alone most of the time or with you? (Give credit if done every day or almost every day)	**Y**	**N**
5. Do you sing lullabies to your baby while you hold her/him at naptime and/or bedtime, or does the baby go to sleep before you can do that? *(Give credit if done every day or almost every day)*	**Y**	**N**
6. Do you usually sing songs especially used with young children to your baby at other times of the day? *(Give credit if done every day or almost every day)*	**Y**	**N**
7. Do you play pat-a-cake games while singing a rhyming song?	**Y**	**N**
8. Other than pat-a-cake, do you play finger games with your child such as Eentsy Weentsy Spider? If yes, could you tell me the names of some of them?	**Y**	**N**

Eentsy Weentsy Spider This Little Piggy I'm a Little Teapot Pop Goes the Weasel Other:	
9. Do you usually talk to your baby while you are feeding her/him and tell her/him about what is going on, or is she/he too young to talk yet? *(Do not give credit for coaxing the child to eat or for telling the child to be careful, etc. Give credit only if done "most of the time.")*	**Y N**
10. Do you play pretend games using a stuffed animal or puppet to talk to your child?	**Y N**
11. Do you ever pretend that you do not know where someone or something is? (E.g. "Where's your brother? Here he is!")	**Y N**

Total PVR Score (total number of "Y" answers from questions 1 to 11) ☐

Calculation of Total STIMQ Score:

Enter ALM Scale Score ☐

Enter READING Scale Score ☐

Enter PIDA Scale Score ☐

Enter PVR Scale Score ☐

Total STIMQ Score ☐

Appendix F. Wechsler Adult Intelligence Scale (WAIS)

2. Vocabulary *(continued)*

Item	Response	Score (0, 1, or 2)
8. Yesterday		
9. Terminate		
10. Consume		
11. Sentence		
12. Confide		
13. Remorse		
14. Ponder		
15. Compassion		
16. Tranquil		
17. Sanctuary		
18. Designate		
19. Reluctant		
20. Colony		
21. Generate		
22. Ballad		
23. Pout		
24. Plagiarize		
25. Diverse		
26. Evolve		
27. Tangible		
28. Fortitude		
29. Epic		
30. Audacious		
31. Ominous		
32. Encumber		
33. Tirade		
	Total Raw Score (Maximum = 66) (Include credit for items on previous page.)	

Appendix G. Parenting Stress Index Short Form (PSI-SF)

This questionnaire contains 36 statements, please read each statement carefully. Please circle the response which best represents your opinion and focus on the child you have the most concerns about.

Circle the SA if you strongly agree with the statement.

Circle the A if you agree with the statement.

Circle the NS if you are not sure.

Circle the D if you disagree with the statement.

Circle the SD if you strongly disagree with the statement.

1. Feel that I cannot handle things	SA A NS D SD
2. Gave up my life for children's needs	SA A NS D SD
3. Feel trapped by parenting responsibilities	SA A NS D SD
4. Unable to do new and different things	SA A NS D SD
5. Never able to do things that I like to do	SA A NS D SD
6. Unhappy with last purchase of clothing for myself	SA A NS D SD
7. Quite a few things bother me	SA A NS D SD
8. Having a child caused problems with spouse	SA A NS D SD
9. Feel alone and without friends	SA A NS D SD
10. Expect not to enjoy myself at parties	SA A NS D SD
11. Not as interested in people as I used to be	SA A NS D SD

12. Don’t enjoy things as I used to	SA A NS D SD
13. Child rarely does things for me	SA A NS D SD
14. Child does not like me or want to be close	SA A NS D SD
15. Child smiles at me less than expected	SA A NS D SD
16. My efforts for child aren’t appreciated	SA A NS D SD
17. Child doesn’t giggle or laugh much when playing	SA A NS D SD
18. Child doesn’t learn as quickly as other children	SA A NS D SD
19. Child doesn’t smile as much as other children	SA A NS D SD
20. Child isn’t able to do as much as expected	SA A NS D SD
21. Takes a long time for child to get used to new things	SA A NS D SD
22. Parent’s rating of competence	SA A NS D SD
23. Expected to have closer feelings for my child	SA A NS D SD
24. Child does things that bother me to be mean	SA A NS D SD
25. Child cries or fusses more often than other children	SA A NS D SD
26. Child wakes in bad mood	SA A NS D SD
27. Child is moody and easily upset	SA A NS D SD
28. Child does things that bother me a great deal	SA A NS D SD
29. Child reacts strongly	SA A NS D SD
30. Child gets upset easily	SA A NS D SD

31. Child's sleeping or eating schedule hard to establish SA A NS D SD

32. Getting child to do something is hard SA A NS D SD

33. Parent report a number of bothersome things child does SA A NS D SD

34. Child does some things that bother me SA A NS D SD

35. Child is more of a problem than expected SA A NS D SD

36. Child makes demands on me SA A NS D SD

Appendix H. Edinburgh Postnatal Depression Scale (EPDS)

Edinburgh Postnatal Depression Scale

Please indicate which response best relates to each statement for you. Please be as honest as possible.

In the past 7 days:

1. I have been able to laugh and see the funny side of things

- ❑ As much as I always could
- ❑ Not quite so much now
- ❑ Definitely not so much now
- ❑ Not at all

2. I have looked forward with enjoyment to things

- ❑ As much as I ever did
- ❑ Rather less than I used to
- ❑ Definitely less than I used to
- ❑ Hardly at all

***3. I have blamed myself unnecessarily when things went wrong**

- ❑ Yes, most of the time
- ❑ Yes, some of the time
- ❑ Not very often
- ❑ No, never

4. I have been anxious or worried for no good reason

- ❑ No, not at all
- ❑ Hardly ever
- ❑ Yes, sometimes
- ❑ Yes, very often

***5. I have felt scared or panicky for no very good reason**

- ❑ Yes, quite a lot
- ❑ Yes, sometimes
- ❑ No, not much
- ❑ No, not at all

***6. Things have been getting on top of me**

- ❑ Yes, most of the time I haven't been able to cope at all
- ❑ Yes, sometimes I haven't been coping as well as usual
- ❑ No, most of the time I have coped quite well
- ❑ No, I have been coping as well as ever

***7. I have been so unhappy that I have had difficulty sleeping**

- ❑ Yes, most of the time
- ❑ Yes, sometimes
- ❑ Not very often
- ❑ No, not at all

***8. I have felt sad or miserable**

- ❑ Yes, most of the time
- ❑ Yes, quite often
- ❑ Not very often
- ❑ No, not at all

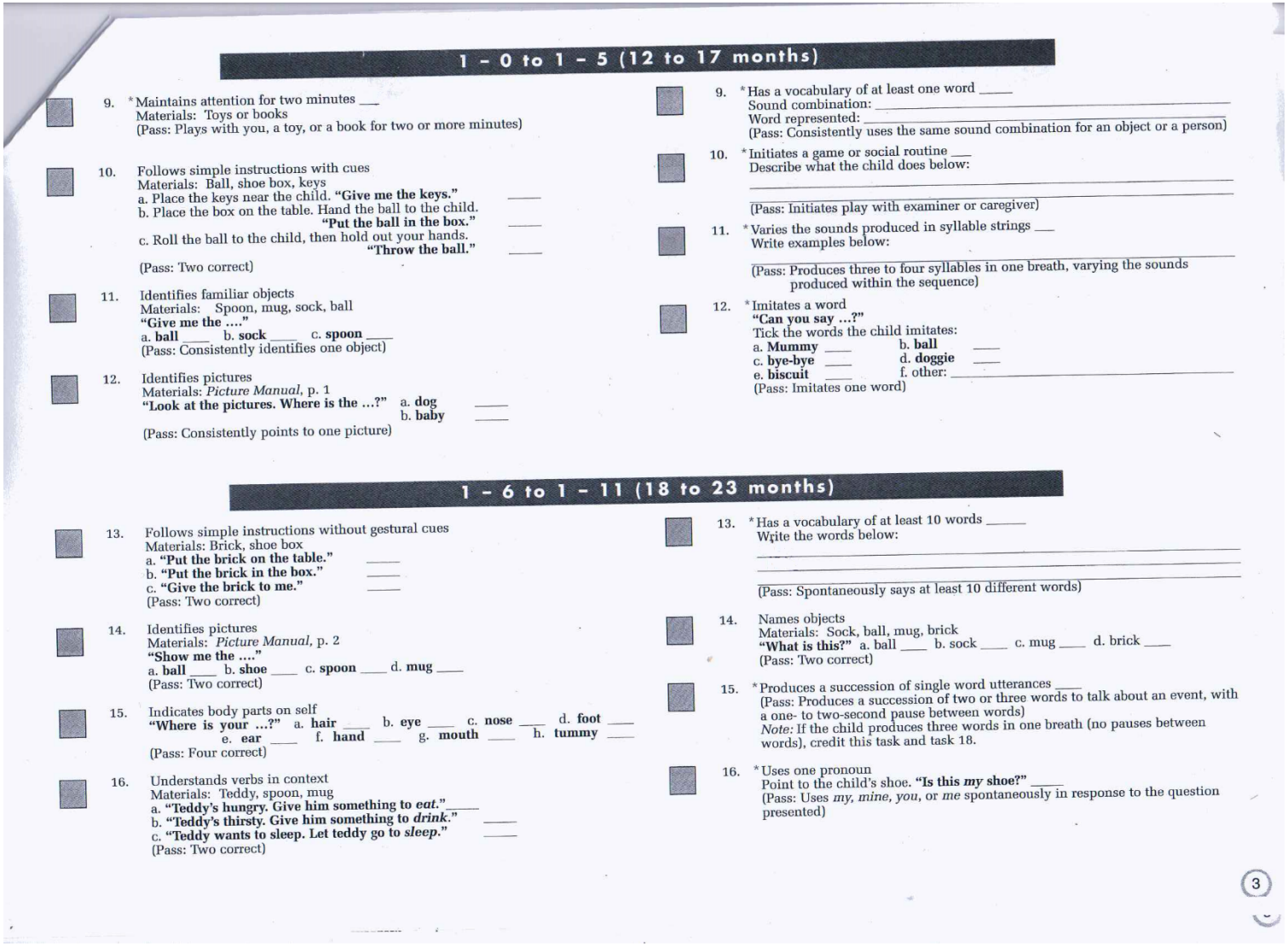
***9. I have been so unhappy that I have been crying**

- ❑ Yes, most of the time
- ❑ Yes, quite often
- ❑ Only occasionally
- ❑ No, never

***10. The thought of harming myself has occurred to me**

- ❑ Yes, quite often
- ❑ Sometimes
- ❑ Hardly ever
- ❑ Never

Appendix I. Sample page from the Preschool Language Scale (PLS)



1 - 0 to 1 - 5 (12 to 17 months)

9. *Maintains attention for two minutes ___
Materials: Toys or books
(Pass: Plays with you, a toy, or a book for two or more minutes)

10. Follows simple instructions with cues
Materials: Ball, shoe box, keys
a. Place the keys near the child. **"Give me the keys."** ____
b. Place the box on the table. Hand the ball to the child. **"Put the ball in the box."** ____
c. Roll the ball to the child, then hold out your hands. **"Throw the ball."** ____
(Pass: Two correct)

11. Identifies familiar objects
Materials: Spoon, mug, sock, ball
"Give me the ...."
a. **ball** ____ b. **sock** ____ c. **spoon** ____
(Pass: Consistently identifies one object)

12. Identifies pictures
Materials: *Picture Manual*, p. 1
"Look at the pictures. Where is the ...?" a. **dog** ____ b. **baby** ____
(Pass: Consistently points to one picture)

9. *Has a vocabulary of at least one word ____
Sound combination: _____
Word represented: _____
(Pass: Consistently uses the same sound combination for an object or a person)

10. *Initiates a game or social routine ___
Describe what the child does below:
_____
_____
(Pass: Initiates play with examiner or caregiver)

11. *Varies the sounds produced in syllable strings ___
Write examples below:
_____
(Pass: Produces three to four syllables in one breath, varying the sounds produced within the sequence)

12. *Imitates a word
"Can you say ...?"
Tick the words the child imitates:
a. **Mummy** ___ b. **ball** ___
c. **bye-bye** ___ d. **doggie** ___
e. **biscuit** ___ f. other: _____
(Pass: Imitates one word)

1 - 6 to 1 - 11 (18 to 23 months)

13. Follows simple instructions without gestural cues
Materials: Brick, shoe box
a. **"Put the brick on the table."** ____
b. **"Put the brick in the box."** ____
c. **"Give the brick to me."** ____
(Pass: Two correct)

14. Identifies pictures
Materials: *Picture Manual*, p. 2
"Show me the ...."
a. **ball** ____ b. **shoe** ____ c. **spoon** ____ d. **mug** ____
(Pass: Two correct)

15. Indicates body parts on self
"Where is your ...?" a. **hair** ____ b. **eye** ____ c. **nose** ____ d. **foot** ____ e. **ear** ____ f. **hand** ____ g. **mouth** ____ h. **tummy** ____
(Pass: Four correct)

16. Understands verbs in context
Materials: Teddy, spoon, mug
a. **"Teddy's hungry. Give him something to *eat*."** ____
b. **"Teddy's thirsty. Give him something to *drink*."** ____
c. **"Teddy wants to sleep. Let teddy go to *sleep*."** ____
(Pass: Two correct)

13. *Has a vocabulary of at least 10 words ____
Write the words below:
_____
_____
_____
(Pass: Spontaneously says at least 10 different words)

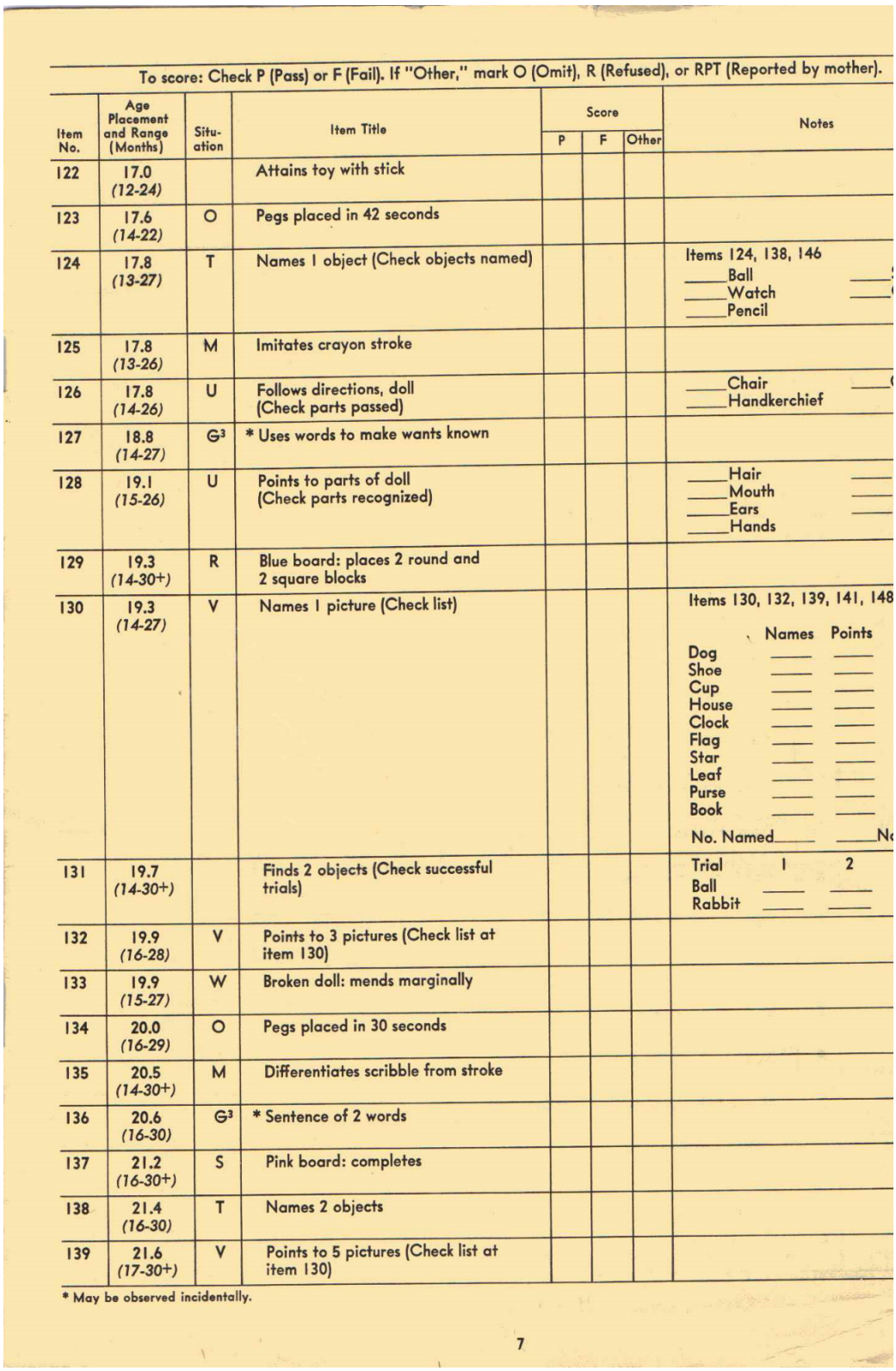
14. Names objects
Materials: Sock, ball, mug, brick
"What is this?" a. ball ____ b. sock ____ c. mug ____ d. brick ____
(Pass: Two correct)

15. *Produces a succession of single word utterances ____
(Pass: Produces a succession of two or three words to talk about an event, with a one- to two-second pause between words)
Note: If the child produces three words in one breath (no pauses between words), credit this task and task 18.

16. *Uses one pronoun
Point to the child's shoe. **"Is this *my* shoe?"** ____
(Pass: Uses *my, mine, you*, or *me* spontaneously in response to the question presented)

3

Appendix J. Sample page from the Bayley's Measure of Infant and Toddle Development



To score: Check P (Pass) or F (Fail). If "Other," mark O (Omit), R (Refused), or RPT (Reported by mother).

Item No.	Age Placement and Range (Months)	Situ-ation	Item Title	Score P	Score F	Score Other	Notes
122	17.0 (12-24)		Attains toy with stick				
123	17.6 (14-22)	O	Pegs placed in 42 seconds				
124	17.8 (13-27)	T	Names 1 object (Check objects named)				Items 124, 138, 146 ____Ball ____Watch ____Pencil
125	17.8 (13-26)	M	Imitates crayon stroke				
126	17.8 (14-26)	U	Follows directions, doll (Check parts passed)				____Chair ____Handkerchief
127	18.8 (14-27)	G³	* Uses words to make wants known				
128	19.1 (15-26)	U	Points to parts of doll (Check parts recognized)				____Hair ____Mouth ____Ears ____Hands
129	19.3 (14-30+)	R	Blue board: places 2 round and 2 square blocks				
130	19.3 (14-27)	V	Names 1 picture (Check list)				Items 130, 132, 139, 141, 148 Names / Points Dog ____ ____ Shoe ____ ____ Cup ____ ____ House ____ ____ Clock ____ ____ Flag ____ ____ Star ____ ____ Leaf ____ ____ Purse ____ ____ Book ____ ____ No. Named____ ____No
131	19.7 (14-30+)		Finds 2 objects (Check successful trials)				Trial 1 2 Ball ____ ____ Rabbit ____ ____
132	19.9 (16-28)	V	Points to 3 pictures (Check list at item 130)				
133	19.9 (15-27)	W	Broken doll: mends marginally				
134	20.0 (16-29)	O	Pegs placed in 30 seconds				
135	20.5 (14-30+)	M	Differentiates scribble from stroke				
136	20.6 (16-30)	G³	* Sentence of 2 words				
137	21.2 (16-30+)	S	Pink board: completes				
138	21.4 (16-30)	T	Names 2 objects				
139	21.6 (17-30+)	V	Points to 5 pictures (Check list at item 130)				

* May be observed incidentally.

7

Appendix K. Demographics

Background Information

All information will be kept confidential. Please tick and fill in the blanks where appropriate.

Your name _____

Your child's name_____

Child's D.O.B _____

Today's date _____

Contact details _____

_____

_____

_____

_____

Does your child have normal vision as far as you know? ❑

Does your child have normal hearing as far as you know? ❑

Is UK English the only language spoken at home? ❑

Has your child had more than five ear infections? ❑

How often, if ever, do you use signing with your child? (Defined as classes such as Tiny Talk or Sing and Sign).

Every Day ❑ Most Days ❑ Some Days ❑ Occasionally ❑

I have **never** had baby signing training ❑

I have **never** used signing with my child ❑

What type of signing have you used with your child? And for how long?

_____

Do you have any other children? If so, please state how many children you have and their ages_____

If your child goes to a nursery or a childminder, how many hours in a week does your child spend at the nursery / childminder?

_____ hours

Do you work? Yes ❑
On maternity leave❑
No ❑

If you do, what's your job title? _____

Can you describe what you do?
_____

How many hours a week do you work? _____hours
If on maternity leave, when do you plan to return to work and how many hours a week do you intend to work?

Are you self-employed? ❑

Do you supervise / manage staff? ❑

Have you any of the following qualifications?

GCSEs or equivalent ❑ (e.g., 'O' Levels, International Baccalaureate, Irish Leaving Certificate, Scottish Highers)
NVQ /BTech ❑ 'A' Levels ❑ Diploma ❑ HND ❑

University degree ❑ PGCE ❑ Masters ❑ PhD ❑

Others _____ Professional qualifications _____

Does your partner work? ❑

If he/she does, what is his/her job title? _____

Can he/she describe what he/she does?
_____

How many hours a week does he/she work? _____hours

Is he/she self-employed? ❑

Does he/she supervise / manage staff? ❑

Does your partner have any of the following qualifications?

GCSEs or equivalent ❑ (e.g., 'O' Levels, International Baccalaureate, Irish Leaving Certificate, Scottish Highers)

NVQ /BTech ❑ 'A' Levels ❑ Diploma ❑ HND ❑

University degree ❑ PGCE ❑ Masters ❑ PhD ❑

Others _____ Professional qualifications _____

Can you please indicate your household annual income bracket including any benefits you or your partner receive:

£10,000 or less ❑ £15,000 – 20,000 ❑ £250,000 – 30,000 ❑ £35,000 -40,000 ❑

£10,000-15,000 ❑ £20,000-25,000 ❑ £30,000-35,000 ❑ £40,000 – 45,000 ❑

£45,000 – 50,000 ❑ £50,000+ ❑

Thank you for your help.

Appendix L. Intervention guidelines

Expected duration of intervention: 1 hour

First, the researcher gives a detailed description of some of the behaviours mothers could use during book sharing and explained their importance to their child's future development. Where the mother was already producing the positive behaviour, it was reinforced so the mother knew they were already producing good practices. For example, rather than saying, 'it is good to do …', the research would say, 'it is really good that you are already doing …'.

Transcript:

The way you interact with your child/infant is very important for their development. You are already using some good techniques whilst looking at books, and I would like to tell you about a few more and explain why they are important.

It is good to describe all the details of the pictures you see in the book to your child/infant, and you can extend this to other relevant topics for your child/infant. For example, you could elaborate the picture of the banana by talking about what animal would like to eat a banana, such as a monkey. Also, there are aspects of the picture your child may still be unfamiliar with the names of, such as the moon or the stars, or windows and curtains. (Child name) will gradually learn these words the more you label them, and will build up associations between objects and words.

You can also talk about the emotions of the characters, yourself or your child/infant in relation to the scenarios in books. For example, mentioning whether the child in the book looks happy, excited, upset, disappointed, as well as others. You can also talk about what the characters, you and your child/infant like and dislike and about what they might be thinking. This is important for your child as they get older, and helps them to understand their own feelings and thoughts and how these can be different from other peoples.

**** Ask if mother has any questions ****

You can personalise the story to your child, for example, talk about a time you did something that is happening in the book, thinking about what your child might remember. It can be very simple, such as comparing the ball in the book to the ball your child/infant plays with, and can be extended by talking about when your child gets to play with their ball, who they play with, and whether they enjoy it. Asking (child name) questions about the book is also a technique to use, this encourages them to think about things for themselves and is a good way to build their knowledge of new words.

Researcher opens book

You can also help (child name) to build connections between objects and words by pointing to the pictures in books, and in the introduction of this book it suggests you point to each picture during your book sharing with (child name). Also, there are gestures you could use to help your child understand what an object is, and you can see some examples in this book (shown them). If (child name) already knows the name of the object, this is just another way you can make looking at books fun for your child.

**** Ask if mother has any questions ****

I am giving you these two books which are similar to the ones you have already looked at with (child name). I would like you to look at them as often as you can before I see you again next week. They have little reminders of some of the techniques I have just mentioned, please feel free to use these prompts as you wish. You can go through the book and just look at the them as reminders and elaborate them as you wish, or you can switch them around using different ideas in different pages, and please carry on with all the good things you are already doing- don't feel like you should only refer to those mentioned in the books.

**** Ask if mother has any questions ****

Now I am going to show you some short video clips which show these difference techniques I have been talking to you about in practice so you can really understand how they can be used in different ways.

**** Play video 1 (video length four minutes) ****

Explaining the videos:

Stop after each few utterances or page (as appropriate to describe all of what has happened) and explain the behaviours seen briefly. For example, in the first video the first set of utterances starts by the mother asking the child what the picture is. The child responds with their version of the word, and the mother follows this up by saying the word more accurately, and asking where the shoe goes (twice). However, the child does not respond so the mother asks if the shoe goes on his foot. The mother says where is your foot, and the child then lifts their foot and the mothers says; yes, we tie your shoe laces and the shoe goes on your foot, and points to the picture in the book.

So for these utterances you would describe that the mother is asking lots of questions, such as what is that? She changes the question after realising her child does not know the answer to where the shoe goes, she personalises by talking about his shoes and his foot. The mother expands by describing the process of tying laces and points to the picture when labelling as well.

**** Expected duration to go through the videos between 30 and 40 minutes ****

Video 1: duration 4 minutes. Built in three ten-second pauses (to check mother does not have an additional questions/to break for a few seconds). Video length without pauses 3 minutes 30 seconds.

Video 2: duration 5 minutes 20 seconds. Built in four ten-second pauses (to check mother does not have an additional questions). Video length without pauses 4 minutes 40 seconds.

Video 3: duration 5 minutes 15 seconds. Built in six ten-second pauses (to check mother does not have an additional questions). Video length without pauses 4 minutes 40 seconds.

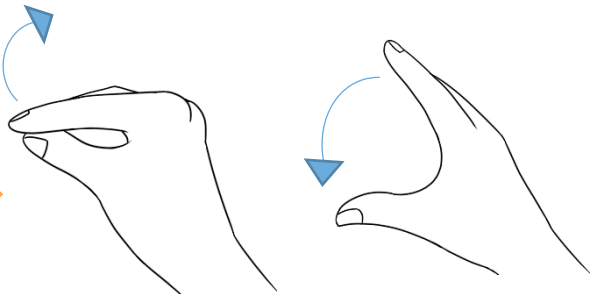
Appendix M. Prompts for intervention books

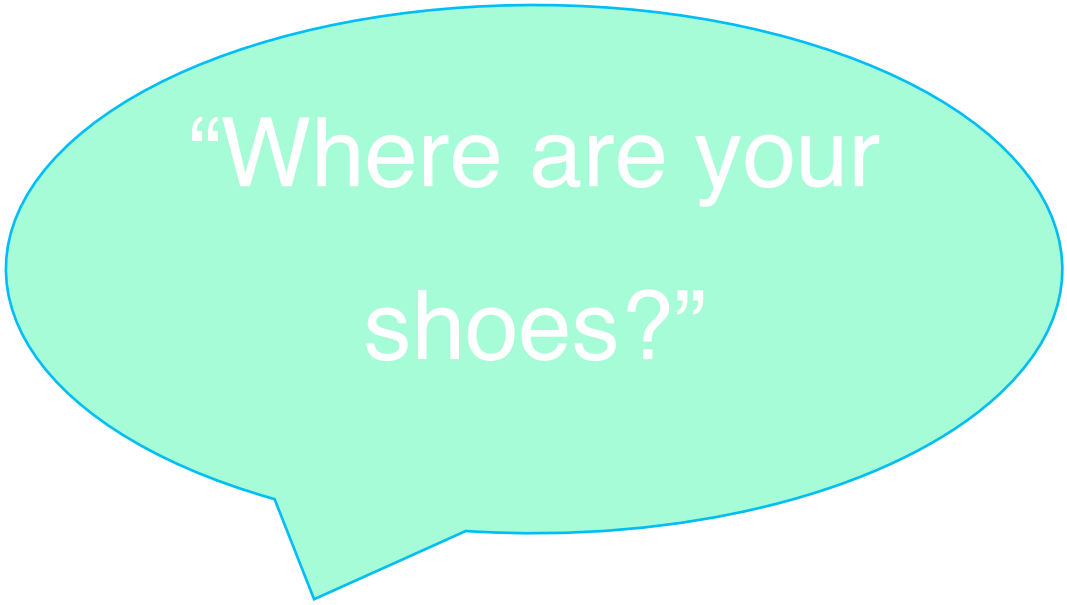
Dear Grown-up

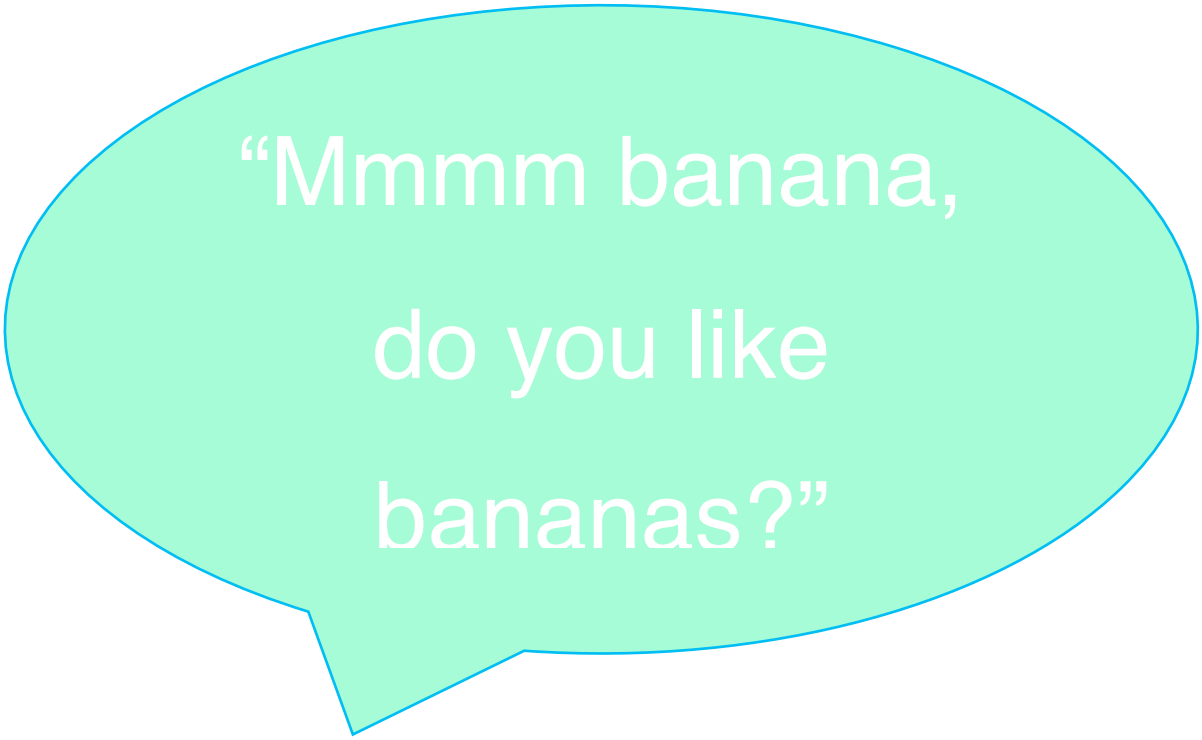
In this book are pictures of everyday things that your baby might know. Can you point to each one and ask your baby what it is called? We've added some other suggestions for ways to talk to your baby about the pictures, but feel free to enjoy the book together in your own way.

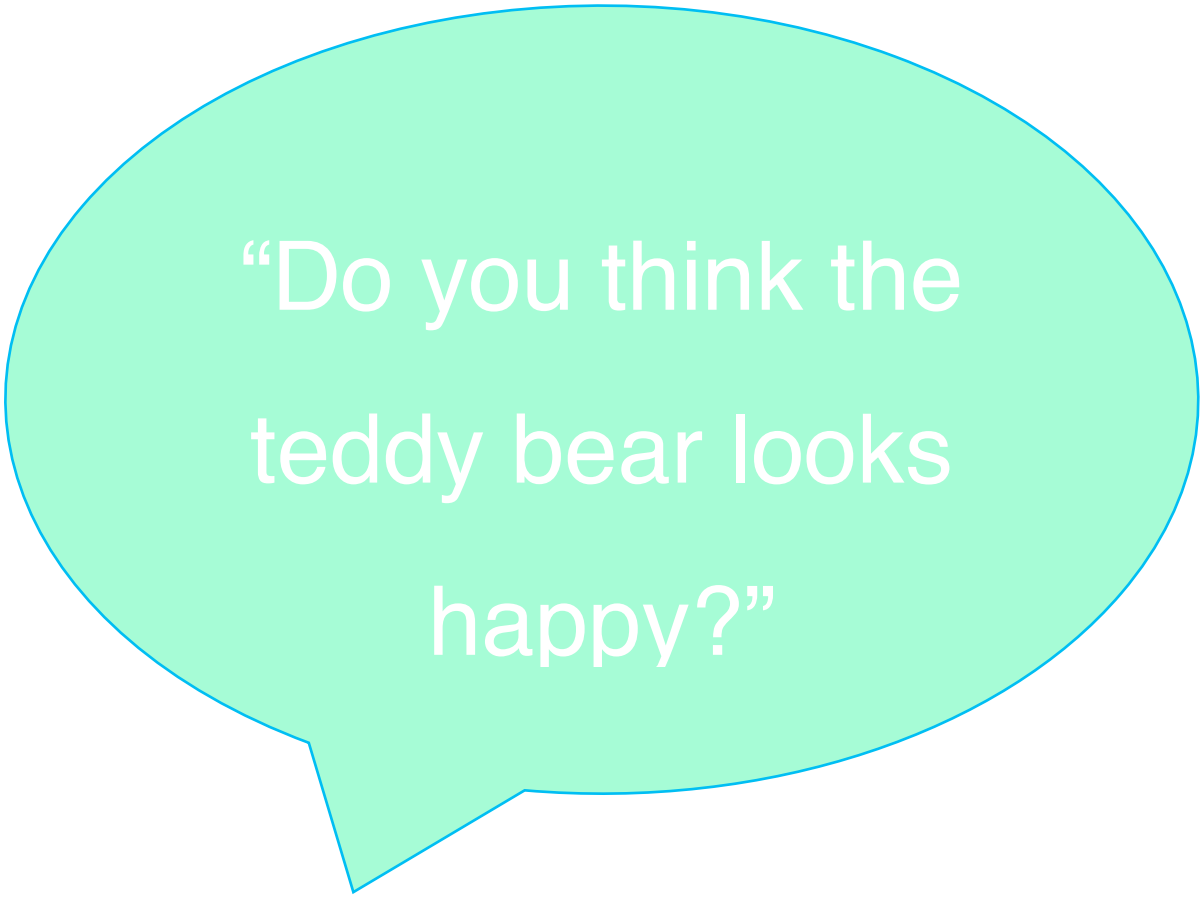
“What noise does the duck make?”

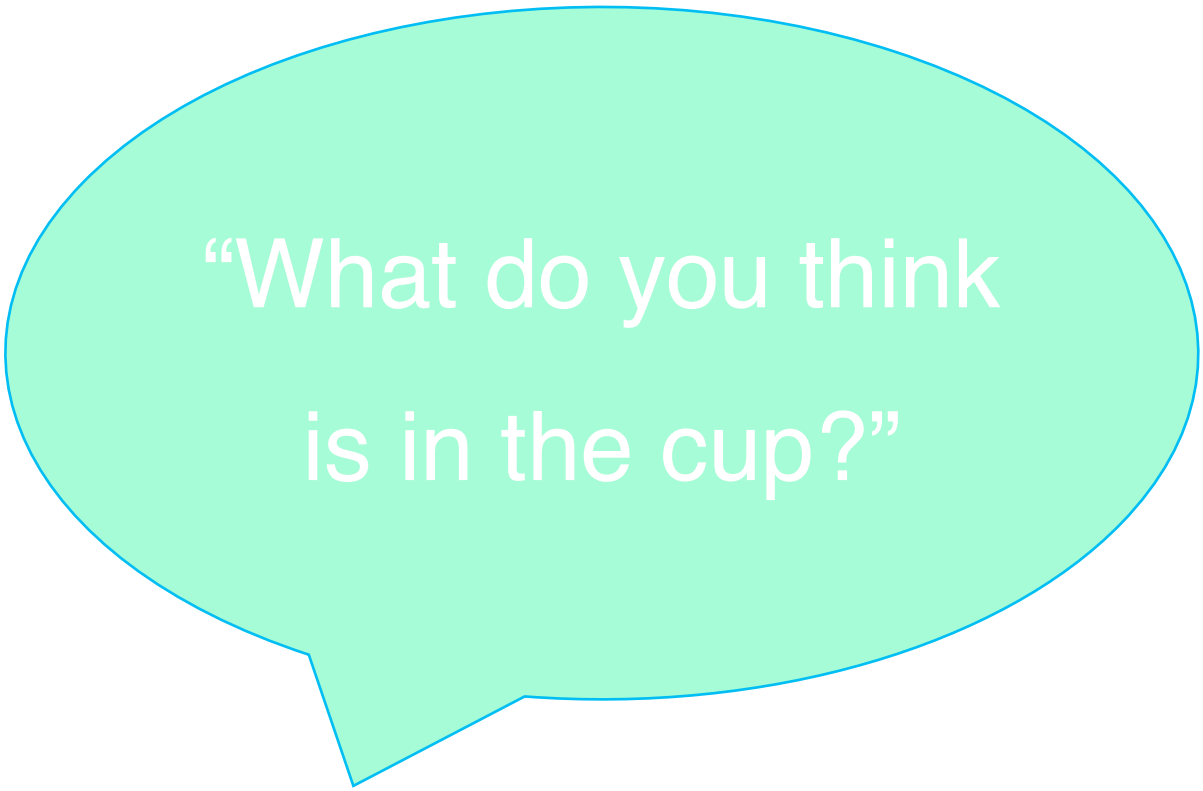
Here’s the action for duck

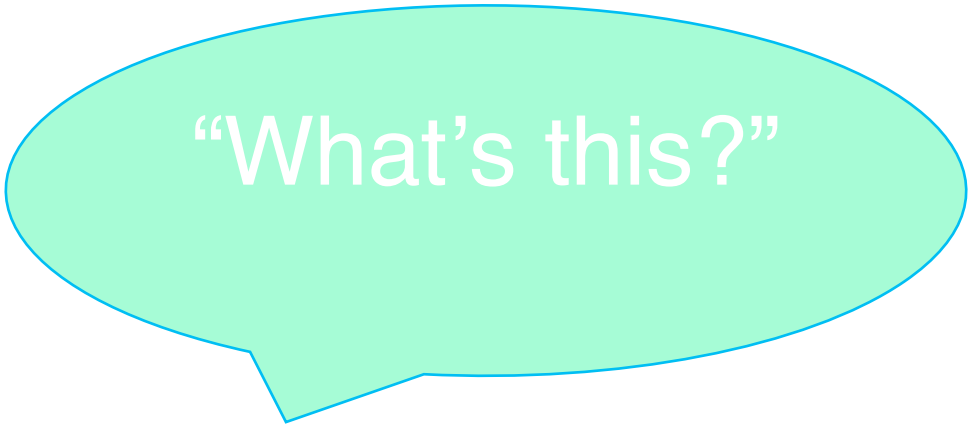


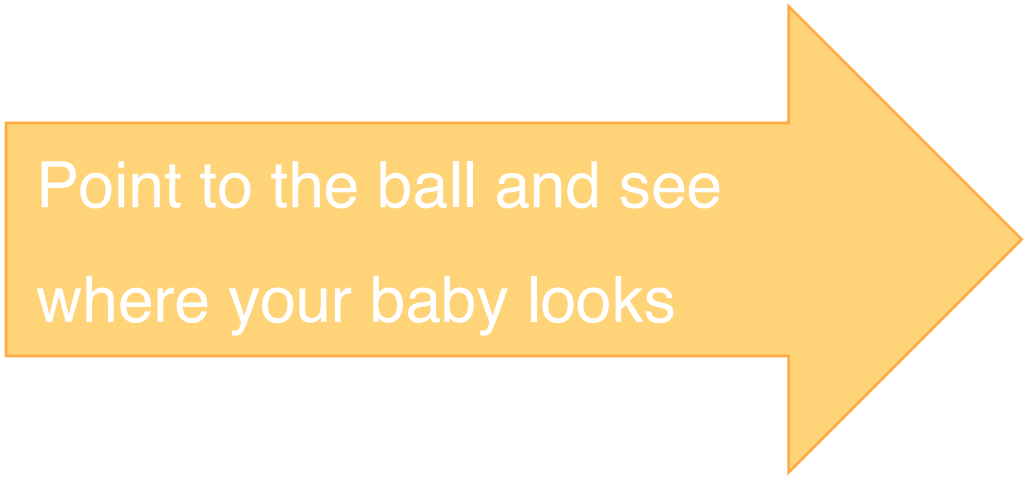

“Where are your shoes?”


“Mmmm banana, do you like bananas?”


“Do you think the teddy bear looks happy?”

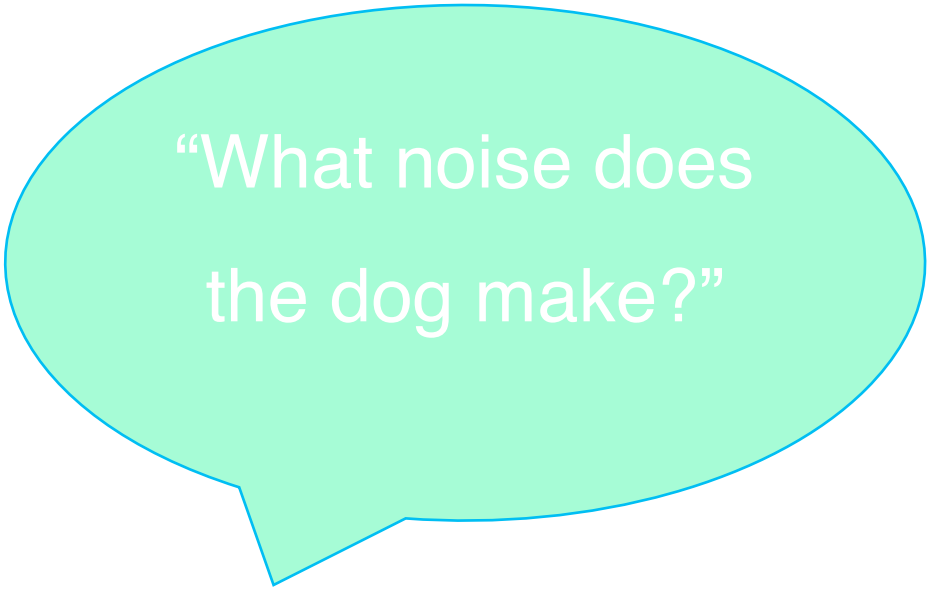

“What do you think is in the cup?”


“What’s this?”


Point to the ball and see
where your baby looks

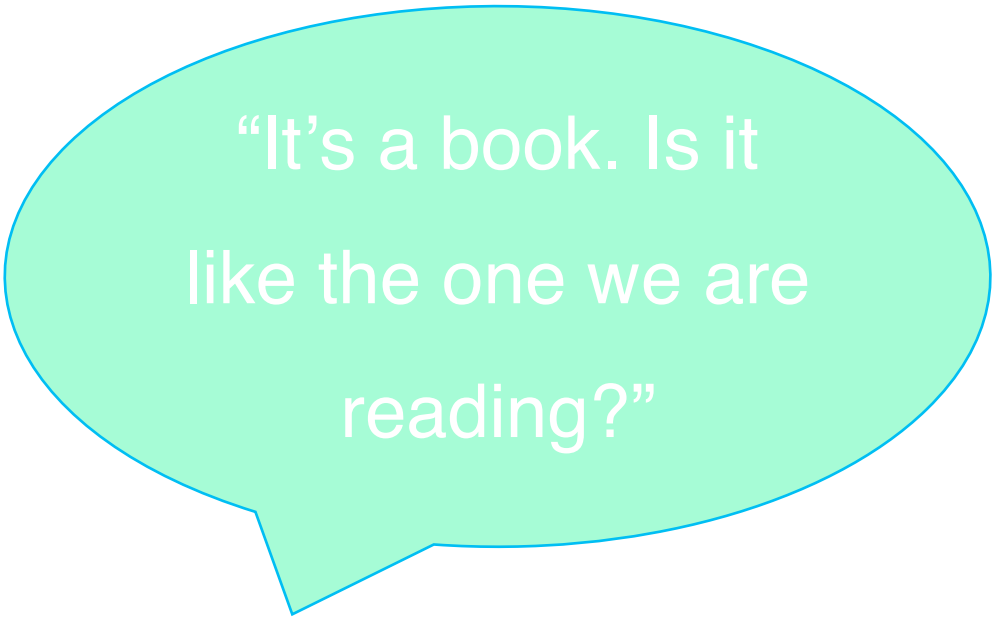
Can you talk to your baby about a time when they went on a car journey?


Does your child
know any dogs?


“What noise does
the dog make?”

“What noise does the cat make?”

Has your child seen a cat? Here is the action for cat.



Does your child like books?

Dear Grown-up

In this book are pictures of everyday routines that will be familiar with your baby, like waking up and getting dressed. Can you talk about each one with your baby, talking about what the child is doing in the picture and also about how your baby might do the same things in his or her day?

A day in the life of Sarah and Timothy Pea

In this book you will see

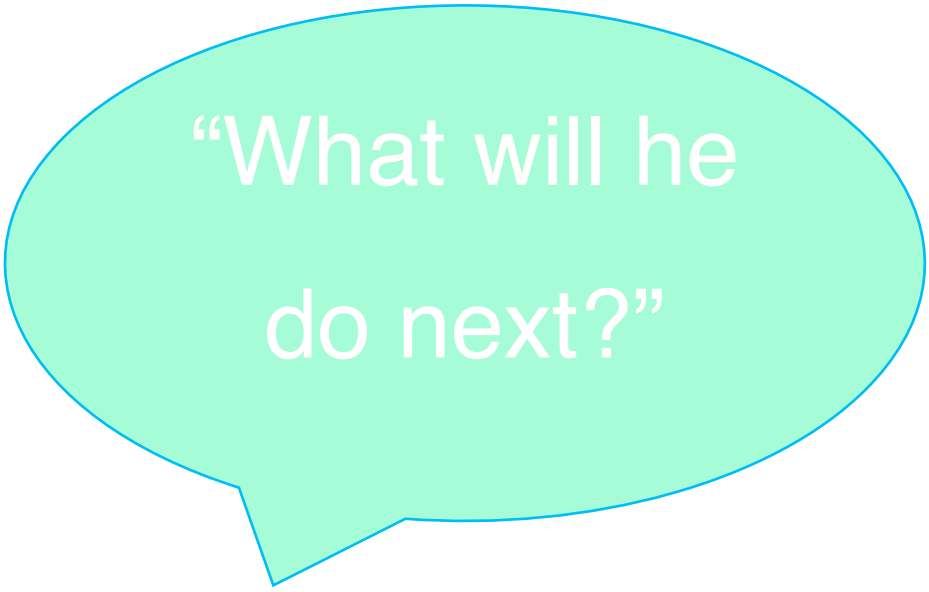
Pictures of a normal day for Sarah and Timothy Pea

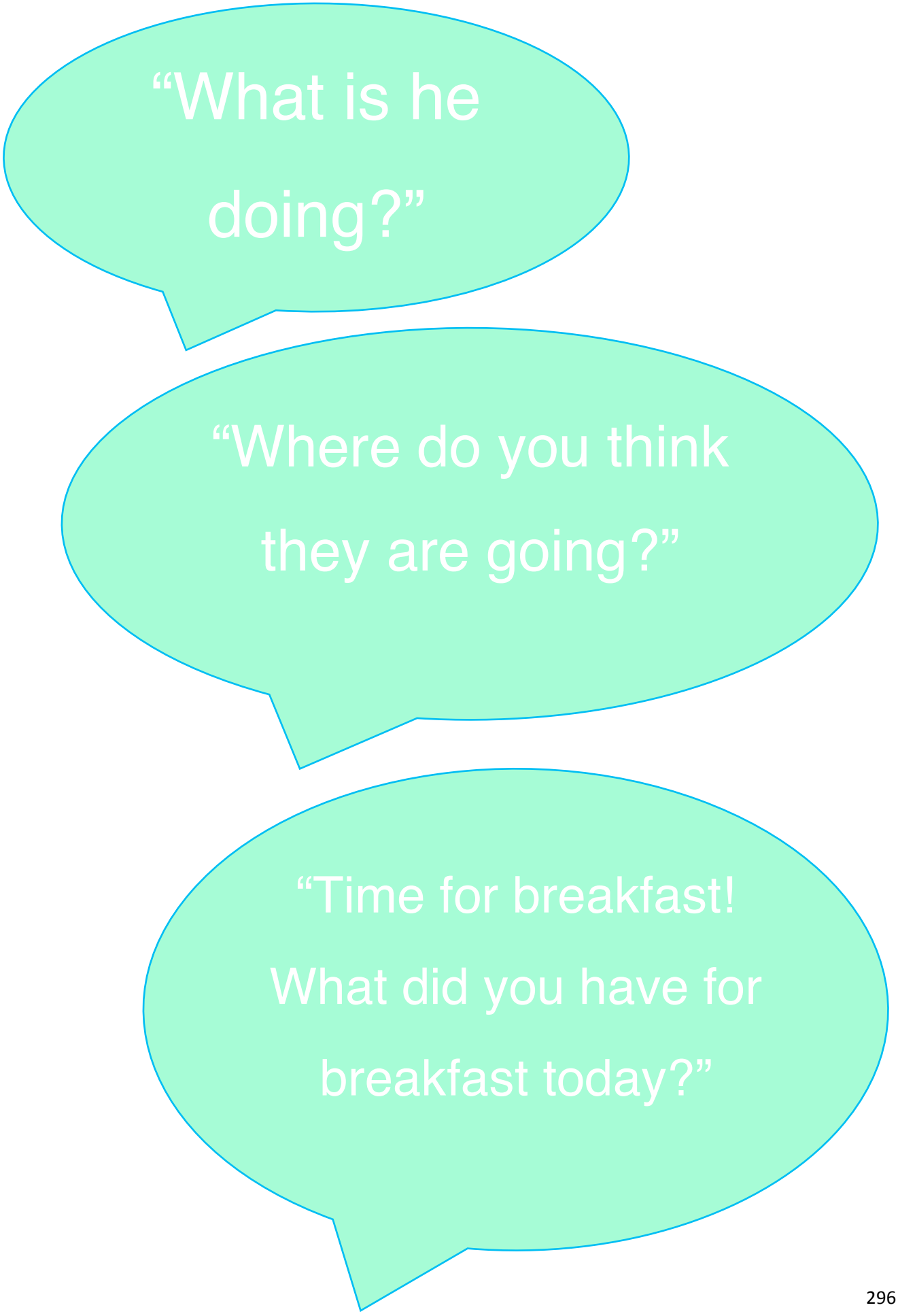
Can you tell me what you see?

Do you do the same things as Sarah and Timothy?


“What is the girl doing?”

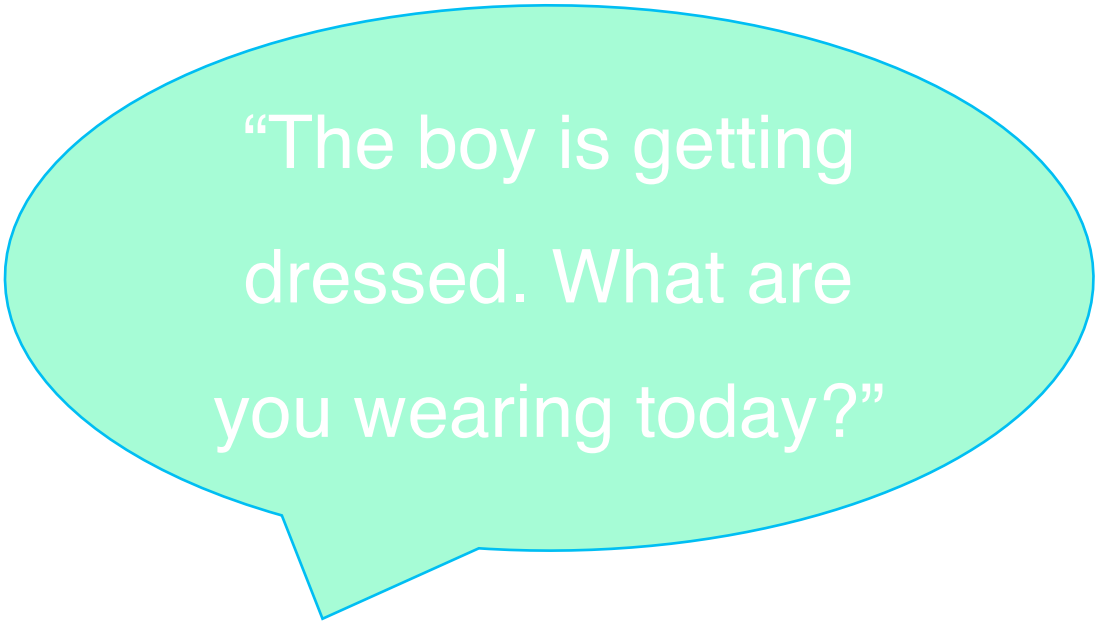

“What do we do when you go to bed?”

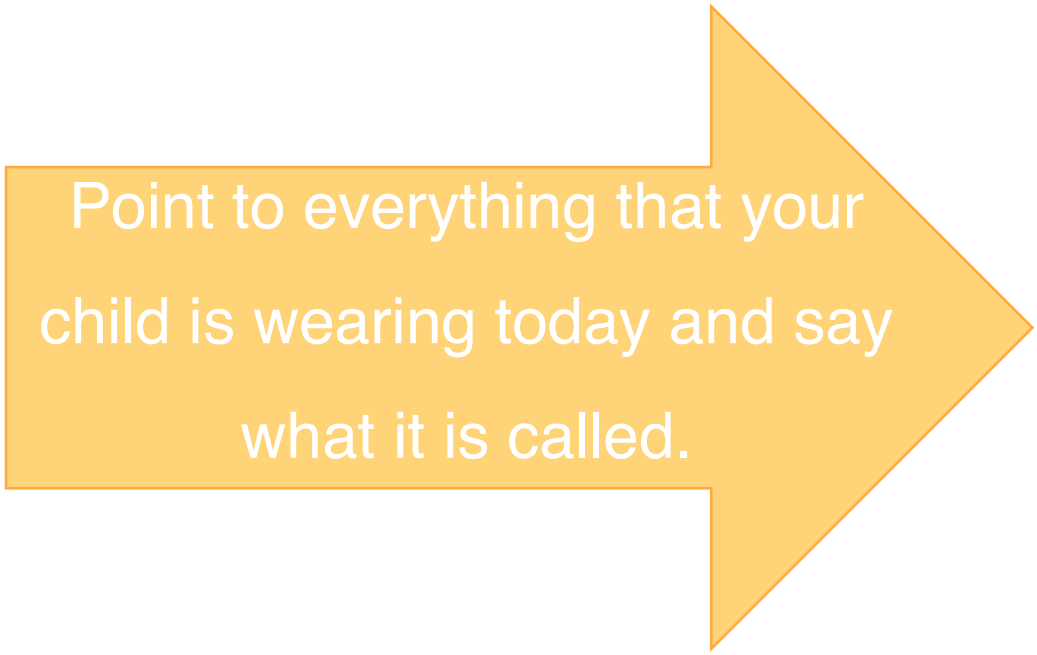

“What will he do next?”

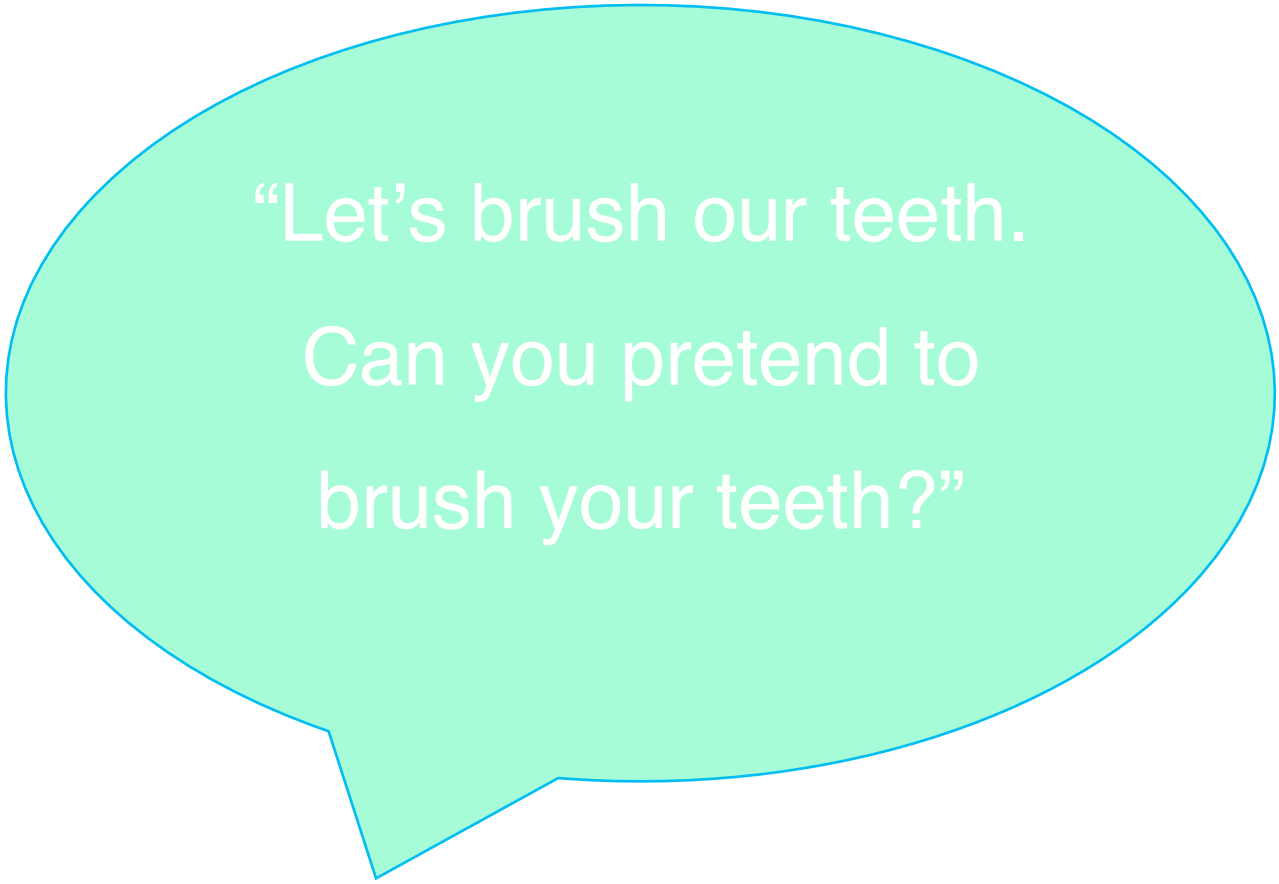

“What is he doing?”
“Where do you think they are going?”
“Time for breakfast! What did you have for breakfast today?”

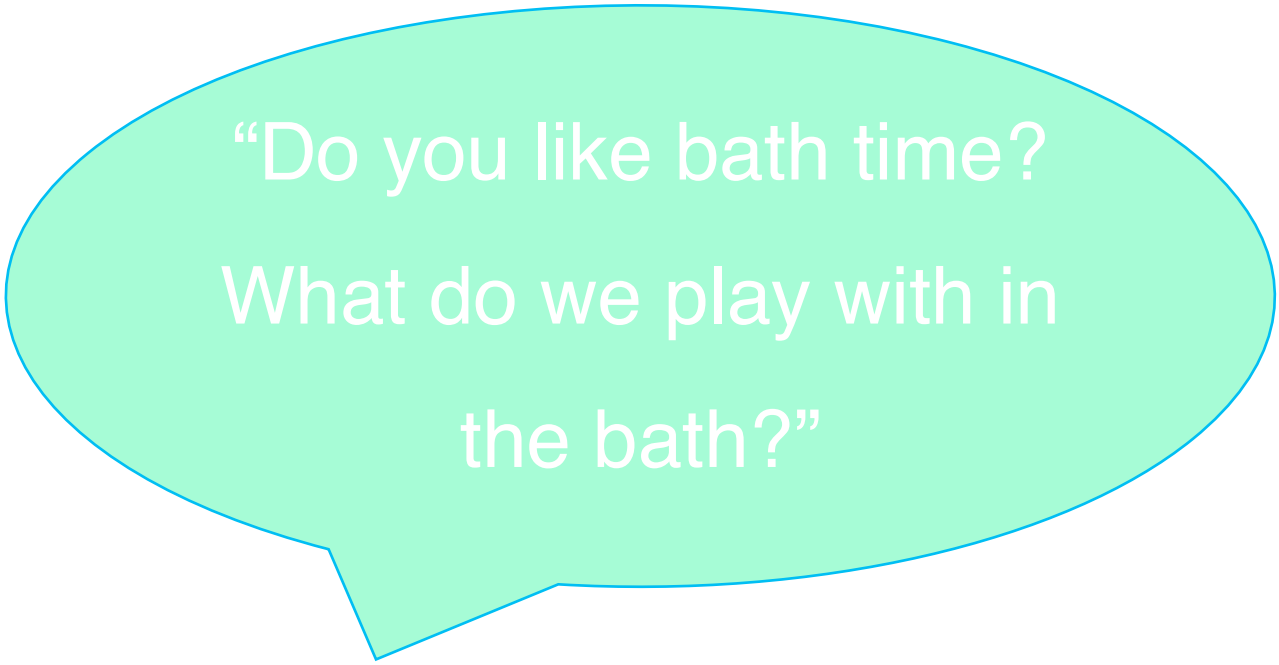
“Do you think she is thirsty? What did you have to drink today?”

“What is the boy doing?”

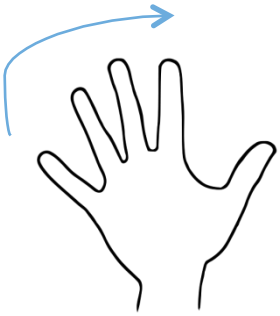

“The boy is getting dressed. What are you wearing today?”


Point to everything that your child is wearing today and say what it is called.


“Let’s brush our teeth.
Can you pretend to
brush your teeth?”


“Do you like bath time?
What do we play with in
the bath?”

“Let’s wave bye-bye!



“Cuddle time! Do you like to cuddle your teddy?”

Appendix N. The Babysitter book images