Infants' socialisation with books and the impacts of maternal input and book familiarity

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Abstract

The importance of shared book reading (SBR) for infants' language development has been highlighted by numerous studies (e.g. Raikes et al., 2006). However, in order to be able to 'read' books, infants must first learn to engage with them appropriately, which means 'contemplating' the book (Werner & Kaplan, 1963) rather than biting or hitting etc as with typical objects. Few studies have investigated the development of this ability which is the focus of this thesis. In this longitudinal study, 24 mother-child dyads were recorded when the infants were 10-, 16- and 28-months-old, engaging in SBR with both a familiar and unfamiliar book. Whilst the development of infants' abilities was assessed (Chapter 3), key factors influencing this were also analysed including maternal input (Chapter 4) and the impact of book familiarity (Chapter 5).

Infants displayed some understanding of how to behave with books, including jointly attending to the books, from 10 months old, but this had not fully developed at this stage with an intermediary stage being evident where the infants 'explored' the books. Infants' turn-taking and referencing skills were also investigated as these are thought to be facilitated by SBR (Jones, 1996). In terms of maternal input, this was analysed firstly for its teaching properties and then in terms of the strategies employed to engage the infants. Whilst previous research mainly focuses on the broader classifications of the functions of maternal language, evidence presented here suggests more specific classifications need to be utilised to enable a more detailed picture to be captured. Here, attention directives decreased in use, as did labels whilst maternal questions increased as the infants aged.

In terms of the impact of book familiarity, the infants' language and behaviours did not appear to be affected beyond more exploratory behaviours being used with unfamiliar books. However, this also coincided with more 'scaffolding' by the mothers with unfamiliar books such as more attention directives and more labelling.

Overall, this thesis is the most detailed examination of shared book reading with 24 infant-mother dyads. It details both the infants' developing behaviours with the book, the ways in which mothers scaffold these behaviours, and the ways in which book familiarity can influence both participants. As with previous research, there were positive relations between maternal language and infants' language development including maternal questioning at 16 months. However, overall, it should be noted that this was based on a relatively narrow SES sample therefore it is important to conduct similar researches with a wider SES group.

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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General Introduction

A brief overview

Shared book reading (SBR) with children has been shown to be beneficial for school readiness and later academic achievement, due to its effect on language development. For instance, a wealth of research has demonstrated a link between SBR and vocabulary development (e.g. Bus, van IJzendoorn, & Pellegrini, 1995; Raikes et al., 2006). Following on from this, early vocabulary size has been shown to predict later vocabulary size (Fenson et al., 1994) and vocabulary size at 2-years-old in turn can predict later reading achievement (Marchman & Fernald, 2008). Similarly, in a longitudinal study, vocabulary growth from 2- to 5-years-old reliably predicted expressive vocabulary, literacy and math skills at 5 years of age; all of which are used as indicators of school readiness (Tamis-Lemonda et al., 2014). School readiness, in turn, has been shown to predict later academic achievement. For example, interventions aimed at improving indicators of school readiness, such as expressive vocabulary and language, have been shown to increase children's success rates at school (Reynolds, Temple, & Ou, 2010). Additionally, literacy and math skills at 5-years-old has been shown to predict math and reading outcomes at 8-years-old (Romano, Babchishin, Pagani, & Kohen, 2010).

The literature outlined above demonstrates that shared book reading in infancy has wider implications for later academic development. The purpose of this thesis will be firstly, in the current chapter, to examine evidence investigating the effects of SBR on language development and theories behind this. This will be followed up with an explanation of how the present study was carried out in the General Method chapter.

The following three chapters cover the following themes and relevant data analyses. Chapter 3, is an analysis of infants' socialisation with books and the skills they develop in the process. The focus of Chapter 4 is the teaching and engagement practices used by caregivers during SBR and the impact these have on infants' SBR abilities. Since characteristics of the books themselves have been shown to differentially affect SBR interactions (e.g. Sénéchal, Cornell, & Broda, 1995), more specifically the influence of the familiarity of the book on SBR interactions will be reviewed and analysed in Chapter 5. The final chapter is a general discussion of the results, their implication and possible ways forward for future research.

SBR & its effect on language

Snow and Goldfield's (1983) longitudinal study analysed the transmission of language and information between the mother and child during SBR interactions. They were able to track the acquisition of language from when the mother first mentioned the word or information unit to when the child mentioned it in later sessions. They argued that due to its routinized nature, book reading enabled the child to adopt a strategy of repeating what they hear "*others say in precisely the same situation*" (Snow & Goldfield, 1983 p.566) aiding the acquisition of language.

As well as Snow and Goldfield's (1983) study, there are numerous other studies which demonstrate the beneficial effects which SBR activities have on children's linguistic development. A meta-analysis was carried out on some of these studies which all used a variety of different methodologies looking at the effect of SBR on children's language and literacy outcome measures (Bus et al., 1995). Over 29 studies, with a medium effect size, SBR was found to be positively related to language skills and this association was not found to be dependent on factors such as the socio-economic status of the families. As the children become older and more successful readers themselves, the effect size was reduced but still suggests SBR is beneficial even with these older children.

Many of these studies linking SBR to subsequent language development have investigated the different factors thought to influence this effect. For example, on the basis of maternal reports of SBR interactions, Debaryshe (1993) found age of onset to be the most robust correlate of language development suggesting that the earlier the children engage in SBR, the more impact it has on language abilities, with the average age of onset in this study being 7 months but some reported engagement in SBR from birth. SBR was also found to account for 35% of the variance of the children's receptive vocabulary but was not related to the children's expressive language skills. Debaryshe (1993) argued that this could be because expressive vocabulary may be more related to how much the caregivers request participation from the children which has been shown to differ (e.g. Debaryshe, et al 1991 as cited in Debaryshe, 1993).

A number of studies report that the frequency of SBR activities is also a strong predictor of language abilities (e.g. Crain-Thoreson & Dale, 1992; Rodriguez et al., 2009). In a review of book reading research, Fletcher and Reese (2005) suggested that the parents' knowledge

of children's linguistic competence is enhanced through frequent reading. This enables parents to be able to structure subsequent reading interactions so that they challenge the child. Intervention studies (e.g. Ortiz, Stowe, & Arnold, 2001) have shown that increases in the quality of SBR leads to increases in frequency of SBR, such as by training the parents in methods of making the SBR activity more fun and engaging the children more, can lead to increases in the frequency of SBR. As a result of this, Fletcher and Reese (2005) argued that with the increased quality of these more structured SBR interactions, the frequency is also likely to increase as both the parent and the child find it more enjoyable, which in turn, is likely to lead to increases in language learning.

In their review, Fletcher and Reese (2005) also argued that individual differences in the children's participation in SBR mediate the effect which reading has on language acquisition. In Sénéchal et al's (1995) study, they showed that children's responsiveness affects the quality of the SBR as those children who produced higher levels of vocalisations were given more feedback and asked more questions by the caregiver. Taken together with findings that asking the children questions can improve their expressive language abilities (Sénéchal, 1997), it can be suggested that the children's responsiveness can lead to more questioning which in turn can lead to more gains in expressive vocabulary which may account for Fletcher and Reese's (2005) suggestion. In support of this, Laakso, Poikkeus and Lyytinen (1999) assessed the children's level of participation at 14 months old using measures such as the amount of spontaneous vocalisations and then measured their language abilities four months later. As predicted, they found that those who engaged more with the book reading activities demonstrated more advanced language abilities at 18 months old. Similarly, Crain-Thoreson and Dale (1992) found that children's participation in SBR at 24 months significantly predicted their later language abilities at 2½, 4½ and, as Dale, Crain-Thoreson and Robinson (1995) found in a follow up study, it also predicted reading abilities at 6½ years old. Lyytinen, Laakso and Poikkeus (1998) suggested there is a reciprocal relationship in that children who are more linguistically and cognitively skilled are more interested in books, attend to books earlier, engage in SBR for longer periods and in turn have larger vocabularies.

Mol, Bus, de Jong and Smeets (2008) conducted a meta-analysis on intervention studies which included interactive reading formats aimed at increasing the child's participation in SBR and compared the effect on language to that when normal reading practices were

used. Of the sixteen studies included, they found a moderate effect size demonstrating how successful increasing the children's participation can be in improving children's expressive linguistic abilities in particular (Mol et al., 2008).

Looking at the SBR practices and the characteristics of low income families, Raikes et al (2006) assessed the impact of these on the children's later language development at 14, 24 and 36 months. Maternal education and maternal verbal ability predicted the likelihood of engaging in daily SBR activities. As well as SBR being related to language development, their findings suggest there may be a 'snowball' effect in that early exposure to reading can lead to vocabulary gains which in turn can lead to more engagement with reading and further vocabulary growth. A similar conclusion was reported in Rodriguez et al (2009) who also found home literacy activities, the quality of maternal engagement and the provision of reading materials all uniquely and cumulatively contributed to language outcomes at 36 months. Of the different characteristics investigated, Cox (1987, as cited in Lyytinen et al., 1998) suggested that home literacy activities have more impact on children's language development than the demographic characteristics of the parents however Scarborough and Dobrich (1994) argue against this saying that both types of factors are important as they reciprocally foster each other.

Overall, although these studies sought to highlight the numerous factors which influence this effect such as the age of SBR onset and the frequency with which SBR is engaged in, the key consistent finding from these is that SBR can play an important role in later language development.

Theoretical perspectives

Although the focus of this thesis is shared book reading, the key theoretical positions considered here are more general child development theories rather than those specific to reading. This is firstly because there are few theories or approaches which specifically focus on reading beyond the Home Literacy Model (HLM; (Sénéchal & LeFevre, 2002) and the Emergent Literacy (EL) perspective (Teale & Sulzby, 1986). Secondly, as highlighted next, the HLM model typically focuses on language and literacy development once the infants' have already been socialised with how to behave with books, as is the focus of the current thesis. Whilst the EL perspective puts more emphasis on these earlier

phases, this approach mostly draws from the more general child development theory of Vygotsky but with application to the SBR setting.

With respect to the HLM, although SBR activities do occur in other settings, the more common setting is in the home (Grolig, 2020). Within this setting, research has highlighted that there are two distinct forms of literacy activities; that of informal reading and formal teaching (Teale, 1982; Senechal, 2006). This led Sénéchal and LeFevre (2002) to propose the HLM for determining how children learn to read. In this model, informal reading experiences occur early on where the adults read the text of the book with accompanying illustrations, with the focus being on oral language and the story. In these cases, children's experience of the written forms of language is incidental to the overall activity. In contrast, in the case of formal teaching, through activities such as letter naming, the written form is a main focus of the activity. The model suggests that these two activities form two distinct pathways with differential effects on language and literacy. Whilst informal reading facilitates early vocabulary growth and comprehension, in the HLM model it is not thought to impact on literacy until more basic literacy skills have been acquired around 8-9-years-old. On the other hand, formal teaching promotes literacy development once basic language skills have begun to develop. As Sénéchal (2006) pointed out, models of reading should take into account preparatory experiences which facilitate development which the HLM does for literacy development.

A key perspective which puts more focus on these preparatory experiences is that of the EL perspective set forth by Teale and Sulzby (1986). The primary idea here is that of the importance of these earlier phases of SBR, going from birth to being classed as a 'reader'. In this view, even the initial non-conventional interactions and behaviours with books are important in shaping the infants later literacy abilities. To determine how infants become socialised with books, which is a key preparatory step before becoming a 'reader', the EL perspective utilises broader theories of child development and applies them to the SBR context. Therefore, for this thesis, the focus will essentially be prior to the informal stage of the HLM (Sénéchal & LeFevre, 2002) to investigate the development of the preparatory skills necessary for children to become 'readers' (i.e. how children come to engage with books as books) and, in line with the EL perspective (Teale & Sulzby, 1986), using these broader theoretical frameworks to conceptualise how this development occurs. There are a number of relevant theories of child development which could be considered here however

the two main theoretical positions in this thesis are those of the Social Interactionist view (Vygotsky, 1978) and the Bioecological theory of development (Bronfenbrenner & Morris, 2007).

Vygotsky's (1978) social interactionist theory posits that children learn and develop through interactions with the social world, particularly with others more competent in the necessary skill. Understanding and successful completion of a skill starts as a joint product which is co-created within the interaction before it can be internalised by the child and used independently. From this perspective "*the interpersonal processes are transformed into intrapersonal characteristics*" (Tudge & Winterhoff, 1993 p.64). As a result of this feature, it has been argued that in terms of research the outcome of the child acquiring the skill is less important than the process of how the child acquires it (Wertsch & Hickmann, 1987). Vygotsky (1978) also highlighted that a key feature of interactions are the tools which are used to mediate the process of internalisation, with language being perhaps the most important tool and, in the case of SBR, the book being another.

According to Vygotsky (1978), in interactions, adults, or 'more experienced' others, operate within the child's 'zone of proximal development'. This is defined as the difference between what the child can accomplish on their own and what they can do with the assistance of others. Here the adults are sensitive to the child's abilities, guiding or 'scaffolding' the child's participation, gradually placing more demands on the child as their abilities become internalised and develop. For example, during book reading and language development, adults may begin by asking the child to point to a referent in the book and once this has been mastered, further demands are placed on the child by asking them to label the referent (Ninio, 1983). The theory suggests that in order to fully understand a social interaction, the historical context and culture in which it was formed also needs to be considered. Therefore, each experience builds upon previous interactions and understanding which helps the adult to build this sensitivity to the child's current level of abilities and means the mechanisms of interactions are reciprocal (Tudge & Winterhoff, 1993).

In conjunction with this theory, the script theory proposed that children's development is aided by the 'scripts' or 'interaction formats' which organise their everyday lives (Bruner, 1985; Lucariello & Nelson, 1986). Here, common activities such as SBR or meal time are comprised of structured set of actions and required objects. In these events, some elements

are obligatory whilst others are optional or fill 'slots' in the event. With a restricted set of utterances being used within these highly predictable routine scripts (C. Snow, 1983), this simplifies the process of learning and development for the child. With early SBR being a classed as a common 'script', particularly with repeated readings of the same book, adults are able to operate within the child's 'zone of proximal development easily by assessing their understanding and placing increasing demands on the child's participation, whilst the child's participation is guided or 'scaffolded' by both the adults' input as well as the structure of the context.

Teale and Sulzby's (1986) EL perspective utilises both the script theory (Bruner, 1985; Lucariello & Nelson, 1986) and the social interactionist theory (Vygotsky, 1978) to explain how infants learn to become 'readers', including the earlier phases of becoming socialised with books. This theory highlights that SBR is a socially constructed interaction, with routine behaviours and language making this interaction highly predictable, facilitating the infants' learning first how to behave with books, followed by other language and literacy abilities. Also, in line with the mechanism of scaffolding, the EL perspective highlights how these interactions increase in complexity over time as the infants' age, knowledge and experience increase.

An alternative, perhaps more unified theory of child development, is the Bioecological model (Bronfenbrenner & Morris, 2007). In this perspective, development is determined by a complex interplay between factors relating to the psychology, biology and environment of the child (Grolig, 2020). Here, there are four spheres of the social world which impact on the child's development; the micro-, meso-, exo- and macrosystems (Bronfenbrenner & Morris, 2007). 'Microsystems', considered to be proximal influences on child development are perhaps the most important settings, comprising of the dynamics between the child and other people. Particular patterns of activities occur with the child and others fulfilling specified roles in a particular setting with particular features. Engagement in activities in these microsystems are constrained and become progressively more complex (Bronfenbrenner, 1994, as cited in Bronfenbrenner & Morris, 2007). For example, the home literacy environment could be considered as a microsystem in which the child and adult engage in particular activities (i.e. reading), with specified objects (i.e. books) and restricted set of utterances (particularly with repeated exposures to certain

books), and these interactions become progressively more complex (i.e. with the adult demanding more participation from the child over time).

The wider spheres consist of 'mesosystems' which are the interactions between two or more microsystems such as the home literacy environment and literacy activities in child care settings (Grolig, 2020). More indirect influences are placed on the child's development in the 'exosystems'. For example, the parents' socioeconomic status which can impact on the frequency with which the child and adult engage in SBR activities (e.g. Hoff, 2006). The wider culture such as cultural norms and laws form the 'macrosystems' within which the lower spheres operate such as education policies specific to literacy practices.

With proximal processes of the microsystems being a key determinant of child development, their impact on development is said to be determined by the regularity with which they occur and whether they occur over an extended period of time (Bronfenbrenner & Morris, 2007). Similarly, the child plays an active role in these activities with prior experiences influencing available resources and the outcome of the current interaction impacting in later proximal processes. This highlights the need to investigate aspects of the interaction in the microsystems which are thought to have the most impact on the outcome (Bronfenbrenner & Morris, 2007).

Overall, although the mechanisms suggested by the two key theories of Vygotsky and Bronfenbrenner may differ, both theories highlight the importance of interaction in children's development with participants playing active roles along with the impact of the context and of growth or maturation. For both theories, the characteristics of the key components of the interaction reciprocally influencing each other. A key interaction, 'script' or 'proximal process' within the 'microsystem' of the child is that of SBR and with such similar emphases of the two theories, they are not necessarily distinguishable in terms of predictions they may make for this activity.

Thesis overview

In line with the above theoretical perspectives, three key elements of the SBR transaction; the child, the caregiver and the book (Fletcher & Reese, 2005) are covered in this thesis. Each chapter focuses on one of these elements with the understanding, however, that this is

not done in isolation since each of the elements interact with each other, in a bidirectional, transactional cycle (Fletcher & Finch, 2015; Muhinyi & Rowe, 2019).

Both Vygotsky and Bronfenbrenner highlight the need to examine interactions over a time as interactions are not independent of previous experiences. Therefore, a longitudinal methodology was adopted for the purposes of this thesis with 24 mother-infant dyads being recorded reading both a familiar and unfamiliar book at 10-, 16- and 28-months old.

Chapter 3 looks at the development of infants' socialisation with books. In this area overall, very little research has been done on a broad scale with infants under the age of 3. Those which have been done have mainly been case studies and looked at one element of development such as labelling (e.g. Ninio, 1983). One broader scale study with 10-month-old infants looked at children's interest in books (Muhinyi & Rowe, 2019) but there has been little interest in how infants become socialised with these activities, a topic addressed by Jones (1996) in her case study. From a theoretical perspective, following on from both Vygotsky and Bronfenbrenner, chapter 3 looks at the maturation or biopsychological changes in the infants and the influence of the book context on the development of their abilities both specifically relating to the book as well as other more general communicative skills such as turn-taking.

Bronfenbrenner and Morris (2007) argued that there is a need for a focus on elements which most closely impact on the developmental outcomes (in this case infants' socialisation with books) which, for the purpose of this thesis, are maternal teaching and engagement strategies (Chapter 4) and the impact of the familiarity of the book (Chapter 5). In chapter 4, looking at a younger age group than in previous studies, the functions of the maternal language during book reading will be looked at in terms of teaching the infants either about the world (referential) or about how to behave with the book (regulatory). From another perspective, how the mothers teach or respond to infants' actions are also examined. As infants' engagement in SBR is seen as a key predictor of later word learning (Muhinyi & Rowe, 2019), this chapter also looks at the different strategies which the mothers used to gain and maintain the infants' engagement/attention. For Bronfenbrenner, proximal processes of SBR within the microsystem of the interaction develop over time, and become more complex, with the mothers meeting the developmental needs of the child within the context and supporting further development. Using Vygotsky's terminology, the 'more experienced other' scaffolds the interaction with

tools (in this case language and books) and activities (reading the books) within the child's 'zone of proximal development'. Therefore, this chapter is looking at how the mothers adapt the strategies used to 'scaffold' or 'meeting the developmental needs' of the child, and then looks at how these changes in strategies impact on the development of the infants' socialisation with books.

For both Vygotsky and Bronfenbrenner, the context is a key factor in children's development. With a key component of the SBR context being the book itself, the characteristics of these are thought to influence the proximal effects of SBR (Grolig, 2020). A common book characteristic which has been noted is that of book familiarity which will be considered in chapter 5. Book familiarity has been shown to impact on both the mothers and the children's language and behaviours in previous studies (e.g. McArthur, Adamson & Deckner, 2005) however the main focus of these studies has been over the age of 2 years old. Therefore, this chapter will look at similar factors as the previous chapters to investigate whether book familiarity will impact on these with a younger sample.

In sum, this is a longitudinal study of the development of 24 young infants' socialisation with books, which covers the development of their book reading appropriate behaviours (Chapter 3), maternal strategies in teaching and engaging their infants' interaction with books (Chapter 4) and, finally, how the familiarity of the book influences these issues (Chapter 5).

General Method

Participants

Infants and their caregivers were recruited either from the Child Study Centre database or from the local baby group at Manchester Museum. Twenty-four infants and their mothers participated in the final sample of the study. Given the qualitative differences in the linguistic environments of first and second born children (Oshima-Takane & Robbins, 2003), the decision was made to recruit only first-born children to ensure homogeneity in the sample as far as possible. Therefore, at the beginning of the study, the infants were typically developing, first born 10-month-old children with monolingual English-speaking mothers from middle class backgrounds. There were two groups with 12 dyads being asked to return every two months and 12 being asked to return every six months for a period of one year with a final 6 month follow up visit when the children were approximately 2 years and 4 months old. At each visit, the dyads received a small amount of monetary compensation towards their travel expenses along with the books which were used as the 'familiar' books. As far as possible, the dyads in each of the groups were matched for the infants' gender, maternal education and household income to ensure the two groups were comparable. Over the course of the study, four dyads withdrew from the study; three after the first visit and one after the second. The data from a further five dyads was omitted from the final sample to ensure comparability; three missed more than two of the visits, one was sent the incorrect familiar book and one included a male caregiver. Table 1 gives the demographic variables for both of the groups at the beginning of the study.

For the purposes of the analysis in this thesis, the two groups were merged into one larger group. As can be seen from the demographic information in Table 1 and data presented in Appendix 1, there are limited differences between the two groups which suggests that no differences would be anticipated in the analysis used in later chapters. In addition to this amendment to the original protocol, only the 10-month (first), 16-month and 28-month (final follow up) visits were analysed. At the 10-month visit, the mean age was 10 months and 10 days (range 1-30 days), at the 16-month visit the mean age was 16 months and 14 days (range 0-26 days) and at the 28-month visit the mean age was 28 months and 14 days (range 1-29 days).

Materials

Books: The selection criteria for books in both book conditions for the first six months of the study (i.e. the first three sessions for the bi-monthly group and the first session for the six-monthly group), was that they contained single pictures with single words on each page and only object-oriented board books with no flaps were included. Books selected in both conditions for the second six months of the study (i.e. the fourth to sixth sessions in the bi-

Table 1: Demographic variables of the two groups of dyads at the first visit

	Bi-monthly group	6 monthly group
Mean age of infants	10 months, 11 days	10 months, 8 days
Gender of infants	9 males, 3 females	8 males, 4 females
Ethnicity of mothers	All Caucasian British	11 Caucasian, 1 East Asian British
Level of education	1 at A-level	2 at A-level
	4 undergraduates	3 undergraduates
	7 postgraduates	7 postgraduates
Household income	3 £31-40,000	1 £31-40,000
	3 £41-50,000	5 £41-50,000
	4 £51-60,000	1 £51-60,000
	2 £60,000+	4 £60,000+
		1 not stated

monthly group and the second session for the six-monthly group), were again board books with no flaps however they contained a single, simple sentence and multiple pictures on each page. The books selected for both conditions, in both the final visit at the end of the year and also the 6-month follow up visit for both groups, all contained between two and four simple sentences per page with at least one complex sentence within the book and more complex pictures.

In order to control for the level of familiarity the infants had with all of the books used in the study, in both the familiar and unfamiliar conditions, books with low popularity ratings were selected. These ratings were identified based on sales information from Amazon and usage data from libraries in the Borough of Greater Manchester. From these lists, for each set of books, seven books were selected based on the above selection criteria.

One of these seven books with low popularity ratings was selected as the familiar book and a copy was sent out to all participating parents two weeks prior to their first visit with a log sheet. Similarly, one of the seven books from the second and final two sets were selected and sent out to the participants, two weeks prior to their six month, final and follow up visits. In each case, the parents were asked to read the book to their child at least once prior to the specified visit and then to make a note on the log sheet every time they read it to provide some indication of the familiarity of the books throughout the study. The book used as the familiar book for the first 6 months was *Mr Pusskins' Opposites* by Sam Lloyd, for the second 6 months, it was *Bunny and Bee Playtime* by Sam Williams, for the final visit, *Bear on a Bike* by Stella Blackstone and for the follow up visit *Don't worry Hugless Douglas* by David Melling was used.

Questionnaires: The Lincoln University Babylab Infant Communicative Development Inventory (CDI) was used to assess the infants' communication skills in terms of their gestures and receptive vocabulary. The Lincoln University Babylab Toddler CDI was used in the 6 month follow up visit. The Family Questionnaire (Noble et al., 2020) was used to assess frequency of activities (including book reading activities) at home and also to assign dyads to either group based on the mothers' responses regarding maternal education and household income. Descriptive statistics for the CDIs and the key reading related questions (Q1-3) in the Family Questionnaire can be found in Appendix 1.

The Preschool Language Scale – Fourth Edition (PLS-4UK; Zimmerman, Pond, & Steiner, 2009) was used to assess the children's receptive and expressive vocabulary in the infants' final visit at 28 months. In the Auditory Comprehension subtest, the child was asked to identify images corresponding with a given word or sentence whereas in the Expressive Communication subtest, the child was asked to identify the name for referents or produce short sentences about a given picture, all increasing in complexity. Descriptive statistics for the PLS scores can be found in Appendix 1.

Study Design

Although experimental designs allow for more control over aspects of the study to enable more causal explanation of outcomes, the rigidity of a controlled experiment was not feasible to apply to this study with infants of this age and with these research questions. Therefore, a semi-naturalistic design was used here; although the familiarity of the books was controlled as well as the restricted setting of the Child Study Centre with fewer distractions than would typically be evident in a home setting, the mothers and infants were on their own during the recorded sessions and could do what they wanted with the books.

Procedure

Prior to the study, the mothers were asked (via the consent form) to indicate which group they would prefer i.e. bi-monthly visits (8 visits in total) or 6 monthly visits (4 visits). The majority of dyads indicated that they had no preference for which group they wished to be in which enabled matching of the groups. Two weeks prior to any testing sessions, the book identified for the familiar category was sent out to the mothers along with a log sheet and they were asked to read the book to their child at least once prior to the beginning of the study.

Each mother and child were then invited into the Child Study Centre. Prior to the beginning of the testing session, the researcher showed the mother one of the six selected unfamiliar books (from a specified order) and asked whether they had read this book to the child. If they had, a series of questions were asked to establish how familiar they were with the book. If they owned the book or had read the book more than 5 times, another book is selected and the questions were repeated. However, this only happened on two occasion as the mothers expressed that they were unfamiliar with the chosen books on all other occasions.

For the first part of the testing session, the researcher first presented the child with an unfamiliar book to establish the child's baseline interactions with books. The unfamiliar book was used first in all testing sessions to control for familiarity in determining children's understanding of books. The mother was asked to engage in shared book reading with this book for up to ten minutes or until they felt it necessary to finish with this book in order to maintain the child's attention. A familiar book was then used by the

mother and they were again asked to engage in shared book reading for up to ten minutes or until they felt it necessary to finish the shared book reading session.

Following this session, they were given a selection of toys and asked to engage in free play for approximately ten minutes. All book reading and toy play sessions were video recorded to be later transcribed and coded. However, the toy play videos were not analysed as part of this thesis.

For the first visit of both groups, after both the book and toy play sessions were completed, the mother was given the Family Questionnaire (Noble et al., 2020) to be completed in the testing room and a CDI checklist to take home where they were asked to return it within a week. The CDI was given to the mothers after each visit to the Centre and the family questionnaire was given to them after every six monthly visit (i.e. the first, fourth, last and 6th month follow up visit for the bi-monthly group and all four visits for the six-monthly group).

At the 6th month follow up visit, following the book reading and toy play sessions, the Auditory Comprehension subscale of the PLS-4UK (Zimmerman et al., 2009) was administered to the child and presented by the researcher in the form of a game where the child would be given stickers as a reward for helping. Although the Expressive Communication subscale was attempted with each child, none completed this section due to task fatigue however all completed the Auditory Comprehension subscale.

Coding schemes

The baseline coding schemes which were utilised in all three data chapters are described here. However, the analyses in these data chapters sometimes built upon and developed these codes further. In these cases, the additional coding schemes are described separately in each chapter.

The first read through of both books at each session was transcribed and coded using the ELAN transcription software with different aspects of the sessions analysed on 16 different tiers within the program (see Appendix 2 for breakdown of tiers and codes and see separate chapters for specific coding schemes and reliabilities).

Two separate tiers were concerned with the mother's child directed speech (CDS) and the language or vocalisation used by the child, in terms of basic transcription of the utterances (which was transcribed using the CHAT transcription formatting (MacWhinney, 2000).

i.   Maternal book interactions

The mother's interactions with the book itself were coded on another tier. Basic actions with regard to the book were coded here including:

- OPN – opening the book
- CLS – closing the book
- UP – turning the book the correct way up
- T:Fwd – turning the page forwards
- T:Bk – turning the page backwards

Maternal interactions with the referents in the book were also coded including:

- PNT – pointing to a referent
- PNT:A – pointing but the referent is not clear
- PNT:ER – when the point is relating a referent to the child's experience such as pointing to the child's teeth
- PNT:ACT – when the point is imitating an action in the book such as going round in circles
- TCH – when the mother demonstrates manipulating a referent in some way for example stroking the image of a cat

Six codes were also added here to capture when the mother was influencing or correcting the child's action on the book which included:

- PREP – when the mother was preparing the book for a child's action such as preparing the page to be turned
- PREV – when the mother was preventing an incorrect action
- OPN:Corr – opening the book following the incorrect closure of the book
- UP:Corr – turning the book the right way up or over
- T:Fwd:Corr – turning the page forwards

- T:Bk:Corr – turning the page backwards[1]

ii.   Infant book interactions

All codes relating to the child's language or behaviour were preceded with a 'C' code to ensure no confusion was encountered in later searches as some of the codes were the same action or language codes. The child's interactions with the books were coded on another tier. Firstly, basic actions with regard to the book itself were coded using the same codes listed for the mother's interactions such as opening the book (C:OPN). The child's unsuccessful attempts at book actions were also coded by adding ':A' to the basic action codes. For example, C:OPN:A for child attempts to open the book and C:T:Fwd:A for child attempts to turn the page forwards. For the child's pointing actions, similar to codes were used as were for the mother's pointing actions however there was also an inclusion of C:PNT:Ext code for when the child's pointing did not appear to be related to the book reading activity[2].

It has been noted that during the early stages of book reading, infants often treat books as if they were objects (e.g. DeLoache & DeMendoza, 1987). Therefore, when the child manipulated the book in some way as if it were an object, for example by hitting, dropping or putting the book in his/her mouth, this was coded as 'C:OBJ'. On some occasions, the child attempted to manipulate or interact with a referent in a book as if it were real for example by stroking the referent, attempting the grasp the referent or waving at the referent. Therefore, this was coded as 'C:TCH'. However, this was sometimes unclear in terms of whether the child was treating the referent as if it were real or if they were treating the book as an object for example, rubbing the surface of the book. Therefore this was coded as 'C:TCH:A'. It was not coded if the child was touching the book but looks away for more than 5 seconds indicating they were not attending to the activity. Jones (1996) noted an intermediary stage between treating the book as an object and correct use/understanding of the book. In this case, children often explore the book by continually opening and closing the book or turning the pages backwards and forwards. Therefore,

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[1] Of the mother action codes, there were two additional codes used which were not included in analysis; reaching towards or taking the book (RTB) and re-enacting actions depicted in the book such as dancing (ACT).

[2] PNT:ACT codes were not included with the infants' pointing behaviours as no infants engaged in this.

once the child's actions were initially coded, these instances were recoded on a different tier as exploring actions (OBJExp).[3]

Reliabilities

One rater transcribed and coded the first read through of both books in all the videos using ELAN transcription software. On 15% of the transcribed files, distributed evenly across the three time points and also across the book types, a number of research assistants acted as second rater coding for the thirteen coding schemes relating to the parent's and child's language and book interactions. Reliabilities were as follows; 0.854 for child book interaction codes and 0.877 for parent book interaction codes. Other reliabilities will be discussed in later chapters however overall, on two occasions, the initial reliabilities did not reach above 0.650 with clear systematic problems with one or two of the codes in that coding scheme. In these cases, the coding schemes were reformulated. For example, in the Engagement Strategies coding scheme, the 'excited' code was difficult to define consistently based on intonation. This led to the alternative definition of stress being used and better inter-rater reliabilities. Initially there was also a code for encouraging the child to 'feel' the book however it was decided that this should be collapsed in with 'activities' code in order to be consistent.

Analysis Plan

Following consultations with several statisticians and academics, a number of key factors were taken into account when considering the plan for analysing the data; the small sample size, the robustness of parametric statistics and consistency across analyses.

It was noted that a number of studies reviewed in this thesis used parametric statistics with small samples (e.g. Fletcher & Finch, 2015, Chang & Luo, 2020) likely due to the robustness of parametric statistics. Therefore, preliminary analysis was carried out in each of the chapters. In some cases, the residuals were normally distributed suggesting parametric statistics were possible. However, this was only in a small number of cases, therefore consistency across the analyses was taken into consideration.

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[3] Of the child actions codes, There were five additional codes used which were not included in analysis; holding the book out to another person (C:HO) and reaching towards or taking the book (C:RTB), re-enacting actions depicted in the book such as dancing (C:ACT), showing some sign of expectation or knowledge about what is due to occur in the book (C:EXP) and when the child showed signed of pushing the book away as if they did not wish to continue the book reading activity - book refusal (BR).

The robustness of parametric statistical tests was also considered in relation to the likelihood of type 2 error with non-parametric tests. However, the possibility of not finding a significant difference when there was one was deemed more preferable to the likelihood of finding a significant difference when there was none or with the incorrect application of parametric statistical tests. Therefore, when considered overall, non-parametric statistics were used throughout this thesis including Friedman's tests, Wilcoxon signed ranks tests and Spearman's rank correlations.

Chapter 3 – The development of children's engagement with books

Introduction

In many groups in WEIRD[4] cultures, book reading makes up a large proportion of mother-infant interactions (Ninio & Bruner, 1978), and with the books, the children are introduced to letter-sound relations and informed about literacy conventions, story structures and the written language register (Bus et al., 1995). Prior to this, however, much more basic book-related skills need to be acquired such as turning the pages over in sequence rather than turning pages back and forth which can initially hold the infant's interest more than actually reading the book (Jones, 1996). Jones (1996) pointed out that when children first encounter books, they treat them the same way they treat all other objects as they explore them through their other senses such as by using their mouths and dropping them. As a result of this, caregivers may not find reading to infants very rewarding and they have sometimes been found to postpone these activities until the infants are better able to appreciate and engage more appropriately with it (Bus et al., 1995). Children must first learn not to put the books in their mouths or manipulate the books in other ways, but instead to treat them as objects of contemplation (Werner & Kaplan, 1963). Infants often go through an intermediary stage of exploring the book by turning the pages back and forth (Jones, 1996), before learning the various activities necessary to fully engage in SBR such as having to learn to hold the book upright (e.g. Teale, 1982). Additionally, during this transition, they must learn that they cannot manipulate the referents within the book, such as attempting to touch or grasp them, that these are only representations of real world objects, and that the correct behaviour towards these book referents is to point to, share attention to and later label or discuss (DeLoache, Pierroutsakos, Uttal, Rosengren, & Gottlieb, 1998); a task made more difficult in books in which there is an increased resemblance to real world objects such as with the use of photographs (Pierroutsakos & DeLoache, 2003).

Much of the research in book reading has focused on the years just prior to school age, from around 2 years old onwards (e.g. Malin, Cabrera, & Rowe, 2014). Previously, those studies which did look at reading in infancy were generally case studies (e.g. Snow & Goldfield, 1983; Hepburn, Egan, & Flynn, 2010) or relied on maternal reports of reading activities (e.g. Debaryshe, 1993; Karrass & Braungart-Rieker, 2005). Alternatively, the

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[4] WEIRD stands for Western, Educated, Industrialised, Rich and Democratic

focus was on one specific aspect of book reading, such as the acquisition of words (Ninio & Bruner, 1978) or the development of maternal labelling strategies (Ninio, 1983). With the popularity of shared book reading (SBR) research increasing, more focus is being given to the earlier years, with two notable studies looking at infants' engagement with books; Muhinyi and Rowe (2019) and Jones (1996). In Muhinyi and Rowe's (2019) study, with a sample of 44 dyads, they recorded SBR interactions at 10 months old, coding for maternal speech and the infants' interest in SBR activities, in order to examine the impact on the infants' language skills at 18 months. They found infants' interest in reading (as measured by combining scales of availability, affect and active participation) at 10 months old to be an important predictor of later language skills. On the other hand, Jones (1996) took a more qualitative approach. After recording SBR activities with her son and daughter once a month from the age of 8 months to 2 years, Jones (1996) noted that early picture book reading is not just simply about vocabulary learning but is also about learning some general communicative conventions, such as turn-taking, and helps to establish children's relationship with books. This study was one of the first to really focus on this aspect of socialising children with books and teaching them the correct SBR behaviours. The broader sample approach similar to Muhinyi and Rowe (2019) has been adopted in the current study, but as with Jones (1996), looking at this development in children's engagement with books and other general communicative skills learned from books from the age of 10 months onwards.

A key element of SBR is the attention to the book or more specifically the infant coordinating their attention with the caregiver to a third object, i.e. joint attention to the book (M Tomasello, 1995). Numerous studies have researched this critical skill and highlighted its role in language development (e.g. Carpenter, Nagell, & Tomasello, 1998; Morales et al., 2000). In one of the first of these, Tomasello and Farrar (1986) found that in both naturalistic and experimental settings, infants were more likely to learn words which were presented to them within joint attentional episodes in comparison to when the mothers' redirected the infants' attention to a referent. Individual differences in joint attentional abilities from 6 to 18 months have been found to be related to vocabulary development at 30 months (Morales et al., 2000). Although some point to evidence suggesting a less critical role such as the Children with Williams Syndrome's ability to learn words effectively without engaging in joint attention (e.g. Akhtar & Gernsbacher,

2007), the general consensus is that language used in joint attentional episodes enables the infants to learn the word-object mappings as it constrains the referents being discussed .

In the context of book reading, characters, objects etc, or rather 'referents' within the book are jointly attended to, and words and information within these joint attentional episodes are transferred about these book referents (Danis, Bernard, & Leproux, 2000). SBR with infants involves highly repetitive and routinised speech including attentional vocatives (e.g. 'Look at this') and labelling of the referents which draws attention to the specific referent and makes it easy for the infant to link the label to the referent (Ninio & Bruner, 1978). Although it has been suggested that despite looking at the same book, there is no guarantee that the infant and caregiver are attending to the same referent (Guo & Feng, 2013), the range of potential referents is greatly constrained and the number of studies highlighting the importance of joint attention and SBR for word learning both separately and together is increasing (e.g. Morales et al., 2000; Farrant & Zubrick, 2012). Some argue that as joint attention is intrinsic to SBR, SBR also facilitates children's ability to sustain attention more generally (Fletcher & Reese, 2005). In line with this, Vally, Murray, Tomlinson and Cooper (2015) carried out an 8-week book reading intervention with 14- and 16-month olds and their mothers and found substantial increases in both the infants vocabulary development as well as a separate measure of sustained attention.

Jones (1996) argues that the more general communicative functions of turn-taking and referencing are also facilitated through SBR. She highlights turn-taking as a mechanism which can be learned as the infant's act of looking (and sometimes vocalising) is interpreted as a communicative act both as discourse initiating and discourse responding and the interaction with the caregiver can be seen as a form of proto-dialogue. In these instances, the looking and vocalising constitute a turn in dialogue either responding to something the caregiver is looking at or introducing a new topic to which the caregiver responds. The infant's participation in the turn-taking grows with linguistic ability from simply looking, to pointing, which can serve to confirm word knowledge, alter the topic or extend discussions about particular referents (Jones, 1996).

It has been suggested that some skill in this area emerges as early as 2 months old with infants actively partaking in proto-conversations with latched turns and very little overlap (Gratier et al., 2015). However, in contrast, Garvey and Berninger (1981) point out that young children at 1- or 2-years old experience difficulty with the timings of turn-taking as

they often either begin their turns too early or too late. As a result of these contrasting findings, it has been suggested that although turn-taking skills emerge early, they are not full mastered until later childhood (Casillas, Bobb, & Clark, 2016). This is because early 'turns' involve the infants looking and does not involve language per se. This demonstrates their interactional skills in this area whereas once they begin to acquire their first words, they then need to integrate this interaction system with their language system (Levinson, 2006). Casillas et al (2016) argue that it is this interplay between these two systems which causes the disruption in infants' demonstrations of turn-taking and with first words typically occurring around the 12 months stage, the most disruption is thought to occur from this age to around 3 years old. However, when Hilbrink, Gattis and Levinson (2015) tested this, it was suggested that the slowing down of turn-taking began earlier than predicted around the 9 months stage, suggesting that this may be due to changes in infants' other communicative developments such as pointing.

As children's turn-taking skills have been shown to be better in collaborative contexts (Kim et al., 2015), this would suggest they may be more skilled at this when attending to the book. There is some evidence to support this: in Snow and Goldfield's (1983) longitudinal study, the child had established successful turn-taking practices in SBR by 1;10 as almost all of the mother's utterances were responded to, the child was able to answer questions, respond to mother's comments and avoided interruptions and pauses. Similarly in Ninio and Bruner's (1978) longitudinal SBR study, they noted that turn-taking was established early with only 1% of the utterances or exchanges occurring simultaneously. Following on from this, it could be that infants' turn-taking skills in joint attention with the book are evident from 10 months old with more problems later, or as with Hilbrink et al (2015), the two systems have already begun to integrate and the disruption has already occurred, meaning there will no decrease in these skills after 10 months.

Referencing skills are also thought to be aided by SBR (Jones, 1996) with pointing gestures being a common gesture used in SBR both on the caregiver's part and on the child's as his/her linguistic competence grows (e.g. Murphy, 1978). Children begin to point for others around their first birthday but can be as young at 9 months old and in comparison to other settings, infants most frequently use this gesture in SBR interactions (Murphy, 1978). From the socio-cognitive perspective, in order to begin to use this gesture correctly in interaction with others, the child must have seen the adult's pointing gesture,

understood the adult's communicative intention was to share attention to a specific referent and then imitates this action with reversed roles i.e. with the intention that the adult is to share attention with the child (M Tomasello, 2003). Liszkowski, Carpenter and Tomasello (2007) showed that when the intended referent was correctly identified from an infant's point, the infants continued to engage in joint attention. However, when an incorrect referent was identified, the pointing gesture to the correct referent was repeated by the infants. This differentiation between contexts suggests that by 12 months old, infants understand that the declarative form of pointing expresses that they want to share attention with the adult to a particular referent. This therefore suggests that this sharing of attention is their main goal when pointing in SBR activities.

Whole hand pointing has been compared to index finger pointing and it is argued the two seemed to embody different communicative and interactional acts (Liszkowski & Tomasello, 2011). More specifically, once infants begin to use index finger pointing, they use these gestures more frequently, coordinate them more with the vocal modality and demonstrate a better understanding of pointing in comparison to when using whole hand points. Similar to Jones (1996), Liszkowski and Tomasello (2011) argue that the development of the act of reference begins with infants' embodied looking and develops into pointing, taking this further by arguing that the motor act of referencing is not fully fledged until index finger pointing begins. This communicative act of pointing signifies a bidirectional referential understanding.

In general, as more pointing occurs when a social partner is present (Franco, Perucchini, & March, 2009), this gesture can be seen as establishing episodes of joint attention (Iverson, Capirci, & Caselli, 1994). As joint attentional engagement facilitates language acquisition (e.g. Tomasello & Farrar, 1986), this highlights that pointing is an important part of the SBR interaction. Tomasello and Haberl (2003) demonstrated that 12-month-olds can understand the intended target of an ambiguous pointing gesture, therefore it seems clear that the task of target identification would be much simpler with pointing in the SBR interaction. This, in turn, making the task of understanding the language easier.

The next stage of referential development is when pointing becomes integrated with the vocal modality (Iverson & Goldin-Meadow, 2005). This is a key intermediary stage where children can convey two concepts before they progress to using two word utterances (Capirci, Iverson, Pizzuto, & Volterra, 1996; Esteve-Gibert & Prieto, 2014) and is thought

to begin around 14 months (Murphy, 1978; Aureli et al., 2017). Grunloh and Liszkowski (2015) looked at these multimodal productions with 14-month-olds and found that they are produced more in imperative contexts when the infants were requesting objects in comparison to declarative contexts when the infants were informing, which suggests that these combinations give more clues as to the infants' intentions than simple pointing. Infants have also been found to produce more of these combinations when their communicative intention is not met (Liszkowski, Albrecht, Carpenter, & Tomasello, 2008). In the context of SBR, this suggests that the infants' combination of points with vocalisations can be seen as requests that the caregiver share attention about and discuss a specific book referent.

Taken together in terms of the development of children's referencing skills, it follows then that in SBR, once the behavioural act of referencing with index finger points has begun to develop, this will soon afterwards be combined with vocalisations, with the infants indicating their intentions for the caregiver's attention to the referent which they are pointing and vocalising about. As pointing occurs most often in SBR contexts (Murphy, 1978), this should also be the case for the coupling of pointing and vocalisations. Therefore, it follows that there will be more pointing in relation to the book in comparison to external points and this will also be the case for combined points and vocalisations.

Current Study

Overall, other than Jones (1996), there has been very little research looking at the development of infants' book reading skills over time. With 12 month old infants, caregivers are thought to assume primary responsibility for determining the course of the SBR interaction, providing linguistic support for, or 'scaffolding' the child's participation such as by providing labels for referents, whereas the level of assistance is lower with 18 month olds as the caregivers request more infant participation (DeLoache & DeMendoza, 1987). This suggests that as caregivers' assistance decreases, infants' participation increases. In fact, with Ninio and Bruner's (1978) analysis of one caregiver/infant dyad, there is evidence to suggest that between the ages of 8 and 18 months, active participation in terms of pointing and vocalising during book reading does increase over time. However, there is clearly a need to investigate a larger sample of infants in terms both of how they learn the correct literacy related actions and how they start to communicate about

the contents of the book. The predictions and areas of investigation are listed and explained below.

In the present study, the first and main question will look at when infants move from treating the book like an object to an object of contemplation (Jones, 1996), assessing this using two measures; Firstly, by looking at the infants' first actions on an unfamiliar book at each time point with the idea being that the treatment of this unfamiliar book would be the best indicator of the infants' baseline abilities in how to treat books. Secondly and more generally, the infants' overall book actions were assessed at each visit.

RQ1. How will the infants' abilities with the books develop over time? With measures of both first actions and overall actions, it is predicted here that the correct SBR actions will increase with age.

For the second question, part of the correct way to behave with books is to attend to the story or contents of the book. As book reading is said to facilitate infants' ability to sustain attention (Fletcher & Reese, 2005) and their book reading skills should improve with age, the attentional state of the infants was assessed throughout the book reading sessions at each time point.

RQ2. How will the infants' joint attentional abilities with books develop over time? In this case, the proportion of time spent in joint attentional episodes is predicted to increase across the ages.

Other communicative skills suggested to be aided by SBR which are assessed more closely here are the infants' turn-taking and referencing skills (Jones, 1996) in the third and fourth research questions.

As early infant 'looking' can be interpreted as a communicative act in a form of proto-dialogue (Jones, 1996), this suggests infants' non-verbal behaviours should be taken into consideration when measuring turn-taking abilities. However, the majority of previous turn-taking research has focused on infants' verbal turn-taking abilities as indicated by the timings of their vocalisations (e.g. Gratier et al, 2015). From this, two measures have been considered; either the rates at which the infants' overlap with the caregivers' utterances (i.e. when they are too early) or the gaps between their responses (i.e. when they are too late). In the context of SBR, the main focus has been on the rate of overlapping vocalisations. According to Snow and Goldfield (1983), turn-taking in SBR has been

established by 1;10 months, with less than 1% of utterances overlapping (Ninio & Bruner, 1978). However, it is not clear what infants' turn-taking abilities are like during SBR before this stage. Therefore, as with previous research, this will be assessed by looking at the rates with which these vocalisations overlap with the mothers' speech. With their turn-taking skills said to be disrupted by the emergence of their first words (Casillas et al., 2016), will their turn-taking skills be poorer at 16 months old in comparison to at 10 months old or will the amount of overlap have already begun to slow down as in Hilbrink et al (2015). In addition, will there be differences in the amount of overlap when the infants are jointly attending to the book in comparison to the other attentional states? The amounts of overlapping vocalisations will be assessed, in terms of the rates of infant-initiated overlaps and no overlaps, and the difference in these rates across the ages. First assessing their overall abilities, followed by whether the rates will be affected by the attentional state.

> RQ3. Looking at infants' turn-taking abilities within the SBR context, as measured by the rates at which they overlap with maternal utterances, how will this develop over time? The key focus here will be on the difference between 10 and 16 months in terms of when the disruption in turn-taking abilities might occur and whether they will be better at turn-taking in episodes of joint attention.

In terms of referencing, pointing is reported as occurring most often in SBR contexts (Murphy, 1978) and increasingly in line with children's linguistic and referencing skills (Tomasello, 2003). The coupling of points and vocalisations is suggested to be the next intermediary step in linguistic development (Iverson & Goldin-Meadow, 2005; Esteve-Gibert & Prieto, 2014) and to increase between 12 and 15 months (Aureli et al., 2017).

> RQ4. Looking at infants' referencing abilities within the SBR context, as measured by the rates of infants' pointing behaviours (including points overall and also points in combination with vocalisations), how does this develop over time? In relation to the above, taken together, it was predicted that points would occur most often in relation to the book, as would the coupling of points with vocalisations and that there would be a marked increase between the 10 months and 16 months visit.

In summary, this study will look at (1) the development of infants' understanding of how to engage with books as well as their skills in terms of (2) jointly attending to the book, (3) turn-taking and (4) infants' referencing skills.

Method

Coding Schemes and Reliabilities

(1) The development of infants' actions on books - The coding scheme (and reliabilities) for the infants' actions on books, such as turning the pages forwards, are described in the General Methods section however once this coding was completed, the child's first action on the book was highlighted for analysis. Rather than analysing individual SBR actions (as indicated in the original coding scheme; see Chapter 3), such as opening and closing the book and points, these were combined into an overall SBR measure to enable comparison to the other composite measures of object actions (i.e. actions including hitting or biting the book and combined with the ambiguous touch code, TCH:A), attempted actions (i.e. all SBR codes with a ':A' suffix) and exploring actions (i.e. actions which were recoded as exploration such as continuously opening and closing the book). Codes for when the child imitates an action from the book (C:ACT), book refusals (C:BR), holding the book out (C:HO) and taking the book (C:RTB) were omitted from this analysis to restrict analysis to behaviours on the book itself and similarly the expectation code (C:EXP) as there was only one instance of this.

(2) Attention to the book - The coding of the different attentional states of the participants was carried out on one tier. Codes here concerned whether both the parent and child were attending to the book (BO), only the parent (PO) or only the child (CO) were attending or if neither were (NO). In each case, the participants' head movements and, wherever possible, eye gaze were used to determine this and attention by either participant had to be maintained for more than five seconds. Following 15% of the video files being coded in ELAN by a second rater, the reliabilities were 0.869 for the attention codes.

(3) Turn-taking – The transcription and coding of the infants' vocalisations are described in the General Methods section. On another tier, vocalisations by the child were coded (VOC) and were given an additional code if the vocalisations were lexical-like in form (L)[5] with basic transcriptions of these vocalisations being added to a separate tier, as discussed

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[5] Vocalisations were also coded further for whether the child was repeating the text (Txt) or around the book content (Out) but these were not analysed as the Txt forms were very infrequent. Similarly, mainly with reference to the later visits, the structure of the infants' vocalisations were also coded and analysed in chapter 5.

in the General Methods chapter. Following 15% of the video files being coded in ELAN by a second rater, the reliabilities were 0.865 for the child verbal codes.

(4) Referencing – Similarly, details of the coding of infants' pointing gestures are noted in the General Methods section. These gestures were coded along with the infants' other book related behaviours and, following 15% of the video files being coded in ELAN by a second rater, the reliabilities for this overall coding scheme was 0.854.

Data Extraction Using ELAN and Excel

For the basic analysis in this chapter, data extraction used one ELAN tier and involved importing the data into Excel with simple pivot tables to produce the numbers, which were then used to calculate mean actions per minute or mean proportions. This was the case for infants' attention (2), however, the searches for overall actions (1), turn-taking (3) and referencing (4) involved searching across multiple ELAN tiers which required some manual manipulation of the data once imported into Excel in order to exclude duplicates or locate omitted codes.

For overall actions, two searches of ELAN were conducted. The first baseline search involved a wild card regular expression to extract all codes on the child book interaction tier whilst the second involved extracting the explore codes (OBJExp) along with those codes on the child's book interaction tier which were '*fully aligned*'. Once these two searches were combined in Excel, the book action codes which were combined with explore codes were identified in the baseline search where the duplicates were removed.

The turn-taking measure had to be extracted in stages with the first part being to look at vocalisations during the different attentional states. This involved using the wild card regular expression to extract all codes on the child verbal tier (with its associated transcription of the vocalisation) which occurred '*within*' all codes on the attention tier. As there were 5569 vocalisations on the child verbal tier alone and 5320 of these occurred 'within' the codes on the attention tier, this meant 249 were not picked up by this search. Due to the way ELAN searches work, this is due to codes on the child verbal tier overlapping the boundary of two codes on the attention tier. This required locating each of these codes manually to determine the extent to which it overlapped with one attention code more than the other.

The next stage involved looking at whether these 5569 vocalisations overlapped in any way with the mothers' speech. This involved using the wild card regular expression to extract all codes on the child verbal tier (with its associated transcription of the vocalisation) in conjunction with four additional search parameters done separately. The vocalisations were extracted when they had annotations on the CDS tier which were '*right overlapping*', '*surrounding*', '*within*' and '*left overlapping*'.

Vocalisations which occurred in two or more lists (right, left or within overlaps) were moved to create a fifth list indicating instances where the child and mother are interrupting each other. Vocalisations in the left overlapping and surrounding search data were counted as the child interrupting the mother whereas vocalisations in the right overlapping and within search data were counted as the mother interrupting the child. Once the left and surrounding search data were combined, duplicates within these lists were located and removed so that the vocalisations only occurred once. This was also done for the right and within combined search data. Taken together, the vocalisations within these three lists were then given unique identifier codes within Excel in order to identify which of the 5569 basic vocalisations from the original attentional state search occurred with and without overlap. Once all of these data were extracted and the lists formulated, pivot tables were used to gather the data. The 'Attention' data was first collapsed in order for the turn-taking data to be calculated overall and then re-enabled to calculate the differences across the attentional states.

For the referencing, the first part looked at rates of pointing either to the book or externally which involved the basic single tier ELAN search. However, for the second part which looked at whether these points were combined with a vocalisation, this involved multiple tiers. Therefore, three additional search parameters done separately. The points '*right overlapping*', '*surrounding*' and '*within*' the annotations on the child verbal tier were extracted, along with its associated transcription of the vocalisation for reference. Any duplicates which occurred across the three searches were removed so that it only appeared on one of the data lists and the three were combined to show how many points were used in conjunction with a vocalisation. These were then removed from the overall points data to highlight how many points occurred alone.

Results

The development of infants' actions on books

In order to investigate the development of infants' abilities in terms of how to engage with books, two measures were analysed. Firstly, the infants' first action on the unfamiliar book as a measure of their baseline abilities in how to behave with books and secondly, their overall book actions throughout each book reading session.

i. *First action on the book.*

At each time point, at the start of the book reading session, the unfamiliar book was always presented first by the researcher to assess the infant's understanding of what to do with a book. The infants' first actions at each session on the books were recorded.

Figure 3.1a shows that at 10 months, although there were 11 infants treating the book like an object, the remaining infants demonstrated some abilities in terms of what to do with a book with three successful actions and the remaining attempting to but not having the manual dexterity to successfully complete the action. At 16 months, the infants' skills with the books and ability to manipulate the books have developed further to successfully being able to open the book with 17 infants being successful in this area and the number of attempts and object actions having decreased with only one object action at this stage. With only one attempted action at 28 months, the rest of the infants were either successfully able to open the book or pointed towards a referent in the book.

i. *Overall actions*

With the addition of the exploring actions included in this analysis, Figure 3.1b shows the mean object, explore, SBR attempts and successful SBR actions per minute. Three Friedman's rank sum tests were conducted comparing the mean per minute of the different action types at each time point separately. At 10 months old, there was a significant difference between the action types, $\chi^2 (3) = 17.05$, $p < .001$, and the Kendall's coefficient of concordance ($W = .357$) indicated this was a medium effect. Post hoc analyses were carried out using Wilcoxon, applying a Bonferroni corrected criterion of $p < .008$. Although there was no significant difference in the amount of object actions in comparison to explore actions ($p = .008$, $r = 0.54$), there were significantly more object actions per minute in comparison to attempted SBR actions ($p = .001$, $r = 0.65$) and successful SBR actions ($p < .001$, $r = 0.76$). There was no significant difference in the mean explore
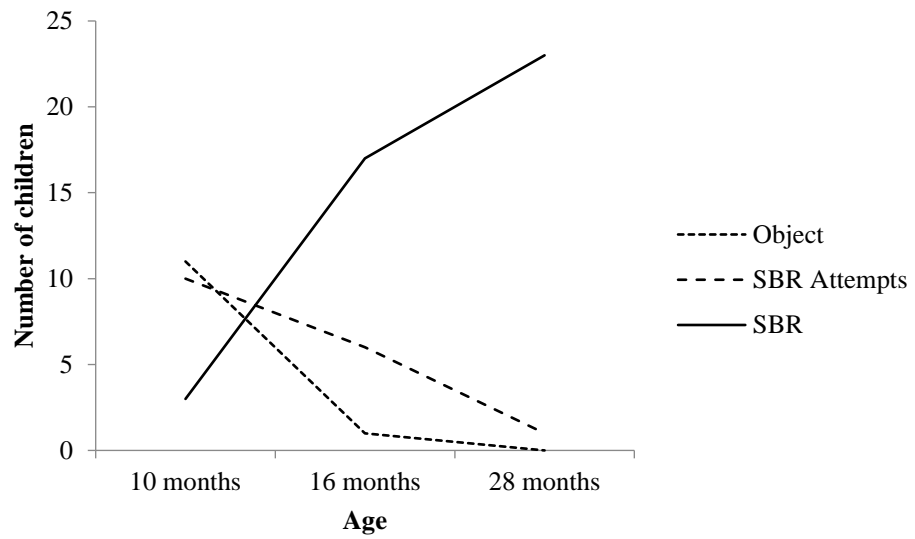
Figure 3.1a. The infants' first actions on the book across the three time points.
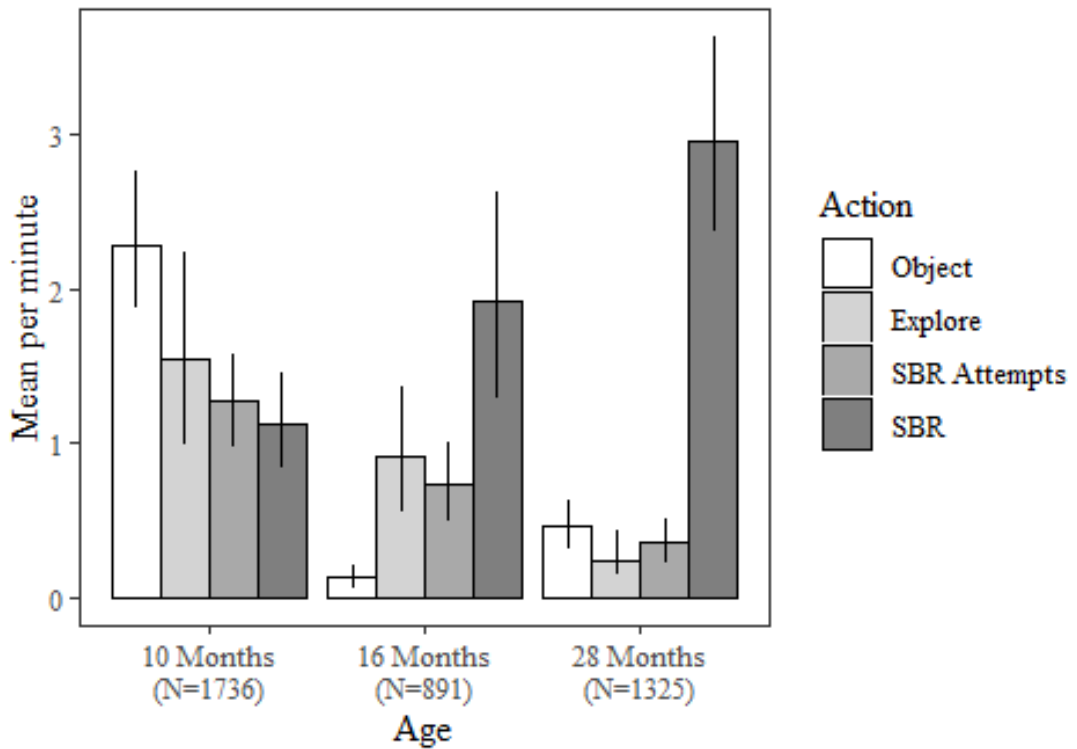
Figure 3.1b. The mean number of infants' overall actions on the book per minute across the three time points

actions per minute in comparison to attempted SBR actions ($p = .900$, $r = 0.03$) and successful SBR actions ($p = .539$, $r = 0.13$) as well as there being no significant difference between amount of attempted and successful SBR action produced ($p = .303$, $r = 0.21$).

At 16 months old, there was a significant difference between the action types, $\chi^2(3) =$ 26.11, $p < .001$, and the Kendall's coefficient of concordance ($W = .446$) indicated this was a medium effect. Post hoc analyses were carried out using Wilcoxon, applying a Bonferroni corrected criterion of $p < .008$. Almost the reverse pattern to that at 10 months is evident at this age with significantly fewer object actions per minute in comparison to explore actions ($p < .001$, $r = 0.85$), attempted SBR actions ($p < .001$, $r = 0.93$) and successful SBR action ($p < .001$, $r = 1.14$). There was no significant difference between the mean explore actions per minute in comparison to attempted SBR actions ($p = .401$, $r = 0.17$) and successful SBR actions ($p = .057$, $r = 0.39$). However, there were significantly more successful SBR actions per minute than attempted SBR actions ($p = .002$, $r = 0.63$).

At 28 months old, as there were only two infants who produced explore actions (at a rate of 0.43 and 0.16 per minute), this action type was removed from analysis. There was a significant difference between the three action types, $\chi^2(2) = 36.85$, $p < .001$, and the Kendall's coefficient of concordance ($W = .392$) indicated this was a medium effect. Post hoc analyses were carried out using Wilcoxon, applying a Bonferroni corrected criterion of $p < .017$. There was no significant difference between the mean object actions per minute in comparison to attempted SBR actions ($p = .332$, $r = 0.20$). However, there were significantly more successful SBR actions per minute than both object actions ($p < .001$, $r = 1.13$) and attempted SBR actions ($p < .001$, $r = 1.16$).

Overall, based on both the infants' first actions on the books as well as their overall actions, some abilities are demonstrated early on with some correct SBR actions but at 10 months old, treating the book as an object was still the predominant action. At this stage, the rates at which they explored the booked, attempted SBR actions and correct actions did not differ. However, between this and the 16-month visit, the infants' abilities with books as well as what appears to be their manual dexterity in being able to handle the books seems to have developed further with the predominant action at this age being correct SBR actions. This was also the case at the 28-month visit, where explore actions were near obsolete and object and attempted actions were rare.

Infants' attention on books

In order to investigate the development of infants' attention to the books, the proportion of time where both the mother and child were jointly attending to the book was analysed along with when only the mother was attending, only the child was attending and when neither were attending to the book. For the proportion of time which the infants spent in the different attentional states, descriptive statistics for each individual infant are presented in Figure 3.2. The proportions of time when only the infants were attending to the book were infrequent, never raising above .03% of the overall time of the book reading sessions and were therefore excluded from the analysis[6]. Three Friedman's signed rank tests were carried out comparing the proportions of each attentional state at each of the time points and a fourth Friedman's test was used to look at the periods of joint attention only across the three time points.

At 10 months old, there was a significant difference between the proportions of time in each attentional state, χ^2 (2) = 34.33, $p < .001$, and the Kendall's coefficient of concordance ($W = .120$) indicated this was a small effect. Post hoc analyses were carried out using Wilcoxon, applying a Bonferroni corrected criterion of $p < .017$. The proportion of time which the infants spent jointly attending to the book with the mother was significantly higher than the proportion of time when neither of the participants were attending ($p < .001$, $r = 1.19$) and when only the mother was attending to the book ($p < .001$, $r = 1.18$). The proportion of time when only the parent was attending was significantly higher than when neither were attending to the book ($p < .001$, $r = 0.70$).

A similar pattern is evident at both 16- and 28-month visits with a significant difference between the different attentional states: 16 months (χ^2 (2) = 16.33, $p < .001$, $W = .072$) and 28 months (χ^2 (2) = 37.41, $p < .001$, $W = .081$). Post hoc analyses were carried out using Wilcoxon, applying a Bonferroni corrected criterion of $p < .017$. In both cases, the proportion of time which the infants spent jointly attending to the book with the mother was significantly higher than the proportion of time when neither of the participants were attending ($p < .001$, $r = 1.09$, and $p < .001$, $r = 1.21$, respectively) and when only the mother was attending to the book ($p < .001$, $r = 0.98$, and $p < .001$, $r = 1.21$, respectively).

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[6] The number of infants who engaged in infant only book attention at each visit (and the range of proportions): Two infants at 10 months (.004% and .008%), five infants at 16 months (all .02%) and seven infants at 28 months (between .007% and .03%)
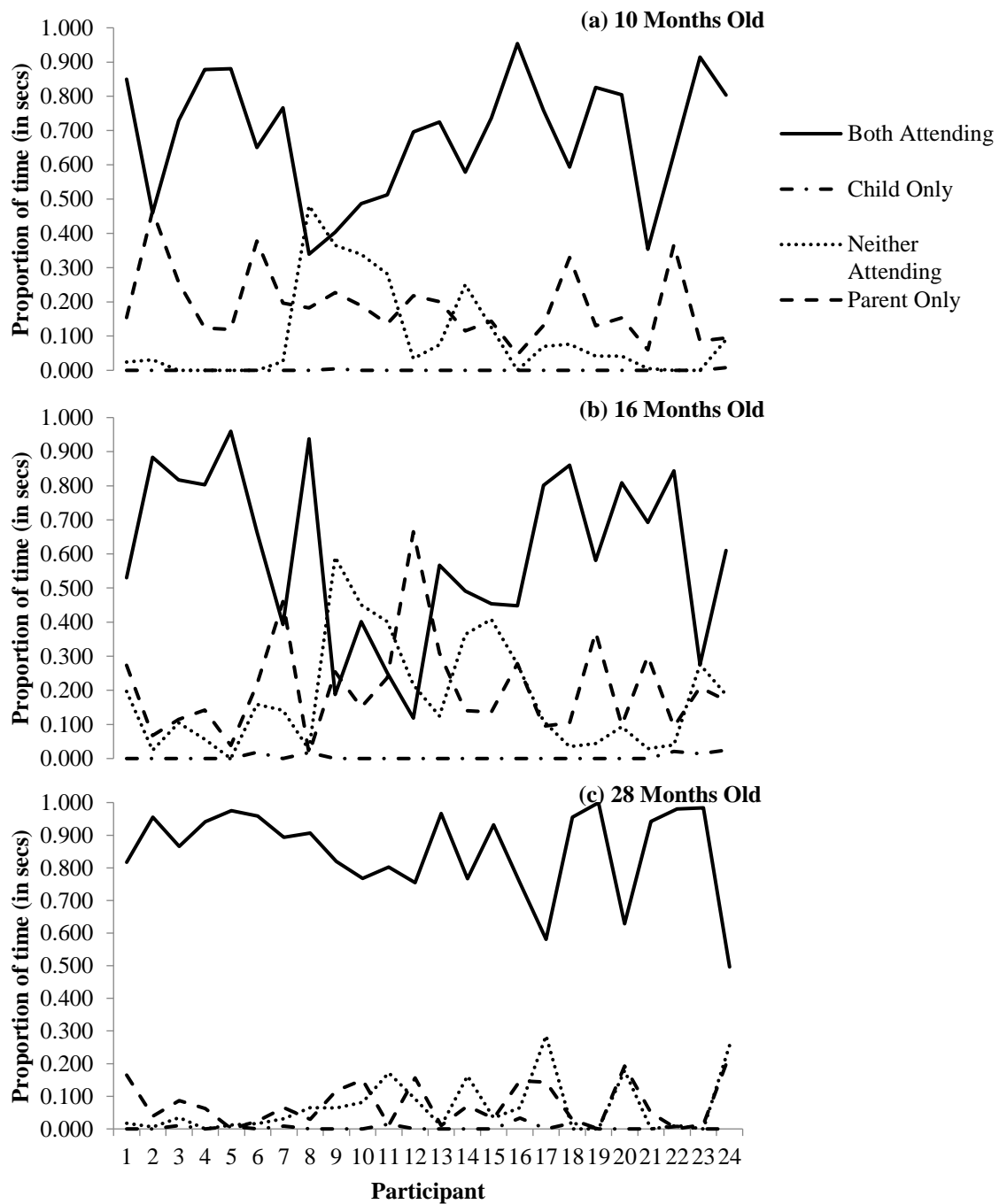
Figure 3.2. The proportion of time (in seconds) each individual participant spent in each attentional state at each of the three time points

However, at both the 16- and 28-month visits, there was no significant differences between the proportion of time when neither were attending and when only the mother was attending to the book ($p = .370$, $r = 0.18$, and $p = .408$, $r = 0.17$, respectively).

The Friedman's test looking only at the time when the both the infant and the mother were jointly attending to the book demonstrated a significant difference between the three time

points, χ^2 (2) = 14.58, $p < .001$, and the Kendall's coefficient of concordance ($W = .393$) indicated this was a medium effect. Post hoc analyses were carried out using Wilcoxon and applying a Bonferroni corrected criterion of $p < .017$. The proportion of time when the infants spent jointly attending to the book with the mother at 10 months old did not differ from the proportion of time at 16 months old ($p = .312$, $r = 0.21$). However, at 28 months old, the infants spent significantly more time jointly attending to the book than at 10 months old ($p < .002$, $r = 0.71$) and 16 months old ($p < .001$, $r = 0.76$).

Overall, at all three ages, the proportion of time the infants spent in joint attention with the mother to the book were significantly higher than all other attentional states. Although there was no difference in the proportions at 10 and 16 months old, this had significantly increased at 28 months old with the proportion being almost at ceiling at this stage. At 10 months, significantly less time was spent when neither were attending than when only the mother was attending but this rate increased at the 16-month visit meaning there were no significant differences between the two attentional states with both reducing in the final visit.

Turn-taking skills

In order to investigate the infants' turn-taking abilities, the rates at which infants' vocalisations overlapped with the mothers' speech were analysed – with two measures here. The focus of these analyses was the infants' skills at turn-taking in general and whether they display better abilities in this area when they are jointly attending to the book. Therefore, the focus was on analysing the vocalisations firstly when the infant interrupted the mother's speech and then when the infants' vocalisations did not overlap. As with the previous analysis, given the minimal amount of time when only the infant was attending, this therefore resulted in only 14 infant vocalisations occurring overall in this attentional state. As a result, these were not included in the subsequent analysis in this section. Descriptive statistics for these analyses can be seen in Figure 3.3 with a focus on when overlap was initiated by the infant and when the infant vocalisations occurred with no overlap. The rates when both the mother and the infant overlap and when the mother interrupts the infant have been coded and depicted in the Figure 3.3 but not analysed here as the focus here is on the infants' turn-taking abilities. However, it should be noted that both are briefly raised in the discussion.

i. Overall Turn-taking skills

The rates of infant-initiated overlap and no overlap were firstly analysed in the simplest, more general form regardless of attentional state, before looking at whether there was a difference across the attentional states. Friedman's signed ranks tests revealed that there was no significant differences between the proportions of vocalisations which did not overlap across the ages (χ^2 (2) = 3.56, p = .169, W = .649), however there was a significant difference in the proportion of vocalisations when the infant interrupted the mother across the ages (χ^2 (2) = 8.08, p = .018, W = .456). Post hoc analyses using Wilcoxon with a Bonferroni corrected criterion of $p < .017$, revealed that there was no significant difference between the rates at 10 and 16 months (p = .070, r = 0.37) and the rates at 16 and 28 months (p = .074, r = 0.36) but there were significantly more infant interruptions at 10 months than 28 months (p = .003, r = 0.61). At all three ages, three Wilcoxon's signed ranks tests results suggest there were significantly more utterances where there were no overlaps in comparison to when the infant interrupted the mother (10 months: z = 3.21, p = .001, r = 0.65, 16 months: z = 5.25, $p < .001$, r = 1.07 and 28 months: z = 5.54, $p < .001$, r = 1.13).

i. Differences across the attentional states

Analysis was then taken further to see if there was a difference in the rates of these measures across the attentional states. For when the infants' interrupted the mother, three Friedman's signed ranks tests were conducted at each of the three ages. The same pattern was evident when the infants were 10 and 16 months old with the Friedman's results showing a significant difference between the attentional states with small effects sizes (10 months χ^2 (2) = 14.23, $p < .001$, W = .442 and 16 months χ^2 (2) = 13.31, p = .001, W = .406). Post hoc analyses of these Friedman's tests were carried out using Wilcoxon, applying a Bonferroni corrected criterion of $p < .017$. At both ages, the infants' interrupted the least when neither were attending to the book in comparison to when they were jointly attending (p = .001, r = 0.67 and p = .007, r = 0.55, respectively) and when only the mother was attending ($p < .001$, r = 0.83 and $p < .001$, r = 0.72, respectively). There was no significant difference between the proportion of infant interruptions when they were jointly attending and when only the mother was attending (p = .166, r = 0.28 and p = .063, r = 0.38, respectively). However, when the infants were 28 months, there were no
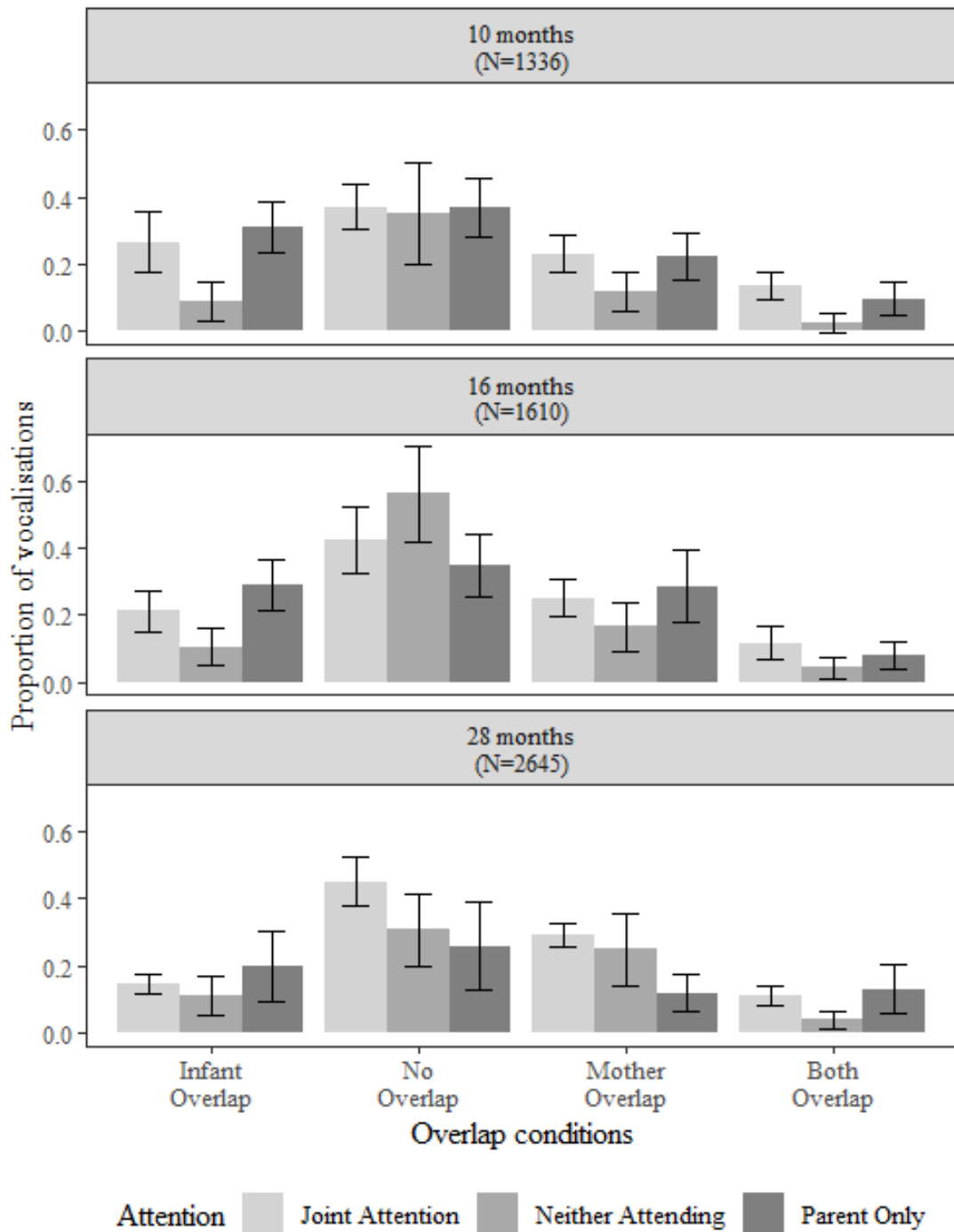
Figure 3.3. The proportion of infant vocalisations with each type of overlap as an indication of turn-taking abilities, in each of the attentional states, at each of the three time points

significant differences between the proportions of infant interruptions across the different attentional states, $\chi^2 (2) = 3.27$, $p = .195$, $W = .492$.

When looking at the vocalisations which did not overlap, the Friedman's signed ranks tests at 10 and 16 months showed there were no significant differences across the attentional states (10 months χ^2 (2) = 0.29, p = .867, W = .296 and 16 months χ^2 (2) = 5.70, p = .056, W = .556). However, at 28 months, there was a significant difference, χ^2 (2) = 9.87, p = .007, Kendall's W = .453. Post hoc analyses of these Friedman's tests were carried out using Wilcoxon, applying a Bonferroni corrected criterion of p < .017. There were no differences between the rates when neither were attending in comparison to both attending (p = .084, r = 0.35) and when only the mother was attending (p = .399, r = 0.17). However, the proportion of vocalisations with no overlap was significantly higher when both were attending to the book in comparison to when only the mother was attending (p = .002, r = 0.63).

Overall, in terms of the rates at which the infants' vocalisations overlapped with the mothers', there were significantly more vocalisations which did not overlap than infant-initiated overlaps. Across the ages, although there were no differences in the no-overlap rates, the infant-initiated overlaps decreased as the infant aged. When considering whether these differences were affected by the attentional state, for the infant-initiated interruptions, at 10 and 16 months, there were significantly fewer vocalisations when neither the infant or the mother were attending, in comparison to when in joint attentional episodes and when only the mother was attending. At these ages, in the latter two attentional states, the proportions did not differ. However, there were no differences in the proportions across the attentional states at 28 months. Almost the opposite pattern was evident when considering the vocalisations where no overlap occurred with no differences across the attentional states at the 10- and 16-month visits. Whereas at 28 months the highest rate at which the vocalisations with no overlap occurred was when the infants were jointly attending to the book.

Referencing

In order to investigate the development of the infants' referencing abilities, two measures were used; the rates at which they pointed as well as the rates at which they combined their points with a vocalisation.
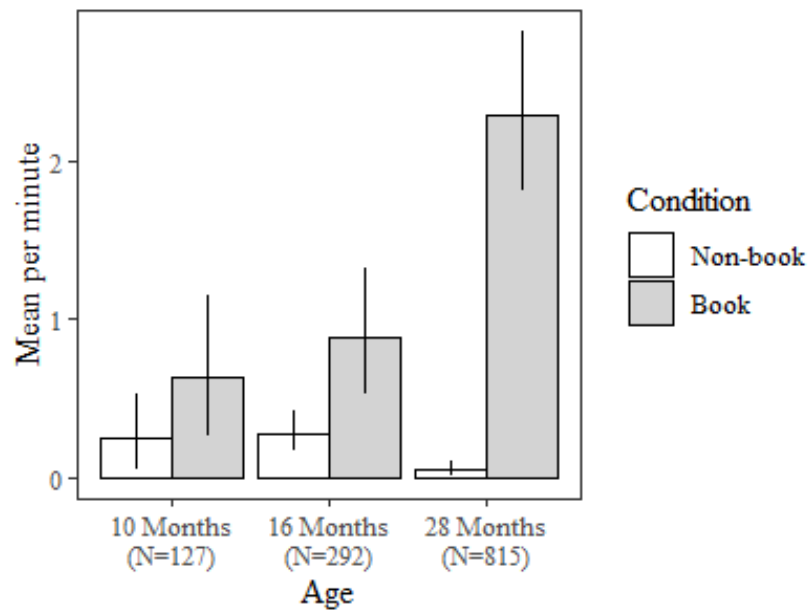
Figure 3.4a. The mean number of infants' points per minute across the three time points

Figure 3.4a presents the descriptive statistics for each of the types of points across the three time points. Due to the small numbers of point actions and experiential referencing points (as defined in the General Methods section) and in order to simplify analysis, these were combined with points and ambiguous points as they were all related to the book. These were then compared to non-book related points. Three Wilcoxon signed rank tests were carried out comparing the mean points per minute for each of the time points separately. At 10 months old, there was no significant difference in the mean number of book related points the infants produced in comparison to the non-book related points, $z = 1.91$, $p = .057$, $r = 0.39$. However, at both 16- and 28-months old, the infants produced significantly more book related points per minute than non-book related points ($z = 2.20$, $p = .028$, $r = 0.45$ and $z = 6.06$, $p < .001$, $r = 1.24$, respectively). Comparing the rates of book related points, a Friedman's signed ranks test showed a significant difference across the ages χ^2 (2) $= 14.92$, $p < .001$, $W = .406$. Post hoc analyses using Wilcoxon and applying a Bonferroni corrected criterion of $p < .017$, showed no differences between the rates at 10 and 16 months ($p = .406$, $r = 0.17$), however both of these rates were significantly lower than at the 28-month visit ($p < .001$, $r = 0.76$ and $p < .001$, $r = 0.78$, respectively).

ii.   Infants' points combined with vocalisations
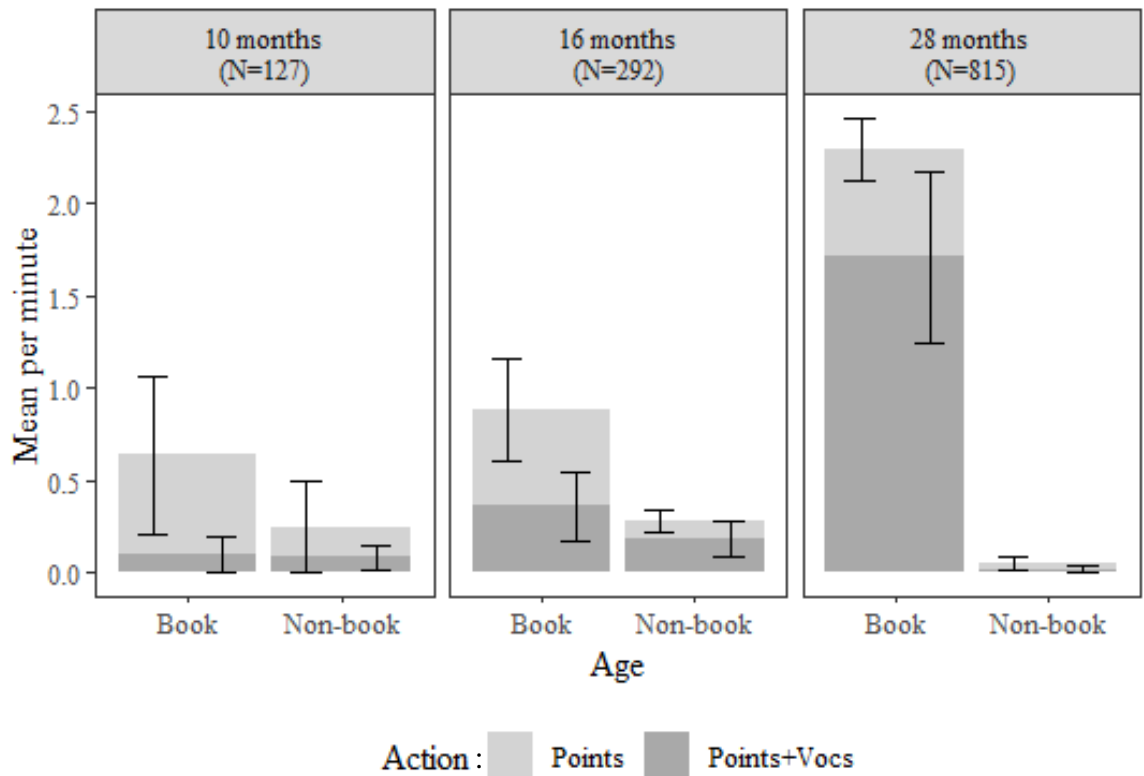
Figure 3.4b. The mean number of points combined with vocalisations per minute separately for book related and external points across the three time points.

The mean number of points per minute, both when they were combined with a vocalisation and on its own, are presented in Figure 3.4b comparing book related points with non-book related points. Focusing specifically on when the points were in combination with vocalisations, Wilcoxon signed ranks tests demonstrated that there was no significant difference between those which were book related and those which were non-book related both at 10 months old ($z = 0.38$, $p = .702$, $r = 0.08$) and 16 months old ($z = 1.36$, $p = .175$, $r = 0.28$). However, at 28 months old, there were significantly more book related points combined with vocalisations in comparison to non-book related point combinations ($z = 5.92$, $p < .001$, $r = 1.21$). Looking at when the infants begin to combine vocalisations with their points in the book contexts only, a Friedman's signed ranks test was carried out to compare the rates across the ages and showed a significant difference, $\chi^2 (2) = 17.43$, $p < .001$, $W = .395$. Post hoc analyses using Wilcoxon and applying a Bonferroni corrected criterion of $p < .017$, showed the rates of point plus vocalisation combinations at 10 months were significantly lower than those at both 16 months ($p = .011$, $r = 0.52$) and 28

months ($p < .001$, $r = 0.95$) and the rates at 16 months were lower than those at 28 months ($p < .001$, $r = 0.92$).

Overall, whilst there were no differences in book related points and non-book related points at 10 months, there were significantly more book related points at 16 and 28 months and there were significantly more book related points at 28 months in comparison to the two earlier ages which did not differ. When combining points with vocalisations, there were no differences in the rates of these in relation to book and non-book related contexts at both the 10- and 16-month visits, with more of these in the book related contexts in comparison to non-book related contexts when the infants were 28 months old. However, the rates at which these combinations were produced in the book related contexts increased as the infants aged, at each time point.

Discussion

The overall aims of this study were to look at (1) the development of infants' understanding of how to engage with books as well as their skills in terms of (2) jointly attending to the book, (3) turn-taking rules and (4) their referencing skills. In these four areas, although object-like actions were the predominant actions made by the infants when they were 10 months old, at this age they did also demonstrate some abilities in this area with correct and attempted SBR actions. Correct SBR actions were mainly achieved by 16 months onwards. High levels of joint attention to the book were evident throughout the study with infants almost at ceiling in the final visit. In terms of the infants' turn-taking skills during SBR, the instances of non-overlapping vocalisations were typically higher than when vocalisations overlapped and instances of infant-initiated overlap decreased across the ages. There were differences in infant-initiated overlaps and non-overlapping vocalisations in terms of the different attention states but not in line with those predicted until the infants were 28 months old. In line with predictions with regard to referencing, there were more points in relation to the book. In comparison to non-book related contexts, there were not more book related point plus vocalisation combinations until the infants were 28 months, however of the book related contexts, there was a marked increase in these combinations between 10 and 16 months. Results and predictions specific to the four areas of book reading actions, attention, turn-taking and referencing will be discussed in turn in more detail.

The development of infants' actions on books

With so few studies looking at SBR with infants under two years old (Muhinyi & Rowe, 2019) and those which do typically being case studies (e.g. Snow & Goldfield, 1983) a key focus of the current study was to take some of the characterisations presented in Jones' (1996) case study to analyse the development of infants' action on books with a larger sample. The main predictions here were that correct SBR actions would increase as the infants aged which by default means a reduction in object-like actions as the infants become more socialised with how to behave with books. An intermediate exploration stage was also suggested to be evident in the early stages (Jones, 1996). Looking at the infants' first actions on the unfamiliar book at the beginning of each SBR session, provided a baseline measure of the infants' abilities with books. On the basis of this analysis, it was clear that the infants demonstrated some early abilities with books as at 10 months old, over half of the first actions on the books were attempts at correct SBR actions such as attempts to open the book or turn the pages. It seems likely that these could only be classed as attempts due to the infants' difficulties in manual dexterity in terms of being able to manipulate the book properly rather than a lack of 'understanding' on what actions to take on the book. From the 16-month visit onwards, the first actions were mainly correct SBR actions, with very few object actions or attempted actions.

With regards to their overall actions on the books, this measure gives a clearer understanding of the infants' abilities as it suggests that at 10 months old, the infants' skills in this area are not fully developed with object-like actions being produced more than other action types except for exploring actions. This supports the idea that infants go from treating the book like an object, such as by hitting the book or biting it, to treating it as an object of contemplation (Werner & Kaplan, 1963) with an intermediary phase where they explore the book such as turning the pages backwards and forwards or opening and closing the book (Jones, 1996). As 21 out of the 24 infants engaged in this exploratory action suggests that this is an important phase which they go through where the mothers allow them to explore and practice the correct actions themselves. The key transitory stage here is when the infants are 16 months old as almost the reverse pattern is evident from this stage onwards with correct SBR actions being the most common. A steep reduction occurs with all other actions at this stage with less exploration of the book, few object-like actions and the manual dexterity more fully developed, enabling them to manipulate the book

more successfully rather than with attempted actions. It would be of interest to see when between the ages of 10 and 16 months, this transition typically occurs.

Attention

Another SBR skill analysed separately here was that of joint attention, particularly due to the well-documented importance of joint attention for word learning (e.g. Morales et al., 2000). Also because the development of this skill during SBR has also been highlighted to facilitate gains in infants' abilities in sustaining attention outside of SBR (Vally et al., 2015). As predicted, infants' joint attention increased as the infants aged as the infants spent significantly longer in joint attention at 28 months in comparison to when they were 10 months old, with 28-month olds performing almost at ceiling at this stage. However, it should be noted here that the infants in this study demonstrated high levels of joint attention to the book from their first visit when they were 10 months old.

There are two important elements to note here which are likely to have impacted on the levels of joint attention in this study. Firstly, that due to the study taking place in a lab setting, the nature of the set-up was that there were minimal distractions available for the infants to become engaged with. This is unlikely to be the case in the home environments with multiple books and toys providing alternatives with which to engage. The second issue is with regards to how joint attention was measured in the current study. In many of the previous studies (e.g. Tomasello & Farrar, 1986) classification of episodes as being instances of joint attention involved the infants looking to both the caregivers' face as well as the object in a 'gaze-checking' manner to ensure they are both sharing attention to the same object. Whereas in the case of SBR, it is not typical for infants to look away from the book to check the eye-gaze of the caregiver, particularly in the early stages when the infants are seated on the caregiver's lap. Therefore, in the current study, measures of joint attention could be seen as relatively crude in comparison to traditional measures in that both the mothers and the infants were both attending to the book based primarily on their head movements. However, as Guo and Feng (2013) point out, it is difficult to guarantee that the infants and mothers were attending to the same referents within the books. It is therefore possible that the levels of joint attention would not have been as high had a more stringent measure been possible. Although it should also be noted that traditional measures of joint attention may not be applicable to SBR settings given the atypical nature of gaze checking in these contexts.

Although overall the levels of joint attention were seen to increase from 10 to 28 months, there was no difference between the proportions of time spent in joint attention at 10 and 16 months. This is likely to be due to an increase in the amount of time when neither were attending to the book at the 16-month visit. The most likely explanation for this increase is that at the 10-month visit, the infants were mostly stationary in the mothers' laps and it was therefore more difficult for them to move around with SBR being mostly directed by the mothers. Whereas at the 16-month visit, the majority of the infants were able to walk and therefore had more independence and input into whether they wanted to remain engaged with the book. The finding that there was no decrease in the amount of time spent in joint attention to the book, particularly at this stage, suggests at least some internal enjoyment in the SBR activities on the infants' behalf.

Possible limitations in measuring overall actions and attention

With reference to the study as a whole, for both the analysis looking at the infants' overall book actions and their joint attention skills in particular, an important point should be raised with regards to the infants' skills in these areas. As noted above, at the first visit of the study when the infants were 10 months old, they were already demonstrating some understanding of the correct SBR actions and also high levels of joint attention to the book. With this in mind, it is possible that this may be due to this being a biased sample in terms of SBR activities. In line with this suggestion, the average household income of the current sample was £45,000, which would indicate a tendency towards being identified as a middle-class sample (Office of National Statistics, 2016). Studies have shown a link between socio-economic status (SES) and language development via SBR (Forget-Dubois et al., 2009). Such skills in these areas may not be evident with infants from more disadvantaged backgrounds or with parents who place less value on SBR activities. This issue will be taken up further in the General Discussion.

Turn-taking abilities

Of the other more general communicative skills thought to be enhanced through SBR (Jones, 1996), infants' turn-taking skills were also analysed here. It was predicted that there would be more vocalisations with no overlaps and fewer infant-initiate overlaps as the infants' aged. The particular focus here was on the difference between the 10 and 16 months visit due to the integration of the infants' interactional and language systems, either with the introduction of the infants' first words around 12 months (Casillas et al., 2016) or

with earlier communicative skills such as pointing at around 9 months (Hilbrink et al., 2015), causing disruption to their turn-taking abilities. When considering infants' overall turn-taking skills throughout the SBR sessions, there were no differences in the proportions of vocalisations where no overlap occurred across the ages. Although this was not in line with the predictions and is not as low as the levels of less than 1% suggested in Ninio and Bruner (1978), the levels of these non-overlapping instances were consistently higher than overlapping vocalisations at each visit. In terms of the infant-initiated overlaps, as predicted, the proportions of these did decrease as the infants aged, suggesting further development of their understanding of turn-taking rules in dialogue. However, as there were no differences in the proportions at the 10- and 16-month visits, this contradicts Casillas et al's (2016) suggestion that disruption in the infants' turn-taking skills occurs after the introduction of the infants' first words around the age of 12 months. Taken together with the high levels of non-overlapping vocalisations at 10 months, these results seem more in line with the idea that the disruption started earlier at around 9 months in line with the development of infants' other communicative understandings with slower improvements from this stage onwards (Hilbrink et al., 2015).

It has been suggested that infants' turn-taking skills may be fully established by the age of 22 months with few interruptions in dialogue (Snow & Goldfield, 1983). However, as there were still some infant-initiated overlaps at the 28-month visit, this suggests Snow and Goldfield's (1983) finding may have been more specific to the child in their case study. This lends support to the suggestion that these skills have not fully developed by 28 months. Taking the infant-initiated overlaps in combination with the vocalisations when both the mother and infant overlapped multiple times (See Figure 3.3), approximately a quarter of all infant vocalisations involved some form of infant-initiated overlap at this stage. With the suggestion that some learning was still needed at this age, it could be that full integration of the interaction and language systems may not occur until around 3 years old (Casillas et al., 2016). However, it should also be noted that maternal-initiated overlap was evident across all of the ages (See Figure 3.3). This is likely because for the mothers there is potentially an interplay between them attempting to drive the stories within the books forward as well as observing turn-taking rules. As the rates of maternal-initiated overlap seem stable, there is some suggestions that this might be the case. Therefore, it is possible that infant-initiated overlap may be influenced by the mothers' use of this in the book reading context.

When considering how the attentional states might affect the infants' turn-taking skills, it was predicted that due to the collaborative nature of jointly attending to the book, the infants' skills here would be improved in episodes of joint attention (Kim et al., 2015). This would therefore mean more non-overlapping vocalisations and fewer infant-initiated overlap, in the joint attentional episodes. However, against these predictions, at both the 10- and 16-month visits, across the different attentional states, there were no differences in proportions of vocalisations where no overlaps occurred. Similarly opposed to the predictions, in the case of infant-initiated overlaps, at the 10- and 16-month visits, there were no differences in the proportions in joint attention and when only the mothers were attending and the lowest proportions were in periods when neither were attending to the book. In the instances when only the mothers were attending to the book, the higher rates can be explained in terms of the mothers continuing to talk about the contents of the book whilst the infants were either vocalising about some other distraction in the room or attempting to get the mothers' attention. It is possible that the argument that the mothers and infants may be vocalising about different things could also be raised with regards to episodes of joint attention. This is because, in addition to the somewhat crude measure of joint attention in the current study, Guo and Feng (2013) point out that it is difficult to guarantee that the infants and caregivers are attending to the same referent in the book. Therefore, it could be that in these instances of infant-initiated overlap the mothers and infants were not necessarily jointly attending to the same referent. By the same token, with such low levels of these overlap types when neither were attending to the book, it could be that in these instances, the mothers and infants were jointly attending to the same non-book related referent or activity.

For both measures of turn-taking, the best demonstration of the predicted patterns seems to be at the 28-month visit as, in comparison to other attentional states, in episodes of joint attention there were more vocalisations with no overlap and although there were no differences across the attentional states in infant-initiated overlap, the proportion of these at this stage were relatively low overall. Given the improvements in both the infants' language skills as well as their attention skills, it seems likely that at this stage, the same referents in the book were being attended to by both the mothers and the infants. Although there is some suggestion that the infants' turn-taking skills are still not fully developed by this stage given that infant-initiated overlap still occurs, it seems clear that there is a transition between the ages of 16 and 28 months in terms of their joint attention to the

same referents and their coordination of turns with the mothers during these periods. Future research could look at ages between 16 and 28 months here to see when this transition occurs, perhaps with a focus around a mean age of 22 months as suggested by Snow and Goldfield (1983) but of course with an appreciation of the considerable variation in individual differences.

Referencing skills

Infants' abilities in referencing are also thought to be aided by SBR activities (Jones, 1996). As points are thought to occur most commonly in relation to books (Murphy, 1978), it was predicted that there would be more points in relation to the book than non-book contexts. In line with this, there were significantly more book related points and this increased as the infants aged and, therefore, it seems that this gesture serves to establish episodes of joint attention (Iverson et al., 1994), as the children's joint attention skills developed. As Tomasello and Haberl (2003) suggest that infants at around 12 months have some understanding of the intentions behind points, it could be that at the 10 months visit, the infants may not yet have developed this understanding and may either be modelling the mothers' SBR behaviours or pointing for themselves (Carpendale & Carpendale, 2010). If infants typically understand the intentions behind points around 12 months old (Tomasello & Haberl, 2003), it follows then that the infants of this study should have developed this understanding by the 16-month visit. Therefore, although the rates at which the infants produced these book-related points did not differ between the 10- and 16-month visit, based on the findings of previous research (Tomasello & Haberl, 2003), it could still be argued that their understanding of this gesture has developed further. The lack of increase at the 16-month visit should also be taken in conjunction with the attention results as at this stage there was also no increase in the proportions of time in joint attention, with more non-book related activities being attended to as the infants are more mobile and have more independence, although it should be noted that this did not lead to an increase in non-book related points at this stage.

Similarly, considered as the intermediary stage before two-word utterances are mastered (Esteve-Gibert & Prieto, 2014), more book related point plus vocalisation combinations were predicted as well as a significant increase in these between the 10- and 16-month visits (Aureli et al., 2017). Although at 10 and 16 months, there were no differences in the rates produced in relation to the book and those which were non-book related, the

predicted difference did occur at 28 months since significantly more of these points combined with vocalisations were related to the book at this age. The fact that no differences were found in the early visits is likely to be due to the small numbers produced overall here, particularly as infants are thought to begin producing these combinations at around 14 months (Aureli et al., 2017). However, in line with the predictions, when looking at only book-related contexts, there was an increase in the rate of the production of these combinations across each of the ages. Looking specifically at the 10- and 16-month visits, not only was there an increase in the mean per minute but the number of infants producing them also increased with only 5 producing them at 10 months old but 23 producing them at 16 months which again is in line with previous research (Aureli et al., 2017).

Possible limitations for turn-taking and referencing

However, overall, a cautionary note should be noted with regards to the analyses of turn-taking and referencing skills. Due to the high levels of joint attention with this sample and the restricted nature of the lab setting, there were more opportunities, and therefore evidence, for the conditions of joint attentional episodes and book related contexts. Therefore, in some cases it could be argued that this was perhaps not the clearest test across the conditions. For example, for the referencing analyses, there were fewer instances where participants engaged in non-book related activities which would reduce the opportunities for the infants to produce non-book related points. A more stringent test of some of these questions would provide equal opportunities for the infants to, for example, provide points in different contexts. Therefore, it is sometimes unclear whether the results presented here on point and vocalisation combinations could be due to a biased sample as discussed earlier, whether this is typical behaviour during SBR or whether this is specific to the semi-naturalistic environment with few distractions available. Future research could investigate the task specificity element of these analyses with comparisons to toy play contexts or the setting specificity element with comparisons to SBR in a home setting. This issue will be taken up further in the General Discussion.

Conclusions

This is one of the first studies to investigate the development of infants' abilities with books. Correct SBR actions and joint attention to the book increased with the infants' age as the infants became socialised with books with an intermediary stage of exploration prior

to mastering the correct actions. Pre-existing abilities and high levels of joint attention at the first visit suggests previous experience with books which in turn could potentially be due to a biased sample with mothers who already place a high value on reading activities prior to the study – a point which will be taken up further in the General Discussion. High levels of vocalisations with no overlap throughout suggests some turn-taking abilities. Although these abilities do improve with age as the rate of infant-initiated overlaps decreased. The context of joint attention only seems to impact on infants' turn-taking abilities in the 28-month visit, where there were fewer infant-initiated overlaps and higher rates of vocalisations with no overlap during these joint attentional episodes, supporting the idea that turn-taking abilities do not fully develop until later (Casillas et al., 2016). Whilst there were more book related points than non-book related point and book related point plus vocalisation combinations increased as the infants' aged demonstrating the development of the infants' referencing skills, comparing findings to those in a toy play setting would give a better understanding of these as well as the infants' turn-taking skills.

Chapter 4 – Maternal teaching and engagement strategies during book reading

Introduction

With SBR being shown to be important for children's later communicative development (Dexter & Stacks, 2014) and academic achievement (Shahaeian et al., 2018), and some arguing that caregivers are infants' first 'teachers' (Britto, Brooks-Gunn, & Griffin, 2006), many researchers have focussed on caregivers' input into the SBR activity. There has been a particular focus on SBR in the home as this is often the only source of one to one reading in the early years. While children in nursery settings are read to, this is usually in group settings (Tizard & Hughes, 2002). Among early reading activities, there is a focus on teaching infants the book reading conventions, such as turning the pages one at a time, and keeping them engaged in the activity (Bruner, 1985; Sénéchal et al., 1995; Jones, 1996). Although some studies have looked at paternal input (e.g. Malin et al., 2014; Baker & Vernon-Feagans, 2015), in most, as mothers are predominately the primary caregiver (Bergelson, Amatuni, Dailey, Koorathota, & Tor, 2019), the majority of studies have focused on maternal input, as is the case here, looking at both the language and teaching functions they use during book reading (e.g. Luo & Tamis-LeMonda, 2017; Muhinyi & Rowe, 2019) as well as the strategies they use to maintain the infants' engagement in the SBR activity (e.g. Sénéchal et al., 1995; Chang & Luo, 2020).

Language and teaching practices

In terms of language use more generally, aside from when caregivers engage directly in labelling activities with the children (e.g. Ninio, 1983), the consensus view is that child directed speech (CDS) is designed with communication in mind rather than specifically language learning, with caregivers treating the children as conversational partners (Pine, 1994). In line with this, in Western cultures in particular, caregivers tend to impose conversational forms onto interactions with their infants (Snow, 1977 as cited in C. Snow, 1984) as indicated by the finding that the majority of maternal utterances both follow on from and precede children's utterances and can also be seen as responses to the children's utterances (Snow, 1986 as cited in Pine, 1994). This is also supported by the view that CDS is generally characterised as consisting of short, grammatically simple and highly repetitive utterances which are rooted in the current surroundings of the infant (Snow, 1984). This suggests that the syntactic simplicity of CDS is a result of the semantic simplicity of the utterance, which in turn, as Snow (1977, as cited in Pine, 1994) points

out, is a result of the caregiver communicating simple ideas to a conversational partner who is less cognitively and linguistically able.

In their seminal work comparing the linguistic environments and language outcomes of children from three different SES groups, Hart and Risley (1995) found that CDS (typically from the higher SES group) which comprised of more words, more different words, more declaratives and more questions correlated to better later language development. Quantity, lexical richness and syntactic complexity in CDS have also been found to be the key components which account for increases in productive vocabulary (Hoff & Naigles, 2002). A key factor known to affect these properties of CDS is that of context. A study comparing the language of mothers from different SES groups looked at how this was affected in four different contexts; SBR, toy play, mealtime and getting dressed (Hoff-Ginsberg, 1991). CDS while getting dressed was found to be the least lexically diverse of the settings, the mealtime setting contained the lowest rate of maternal speech and the toy play setting contained the highest rate of directives. Overall, of the four settings, Hoff-Ginsberg (1991) found SBR had the most effect on CDS which was more lexically diverse, more syntactically complex and contained the highest rate of topic-continuing responses. Whilst there were again class differences in the CDS properties, these differences were moderated by the context as these were minimised during SBR activities (Snow et al., 1976; Hoff-Ginsberg, 1991).

As well as looking at the properties of CDS more generally, the functions or communicative intent of CDS have also been investigated. Kuchirko, Schatz, Fletcher and Tamis-LeMonda (2020) argued for the importance of this factor being investigated in that it typically involves, and distinguishes between, teaching about the world and teaching about how to behave in it. Initially, Nelson (1973, as cited in Della Corte, Benedict, & Klein, 1983) analysed the first fifty words acquired by a group of eighteen children and categorised them in terms of their language styles. Some were described as *Referentials* as they acquired mostly referential words, having an object-oriented language style whereas others were described as *Expressives* as they acquired words expressing social relationships or emotions, having a self-oriented language style. Links were found between these children's language styles and the language used by the mothers (Klein 1980 as cited in Della Corte et al., 1983). A negative correlation was found between directiveness in CDS and referentiality in the child's language whereas descriptiveness in

CDS was positively associated with referential child language as common nouns and references to objects were produced more often by the mothers of referential children in comparison to the mothers of expressive children. Peters (1983, as cited in Pine, 1994) argued that variations in children's language styles should be thought of more in terms of variations in the information they extract from input. Following on from this, it has been argued that focus should not necessarily be on the overall language style of the caregiver but rather the different types of interaction which in turn changes the function of the input being received (Pine, 1994).

After analysing the interactions and subsequent language growth of six mother-infant dyads over a period of five months, it was found that when mothers' language directed the infants' attention, there was less vocabulary growth than when the mothers followed into and engaged in discussions about the infants current focus of attention (Tomasello & Todd, 1983). This led Tomasello and Todd (1983) to propose the 'Attentional Regulation' hypothesis which suggests there is an interaction between the child's processing mechanisms and the structure of the input which is what causes the variations in vocabulary growth. Therefore, when the function of the CDS is to direct the attention of the child, the child has to first determine the caregiver's focus of attention meaning there is less processing capacity for the language learning task whereas when the CDS follows into what the child's focus of attention is, there are more resources available for language learning (Akhtar, Dunham, & Dunham, 1991).

This could explain the findings that certain types of language function are more beneficial for vocabulary growth than others. Specifically, referential language was found to have a stronger correlation with vocabulary development than regulatory language (Tamis-LeMonda, Song, Leavell, Kahana-Kalman, & Yoshikawa, 2012). Referential language, which is language used to teach about the world (e.g. '*That's a cat*'), comprises of more nouns, verbs and adjectives in comparison to regulatory language, which is language used to teach about how to behave (e.g. '*Put it down*') and is less lexically diverse, containing more pronouns (Tamis-LeMonda, Kuchirko, & Tafuro, 2013). This greater richer lexical diversity in referential language is thought to be a key factor in the link to vocabulary development (Tamis-LeMonda et al., 2012). On the other end of the scale, however, in other studies negative correlations have been reported between use of regulatory language and the subsequent language outcomes (e.g. Hart & Risley, 1995; Paavola, Kunnari,

Moilanen, & Lehtihalmes, 2005). In these instances, in light of Tomasello and Todd's (1983) hypothesis, it seems likely that the regulatory language is affecting the learning conditions rather than enabling assessment of the words' meanings. Akhtar et al (1991) found support for this as, when analysing mothers' regulatory language during toy play, they found that when regulatory utterances followed into the child's focus of attention, this was positively correlated with the children's productive vocabulary growth. Therefore, it seems joint attentional focus may be a key factor in determining language acquisition when regulatory language is used.

As previously noted that context can affected the properties of CDS (e.g. Hoff-Ginsberg, 1991), this element has also been shown to affect the functions of CDS. One study examined the effect of different situational contexts (i.e. SBR and toy play) on the language and communicative intent of mothers' and their 12 month old infants (Yont, Snow, & Vernon-Feagans, 2003). Similar to Snow et al (1976), mothers' language changed depending on the context, as toy play involved more attention directing language and more discussion of recent events, whereas SBR involved more referential language, comparisons to real life objects, discussion of present events and joint attention (Yont et al., 2003) Other studies support this finding such as Moreno (2000) and Tamis-LeMonda et al's (2012) with the latter demonstrating that more regulatory language was produced during a task involved stringing beads whereas more referential language was used during SBR.

Characteristics of the book have also been shown to impact on the functions of the CDS such as the familiarity of the book (e.g. Fletcher & Finch, 2015); to be discussed further in Chapter 5) and the amount of text in the book. For example, Sénéchal, et al (1995) noted that although text-less books tended to produce more maternal verbal behaviours, the more text a book contained, the more likely the mother tended to stick to reading the text. The likeliest explanation for the finding is that that typically there is an interaction between age and the text such that books become more challenging and age appropriate with more complicated narratives requiring more text. This has been shown in a number of studies (e.g. Goodsitt, Raitan, & Perlmutter, 1988; Fletcher & Finch, 2015; Chang & Luo, 2020).

The development of infants' communicative and linguistic skills, typically in line with age, has been shown to affect CDS both in terms of general properties (e.g. Wheeler, 1983) as well the functions, in a variety of contexts such as object exploration (e.g. Deák, Walden, Kaiser, & Lewis, 2008) and during SBR. For example, one study looking at the CDS of

Taiwanese mothers found that whilst there was no difference in the rates of referential language when the infants were 36 months old compared to when they were 14 months old, there was a significant decrease in the rates of regulatory language, as the infants were better able to self-regulate their attention and actions (Chang & Luo, 2020). However, in a study looking at the CDS of a group of Latina and African American mothers, whilst there were again no differences in the rates of referential language, no such decrease in regulatory language was recorded (Kuchirko et al., 2020). A partial explanation for this is that there was a general, regulatory-focused, function profile for this group of mothers which reflected their cultural values in addition to which the age range was much shorter in this study; i.e. being tested from 14- to 24 months. However, in this study, the researchers also went on to look at the sub-categories of both referential and regulatory language. Whilst the referential subcategories of labels and emotion/state statements remained the same, of the regulatory subcategories, the rates of prohibitions (e.g. '*Don't do that*') and attention directives (e.g. '*Look at the cat*') decreased as the infants were better able to regulate their own attention, whereas action directives (e.g. '*Turn the page*') increased with age (Kuchirko et al., 2020). These findings were partially supported by Vallotton, Mastergeorge, Foster, Decker and Ayoub (2017) who found directing attention decreased with age. Overall, this therefore suggests it may be too simplistic to focus on the overall regulatory function of CDS.

In a similar vein, although their focus was the differences between Japanese and American dyads in the sequences of infants' labelling, Murase, Dale, Ogura, Yamashita and Mahieu (2005) touched on some specific, mainly referential, CDS functions in a cross-sectional study looking at infants from 12 to 27 months old and found specific differences across the categories. They coded the maternal utterances for labelling, imitation, information asking, elaborative information, instructional feedback and interpersonal feedback. Although there were no age differences in the rates of maternal labelling or information asking across the two languages, elaborative information increased from 18 to 27 months. Imitation was used more by Japanese mothers and their rates of using this decreased from 21 to 27 months. A similar pattern was evident with instructional feedback by the American mothers. There were also language differences for interpersonal feedback as American mothers did not really engage in this much, but the rates were not affected by age. However, as mentioned above, the main focus of Murase et al's (2005) study was the language differences in the overall sequences rather than the specific functions and with a

small sample of 10 dyads per age group per language, this meant that in some of the above analysis, the younger age groups were excluded as there were not enough sequences available for the appropriate analysis. Therefore, it is not clear whether some of these age differences were sample specific and if there would be different patterns with a longitudinal design with a larger sample.

Taken together, as previous studies (e.g. Fletcher & Finch, 2015) found an increase in reading the direct text, and given that in both the Chang and Luo (2020) and Kuchirko et al (2020) study, there were no differences in the rates of general referential language used, it seems likely that similar results will be found with in the current study using a longitudinal design and an age range beginning earlier than these studies i.e. with testing beginning when the infants are 10 months old and finishing at 28 months. However, given the younger age of the current sample and them perhaps needing further instruction, it is not clear if the current sample will resemble Kuchirko et al's (2020) regulatory focussed sample or a more referentially focussed sample such as in Tamis-LeMonda, Custode, Kuchirko, Escobar and Lo (2019). If the latter were the case, it may be that there will be a decrease in general regulatory language as the children get older. Similarly, when looking at the more specific CDS functions, the more referential teaching functions such as labelling and information-asking may not change with age apart from elaborative information which is likely to increase in line with the linguistic competence of the infants as this was apparent in both languages in Murase et al's (2005) study. It seems likely that the mothers in the current sample would also reduce the levels of attention directives as the infants become better able to regulate their attention (Kopp, 1982) however it is not clear whether they will also increase the rates of action directives or whether this is specific to the regulatory focussed sample of Kuchirko et al (2020).

Although Tamis-LeMonda et al (2012) found overall referential language to be strongly correlated with infants' vocabulary development, this relation was found to be limited to the infants' receptive vocabulary and was only when the infants were 2 years old. It is not clear why such a relationship was not found with their expressive vocabulary or when the infants were 14 months old. As above, it could be that the more specific referential functions have differing effects at different ages. Whilst Murase et al (2005) did look at correlations between the mothers' use of referential language and the infants' productive vocabulary, the focus of their analysis was on the sequences of infants' labels, i.e. they

only analysed the utterances preceding and following infants' labels, rather than the mothers' overall productions of these more specific functions which may not give a clear demonstration of the relationship with vocabulary size. For example, they found a positive relationship between infants' productive vocabulary and both maternal questions and elaborative information which would make coherent sense. However, they also found a negative relationship between the mothers' use of labels and the infants' productive vocabulary. Because the focus here is only on labels produced prior to infants' labels, this can be explained in terms of the infants being less likely to produce a label following a maternal label as their linguistic competence increases. Therefore, although it seems likely that the mothers' overall use of more specific functions will be related to the infants' vocabulary development, it is not clear if any of the functions may be more important at different stages of development before the age of 2 as in Tamis-LeMonda et al's (2012) study. Similarly, as regulatory language is thought to be negatively related to vocabulary development (Tamis-LeMonda et al., 2012), it could be that these more specific regulatory functions are more likely to be correlated with the rates at which the infants' use correct book reading action or their joint attention.

With a focus specifically on the feedback element of regulatory teaching in CDS, in terms of children's language, some researchers have suggested that caregivers either correct or confirm when infants' make erroneous responses (Ninio & Bruner, 1978; Sénéchal et al., 1995) whereas others have argued the opposite i.e. caregivers do not engage in reinforcing the grammaticality of their infants' utterances (Brown & Hanlon, 1970). However, Chouinard and Clark's (2003) analysis of English and French CDS suggests that caregivers' teaching comes in a much more supportive way. Namely, rather than simply accepting the error or overtly correcting them, caregivers tended to reformulate the target utterances. Whilst overall, these studies focus on children's errors in language, there has been little attention on whether caregivers make corrections of children's book reading behaviours. In a longitudinal study of her own two children from the age of 8 months to 2 years old, Jones (1996) suggested that when key book elements or correct behaviours occurred, they were verbally marked in some way including by giving them positive feedback. However, when inappropriate or 'less desirable' book reading behaviours were produced, such as turning the pages backwards, rather than explicitly rejecting them or correcting them, these were typically ignored and unmarked.

In relation to the correct book behaviours, Fletcher and Finch (2015) confirmed that positive feedback was a common response. However, the proportion of this response overall was quite low and it was in relation to all response types within the overall book reading session rather than only correct actions, so it is not clear whether there were times when correct actions or key book elements went unmarked. In regard to the incorrect actions, in partial support of Jones (1996), a recent study found prohibitions to be rare among a group of mothers whose CDS was predominantly regulatory (Kuchirko et al., 2020) suggesting that the regulatory language used was done in a more supportive manner, similar to the suggestions made by Chouinard and Clark (2003). Although corrections have been noted to increase in a toy play setting (Vallotton et al., 2017), these researchers highlighted the need to distinguish sensitive directives from more prohibitive forms.

Overall, it is therefore not clear whether verbally marking key book actions and ignoring incorrect ones is specific to Jones' (1996) study or whether more overt verbal teaching occurs more generally. It seems likely that if verbal teaching of book reading actions occurs, it would be in a more supportive rather than prohibitive manner, but it is not clear what form this supporting will take, either verbally or nonverbally. Similarly, Jones' (1996) suggestion that verbally marking the beginning and end of the book occurs as a teaching method early on could be specific to this dyad and may not generalise beyond.

Engagement strategies

It has long been thought that children's interest or engagement in SBR can predict later language and literacy development (e.g. Crain-Thoreson & Dale, 1992; Lyytinen et al., 1998). For example, measuring children's interest in reading as the amount of solitary reading which they engage in per week, Scarborough, Dobrich and Hager (1991) found that those children classified as 'poor readers' at 7-8 years old tended to read alone 2 to 3 times per week during the preschool years, whereas those classed as 'good readers' engaged in daily solo reading. Assessing whether interest has the same impact with infants, Muhinyi and Rowe (2019) found that variability in interest in the book reading activity with 10-month-olds could significantly predict their language skills at 18 months in terms of their expressive, receptive and pragmatic abilities. The same was found in another study with 14-month-olds (Laakso et al., 1999). Although there has been some contradictory evidence where no such association has been found (Baroody & Diamond, 2016; Walgermo, Frijters, & Solheim, 2018), one potential reason for this difference is that

these studies took place within the classroom and were more focused on literacy skills such as print knowledge rather than vocabulary. However, in a later classroom study, Carroll, Holliman, Weir and Baroody (2019) argued that as much as 25% of literacy abilities could be accounted for by a child's interest in book reading, even when the home learning environment and SES was controlled for. The authors suggested this sizeable contribution and difference to previous findings was likely due to sampling and to the measuring differences in terms of reports of interest from the children themselves. Despite these findings, Malin et al (2014) argue that children's own interest in SBR may mediate the link between SBR and later language and literacy skills.

Given its importance for the development of language abilities, some research has looked at possible influences on children's interest in SBR. A number of correlational studies have found parental behaviours to facilitate children's interest (Frijters, Barron, & Brunello, 2000; Malin et al., 2014). Ortiz et al (2001) went on to test this link experimentally with an intervention study designed to tackle the parents' behaviours. Although their baseline levels of interest were not found to differ, after one week of the intervention, the children in the intervention group initiated more reading and expressed more interest in comparison to the control group (Ortiz et al., 2001). Another study investigated the possibility that this association might be bidirectional (Pezoa, Mendive, & Strasser, 2019). The results suggested the children's interest had more influence on the parents' behaviours than the other way around. However, as well as this being a correlational study, the authors noted that this may have been due to the sample being from Chile where SBR is not encouraged generally due to the cost of books which could have impacted on the prevalence of interest-beneficial parental behaviours. Muhinyi and Rowe (2019) found evidence that the impact of children's interest was partially accounted for by maternal questions which lends support to the idea that the this is bidirectional in a transactional cycle.

From the above studies, it should be noted that there has been some difficulty and inconsistencies in defining what 'interest' is as it has been measured in different ways. Some studies measured children's motivation (Skinner & Pitzer, 2012), others used self-report measures from the parents, teachers (Fulmer & Frijters, 2009) or the children themselves (Carroll et al., 2019). For the purposes of the present study, a similar strategy to Sénéchal et al (1995) was adopted with the infant's attention to the book being taken as the infant's interest or rather 'engagement' with the activity.

As a result of this link between children's interest and later language development, one avenue of research which has been looked into are the different strategies which parents use during SBR. Some have focused on individual strategies, such as the use of decontextualized talk (Rowe, 2013) or the use of questions (Blewitt, Rump, Shealy, & Cook, 2009) and most have looked at strategies used with older children, for instance, Silven, Ahtola and Niemi (2003) looked at strategies used with children from the age of 2 years old onwards. Two notable studies looked at a profile of maternal strategies used with infants before the age of three and how these changed over time. Sénéchal et al (1995) found that the maternal strategies used with 9-month-olds tended to be characterised by attention getting and picture descriptions whereas at 29 months, there were more discussions and questions. The 17-month-old stage seemed to be a transition period with use of both attention getting strategies as well as the introduction of questions. In a similar study, Chang and Luo (2020) reported that task and behavioural regulation strategies were common at 14-months-old and decreased with age, the rates of maternal description did not change from 14 to 36 months (however they did not analyse how elaborative these descriptions were) and non-immediate and print related talk increased with age.

However, it should be noted that most of these studies have focused on strategies more specific to reading abilities rather than strategies focussing on maintaining the infants' engagement which, as noted earlier, has been shown to mediate the link between SBR and infants' vocabulary development (Malin et al., 2014). Although there will be some overlap with the codes for reading skills strategies discussed by Chang and Luo (2020), the focus here will be more on expanding on the task and behavioural regulation strategies as particularly relevant for the present study which starts when the children are 10 months old. From previous studies, it seems likely that attention getting (Sénéchal et al., 1995; Chang & Luo, 2020) and more physical strategies (Moreno, 2000) will decrease with age, whereas decontextualized talk such as in its simplest form of relating elements to the infants' own experiences (Rowe, 2013; Chang & Luo, 2020) will increase. Although questioning can be seen as a reading strategy to test the infants' vocabulary, it can also be seen as an engagement strategy as Jones (1996) points out that these are introduced to SBR activities early on before infants are able to appropriately respond which led her to argue that SBR is used by caregivers to facilitate the learning of this conversational convention as well as to maintain their attention. Therefore, in line with previous research, questions are also predicted to increase as the infants' age (Sénéchal et al., 1995).

In contrast to the above strategies, one strategy predicted to decrease is allowing infants to 'explore' books such as repeatedly opening and closing the book and turning the pages forwards and backwards which was noted by Jones (1996) to decreased as the infants became more socialised with how to behave with books. Given the evidence for supportive strategies in other areas of interaction (Chouinard & Clark, 2003; Vallotton et al., 2017), it seems likely that this strategy of allowing the infants' exploration will be a strategy used by some to maintain the infants' interest in the activity rather than them being prohibitive of the infants' actions. Another strategy touched on by Chang and Luo (2020) was that parents engage in performances such as making the sounds from the book. In their study, they merged this action with labelling due to the prevalence of using onomatopoeic words in place of actual labels such as 'meow' in place of 'cat'. Together with labelling this could be classed as a reading strategy but along with other activities such as performing actions from the book, it seems likely that this is more about keeping the infants' attention and engagement in the activity which may be more prevalent when the infants are younger (Chang & Luo, 2020). Similarly, although parents' pointing behaviours are concerned with referencing (Jones, 1996), they are also used to attract and sustain the infants' attention (Murphy, 1978; Sénéchal et al., 1995). These behaviours occur as early as 9 months (Murphy, 1978) so it is likely these will be prevalent here in this capacity and it may well be that the levels will be maintained throughout.

Given that some of the reading strategies have been found to predict later vocabulary development (e.g. Britto et al., 2006; Rowe, 2013), it is not clear whether any of these early engagement strategies can predict attention to the book – in this case, used as a measure of the infants' interest in the activity.

Current Study

In summary, for the first research question, this study will look at teaching strategies in terms of the overall functions of CDS i.e. referential language, regulatory language and reading the direct text:

RQ1. How will the general functions of maternal language change as the infants' age? Of the three main functions, the predictions are that referential language is unlikely to change with age (Chang & Luo, 2020) and that reading of the direct text will likely

increase (Goodsitt et al., 1988; Fletcher & Finch, 2015; Chang & Luo, 2020). However, it is not clear what will happen with the regulatory language.

In the second question, given the suggestion that more specific functions of CDS need to be investigated, these were analysed using a combination of Murase et al's (2005) and Kuchirko et al's (2020) coding scheme:

RQ2. How will the more specific functions of maternal language change as the infants' age? Across the five more specific functions, it is predicted that labelling and information asking are unlikely to change but elaborative information will increase (Murase et al., 2005). The differential roles of attention directives and action directives will be investigated further (Kuchirko et al., 2020).

For the third research questions, given that referential language is about teaching the children about the world (Kuchirko et al., 2020) and has been related to vocabulary development (Tamis-LeMonda et al., 2012), and regulatory language is about teaching the children how to behave in the world (Kuchirko et al., 2020), it will be investigated whether the more specific functions within this category are correlated with the infants' language and/or correct book actions:

RQ3. How do the functions of maternal language correlate with later behaviours or language? More specifically:
(a) Are maternal labelling, information asking and elaborative information related to the infants' vocabulary at 28 months?
(b) Are maternal attention and action directives related to the infant's correct book actions and joint attention?

Looking at teaching strategies from a different perspective in the fourth question, Jones' (1996) suggestion that key book actions will be marked (i.e. correct actions and the beginning and end of books) and incorrect actions will be ignored or 'unmarked' will be investigated in terms of whether this was specific to her children or more widely accepted:

RQ4. How will the mothers respond to the infants' key book actions including correct and incorrect actions? There are no clear predictions for whether the beginnings and endings of the books will be marked or for correct book and incorrect book actions. However, when incorrect actions are verbally marked or corrected, as defined by

Kuchirko et al (2020) and Vallotton et al (2017), this will likely be done in a supportive rather than prohibitive manner. Similarly, if the incorrect actions are not verbally marked, it seems likely that teaching will occur in the form of non-verbal correction rather than being ignored.

Engagement strategies will be investigated in the fifth and sixth research questions, with a focus on the task and behavioural regulation strategies used during SBR:

RQ5. How do the maternal strategies used to engage the infants with books change over time? Of the nine strategies identified, it seems likely that attention getting (Sénéchal et al., 1995), physical (Moreno, 2000) and exploration strategies (Jones, 1996) will decrease with age. Whilst questions (Sénéchal et al., 1995) and decontextualized talk in the simple form of linking book referents to the infants' world (Rowe, 2013; Chang & Luo, 2020) will increase with age. Rates of parental points are not expected to change (Murphy, 1978), whereas it is not clear what will happen with book related actions and activities such as noises (Chang & Luo, 2020). Similarly, ignoring the infant or engaging in their non-book related activities in an attempt to reintroduce the book are identified but with no clear predictions.

RQ6. Given that the aim of these strategies is to regain and maintain the infants' engagement in the book reading activity, how do these strategies relate to the rates of joint attention to the book?

In summary, this study will investigate maternal input into the SBR activity in terms of (a) teaching practices which will look at both general and more specific functions, how these are related to infants' language and behaviours and how key book elements are marked (research questions 1-4). In addition to these, (b) maternal engagement strategies will also be examined in terms of the strategies used and how these relate to the infants' joint attention to the book (research questions 5 and 6).

Method

Coding Schemes and Reliabilities

Following the transcription of the CDS, the function of this speech was coded. Similar to the referential and regulatory language distinction, a distinction was made between talk around content (or 'referents') and talk around how to behave (or 'actions') and whether

the utterances were about the book (BK) or external (EXT) was noted. The coding scheme for referential language (i.e. BK or EXT) and regulatory language (i.e. BK:ACT or EXT:ACT) was broken down into further codes adapted from the coding scheme used by Murase et al (2005). An additional code was added for when the CDS was a direct reading of the book text (Direct) so that this could be separated from other functions.

For referential language, there were three further levels of codes:

- Labels - there were three label codes used here:
    - LBL – these were basic forms of labels e.g. '*it's a lion*'
    - LBL:EXP[7] – these were labels which included experiential referencing '*it's a lion like we saw at the zoo*'
    - LBL:FBK – these were labels which are similar in form to the basic label but used as feedback when imitating the child's label.
- Prompts or information asking (PMT:IA) – these were questions such as '*what's that?*'
- Feedback – there were three feedback codes used here:
    - FBK:EI – was used when more information is asked for or given after the label has been given e.g. '*what colour is the lion?*' or '*The lion is big*'.
    - FBK:INST:POS – these were used when the label had previously been given and instructional feedback followed which was positive e.g. '*yes it is*'
    - FBK:INST:NEG – these were used when the instructional feedback was negative e.g. '*nearly, it's a tiger*'

Within the regulatory language codes, the 'ACT' code was added followed by whether it was either a prompt or feedback:

- Prompts[8] – there were two codes used here:
    - PMT – these were basic prompts such as '*shall we turn the page?*'
    - PMT+LBL – these were used when the prompts included a label e.g. '*look at the lion*'

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[7] Although this was analysed as an engagement strategy

[8] These two prompt codes are in line with Kuchirko et al's (2020) action directives (i.e. ACT:PMT) and attention directives (i.e. ACT:PMT+LBL).

- Feedback – two codes were used here:
  - FBK:INST:POS – these were used following a child's action on the book, when instructional feedback was given which was positive e.g. '*well done*'
  - FBK:INST:NEG – these were when the instructional feedback was negative e.g. '*don't hit the book*'

Although included in the above coding of general CDS functions, it should be noted here that except for the FBK:EI code which refers to elaborative information of a referent, the other feedback codes discussed above were not analysed when looking at the specific functions. This was because it was noted that these do not account for null responses to correct or incorrect behaviours as noted in the book elements analysis described later.

Whether the mothers verbally marked key book elements and actions was also coded on another tier. This coding was done following the coding of the child's book behaviours and transcriptions of the videos (see General Methods). For each child action, the mother's speech was analysed for marking:

- When the child's action on the book was correct, there were two possible codes:
  - CORR_Y – was used when the mothers verbally marked the correct actions such as saying '*well done*'
  - CORR_N – was used when the mothers did not verbally mark the action.
- When the child's action was incorrect, there were three possible codes:
  - INCORR_Y_COM – was used when mothers simply commented on the incorrect action such as asking '*are you turning the page backwards?*'
  - INCORR_Y_NEG – was used when the mothers verbally marked the incorrect action by correcting it such as saying '*no let's turn the pages forwards*'
  - INCORR_N – was used when the mothers did not verbally mark the action.
    - ELAN searches were then used to identify these INCORR_N codes to code whether any maternal non-verbal responses to incorrect actions were evident in the mother's book related behaviour (See General Methods):
    - Y – highlighted when a maternal response was present
    - N – when no non-verbal response was made

On the book elements tier, the beginning of each book was also coded as to whether this was verbally marked such as saying '*Let's start at the beginning shall we?*' (BEG_Y) or not (BEG_N). Similarly, verbal marking of the end of a book such as '*the end*' or '*that was a lovely book wasn't it?*' was noted (END_Y) as well as when this was not present (END_N).

The videos were further coded on a separate tier for the strategies used by the mothers to maintain the infants' engagement with the books. These codes ranged on a gradient from more simple verbal strategies to more complex followed by nonverbal strategies. Initially, there were eight codes used here, which were followed by additional searches on different tiers:

- Surprise – when the mother indicates surprise such as quick inhalations.
- Excited – when the mother put stress into sentences to indicate excitement.
- Attention – was when the mother's language is aimed at getting the child's attention such as '*look*' or calling the child's name.
    - These three codes were initially given separate codes but for analysis purposes, these were combined into an overarching 'Attention Getting' category.
- Activities – when the mother engaged in activities from the book such as imitating actions and sounds, feeling the book and counting referents (Chang & Luo, 2020).
- Ignore – when the mother engaged in ignoring the infants' non-book related activities.
- Engage – when the mother engaged in the child's non-book related activities before reintroducing the book.
- Visual – involved the mother physically moving the book into the child's visual field
- Physical – when the mother physically restrained the child
    - These final two codes were initially given separate codes but for analysis purposes and to be more in line with Moreno (2000), these were combined into an overarching 'Physical' category

This resulted in five strategy labels. In cases where there were two relevant verbal codes for example, asking a question in an excited manner, the more complex code would be

used i.e. the 'question' code would be used here. However, if both a verbal and nonverbal code were relevant, for example if the mother physically restrains the child whilst engaging in a book activity such as counting, both codes would be used. In the analysis, four additional strategies were included which were coded on different tiers:

- Asking questions (Sénéchal et al., 1995) – was coded on the function tier
- Experiential referencing (Rowe, 2013; Chang & Luo, 2020) – was when the mothers made links to referents in the book and the child's experiences. Therefore, these were in the mother's language, points or both and coded on the function tier and the mothers' book interaction tier.
- Points (Murphy, 1978; Sénéchal et al., 1995) – this was coded on the mothers' book interaction tier and experiential reference points were excluded from these.
- Explore (Jones, 1996) – this was when the child was allowed to explore the book and was coded on the child's book interaction tier

Following 15% of the video files being coded in ELAN by a second rater, the reliabilities were as follows; 0.802 for CDS function codes, 0.926 for book element codes, 0.922 for engagement strategy codes.

Data Extraction Using ELAN and Excel

For most of the analysis in this chapter, data extraction used one ELAN tier and involved importing the data into Excel with simple pivot tables to produce the raw numbers of the codes, which were then used to calculate mean actions per minute or mean proportions.

Results

The analysis in this section will be separated into two areas. The first looking at teaching strategies used by mothers in terms of both the general and specific functions of their language and how these relate to the infants' language and behaviours, as well as how they mark key book elements (addressing the first four research questions). The second covers maternal engagement strategies and how these relate to infants' joint attention (addressing the final two questions).

Language and teaching practices

This section first looks at whether there are any differences in the general functions of the maternal utterances as the infants aged (addressing the first research questions), followed by the more specific functions (the second research question). This is followed by an analysis of whether these specific functions are related to the infants' language and behaviours at 28 months (the third research question). The final analysis addresses the fourth research question by looking at whether the mothers marked correct and incorrect actions as well as key book elements.

i.   *General functions*
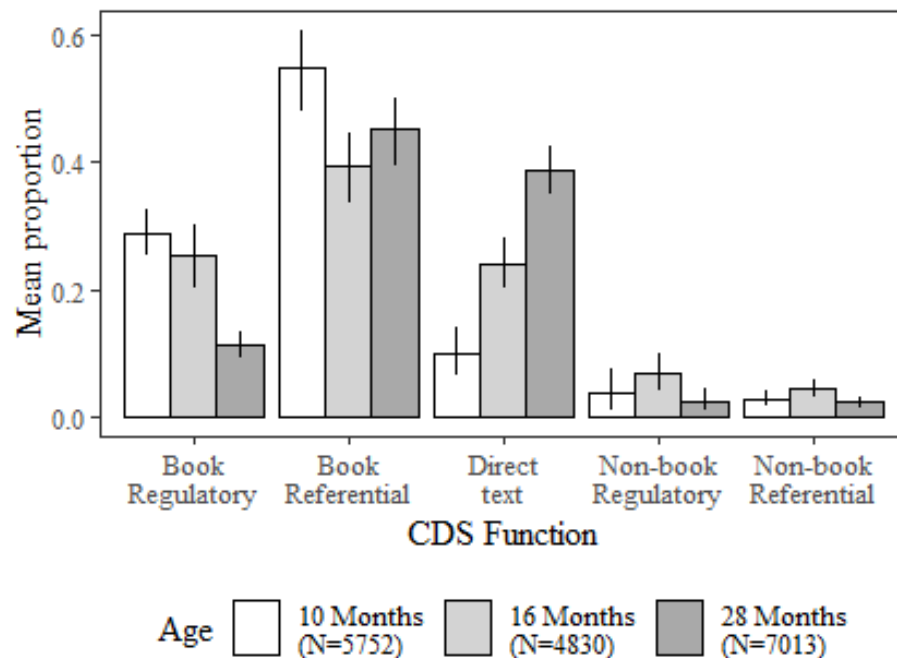
Figure 4.1. The mean proportion of maternal utterances using each function across the three ages

Although the non-book utterances were included in the calculations of the proportions as presented in Figure 4.1, as they only made up 1405 out of the 17625 utterances (8%) and the focus here was the functions used in relation to the book, these were excluded from the analysis. Three separate Friedman's tests were carried out on maternal utterances about how to act with the book (i.e. 'regulatory' language), about the contents of the book (i.e. 'referential' language), and directly reading the text (direct text), looking at how these change across the three ages. For regulatory utterances, there was a significant difference between the ages, χ^2 (2) = 31.08, $p < .001$, and the Kendall's coefficient of concordance

($W = .534$) indicated this was a medium effect. Post hoc analyses were carried out using Wilcoxon, applying a Bonferroni corrected criterion of $p < .017$. Although there was no significant difference in the proportion of regulatory utterances at 10 and 16 months ($p = .214$, $r = 0.25$), there were significantly fewer regulatory utterances at 28 months in comparison to those at 10 months ($p = .001$, $r = 1.09$) and 16 months ($p < .001$, $r = 0.87$).

For referential utterances, there was a significant difference between the ages, $\chi^2 (2) = 9.25$, $p = .010$, and the Kendall's coefficient of concordance ($W = .571$) indicated this was a medium effect. Post hoc analyses were carried out using Wilcoxon, applying a Bonferroni corrected criterion of $p < .017$. Although there was no significant difference in the proportion of referential utterances at 28 months in comparison to both those at 10 months ($p = .022$, $r = 0.47$) and 16 months ($p = .152$, $r = 0.29$), there were significantly more referential utterances at 10 months in comparison to those at 16 months ($p = .002$, $r = 0.63$). However, for utterances directly reading the actual text, there was a significant difference between the ages, $\chi^2 (2) = 35.08$, $p < .001$, and the Kendall's coefficient of concordance ($W = .470$) indicated this was a medium effect. Post hoc analyses were carried out using Wilcoxon, applying a Bonferroni corrected criterion of $p < .017$. In comparison to the proportion of direct text utterances at 10 months, there were significantly more of these utterances at 16 months ($p < .001$, $r = 0.85$) and at 28 months ($p < .001$, $r = 1.10$). Similarly, there were significantly more of these utterances at 28 months in comparison to 16 months ($p < .001$, $r = 0.84$).

To investigate the difference in the rates of reading of the direct text and the mothers' use of referential language, three Wilcoxon signed rank tests were carried out. At all three ages, the mothers produced significantly more referential language than reading the direct text; 10 months $z = 5.76$ $p < .001$ $r = 1.18$, 16 months $z = 3.64$ $p < .001$ $r = 0.74$, and 28 months $z = 2.07$ $p = .038$ $r = 0.42$.

Overall, this suggests that as there were fewer regulatory utterances at 28 months in comparison to the earlier ages. The results for referential utterances should be taken in conjunction with the direct text utterances as almost the opposite patterns occurred. With similarly high levels of referential utterances, there were higher rates of these utterances at 10 months in comparison to the 16 months but no other differences here, whereas for direct text utterances there were fewer at 10 months in comparison to both later ages and fewer at

16 months than at 28 months suggesting the use of this function increases with age. However, from directly comparing the rates of direct text and referential language, there is consistently more referential language produced.

ii.   Specific functions
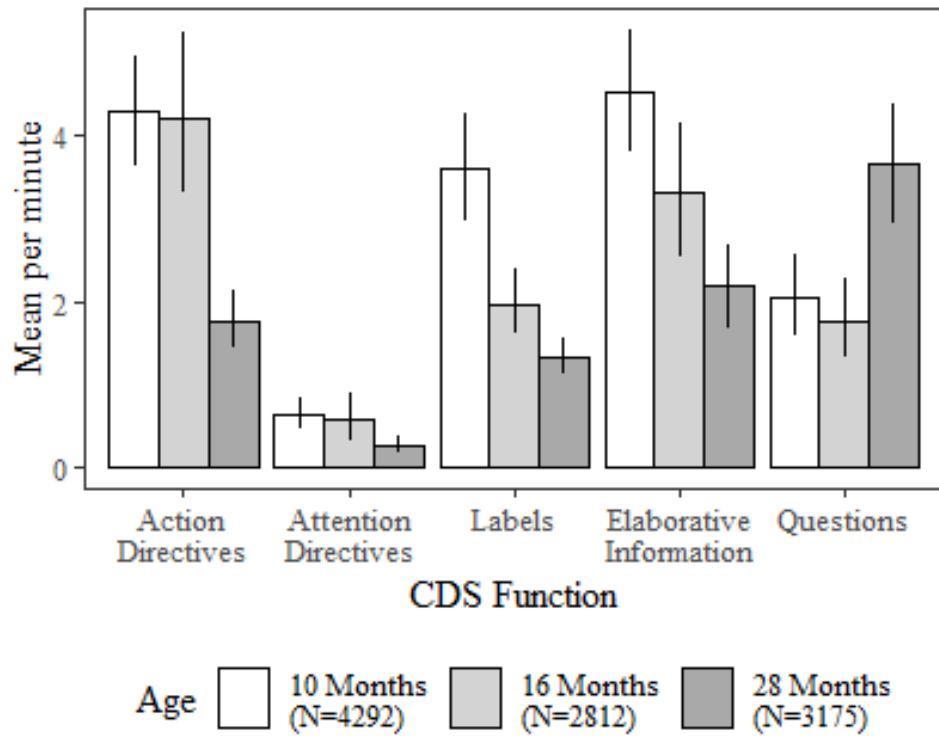
Figure 4.2. The mean maternal utterances related to the book (per minute) using each function across the three ages

As not all maternal utterances are analysed here[9], the mean utterances per minute were calculated for each of the specific functions examining the maternal utterances about how to behave with the book (attention and action directives) and about the book content (labels, elaborative information and questions) in more detail. Descriptive statistics are presented in Figure 4.2. Five separate Friedman's tests were carried out for each of the functions examining how the rates differ across the ages.

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[9] The feedback codes were not considered in this analysis as this was captured in the analysis investigating maternal responses to infants' actions.

For the more regulatory functions, both Friedman's tests revealed similar patterns with a significant difference across the age; actions directives (χ^2 (2) = 23.08, $p < .001$, $W = .552$) and attention directives (χ^2 (2) = 6.08, $p = .047$, $W = .395$). Post hoc analyses were carried out for each using Wilcoxon and applying a Bonferroni corrected criterion of $p < .017$. In both cases, there were no differences in the mean directive per minute at 10 months and 16 months (action directives $p = .546$, $r = 0.12$; attention directives $p = .198$, $r = 0.26$) and there were significantly more per minute of these utterances at 10 months in comparison to 28 months (action directives $p < .001$, $r = 1.09$; attention directives $p = .002$, $r = 0.63$). However, whilst there were no differences between the rates at 16 months and 28 months for attention directives ($p = .089$, $r = 0.35$), there were significantly more actions directives per minute at 16 months in comparison to those at 28 months ($p < .001$, $r = 0.80$).

For the more referential functions, whilst the three Friedman's tests were significant (labels χ^2 (2) = 25.08, $p < .001$, $W = .579$, elaborative information χ^2 (2) = 25.58, $p < .001$, $W = .620$ and questions χ^2 (2) = 15.75, $p < .001$, $W = .629$), the patterns differed somewhat. Wilcoxon post hoc tests applying a Bonferroni corrected criterion of $p < .017$ were carried out for each of the functions. For labels, significantly more were produced at 10 months in comparison to those produced at both 16 months ($p < .001$, $r = 0.76$) and 28 months ($p < .001$, $r = 1.03$) whereas the rates did not differ between 16 and 28 months ($p = .023$, $r = 0.46$). For elaborative information, whilst there were significantly more of these utterances produced at 10 months in comparison to 28 months ($p < .001$, $r = 0.89$), there were no differences in the rates at 10 and 16 months ($p = .036$, $r = 0.43$) and 16 and 28 months ($p = .065$, $r = 0.38$). However, for maternal questions, there were significantly more produced at 28 months in comparison to both 10 months ($p < .001$, $r = 0.67$) and 16 months ($p < .001$, $r = 0.84$), whereas there were no differences in the rates at 10 and 16 months ($p = .493$, $r = 0.14$).

In summary, with similar levels at 10 and 16 months for both action and attention directives, these decreased in the final visit in both cases. Both the rates of elaborative information and labels decreased as the child aged, the rate of maternal questioning increased.

iii.   Correlations with infants' language and behaviours at 28 months

The third research question was concerned with investigating the link between the different functions of maternal speech and the infants' language and behaviours. The focus here was to look at the relationship between the more referential functions and the infants' language at 28 months, followed by investigating the relationship between the more regulatory functions and the infants' behaviours. Descriptive statistics for the language scores can be found in the Table in the Appendix 3.

Table 4.1. Correlations between maternal referential functions and infant language scores at 28 months

| Functions | Age | CDI | | PLS[10] |
		Receptive	Expressive	Standardised Score
Labels	10 months	-.011	-.106	-.096
	16 months	-.131	.176	.239
	28 months	.508*	.185	-.029
Elaborative Information	10 months	.252	.276	.140
	16 months	-.111	.183	.477*
	28 months	-.041	.418*	.061
Questions	10 months	.310	.265	.258
	16 months	-.001	.297	.465*
	28 months	-.051	.119	.164

Note: $*$ p < .05.

As a measure of the infants' language skills as 28 months, the maternal reports of the infants' receptive and expressive vocabulary (CDI) and the scores from auditory comprehension subtest of the standardised language test, the PLS-UK4, which was carried out by the experimenter at the final visit. Therefore, as can be seen in Table 4.1, three bivariate correlations using Spearman's rho were carried out comparing each maternal

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[10] Although the Expressive Communication subtest of the PLS-UK4 was not administered to the infants in this study, the standardised scores are reported here. Analysis was also conducted with the raw scores from the Auditory Comprehension subtest and there were no differences between the reported results.

function at each of the ages to the three language scores from the final visit, giving a total of 27 correlations. Of the CDI correlations, there were only two significant relationships; maternal labels at 28 months were positively related to the infants' receptive vocabulary and maternal utterances involving elaborative information at 28 months were positively related to what the infants' expressive vocabulary. Similarly, of the PLS correlations, there were only two significant relationships for each of the PLS scores; when the mothers used questions and elaborative information at 16 months, these were both positively related to the infants' PLS scores at 28 months.

In terms of correlations with the children's behaviours, six bivariate correlations using spearman's rho were carried out to investigate the relationship between maternal action directives and infants' correct book actions (See descriptive statistics for the correct book actions in Figure 3.1b in Chapter 3) and a further six to investigate the relationship between maternal attention directives and children's joint attention to the book. Maternal action directives produced when the infants were 10 months old were not significantly related to the infants' correct book actions at 10 months ($r(22) = -.340$, $p = .104$), 16 months ($r(22) = .121$, $p = .572$) or 28 months ($r(22) = -.012$, $p = .956$). Similarly, there was no relationship between action directives at 16 months and correct book actions at both 16 months ($r(22) = -.250$, $p = .237$) and 28 months ($r(22) = .093$, $p = .665$) and no relationship between action directives and correct book actions at 28 months ($r(22) = -.198$, $p = .351$).

Initially, a similar pattern is evident for maternal attention directives produced when the infants were 10 months old as there was no significant relationship to infants' joint attention at 10 months ($r(22) = .187$, $p = .380$), 16 months ($r(22) = -.280$, $p = .185$) or 28 months ($r(22) = -.085$, $p = .691$) and no relationship was found between attention directives and joint attention at 28 months ($r(22) = -.220$, $p = .301$). However, attention directives at 16 months were positively related to the infants' joint attention at both 16 months ($r(22) = .477$, $p = .019$) and 28 months ($r(22) = .567$, $p = .004$). See descriptive statistics for joint attention in Figure 3.2 in Chapter 3.

Overall, at 28 months, maternal labels were related to better receptive vocabulary and elaborative information was related to better expressive vocabulary as measured by the CDIs, whereas maternal questioning and elaborative information at 16 months was related to better receptive vocabulary as measured by the PLS. Maternal action directives across

the ages were not related to the infants' use of correct book actions, whilst attention directives at 16 months were related to better joint attention at both 16 and 28 months.

iv.   *Book elements*

Analysis of how the mothers marked key book elements is considered in two parts; firstly, a descriptive analysis of how the mothers marked the beginnings and endings of the books is considered. The second part considers the 'feedback' element of maternal speech in terms of whether mothers marked correct and incorrect child actions or not and in what alternative ways incorrect actions are dealt with.

a)   Verbal marking of book beginnings and endings

With the sample size being 24 and three visits being analysed here, this means there were 72 visits in total, with two books (a familiar and unfamiliar book) introduced and concluded in each. Due to the low numbers, these will be analysed more descriptively and to analyse this in a more meaningful way with references to teaching behaviours, the familiarity of the book was considered here. In terms of the beginnings of the books, at 10 months, 8 mothers marked both books and 3 did not mark either book, however 13 mothers marked one but not the other. Analysing this further, when the book was unfamiliar 18 mothers marked the beginning and 6 did not mark it whereas, the numbers were roughly equal with the familiar books (11 marked and 13 not). The same pattern was evident at both 16 and 28 months with the beginnings of unfamiliar books being marked most often: 16 months - 8 mothers marked both, 5 did not mark either, with 17 marking the unfamiliar book (in comparison to 7) and 10 marking the familiar book (in comparison to 14), and 28 months – 9 mother marked both, 2 did not mark either, with 17 marking the unfamiliar book and 13 marking the familiar book. Therefore suggesting that overall, mothers tended to mark the beginnings of books when the books are unfamiliar to the infant.

In contrast to this, there was no clear pattern with the markings of the endings of the books. At 10 months, 4 mothers marked the endings of both books whilst 9 left the ending of both books unmarked with 11 marking one but not the other. There were roughly equal rates of marking or not with the unfamiliar book (11 and 13, respectively) whereas the ending of the familiar book was more likely to go unmarked (with 16 mothers). At 16 months, the ending of the books generally went unmarked; 14 mothers did not mark both books and 10 marked one but not the other. With both the familiar and unfamiliar books, only 5 mothers

marked the ending with 19 choosing to leave it unmarked. At 28 months, 8 mothers marked both books whilst 7 did not, and 9 marked one but not the other. Almost the opposite patterns were evident across the two types of books as 8 marked the end of the unfamiliar book (compared to 16 who did not) and 17 marked the end of the familiar book (compared to 6 who did not).

b) Marking in/correct book actions
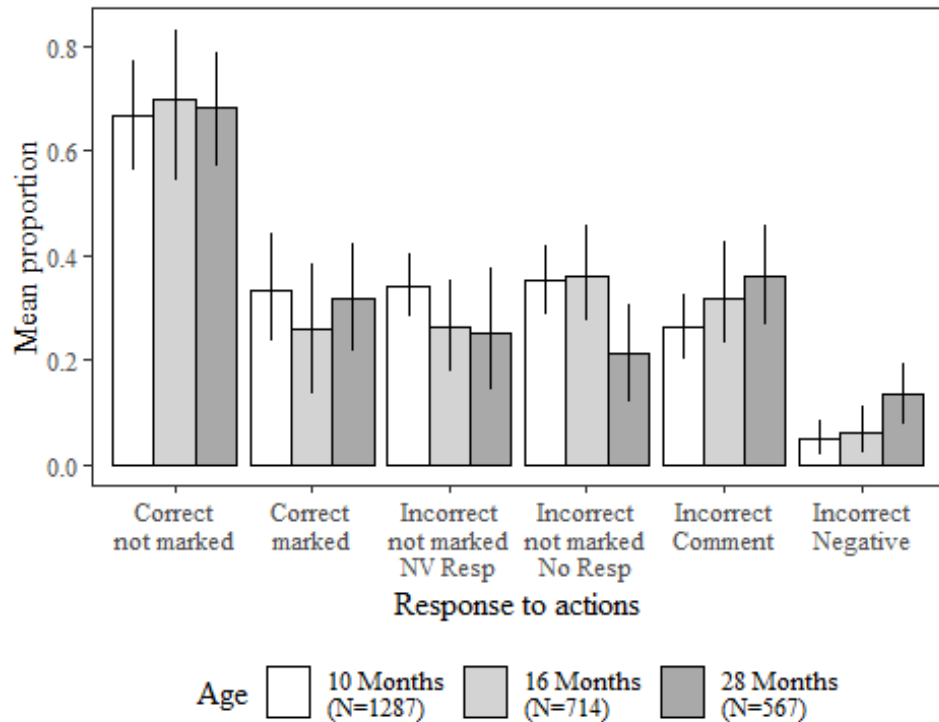
Figure 4.3. The mean proportion of correct and incorrect infant book actions which were un/marked verbally by mother including how incorrect actions are un/marked

Note: 'NV Resp' stands for non-verbal response and 'No Resp' is no non-verbal response

Descriptive statistics are presented in Figure 4.3 and the analyses are considered in four parts; the maternal marking of the child actions which are correct and incorrect, and then separately looking at incorrect actions which were not marked and incorrect actions which were marked. For each analysis, a separate Wilcoxon signed ranks test for each of the three ages. In terms of the child book actions which were correct, the mothers were significantly more likely to not verbally mark them than to mark them at each of the ages; 10 months $z = 4.18$ $p < .001$ $r = 0.85$, 16 months $z = 4.05$ $p < .001$ $r = 0.83$, and 28 months $z = 4.19$ $p < .001$ $r = 0.86$. The same pattern occurred with child book actions which were incorrect; 10

months $z = 4.27$ $p < .001$ $r = 0.87$, 16 months $z = 4.18$ $p < .001$ $r = 0.85$, and 28 months $z = 4.01$ $p < .001$ $r = 0.82$.

Analysing the mothers responses to incorrect book actions in more detail, when the mother did not verbally mark these, there were no differences in whether the mothers responded non-verbally such as correcting the action or not at any of the ages; 10 months $z = 0.08$ $p = .934$ $r = 0.02$, 16 months $z = 0.29$ $p = .769$ $r = 0.06$, and 28 months $z = 1.61$ $p = .107$ $r = 0.33$. Whereas when the mother did verbally mark incorrect actions, at all three ages they were significantly more likely to simply comment on this rather than to provide negative feedback; 10 months $z = 4.75$ $p < .001$ $r = 0.97$, 16 months $z = 4.13$ $p < .001$ $r = 0.84$, and 28 months $z = 3.33$ $p < .001$ $r = 0.68$.

In terms of the key elements overall, book beginnings were marked more often than not and this was particularly evident with unfamiliar books at all three ages. In contrast to this, the book endings tended to go unmarked, particularly at the 16-month visit however at the 28-month visit, the familiar book ending was marked more often than not. For the infants' book actions, both correct or incorrect actions were significantly more likely to go verbally unmarked compared to verbally marked. When the incorrect actions were unmarked verbally, there was no difference in the likelihood at which it would be marked non-verbally and when the incorrect actions were verbally marked, the mothers were more likely to comment on the action rather than give negative feedback.

Engagement strategies

This section looks at whether there are any differences in the strategies which the mothers used to engage the infants in the book reading context (addressing the fifth research question) followed by an analysis of how these engagement strategies related to the infants' joint attention to the book at 28 months (the final research question).

i.   Engagement strategies
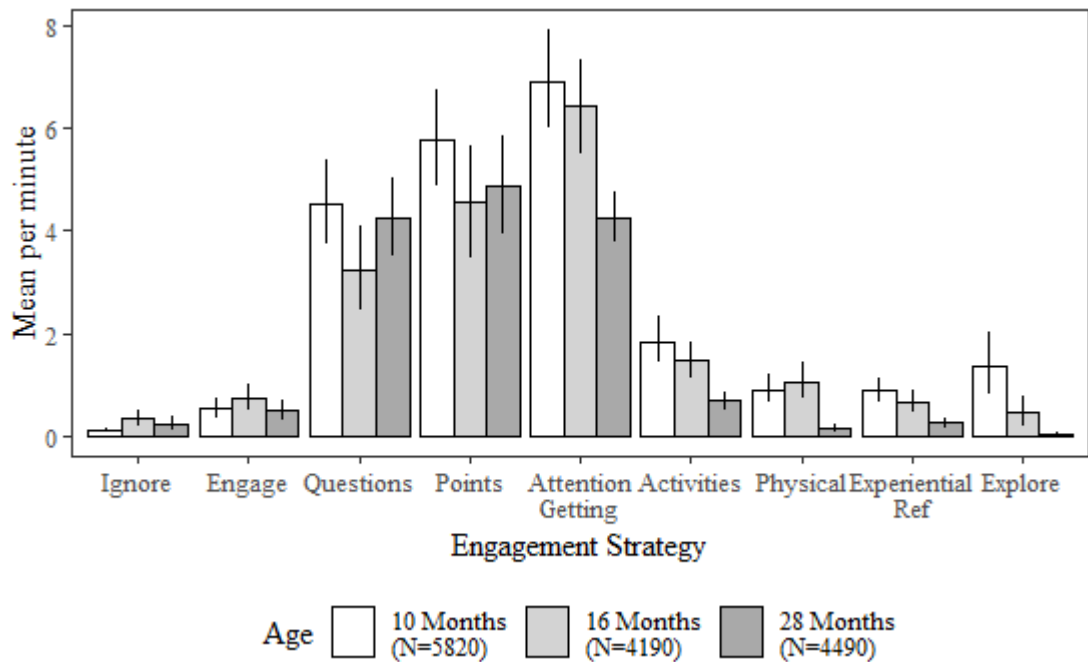
Figure 4.4. The mean maternal engagement strategies used per minute across the ages.

The final research question investigates the strategies which the mothers used to maintain or regain the infants' attention which in turn was used as a measure of their engagement in the book reading activity. The strategies and descriptive statistics are shown in Figure 4.4. Nine Friedman's tests were carried out for each of the strategies, comparing the mean instances per minute across each of the ages. The rates at which the mothers ignored the child's actions and when they engaged in the infants' non-related activities did not differ across the ages; Ignore χ^2 (2) = 2.30, p = .317, W = .437 and Engage χ^2 (2) = 4.96, p = .083, W = .599. Similarly, although the Friedman's tests for when the mothers used questions and points to maintain the children's attention (Questions: χ^2 (2) = 10.75, p = .004, W = .611, Points: χ^2 (2) = 6.58, p = .037, W = .629), once the Bonferroni corrected criterion of $p < .017$ was taken into consideration for the post hoc tests, there were no significant difference in the rates of these strategies across the ages; 10 vs. 16 months (p = .037, r = 0.43 and p = .097, r = 0.34, respectively), 10 vs. 28 months (p = 1.00, r = 0 and p = .153, r = 0.29, respectively) and 16 vs. 28 months (p = .041, r = 0.42 and p = .546, r = 0.12, respectively).

However, the Friedman's tests for when mothers used attention getting strategies (attention getting), book related activities (activities), physical manipulation of the child or book (physical), or linking contents of the book to the infants' experiences (experiential referencing) were all significant and showed the same pattern of differences; Attention getting χ^2 (2) = 22.58, $p < .001$, $W = .643$, Activities χ^2 (2) = 32.25, $p < .001$, $W = .705$, Physical χ^2 (2) = 21.02, $p < .001$, $W = .508$ and Experiential referencing χ^2 (2) = 15.94, $p < .001$, $W = .642$. In each case, post hoc analyses were carried out using Wilcoxon and applying a Bonferroni corrected criterion of $p < .017$. There were no significant differences between the rates at which these strategies were used at 10 and 16 months ($p = .533$, $r = 0.13$, $p = .291$, $r = 0.22$, $p = .564$, $r = 0.12$ and $p = .170$, $r = 0.28$, for each action respectively). However, the rates of these strategies at 28 months were significant lower than the rates at both 10 months ($p < .001$, $r = 0.86$, $p < .001$, $r = 0.86$, $p < .001$, $r = 0.96$ and $p < .001$, $r = 0.73$, respectively) and 16 months ($p < .001$, $r = 0.73$, $p = .001$, $r = 0.65$, $p < .001$, $r = 0.88$ and $p = .015$, $r = 0.49$, respectively).

The Friedman's test looking at the rates at which the mothers allowed their child to explore the book revealed a similar pattern with a significant difference overall, χ^2 (2) = 23.28, $p < .001$, $W = .361$. Post hoc tests using Wilcoxon and a Bonferroni corrected criterion of $p < .017$ revealed that the mean number of instances produced per minute were significantly lower at 28 months in comparison to both 10 months ($p < .001$, $r = 1.09$) and 16 months ($p = .002$, $r = 0.62$) and similarly, the rates produced at 16 months was significantly lower than 10 months ($p = .002$, $r = 0.61$).

Overall, the most prevalent engagement strategies were attention getting and pointing. The rates of these maternal points, along with questioning, did not differ across the ages. The rates at which the mothers used attention getting strategies, activities linking book content to infants' experiences, allowing the infants to explore the book and more physical strategies decreased as the infants grew older. However, the rates at which mothers ignored infants' non-book related activities or engaged in them were low and did not change over the ages.

ii. Correlation with infants' joint attention at 28 months

Table 4.2. Concurrent correlations between maternal engagement strategies
and infant joint attention

Strategy	10 months	16 months	28 months
Ignore	-.125	-.601**	-.680***
Engage	-.487*	-.793***	-.685***
Questioning	.037	.507*	.150
Points	.584**	.467	.011
Attention Getting	.508*	-.213	.030
Activities	.714***	.330	.083
Physical	-.315	-.640***	-.779***
Experiential Referencing	.161	-.047	-.084
Explore	.121	-.206	-.480

Note: ∗ p < .05, ** p < .01, *** p < .001

As can be seen in Table 4.2, each of the engagement strategies were investigated in terms of their relation to the infants' joint attention at each of the ages, concurrently (See Figure 3.2, Chapter 3 for descriptive statistics of joint attention). Of the nine Spearman's rho correlations carried out at the 10-month visit, when the mothers used attention getting strategies, activities related or referred to in the book and points, these were positively related to the infants' engagement with the book, as measured by their joint attention. However, when the mothers engaged with the infants' non-book related activities, this was negatively related to the infants' joint attention. At the 16-month visit, whilst maternal questioning was positively related to the infants' joint attention, when the mothers ignored the infants' non-book related activities, engaged in them or attempted to physically manipulate either the book or the infant, these were negatively related to joint attention. Similarly, relations were found at the 28-month visit, with ignoring or engaging in the infants' non-book related activities and more physical activities being negatively related to the infants' joint attention at this age.

Overall, attention getting, activities and points were positively related to joint attention at 10 months whereas engaging with the infants' non-book related activities was negatively

related. Ignoring or engaging in the infants' non-book related activities, and more physical strategies were all negatively associated with joint attention at both 16 and 28 months with the addition of maternal questions at 16 months being positively related.

Discussion

The overall aims of the study were to look at (a) maternal teaching practices in terms of the functions of maternal utterances and how these relate to infants' language and behaviours, as well as how key book elements are marked and (b) maternal engagement strategies and how these relate to infants' joint attention to the book. The results are summarised and discussed separately for two areas of teaching and engagement strategies.

Language and teaching practices

To summarise the results for teaching strategies, whilst reading the actual text increased across the ages, initial analysis suggested that regulatory language decreased and referential language remained at equally high levels. Upon more detail inspection of the specific functions for regulatory functions, although both attention and action directives decreased with age, action directives were more common. Of the referential functions, labels and elaborative information decreased whilst questions increased. Overall, the more specific referential functions were positively related CDI and PLS scores in the two older ages and similarly at these ages, attention directives were positively related to joint attention. For the key book elements, infants' book actions whether correct or incorrect were more likely to be left unmarked by the mothers however when verbal teaching did occur it was done in a more supportive rather than prohibitive manner.

Analysing the more general functions of maternal language during SBR, as the infants aged and their abilities with book reading developed, the mothers used less regulatory language because less instruction on how to behave with the book was required, supporting the findings of Chang and Luo (2020). Whilst this is contradictory to Kuchirko et al (2020) who reported stable rates of regulatory language, it was noted that Latina and African American mothers, as in their study, are culturally more regulatory-focused which can be seen to influence their function profile. Supporting previous research (e.g. Fletcher & Finch, 2015), the rates at which the mothers read the actual text of the book increased across the visits, likely due to an interaction between the age of the infants and the text, with there being more available text in order to convey more complex narratives in line

with the linguistic competences of the infants. However, this text reading did not surpass the rates of referential language at any of the visits. Although there did appear to be a slight dip in the levels of referential language at the 16-month visit, the mothers' language was predominantly focused on discussing the contents of the book, as in previous research (Chang & Luo, 2020; Kuchirko et al, 2020)[11]. There are two potential reasons for the dip in referential language at the 16-month visit. The first being that at this stage there was a big increase from the 10-month visit in the rates of reading from the text, with the books at the 10-month visit consisting of single words per page and the books at the 16-month visit containing simple but whole sentences. This would lend support to the finding that the more text there is available, the more likely mothers are to rely on it (Sénéchal et al., 1995). Another possible explanation for this is that there was also an increase in instances where the neither the mother or the infant were engaged in the book reading activities, as noted in Chapter 3, therefore reducing the talk about the book as a whole. This was confirmed by analysing the combined non-book related talk showing the proportion of this was higher at 16 months in comparison to the other visits (see Appendix 4 for analysis).

However, as suggested by Kuchirko et al (2020), focusing on the broader categories of functions may be too simplistic, missing the more nuanced differences in the subcategories or more specific functions of maternal language. Therefore, the regulatory functions were analysed in more detail in terms of action directives and attention directives. For action directives, similar to the overall regulatory category, it was not clear what would happen due to contradictory findings in previous research (Chang & Luo, 2020; Kuchirko et al, 2020). However, the mothers of this study produced more action directives when the infants were 10- and 16-months-old in comparison to 28-months-old, showing a marked decrease in instructing the infants on how to behave with the book as the infants aged, contrasting the more regulatory-focused sample in Kuchirko et al's (2020) study. Similarly, in line with the overall regulatory category, Kuchirko et al (2020) and Vallotton et al (2017) both found maternal attention directives to also decrease as the infants aged, as was supported in the current study, with infants being better able to regulate their own attention (Kopp, 1982). It should also be noted that at each of the visits, the mother produced higher rates of action directives than attention directives which is perhaps due to

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[11] It should also be noted that, when removing direct text reading from the analyses, the dip in referential language at 16 months was no longer significant, with there being a slight increase at 28 months, suggesting that referential language increased as the infants aged. See Appendix 5 for analysis.

the infants of the current study being socialised with books fairly early on as demonstrated by high levels of joint attention at the 10-month visit, as seen in Chapter 3. However, by the 28-month visit, the infants typically needed less guidance on how to behave with the book both in terms of attending to it and their actions on the book.

How these maternal directives relate to the infants' behaviours was analysed to see if action directives were related to the infants' behaviour with the books in terms of correct book actions and if attention directives were related to rates of infants' joint attention with the book. In this case, action directives were not related to correct book actions at any of the visits. This could be because, as discussed in Chapter 3, at the 10-month visit, many of the infants were already showing some abilities in this area at this age. As a result, it could be that instances of mothers giving feedback about the infants' actions, such as correcting them or giving them praise for correct actions, may be a better predictor of infants' actions than maternal action directives, which could be of interest to investigate further. Alternatively, it could be that infants learn how to behave with books more from modelling the mothers' actions as has been shown to be common form of learning with infants (e.g. Tomasello. Carpenter, Call, Behne & Moll, 2005).

Although there were no relationships between action directives and the infants' behaviours, attention directives were related to the proportion of time the infants' engaged in joint attention at both 16 and 28 months. The rates at which these directives were used were relatively low overall and the levels of joint attention were relatively high with this sample, particularly at 28 months. It could be at these stages that the infants have learned the significance of attention directives in that this is an object which the mothers want the infants to attend to. Research shows that attentional directives or 'vocatives' are produced by mothers as early as when the infants are 8 months old (Ninio & Bruner, 1978), which suggests they may be familiar with the significance of this signal from a very early age.

In terms of the referential utterances, these were analysed in more detail in terms of the sub-categories of labels, elaborative information and questions. In line with previous research, it was predicted that the rate at which the mothers produced labels would be relatively stable across the visits (Kuchirko et al, 2020; Murase et al, 2005) whereas utterances containing elaborative information would increase (Murase et al, 2005). In current study however, in both cases the mothers produced less of these as the infants got older. As with the overall referential category, this should be taken in conjunction with the

findings related to the rates at which the mothers read the actual text which increased. Although this initially seems contradictory to the findings of Kuchirko et al (2020) and Murase et al (2005), in both of these studies, they did not measure reading of actual text as textless books were used throughout. Taken together, this again highlights the impact which the availability of text can have on the CDS functions (Sénéchal et al., 1995).

The decrease in labels and elaborative information may also have been impacted by the increase in the use of maternal questions in relation to the book. This increase can be explained in terms of the mothers raising the ante, adapting their approach based on their understanding of the infants' word knowledge and attempts to encourage more infant participation in the SBR activities (Ninio, 1983). As, according to Ninio (1983), mothers are more likely to produce either production or comprehension questions about a referent after the infant has produced a correct response in regards to that referent. Therefore, once the mothers are satisfied that the infants have some understanding of the referent, they are able to test their linguistic competence in different ways. On the surface the increase found here initially seems contradictory to Murase et al (2005) who analysed book reading sessions with infants every three months from 12 to 27 months old and found the rate of questions to be relatively stable. However, as they noted, much of their analyses did not include the earlier sessions (12 and 15 months) due to low numbers, therefore, the stability in rates of maternal questioning may have been more to do with the infants of their analysis being older (i.e. 18 months onwards) than the infants of the current study as both of the earlier visits (10 and 16 months) had lower levels of questioning in comparison to the 28-month-visit where the infants' linguistic competence is much higher. As comprehension typically comes before production, Ninio (1983) found mothers produced *where*-questions before production eliciting questions. Therefore, it would be of interest to analyse whether there are any qualitative differences in the questions asked by the mothers across the ages with the suggestion being that more comprehension questions will be produced in the earlier visits than in the later visits.

How these referential functions relate to the infants' language skills at the 28-month visit was analysed using both parental reports (CDIs) and the comprehension subtest of a standardised language comprehension test (PLS-UK4). Partial support was found for Tamis-LeMonda et al's (2012) study in that no relationship was found with maternal referential language and infants' vocabulary development before the infants were 16

months old (i.e. at 10 months old). However, these findings have added to Tamis-LeMonda et al (2012) in that relations were found before the age of 2 years old and it seems that the more specific functions have differential effects at different time points, and with different measures. Maternal questions and elaborative information produced when the infants were 16 months old were positively related to the infants' comprehension as measured by the PLS-UK4 at the 28-month visit. This is somewhat in line with Murase et al (2005) in that they also found a positive relationship with these functions, however they looked at production rather than comprehension. It is possible that similar results would have been obtained with the expressive vocabulary subtest of the standardised test or more differential results may have been found, as was the case with the CDI scores. It is not clear why no such relationships were found with the maternal referential functions produced at 28 months however again the expressive vocabulary subtest might have yielded different results.

Of the referential functions produced at 28 months, maternal labels were positively related to the infants' receptive vocabulary whilst elaborative information was positively related to the infants' expressive vocabulary, both as measured by the parental reports at 28 months. On the surface this seems to support Murase et al's (2005) finding with regards to the positive correlation with elaborative information and infant vocabulary but refutes their negative correlation with maternal labels and infant vocabulary. However, their focus was only analysing the utterances on either side of the infants' labels rather than looking at the relationship between all of the utterance types and vocabulary. These differential effects can be explained in terms of simple labels being good for infants' receptive vocabulary as this is their baseline understanding of a word or referent whereas to know how or when to use the word requires a more developed understanding. Elaborative information provides infants with a better understanding of the referent therefore building a better representation and so are better able to produce the word. Overall, these differential findings again highlight the importance of analysing the more specific functions of maternal speech rather than using the broader categories as not only are they produced at different rates but they can also have different effects at different stages of development or on different elements of language development.

When looking at mothers' teaching strategies, an alternative perspective can be taken in terms of how they respond to or treat key book elements and infants' book actions.

Specifically looking at how they mark the beginnings and the endings of the books, according to Jones (1996) a key teaching activity made by caregivers is that these aspects are verbally highlighted. In this case, an overall pattern was not clear, therefore a potentially more meaningful way to look at this was to look at the difference across the two different book types with a familiar and unfamiliar book being introduced and concluded in each session. In the case of book beginnings, these tended to be verbally marked, particularly when the books were unfamiliar to the infant rather than familiar. There are two possible explanations for this with the first being that the mothers recognised the unfamiliarity of the book and considered more teaching to be necessary in these instances. However, it should also be noted that the unfamiliar book was always the first book to be introduced in the book reading sessions, therefore the verbal marking could also be potentially more to do with the mothers verbally introducing the overall book reading activity. In contrast to Jones (1996), for book endings, although no clear pattern was evident, there was a slight tendency for the mothers to leave these unmarked. This could be due to the visual aspect of closing the book to end the activity meaning the mothers felt it unnecessary to verbalise this action.

With regards to mothers' treatment of infants' book actions, Jones (1996) suggested that correct infant actions on the book would be marked verbally by mothers whilst incorrect actions are largely ignored or unmarked. Partial support for this was found in that incorrect actions were unmarked more often than not however the same results was found with correct actions as well, indicating that mothers tended not to mark infant actions in general. To some extent this supports Fletcher and Finch (2015) in that although positive feedback was given, the rates at which these were produced were relatively low. This is also similar to the argument that caregivers tend not to engage in corrections (Brown & Hanlon, 1970), although this was raised in regards to infants' grammaticality of language rather than book actions. Based on the idea that caregivers engage in reformulations rather than corrections (Chouinard & Clark, 2003), the current study looked at whether those incorrect actions which were left unmarked verbally would be corrected non-verbally or not however, there was no difference in the rates of either response. Looking specifically at when the infants' incorrect actions were verbally marked, the form which the marking took was analysed in terms of whether the mothers simply commented on the incorrect actions or whether they gave negative feedback on the actions. In line with previous research (Kuchirko et al, 2020; Vallotton et al, 2017), if the mothers chose to mark the infants' incorrect actions, this

tended to be done in a more supportive way by simple comments on the actions rather than in a prohibitive way with negative feedback, perhaps in a bid to encourage the infants' enjoyment in book reading activities rather than discourage them with negative feedback. Taken together, this suggests that teaching in SBR is done without much correction within a supportive learning environment.

Engagement Strategies

In summary of the results in terms of engagement, strategies most frequently used by the mothers were attention getting and pointing. Strategies involving attention getting, activities in relation to the book, allowing infant book exploration, experiential referencing and more physical means decreased as the infants aged whilst levels of maternal points, questions and ignoring or engaging with the infants' non-book related activities remained the same. At 10 months old, attention getting strategies, activities, and points were positively related to the infants' joint attention and ignoring, engaging and physical strategies were negatively related at 16 and 28 months.

With the importance of children's interest or engagement in SBR being noted as a mediating link between SBR and language development (Malin et al., 2014), caregivers' strategies which facilitate this are also of importance, with the two factors thought to have bidirectional influence (Pezoa et al, 2019). The two least common strategies used by the mothers which did not differ across the ages were when they continued to read the book ignoring the infants' non-book related activities or when they initially engaged in the infants' non-book related activities in an attempt to reengage the infant with the book. This is likely because the levels of joint attention with this group of infants were relatively high from the first visit and due to the set-up of the room, there were also limited non-book related activities for the infants to engage in during these recordings. In contrast, the most common strategies used by the mothers across all three visits were points and those strategies designed to attract the infants' attention such as calling their name or expressing surprise. The rates at which the mothers pointed to book referents did not change across the ages, supporting the idea that this activity is practiced early and frequently in relation to book reading, and is used in a way so as to attract and sustain infants' attention to the book (Murphy, 1978). On the other hand, the use of attention getting strategies decreased as the infants aged. To some extent, this is in line with Sénéchal et al (1995) who suggested the strategies used by caregivers with young infants is characterised by these attention getting

strategies whereas more sophisticated strategies such as questioning are used with older infants (in their study, 29 months old). In the present study, although there is a reduction in the use of attention getting strategies, the rates at which these are used are consistently higher than all other strategies used (except for points). The difference here is likely to be due to the attention getting strategies reported in Sénéchal et al's (1995) study being limited to maternal utterances only such as '*Look at this!*', whilst in the present study, it was also recorded when mothers expressed surprise or excitement such as with quick inhalations. It would be of interest to look at the quality of these attention getting strategies in more detail in terms of whether they change as the infants engage more with the SBR activity or as they get older, with perhaps the more simplistic 'surprise' and 'excitement' strategies being used more heavily early on.

Other engagement strategies which decreased as the infants aged and which were predicted to do so, were when the mothers engaged in activities in relation to the book (e.g. making noises or imitating book actions), when they physically manipulated the book or the child in some way and when they allowed the infants to explore the book. With the book related activities strategy, in Chang and Luo's (2020) study, they incorporated this element into their labelling category rather than looking at it separately. However, more in line with the attention getting strategies than labelling, these strategies were used as extra-contextual aides to keep the infants engaged with book which, due to the infants' improved abilities to self-regulate their own attention, this was therefore less of a necessity in the later visits. In line with this explanation and previous research (Moreno, 2000), physical manipulation of either the infant or the book to 'force' the infants to engage in the SBR activities similarly decreased with age as the infants became better able to or more willing to engage with these activities. The findings with regards to infants' exploration of the book can be explained in a similar way as Jones (1996) suggested enabling the infants to explore the book helps to maintain their interest in the books in the early stages before they are fully socialised with the book reading activities.

In the case of strategies when the mothers linked references in the book to the infants' experiences both by linguistic and non-linguistic means (e.g. pointing the infants' eyes to link this to the referents' eyes), it was predicted in line with the previous findings regarding decontextualized language (Rowe, 2013) that this would increase as the infants aged. However, in this case, the rates at which these were produced decreased across the visits.

Although this can be seen as a form of decontextualized language, previous studies have not looked at this form separately before as the focus has previously been on the impact this has on the infants' language development and therefore incorporated a broader definition including caregivers' discussions of future events or explanations of referents. The more specific categorisation in this study, which was also not limited to language, was due to the focus of this strategy being to gain and maintain the infants' engagement with the book rather than the link to language development. Future research could look into the different forms of decontextualised language and to investigate the impact on both simply maintaining attention and language development separately.

In line with previous research (Sénéchal et al., 1995), it was predicted that maternal questioning would increase as the infants aged, however in this case the rates were relatively stable across the visits. Whilst on the surface this appears to be contradictory to previous research and discussions earlier in the chapter, it should be noted that when considering teaching strategies and in previous research, a more stringent classification of questions was used as the focus was on teaching the infants about book referents such as '*Where is the doggie?*'. However, in the case of engagement strategies, a broader classification was used including all types of questions asked such as '*Do you want to turn the page?*'. The justification for this being that Jones (1996) argues that early uses of the question and answer format are more in regards to introducing the infants to this conversational convention and to keep them engaged in the SBR activity as it is clear that with early instances of questions, the caregivers are not posing these with the expectation that the infants will respond. In line with the suggestions from earlier discussions of maternal questioning, future research could investigate the quality of the questions asked with the expectation that these would change as the infants' linguistic competence and socialisation with books develops. For example, it seems like that questions about how to behave with the book would decrease whilst questions in relation to book referents would increase.

Whilst it is clear that multiple forms of engagement strategies are used throughout each SBR session and across the ages, the key element to consider is the extent to which these strategies are successful in gaining and maintaining the infants' attention to the book as a measure of their interest or engagement in the activity (Sénéchal et al., 1995). As previous research has only looked at some of these strategies from the perspective of reading

strategies and language development rather than specifically their success in engaging the infants' attention, few predictions were made for this study. One exception to this was due to Muhinyi and Rowe (2019) who suggested that maternal questioning may be bidirectionally linked to infants' engagement. At the 10-month visit, the more the mothers utilised attention getting strategies, activities in relation to the book, and points, the more the infants attended to and engaged with the book. At this stage, it is clear the infants require more external encouragement to engage in SBR with these more overt strategies directing and encouraging the infants' attention, in comparison to the later stages when these strategies were not related to the infants' attention as they became more internally regulated to attend to the book.

Unsurprisingly, when mothers engaged in the infants' non-book related activities in an attempt to reintroduce the book, this was negatively associated with the infants' engagement with the books at all three visits. Similarly, the more the mothers ignored the infants' non-book related activities or physically manipulated the infants or the book, the less the infants engaged with the book at both the 16- and 28-month visits. These strategies are more in line with the idea of 'forcing' the infants to engage in SBR when some other activity may be of more interest to them. Although, as noted earlier, the levels of joint attention with these infants were relatively high from an early age and the rates at which all three of these strategies were produced were relatively low in comparison to other strategies. As the set-up of these reading sessions were in an artificial environment with minimal external distractions, it is not clear that the mothers would have 'forced' their infants to engage in SBR as much in their home environment. It could be that alternative books are adopted to try to reengage them or it could be that SBR activities would be abandoned in the home setting. Some have suggested that the latter may be more likely as caregivers may not find the SBR activities rewarding until the infants are old enough to engage with books appropriately (Bus et al., 1995). Engagement strategies adopted in the home setting could be investigated in future research.

The findings also provide support for the suggestion that maternal questioning is related to infants' interest in SBR (Muhinyi & Rowe, 2019) in that increased use of this strategy led to an increase in the infants' attention to the book. To further support this finding, Muhinyi and Rowe (2019) also utilised both a stringent category of maternal questions, more specific to reading content, as well as a broader category of all questions. Although the

ultimate analysis was to later language development, it was this broader category which was associated with infants' interest in books, as was the case in the current study. The implication of this is that all forms of maternal questioning encourages participation in numerous ways including attention to the contents of the book as well as more simply encouraging engagement with the book itself such as turning the pages. Taken together with earlier correlations with questions at 16 months being related to infants' language at 28 months, this suggests that the more stringent category of questioning directly impacts on infants' language development whereas the broader overall category of questioning can indirectly impact on infants' language development via the bidirectional relationship which it has with infant's engagement with books as suggested by Muhinyi and Rowe (2019). It should also be noted however that, as with the correlation to the infants' language development, the relationship between questioning and infants' attention to the book was only significant at the 16-month visit. One possible reason this was not the case at the 28-month visit (and perhaps why very few strategies were related at this stage) is because at this stage, the levels of joint attention were almost at ceiling which suggests few of the maternal strategies would have direct impact on the infants' engagement as at this stage they are more internally motivated to engage in SBR rather than externally motivated.

Conclusions

Overall, the key findings and arguments with regards to maternal teaching practices were that the amount with which the mothers read the actual text in the book increased as the infants aged and as more text became available. Additionally, it is too simplistic to look at overall categories of referential and regulatory language. This is because the mothers exhibited different patterns with the more specific functions which in turn differentially related to the infants' language and behaviours at different ages. Furthermore, mothers typically did not give verbal feedback on infants' book related behaviours but for incorrect behaviours when they did give feedback, this was done in a supportive rather than prohibitive way, supporting previous research (e.g. Vallotton, et al, 2017). This supports the idea that teaching in SBR is carried out without much correction, in a more supportive learning environment. This similarly supports the idea that much of CDS is designed with communication in mind rather than language learning (Pine, 1994) or, in this case, learning in general. Whilst some of the results with regards to maternal engagement strategies differed from previous research, much of this was to do with measurement differences with

these differences typically coming about due to differences in the focus of studies i.e. the current study was looking at strategies for maintaining the infants' engagement in the SBR activity, whereas previous research tended to focus on reading strategies. Whilst more 'external' strategies (e.g. attention getting strategies and engaging in activities from the book) were seen to relate to infants' engagement at 10 months, there were fewer relationships in the later stages as the infants were better able to self-regulate their own attention. Strategies designed to 'force' the infants' engagement were negatively related however it is possible that these strategies are less likely to be seen in a home environment.

Chapter 5 – How does book familiarity impact on children's engagement with books and maternal teaching strategies?

Introduction

With the importance of shared book reading (SBR) interactions being highlighted for children's school readiness (Tamis-Lemonda et al., 2014), research has typically focussed on one or other of the three key elements of this activity i.e. the parent (e.g. Hoff-Ginsberg, 1991; Luo & Tamis-LeMonda, 2017), the child (e.g. Muhinyi & Rowe, 2019) and the book (e.g. Sénéchal et al., 1995). In terms of books, one key element which has been highlighted by research is that of the familiarity of the book (e.g. McArthur, Adamson, & Deckner, 2005). This is due to the widely recognised impact which book familiarity has on infants' word learning (e.g. Sénéchal, 1997; Horst, Parsons, & Bryan, 2011). The reasons behind this impact have been investigated (e.g. Horst, 2013), including the influence which familiarity has on the maternal language (e.g. Sonnenschein & Munsterman, 2002; McArthur et al., 2005) as well as on the infants' language (e.g. Goodsitt et al., 1988; Fletcher & Jean-Francois, 1998). However, previous research in this area has typically focused on SBR interactions with infants over the age of 2 years old. Therefore, it is not clear whether such differences in maternal language and infants' language and behaviour would be evident with younger infants as will be investigated in the current study.

Repeated readings of the same book is a common request made by infants (Martinez & Roser, 1985), perhaps because the predictability of familiar books is known to enhance the enjoyment of the reading experience (Leavitt & Christenfeld, 2011). The importance of this characteristic of book familiarity is widely recognised, due to the impact it has on SBR interactions and, more specifically, because reading books more than once has been shown to affect vocabulary learning as it provides repeated opportunities for infants to process novel words in appropriate contexts (Sénéchal, 1997; Horst et al, 2011; Horst, 2013). For example, Snow and Goldfield (1983) analysed the SBR interactions between a boy aged 1;10 and his mother over the course of eleven months, focussing particularly on recurrent discussions of the same referents. It was reported that the child often reproduced, and subsequently acquired, lexical items and constructions which his mother had produced in previous encounters with the referents. With a group of older children, between the ages of 3 and 4 years old, Sénéchal (1997) compared single reading, repeated reading and repeated reading with the addition of questioning as SBR techniques, examining their effect on

expressive and receptive language acquisition. The repeated reading techniques involved three readings of the books and these were both found to facilitate expressive and receptive language development. However, asking children questions which required them to label the referent facilitated expressive language acquisition more than receptive language acquisition.

One key study highlighting the effect of the use of familiar books on word learning is that of Horst, et al (2011). They pointed out that, for two reasons, many previous studies were problematic in the extent to which they can demonstrate children's word learning. In many of the cases, either the control groups generally had lower levels of reading exposure in comparison to the experimental 'repeated reading' groups (e.g. Biemiller & Boote, 2006) or the number of target words the children were expected to learn was up to ten (e.g. Robbins & Ehri, 1994) when the typical number of words learned per day is around 3 (Bion, Borovsky, & Fernald, 2013). Horst et al (2011)'s study therefore set out to rectify this with two groups of 3-year-olds, each receiving the same number of exposures to target words over the course of a week, with either nine different stories or three repeats of the same three stories and a maximum of two target words per day. With immediate testing on the same day as the reading sessions, there were no differences between the two groups. However, when the children were tested again at the end of the week, only those who were read the same three stories were able to recall the target words whereas those who were read different stories performed at chance. Horst (2013) argued that this distinction is because the immediate test results demonstrated the children's 'fast mapping' abilities to map the referent to the target word whereas the delayed test results of the children who were read the same stories, demonstrates that the repeated encounters in the same contexts facilitated the creation of more robust representations indicative of word learning. The contextual cueing effect, thought to be the mechanism behind this finding, serves to reduce the complexity of the SBR contexts by decreasing the children's attention to non-target items to facilitate word learning more with familiar books (Horst, 2013).

In addition to the contextual cueing effect found with familiar books, Snow (1994) pointed out that the impact of repeatedly reading familiar books on language development is also caused by changes in either the caregivers' language or the children's participation. Some studies report changes to the caregivers' behaviours and language whereas others focus more on the child's participation. For example, book familiarity has been shown to affect

maternal reading styles as, with unfamiliar books there was an increase in mothers' uses of descriptions and labelling, however with familiar books, mothers commented on general knowledge more, allowing the children to engage in higher level processes of linking what is in the book to the world (Haden, Reese, & Fivush, 1996). Similarly, in a study with 5-year-olds, mothers tended to use more non-immediate talk with familiar books rather than unfamiliar books (Sonnenschein & Munsterman, 2002). Studying the SBR interactions of 24-, 30- and 36-month olds and their mothers, McArthur et al (2005) provided them with two unfamiliar books and recorded them three times with these books over a two-week period. They argued that the role, or function, of the maternal utterances changed as the familiarity of the book developed, more so than as a function of the children's age. With the initial readings, the primary emphasis was the transfer of knowledge with more utterances relating to gaining the children's attention and comments about the story details. However, in later readings, the mothers made more attempts to assess and guide the children's understanding with an increase in the number of questions and feedback (McArthur et al, 2005).

In terms of repeated reading affecting the children's language and participation, one study analysed the prompted responses of 4-year-olds over ten sessions in either a repeated reading, different reading or control group (Morrow, 1988). In general, the children in the repeated reading group produced more comments than the other groups whereas the children in the different reading group asked more questions. Over the course of the sessions, the repeated reading group displayed increasingly sophisticated reading behaviours such as making predictions and reciting text. Similarly, when looking specifically at the spontaneous responses during repeated reading sessions rather than prompted responses, another study found labels and comments to be the most frequent response which increased over the first four sessions but then decreased (Fletcher & Jean-Francois, 1998). Repeating lexical items and reading along increased over the sessions suggesting that the responses were becoming increasingly more complex, as the children moved away from simply labelling and commenting and attended to the story more (Fletcher & Jean-Francois, 1998). With 5-year-old children, both at home and in the classroom, talk doubles as the books become more familiar and as a result, it was suggested that children tend to focus on listening more with unfamiliar books (Martinez & Roser, 1985). And with children as young as 2 years old, the number of discussions

initiated by the infant was seen to increase across three sessions, as they become more familiar with the books (McArthur et al, 2005).

Rather than looking at familiarity through repeated readings within the study, other studies have analysed SBR interactions with familiar books from the children's home and found similar results. For example, Goodsitt et al (1988) compared the book reading interactions of 2-, 3½- and 5-year-olds with novel books and a favourite book from home. In all three age groups, more statements were made with familiar books whereas with novel books, the children labelled the referents more. In a similar study, 3 and 4 year olds were found to relate the text to their own experiences more frequently with familiar books (Hayden & Fagan, 1987).

However, many of these studies have been criticised due to either the variability in the levels of familiarity typically created when using the children's favourite books, or due to the minimal control observed regarding the genre or type of the books used (Fletcher & Finch, 2015). Fletcher and Finch (2015) argued that there is a complex interplay between the child, the parent and the book which changes over time and varying different characteristics of these three components can have an effect on the others. With eleven 2- to 3-year-olds, Fletcher and Finch (2015) investigated the process of books becoming more familiar over four visits. Looking at how familiarity affects the responsiveness of the children, this was examined both as a factor on its own and in conjunction with the maternal reading strategies and book type. As with previous studies, the children became more responsive over the sessions i.e. as the books became more familiar. However, when considering the type of book, this was only the case for when the more simplified books were used, such as ABC books, as there was no clear pattern of responsiveness when there was more narrative text involved. Similarly, the effect of the interaction between familiarity and maternal reading strategies on the children's responsiveness was mixed. For example, as the books became more familiar, the children's responses increased with positive feedback and questioning but not with labelling or yes/no questions. These differing effects of book familiarity lend support to the notion of a transactional interaction during SBR activities which develops over time (Fletcher & Reese, 2005).

Current Study

In summary, book familiarity has been shown to be an important factor for word learning due to contextual repetition (e.g. Horst et al, 2011, Horst, 2013) but also due to the impact it has on both the language used by the caregivers, in particular the functions of the mothers' speech (e.g. Sonnenschein & Munsterman, 2002, McArthur, et al, 2005) and the children's participation and responsiveness (e.g. Fletcher & Jean-Francois, 1998, Fletcher & Finch, 2015). However, besides Snow and Goldfield (1983), the main focus of these studies has been with children over the age of two. Therefore, with infants from the age of 10 months, this study will look at the effect of book familiarity on SBR interactions in terms of how it affects the mothers' behaviour and language and also the infants' participation, both verbal and non-verbal. The predictions and/or areas of investigation are listed below:

To begin with, the first question, which has not been considered in previous research, is whether the books are handled differently in terms of whether there is a difference in how the mothers introduce them and whether there is a difference in the time spent with each.

> RQ1. Does the familiarity of the book differentially affect the way the mothers and infants interact with the book in terms of how the books are marked and how much time is spent with each book?

Following this, for the second question, general maternal language differences across the two books will be analysed in terms of the function of the maternal utterances, with the three main functions being referential language, regulatory language and reading of the actual text from the books. Although Fletcher and Finch (2015) did not find familiarity to impact on the levels of reading the actual text from the books, this was over a shorter period of time to the current study and Chang and Luo (2020) found that this increases with the infants' age. Therefore, it seems likely that direct text reading will increase across the sessions, but it is unclear whether there will be a difference between the presentation of familiar and unfamiliar books. However, it is also unclear whether this reading of the text will have an impact on the rates of overall maternal referentiality across the two books. For example, it could be that as a result of this familiarity with the text, they are able to read around the book content more (i.e. using more referential language) with familiar books. Whereas for regulatory language, with the ritualisation of familiar books, it seems likely

that there will be more overall regulatory language used by mothers with unfamiliar books as is suggested by McArthur et al (2005) who found more calls for the children's attention in these contexts.

> RQ2. Does the familiarity of the book differentially affect the rates of general functions in maternal language? In this case, no predictions are made for differences in maternal rates of referentiality (i.e. utterances about the contents of the book) or direct reading of the text across the two books, however, more regulatory language (i.e. utterances about actions on the book) is predicted to be produced with the unfamiliar books.

Using the same terminology as in previous chapters combining the coding schemes of Murase, et al (2005) and Kuchirko et al (2020), the specific functions of maternal utterances will also be looked at in the third research question. With labels, elaborative information, questions and feedback on language being forms of referential language, whilst action directives, attention directives and feedback on actions are forms of regulatory language. With older children, the mothers produced more labelling (Haden et al, 1996) and more attention directives (McArthur et al, 2005) with unfamiliar books whereas with familiar books there were more questions (McArthur et al, 2005) and elaborative information (Sonnenschein & Munsterman, 2002). However, differences with feedback and action directives have not been investigated.

> RQ3. Will the familiarity of the book differentially affect the rates of specific functions in maternal language? With a younger sample, it is unclear whether a similar pattern of functions will occur across the two book types as it does with older children.

The fourth and fifth research questions will look at the children's participation. In this case, older children have been shown to participate more with familiar books (Morrow, 1988) and with children from the age of 2, their levels of responsiveness increases as the book becomes more familiar (Fletcher & Finch, 2015). Previous research in this area has not looked at how book familiarity will affect the process of children becoming socialised with books in terms of when they stop treating the book the same way they treat an object and begin to use the correct SBR behaviours.

> RQ4. Will the familiarity of the book differentially affect the way the infants' interact with the books in terms of their behaviour with the books? In this case, it seems likely

that having some experience of the familiar book will mean the infants will use more correct SBR actions and more joint attention to the book and that there may be more object-like actions with unfamiliar books.

RQ5. Will the familiarity of the book differentially affect the infants' verbal interactions with the books? Here, the socialisation with familiar books suggests more infant vocalisations will be produced with the familiar books. Similarly, more complexity and lexical diversity is predicted to be produced with familiar books in the later visits as in previous research (e.g. Goodsitt et al, 1988, McArthur et al, 2005).

In summary, this study will look at how the familiarity of the book impacts on three key areas; (a) the dyads' treatment of the books particularly of marking of and time spent with the books (research question 1) (b) maternal utterances in terms of both general and more specific functions, (research questions 2 and 3) and (c) infants' behaviours and language (research questions 4 and 5).

Method

Overview of design

Procedure: 24 dyads were invited into the Child Study Centre every two months for a period of 18 months. Three of these visits are coded and analysed here – when the infants were 10-, 16- and 28-months-old. At each visit, a researcher (rather than the mother) handed an unfamiliar book to the infant. The procedure was carried out in this way in order to assess the infants' baseline abilities with books in terms of their first actions on an unfamiliar book (examined in Chapter 3). The dyads then proceeded to read the book together followed by the familiar book.

Books: Due to the longitudinal design of the study, the books were changed every six months, meaning the familiar books were different at each visit analysed here. All books were selected from lists of Amazon sales and library records in terms of low popularity in an attempt to provide books which were not likely to be familiar to the dyads. For the 10-month visit, all books were single pictures with single words on each page. For the 16-month visit, they all had a single, simple sentence and multiple pictures on each page whereas for the final visit, the books contained between two and four simple sentences per page with at least one complex sentence within the book and more complex pictures. For

each visit, the 'familiar' book and 'unfamiliar' book were selected and matched as far as possible. In order to control the familiarity, the books selected as the 'familiar' books were sent out to the dyads two weeks before the visits and they were asked to read the books at least once beforehand, recording the number of book reads. At each visit, the researcher checked whether the dyads had had any experience with the selected unfamiliar book before proceeding.

Coding Scheme and Reliabilities

The videos were coded for when the familiar (Fam), the unfamiliar (Unfam) book or, on some occasions, when both books (2Books) were being looked at[12]. Following 15% of the video files being coded in ELAN by a second rater, the reliabilities for these codes was 0.933.

Data Extraction Using ELAN and Excel

For the analysis in this chapter, the addition of the familiarity tier meant all data extraction used searches across multiple tiers in ELAN. This additional tier meant that once the data had been imported into Excel, comparisons to original searches from previous chapters had to be made in order to ensure the ELAN searches had identified all the eligible codes and any missing. The wild card regular expression was used on the book familiarity tier and codes were identified which occurred '*within*' these codes on other tiers. In most instances, as was the case in previous chapters, this meant that those codes overlapping the boundary of codes on the book familiarity tier were omitted from searches and required manually locating to determine which book code to assign the codes to. The following searches required this manual input (along with the number manually inputted); CDS functions (99) for both general and specific functions, infants' overall book actions (12), vocalisations (27) and vocalisation structure (8). Following these manual searches, in order to ensure the behaviours or language being analysed was specific to one of the two books, those codes which were identified as within periods of when both books were being used were omitted from subsequent analysis. The following analyses involved omission of annotations with this criterion (along with the number omitted in brackets out of the total number of codes); CDS functions (56 out of 17627) for both general and specific functions, infants' overall

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[12] Whether it was the experimenter (E), the child (C) or the parent (P) who was holding the book was also coded however this was not analysed.

book actions (29 out of 4235), attention (16 out of 1820), vocalisations and the structure of the vocalisations (48 out of 5584). Once the above data manipulation was carried out, pivot tables were used to produce the raw numbers of the codes, which were then used to calculate mean actions per minute or mean proportions.

In terms of specific analyses, for the analyses looking at the infants' overall book actions (research question 4), for the analysis looking at the infants' different attentional states with the book, due to the low number of instances, periods when only the infants were attending the book were omitted from the analysis (although they were included in the calculations of proportions). Similarly, when analysing the structure of infants' vocal behaviours (research question 5), one instance where the infant used reported speech was omitted from the analysis due to low numbers.

Data Extraction using CLAN

As the videos were transcribed using the CHAT transcription format, this enabled the extraction of the transcripts from ELAN into CLAN for further linguistic analysis of the infants' utterances from the final visit at 28 months. Once the CLAN files were formatted correctly, they were separated into separate files for the two books. The CLAN files were then analysed for lexical diversity (using the VOCD function), mean length of turn as a measure of the conversational load which the infants assume (using the MLT function) and the mean length of utterance of the five longest sentences (using the MLU5 function) as a measure of the infants' productivity.

Results

The analysis in this section will be separated into three areas; looking at differences in behaviours with the two books (addressing the first research question), the differences in the functions of the mothers' language across the two books (addressing the second and third research questions) and differences in the infants' behaviour and language across the two books (addressing the fourth and five research questions).

Differences in introductions and time spent with the two books

This section looks at whether there are behavioural differences in firstly how the mothers handle the familiarity of the books in terms of how they are introduced and then looking at whether the books are treated differently in terms of how much time is spent on each.

i.   *Introducing the two books*

With the sample size being 24 and three visits being analysed here, this means there were 72 total instances where a familiar and unfamiliar book is each introduced. Due to the low numbers, this will be analysed more descriptively. Although it can be noted that in all book introductions the mothers expressed excitement at looking at a book, out of all of the instances where the unfamiliar book was introduced, there were only three occasions when the mothers drew attention to the fact that it was a new book which the infants had not come across before. However, for the familiar books, the mothers often highlighted the familiarity of the book with phrases such as '*This is the same as the book we read at home!', 'You know this book!' or 'Oh look! It's X* [Character from familiar book]'. Out of the 24 at each visit, 18 of the mothers did this at the 10-month visit, 13 at the 16-month visit and 14 at the final visit.

ii.   *Amount of time spent on books*

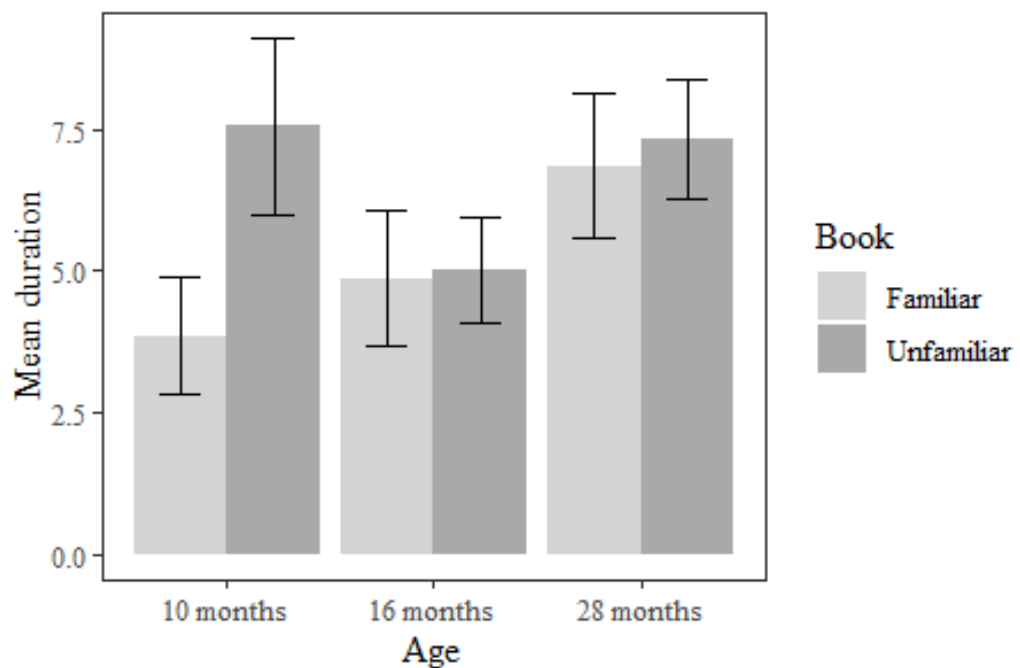*Figure 5.1. The mean duration (in minutes) spent on both the familiar and unfamiliar books across the three ages*

The amount of time the dyads spent on each book at each visit was measured and descriptive statistics shown in Figure 5.1. When directly comparing the time spent with the familiar and unfamiliar books, three Wilcoxon signed rank tests were carried out at each

age. Whilst there were no differences in the time spent with the books at both 16 and 28 months ($z = 0.28$, $p = .781$, $r = 0.06$ and $z = 0.65$, $p = .516$, $r = 0.13$, respectively), the dyads spent significantly longer time with the unfamiliar book when the infant was 10 months old ($z = 3.66$, $p < .001$, $r = 0.75$). Therefore, the differences in the overall patterns in time spent with each of the books from the Friedman's tests seems to be driven by the difference at 10 months old.

Therefore, overall, it seems that the mothers did tend to draw attention to the familiarity of the books but they were much less likely to mark the novelty of the unfamiliar book. In terms of time spent with each type of book, the main difference in how the dyads treated the books was at 10 months, spending more time with the unfamiliar book.

Differences in functions of maternal language

This section addresses the second and third research questions by first looking at whether there are any differences in the general functions of the maternal utterances across the two books, followed by the more specific functions.

i. *General functions*

Although the maternal utterances which were not book related were included in the calculation of proportions, due to the low but similar numbers (627 out of 7710 with familiar books and 773 out of 9830 with unfamiliar books) and the focus of analysis being on the functions of the utterances in relation to the two books, these were not included in further analysis here. Therefore, the subsequent analysis was related to regulatory utterances (i.e. involving actions on the book), referential utterances (i.e. about the book content) and when the mothers read directly from the text in the books. See Figure 5.2 for descriptive statistics.

For the mean proportions of maternal regulatory utterances regarding actions on the books (e.g. '*Turn the page*'), when comparing the books directly with three Wilcoxon's signed ranks tests, there was no difference in the proportions when the infants were 28 months old ($z = 1.89$, $p = .059$, $r = 0.39$). However, there were significantly higher proportions of maternal regulatory utterances with the unfamiliar books than the familiar books at both 10 months old ($z = 3.02$, $p = .002$, $r = 0.62$) and 16 months old ($z = 2.67$, $p = .007$, $r = 0.55$). Therefore, as shown in the Figure 5.2, and reported in Chapter 4, as the infants' ages
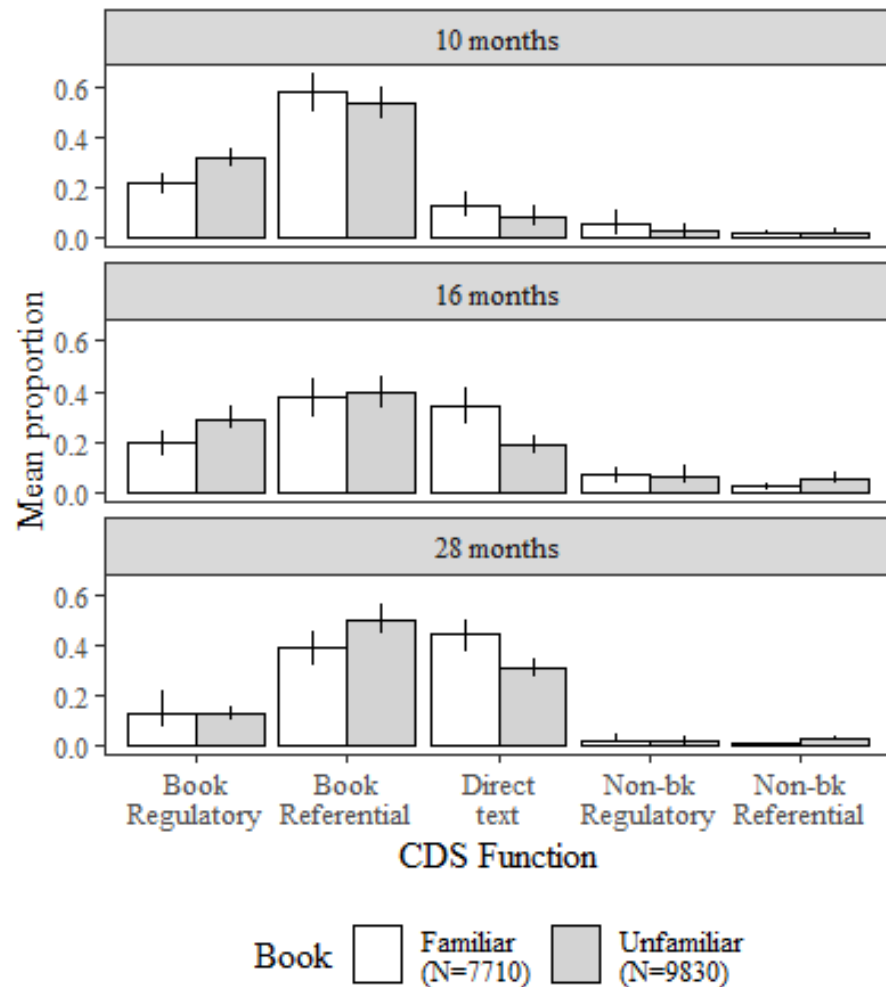
Figure 5.2. The mean proportion of maternal utterances using each general function across the three ages with the familiar and unfamiliar books

increased, there were significantly fewer maternal utterances used to instruct the infants on the actions on the books and in the earlier visits, there were more of these utterances with unfamiliar books.

In terms of the proportions of maternal referential utterances regarding the book content (e.g. '*That's a bunny*'), when comparing the books directly with three Wilcoxon's signed ranks tests, there was no difference in the proportions when the infants were 10 months old ($z = 0.55$, $p =.585$, $r = 0.11$) and 16 months ($z = 0.57$, $p =.571$, $r = 0.12$). However, there were significantly higher proportions of referential utterances with the unfamiliar books than the familiar books at 28 months old ($z = 2.48$, $p = .013$, $r = 0.51$). Therefore, it is clear that the difference in patterns across the ages for the two books, as seen in Figure 5.2, is

driven by the visit at 28 months old with more referential utterances with the unfamiliar book in comparison to the familiar book.

When comparing the proportions between the two books in terms of maternal utterances involving reading the direct text with three Wilcoxon's signed ranks tests, there was no difference in the proportions when the infants were 10 months old ($z = 1.65$, $p = .099$, $r = 0.34$). However, although the amount of text available in the books was matched as far as possible across the two books at each age, there were significantly higher proportions of direct text reading with the familiar books than the unfamiliar books at both 16 months old ($z = 3.35$, $p < .001$, $r = 0.68$) and 28 months old ($z = 2.94$, $p = .003$, $r = 0.60$). Therefore, as seen in Figure 5.2, there were more text related utterances with familiar than unfamiliar books in the later visits.

ii.   *Specific functions*

As shown in Figure 5.3, this analysis looks at the more specific sub-categories of the general functions i.e. labels, elaborative information, questioning and feedback on language being forms of referential language, and action directives, attention directives and feedback on actions being forms of regulatory language. Although it would be possible to calculate the proportions for this analysis, in order for the analysis to be comparable to that used in Chapter 4, the mean per minute was calculated for each of the measures.

Three separate Wilcoxon's signed ranked tests were carried out comparing the rates of labelling with familiar books to unfamiliar books. There were no differences in the rates of labelling between the familiar and unfamiliar books at both the 16-month visit ($z = 1.36$, $p = .174$, $r = 0.28$) and the 28-month visit ($z = 1.49$, $p = .136$, $r = 0.30$). However, at the 10-month visit, there were significantly more labels with the unfamiliar book than the familiar book ($z = 3.83$, $p < .001$, $r = 0.78$). When looking at the mothers' use of elaborative information, three separate Wilcoxon's signed ranked tests comparing the rates with familiar books to unfamiliar books were carried out. There were no differences in the rates of elaborative information at the 16-month visit ($z = 0.54$, $p = .592$, $r = 0.11$). However, at both the 10-month visit and the 28-month visit, there were significantly more utterances giving elaborative information with the familiar book than the unfamiliar book ($z = 5.98$, $p < .001$, $r = 1.22$ and $z = 2.24$, $p = .025$, $r = 0.46$, respectively). With the three Wilcoxon's signed ranks tests comparing the rates of questions given by the mothers with the familiar
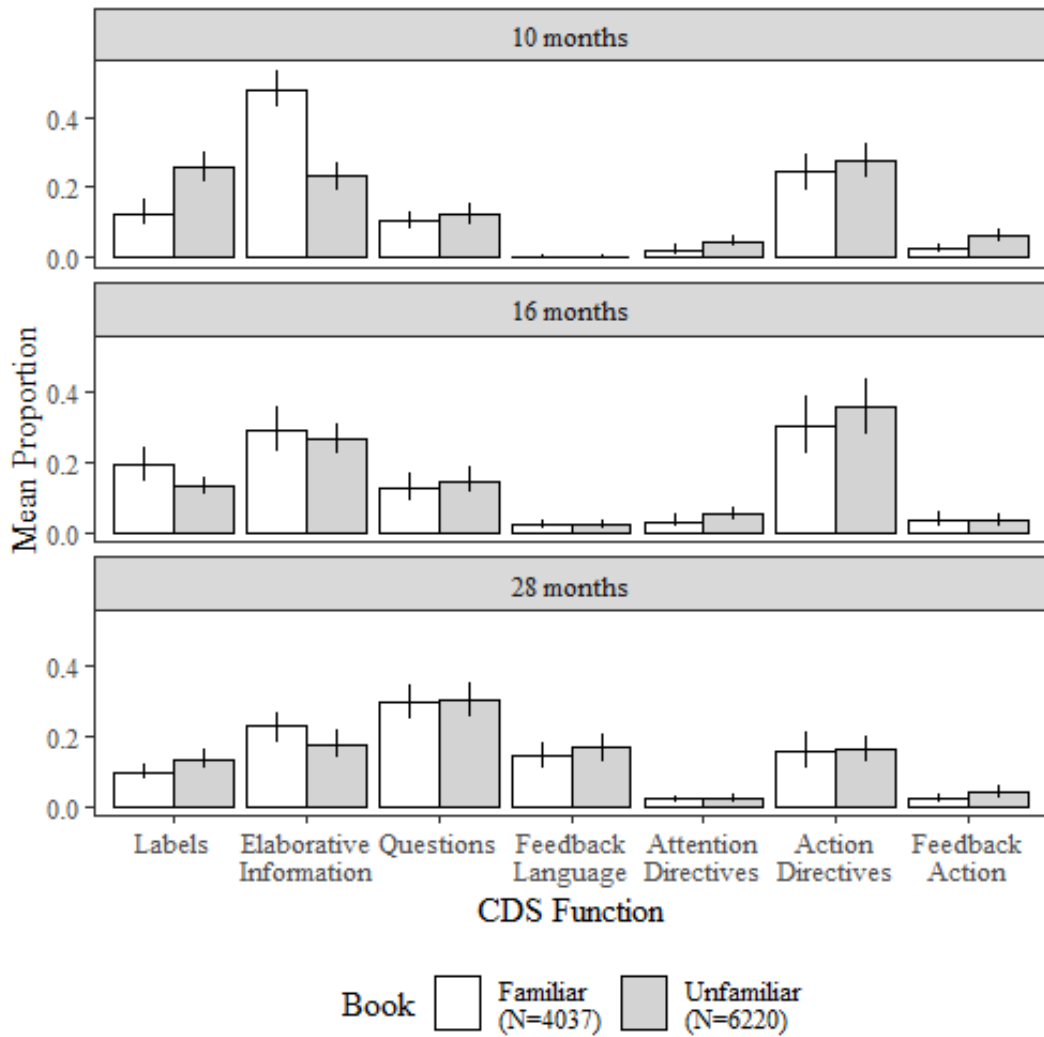
Figure 5.3. The mean maternal utterances per minute using each specific function across the three age with the familiar and unfamiliar books

and unfamiliar books, there were no significant differences between the two books (10 months: $z = 0.59$, $p = .557$, $r = 0.12$, 16 months: $z = 0.64$, $p = .523$, $r = 0.13$, and 28 months: $z = 0.08$, $p = .934$, $r = 0.02$).

The three Wilcoxon's signed ranks tests comparing maternal uses of attention directives revealed that there were significantly more attention directives with the unfamiliar books at the 10-month visit ($z = 3.61$, $p < .001$, $r = 0.74$) as well as the 16-month visit ($z = 1.96$, $p = .049$, $r = 0.40$). However, there was no difference between rates used with the two books at 28-months ($z = 0.37$, $p = .710$, $r = 0.08$). However, for the maternal rates of using action directives, the three Wilcoxon's signed ranks tests comparing the two books revealed that there were no differences in the rates of action directives at any of the visits (10 months: z

$= 0.78$, $p = .433$, $r = 0.16$, 16 months: $z = 1.03$, $p = .303$, $r = 0.21$ and 28 months: $z = 0.88$, $p = .381$, $r = 0.18$).

In terms of maternal utterances which involved giving the infants feedback on their language, when the infants were 10 months, as would be expected, there were too few child utterances to analyse here as there were only six feedback utterances made by five mothers with familiar book and eleven utterances made by five mothers with the unfamiliar book. As can be seen in Figure 5.3, Wilcoxon signed ranks tests revealed there were no significant differences between the rates of these utterance types when the infants were both 16 months old ($z = 0.08$, $p = .939$, $r = 0.02$) and 28 months old ($z = 0.99$, $p = .322$, $r = 0.20$). When the mothers gave feedback about the infants' action on the books, there were no difference between the two books when the infants were 16 months old ($z = 0.24$, $p = .808$, $r = 0.05$) and 28 months old ($z = 1.23$, $p = .217$, $r = 0.25$). However, when the infants were 10 months old, there were significantly more utterances of this function with the unfamiliar book ($z = 3.13$, $p = .002$, $r = 0.64$).

Overall, the key findings here were that when the infants were 10 months old, the mothers produced more labels, attention directives and feedback regarding the infants' actions with the unfamiliar book and elaborative information with the familiar book. Whereas when the infants were 16 months old, the mothers produced attention directives with the unfamiliar book and when the infants were 28 months old, the mothers produced more elaborative information with the familiar book.

Differences in infants' behaviours and language

This section focuses on the final research questions, firstly looking at whether there are any differences in how the infants behave with the two books both in terms of their book related actions and how they attend to the books and then looking at whether there are any differences at the 28-month visit in measures of their vocabulary and syntax.

i. *Infants' book actions*

For the key analyses here, codes for when the infants imitated an action from the book (C:ACT), book refusals (C:BR), holding the book out (C:HO), taking the book (C:RTB) and non-book related points (C:PNT:EXT) were omitted from this overall analysis to restrict analysis to behaviours on the book itself and similarly the expectation code

(C:EXP) as there was only one instance of this. However, to eliminate the possibility that there were differences between the two books for these codes, they were analysed separately. The analyses and graph of these can be found in the Appendix 6. The majority of these were not significant except for when the infants imitated actions from the books at the 16 months visit as the mean actions per minute was significantly higher with the familiar books than unfamiliar books ($z = 1.97$, $p = .049$, $r = 0.40$)[13].
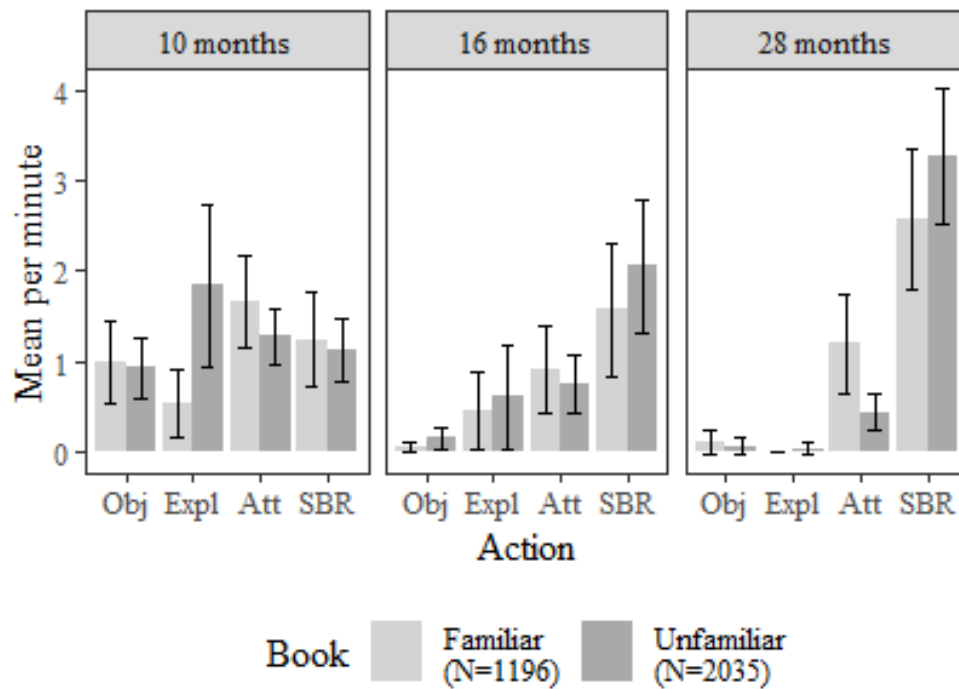
Figure 5.4. The mean (per minute) of child actions on the book across the three ages with the familiar and unfamiliar books.

Note: 'Obj' stands for object actions, 'Expl' is explore actions and 'Att' is attempted SBR actions

For the main analysis, as seen in Figure 5.4, the mean actions per minute used with the familiar book were compared to those used with the unfamiliar book at each age, for each action separately with Wilcoxon's signed rank tests. When the infants were 10 months old, there were no differences between the two books with the rates of object like actions ($z = 0.16$, $p = .877$, $r = 0.03$), attempted SBR actions ($z = 0.53$, $p = .599$, $r = 0.11$) and correct

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[13] When the infants took the book from the mothers at the 16 months visit, the infants did this significantly more often with the unfamiliar book in comparison to the familiar book. However, this finding was not deemed to be relevant for the current analyses.

SBR actions ($z = 0.06$, $p = .951$, $r = 0.01$). However, at this age, there were significantly more explore actions with unfamiliar books in comparison to the familiar books ($z = 3.25$, $p = .001$, $r = 0.66$). In both of the later visits, there were no significant differences in the rates of actions between the two books; 16 months: Object actions ($z = 1.59$, $p = .111$, $r = 0.33$), explore actions ($z = 0.46$, $p = .644$, $r = 0.09$), attempted SBR actions ($z = 0.19$, $p = .852$, $r = 0.04$) and correct SBR actions ($z = 1.30$, $p = .193$, $r = 0.27$). 28 months: Object actions ($z = 0.62$, $p = .532$, $r = 0.13$), explore actions ($z = 1.74$, $p = .081$, $r = 0.36$), attempted SBR actions ($z = 1.91$, $p = .056$, $r = 0.39$) and correct SBR actions ($z = 1.42$, $p = .155$, $r = 0.29$). Therefore, overall, the only key difference in the infants' behaviours between the two books is that of higher rates of explore actions when the infants were 10 months old with unfamiliar books.

ii.   *Infants' attentional states*
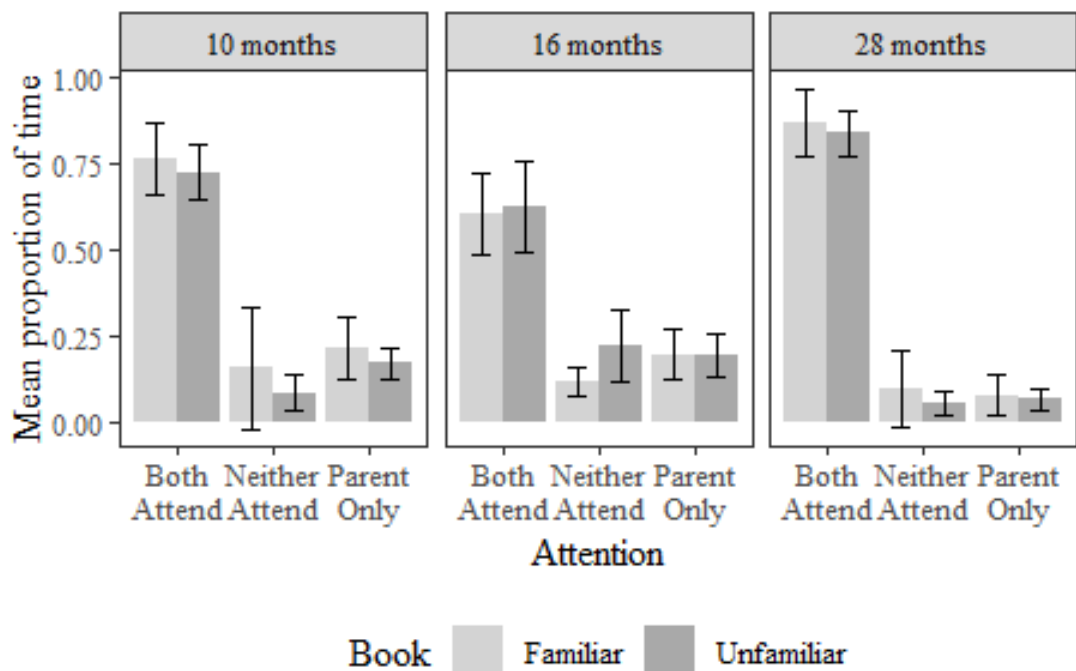
Figure 5.5. The mean proportion of time spent in each of the attentional states across the three ages with the familiar and unfamiliar books

To analyse the difference between the two books, as shown in Figure 5.5, the mean proportion of time in each attentional state was calculated separately for each book in terms of when the infants spent jointly attending with the mother to the book, when neither the infant or when the mother were attending to the book or, third, only the mothers were

attending. The instances where only the infant was attending to the book were too few and therefore omitted from this analysis. Wilcoxon's signed rank tests were carried out comparing the books in each attentional state at each age however none of these were significant; 10 months: Both attending ($z = 0.36$, $p = .718$, $r = 0.07$), Neither attending ($z = 0.53$, $p = .598$, $r = 0.11$) and Parent only ($z = 0.86$, $p = .392$, $r = 0.17$). 16 months: Both attending ($z = 0.04$, $p = .967$, $r = 0.01$), Neither attending ($z = 0.68$, $p = .495$, $r = 0.14$) and Parent only ($z = 0.28$, $p = .781$, $r = 0.06$). 28 months: Both attending ($z = 1.56$, $p = .119$, $r = 0.32$), Neither attending ($z = 0.35$, $p = .724$, $r = 0.07$) and Parent only ($z = 0.84$, $p = .399$, $r = 0.17$). Therefore, overall, there were no differences in the proportions of attentional states between the two books.

iii.   Child vocal behaviours

Vocalisations

Similarly, the mean proportion of infants' vocalisations which were book related and non-book related are presented in Figure 5.6a and were analysed in terms of the differences between the familiar and unfamiliar books. Wilcoxon's signed rank tests were carried out comparing the books in each context at each age however none of these were significant; 10 months: Book related ($z = 0.13$, $p = .893$, $r = 0.03$) and Non-book related ($z = 0.94$, $p = .348$, $r = 0.19$). 16 months: Book related ($z = 1.37$, $p = .170$, $r = 0.28$) and Non-book related ($z = 0.76$, $p = .445$, $r = 0.16$). 28 months: Book related ($z = 1.01$, $p = .310$, $r = 0.21$) and Non-book related ($z = 0.07$, $p = .942$, $r = 0.01$). Therefore, overall, there were no differences in the rates of book related and non-book related vocalisations between the two books.

Language at 28 months

This was analysed in two ways. Firstly, to be comparable to previous research, similar categories were analysed, such as fragments (i.e. labels) and questions, as seen in Figure 5.6b. Alternatively, as the infants in this study were younger than in previous research, more qualitative differences were analysed using the CLAN looking at lexical diversity, the mean length of utterance (MLU) of the five longest utterances and the overall conversational load. The five Wilcoxon signed ranks tests comparing the difference in rates between the two books for each of the categories were not significant: communicators ($z = 0.06$, $p = .951$, $r = 0.01$), fragments ($z = 1.56$, $p = .120$, $r = 0.32$), copulas ($z = 0.42$,
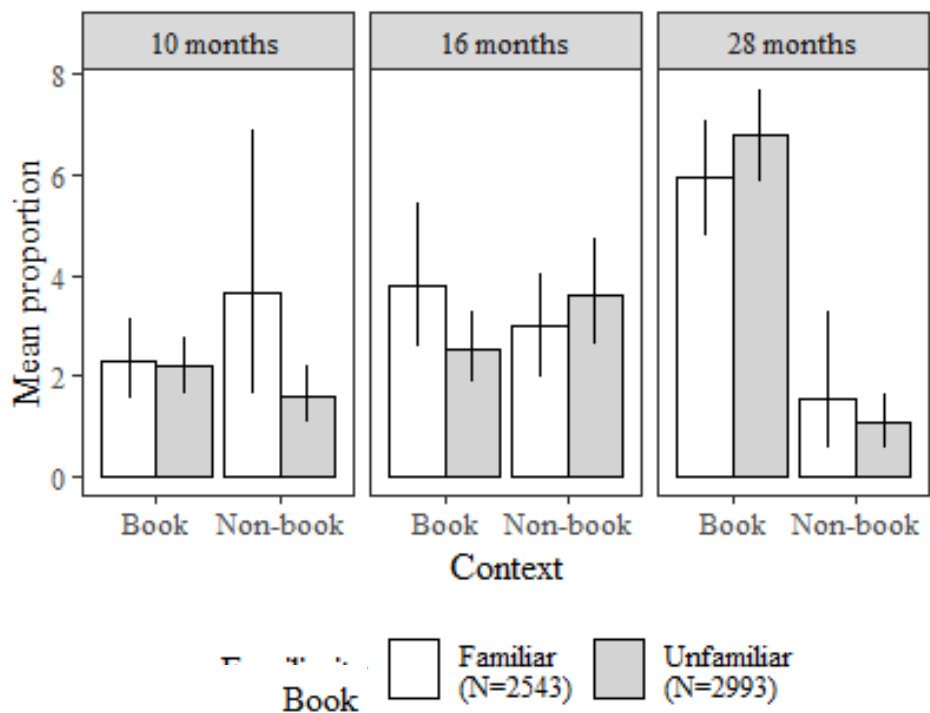
Figure 5.6a. The mean proportion of child vocalisations which were book related and non-book relates across the three ages with the familiar and unfamiliar books
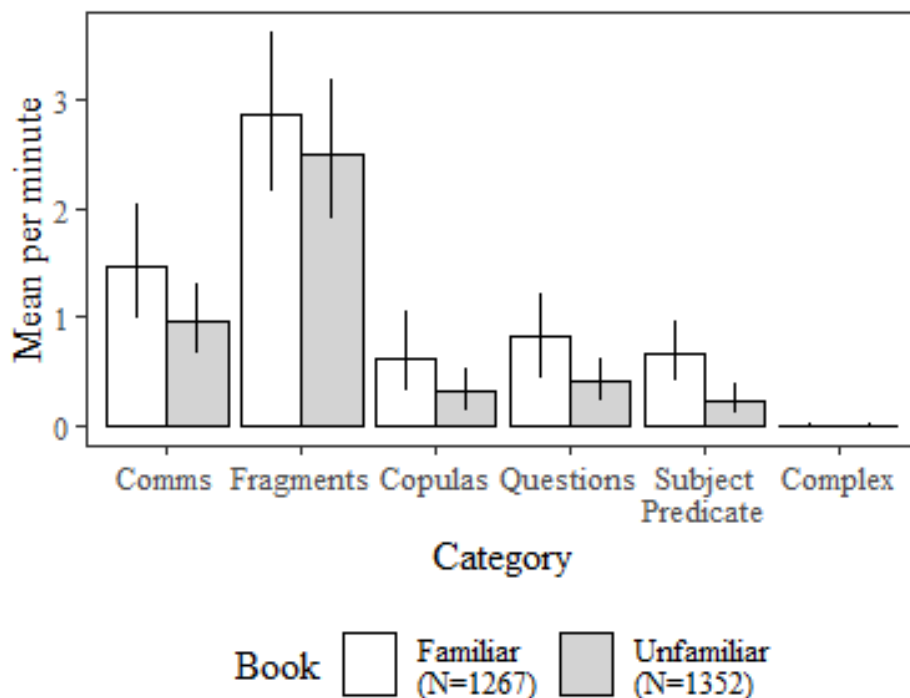
Figure 5.6b. The mean infant utterances per minute per category across the three ages with the familiar and unfamiliar books

Note: 'Comms' stands for communicators

$p = .672$, $r = 0.09$), questions ($z = 0.49$, $p = .626$, $r = 0.10$) and subject-predicate utterances ($z = 1.67$, $p = .094$, $r = 0.34$). There were too few complex utterances to analyse statistically; one was produced with the familiar book and three were produced with the unfamiliar book.

Looking at how many different words the infants' use, the VOCD analysis in CLAN measures how complex their language is, otherwise known as their lexical dexterity. Using this analysis, the infants' lexical diversity across the two books were compared in the final visit. With the familiar books, the median VOCD score was 19.92 (range = 8.44 – 43.24) whereas with the unfamiliar books, the median type/token ratio was 20.80 (range = 7.79 – 44.47), however, this difference was not significant (*Wilcoxon z* = 0.31, $p = .755$, $r = 0.06$). When analysing the MLU for the five longest utterances in CLAN, the median with the familiar books was 4.60 (range = 2.2 – 9.5) and with the unfamiliar books, it was 5.10 (range = 2.4 – 7.6). Similarly, a Wilcoxon signed ranks test found that this difference was not significant ($z = 0.06$, $p = .949$, $r = 0.01$). The final measure of the infants' language was looking at the conversational load during this final visit comparing the mean length of the turn of the infants to the mean length of turn of the mothers. Again, in this case, the median with the familiar books (0.123, range = 0.047 – 0.339) was not significantly different from the median with the unfamiliar books (0.124, range = 0.056 – 0.290; *Wilcoxon z* = 0.47, $p = .635$, $r = 0.10$). Therefore, overall, these results suggest there were no differences between the two books in terms of the categories, lexical diversity, complexity or conversational load used by the infants in the final visit.

Discussion

The overall aims of the study were to look at how book familiarity impacts on the three key areas of (a) dyads' treatment of the books in terms of introductions and time spent with the books, (b) the function of maternal utterances and (c) infants' behaviours and language. In these three areas, in terms of the differences in introductions and time spent with books, familiar books were typically highlighted and more time was spent with unfamiliar books in the first visit but no differences occurred after this. For maternal language, the main differences between the books occurred with the unfamiliar books, as there was more regulatory language concerning how to behave with the book (at the 10- and 16-month visits) and more referential language concerning the book content with unfamiliar books (at the 28-month visit) whereas with the familiar books, there was more reading of the

book text (at the 16- and 28-month visits). However, for infants' behaviours and language, there were no differences in the infants' behaviours except for more exploring actions with unfamiliar books at 10 months. The results are summarised in more detail and discussed separately for how book familiarity impact on each of the three areas of book treatment, maternal language and infants' behaviour and language.

Differences in introductions and time spent with the two books

In terms of whether the two books were treated any differently, whilst the mothers rarely highlighted the novelty of unfamiliar books, the familiar books were more often than not an element which the mothers drew attention to at each of the three visits. The main difference between the treatment of the unfamiliar versus familiar books was that the dyads spent longer with the unfamiliar books when the infants were 10 months old although this difference was not sustained in the later visits. There are two possible explanations for this difference with the first being that this could simply be an artefact of the design of the study as at each of the visits the unfamiliar book was the first book which was introduced to the book reading session (to enable the assessment of infants' baseline interactions with books as analysed in Chapter 3). Given than this was the first visit of the study and therefore the first book of the study, this increase in time spent with the book may be more to do with the dyads becoming more acquainted and comfortable with what they were being asked to do. On the other hand, another explanation for this finding could be that at this age, the infants are more engaged with new 'objects' to explore (Werner & Kaplan, 1963) and were perhaps more engaged with the unfamiliar book for this reason. This may have signalled to the mothers that the infants were happy to continue reading this book. Whereas the infants have some experience with the familiar book and were perhaps 'bored' or 'habituated' to it to some extent. Indeed, many studies with pre-verbal infants, in a variety of areas including perception, cognition and language, utilise the habituation/familiarisation process to assess infants' abilities in these areas (Aslin, 2007). The phenomenon occurs when infants become habituated to certain stimulus through repeated exposure and they then demonstrate a tendency to look at novel stimuli longer (Turk-Browne, Scholl, & Chun, 2008). Through repeated exposure to the familiar books in this study, the infants' may have been exhibiting this tendency to engage more with the novel 'object' in this case the unfamiliar book.

Differences in functions of maternal language

The results regarding the function of the mothers' language suggest that with both books, the use of regulatory language (i.e. language used to direct the infants' behaviours) decreased over time. There were more utterances of this nature with the unfamiliar book in comparison to the familiar books when the infants were 10- and 16-months old but no such difference occurred at the 28-month visit. This was as predicted as the mothers were in the process of 'socialising' the infants with the books and therefore perhaps more guidance is needed on how to behave with new books which fits with Vygotsky's (1978) zone of proximal development. However, it should also be noted here that there were no differences between the two books in the infants' correct SBR actions and incorrect object-like actions. Therefore, this increase in regulatory language with unfamiliar books is likely to be due to the mothers' scaffolding of the infants' interactions with book, with their understanding being that more 'help' or instruction, in the form of regulatory language, is needed with new books, which in turn could account for there being no difference in the infants' actions. It would be of interest to know whether there would have been a difference in the infants' behaviour between the two books had there not been this extra guidance or scaffolding.

The mothers exhibited a similar pattern at 10 and 16 months between the two books in terms of referential utterances (i.e. relating to the books' content) with more being produced when the infants were 10-months old. At the 28-months visit, they used more of these utterances with the unfamiliar books than the familiar books. However, this should be considered in conjunction with maternal utterances which were reading the actual text of the books as the proportions of referential utterances seemed to be impacted by the proportions with which they stuck to the text. As the infants got older, there was a general increase in reading of the actual book text by the mothers and there was the added finding that when the infants were both 16- and 28-months old, the mothers engaged in this more with the familiar books. This therefore suggests that more text reading with the familiar book led to less referential language being produced. There are two potential explanations for these findings. Firstly, as Chang and Luo (2020) found that the amount of maternal direct text reading increases as the child gets older and as more text is typically made available with more complicated narrative books, it could be that there was more text available in the familiar books at the 16- and 28-month visits. To check this, the text of the books at each visit were examined more closely. On closer inspection of the books at each

visit, although there was no difference between the amounts of text in the two books at the 28-month visit, there was more text available on average in the familiar book for the 16-month visit which does lend support to this explanation (see Appendix 7 for analysis) which can be seen as a potential limitation of the current study. In addition to this, another possible explanation is that due to the design of the study, the second book used at each of the visits was the familiar book. It could therefore be that the mothers stuck to reading the text in order to finish the book before the infant lost interest in the book reading activity as a whole. However, this should be considered in conjunction with the analysis of the time spent with each of the books as, as discussed above, there was no difference in this in the final visit, which suggests there is no evidence that the mothers read the second (i.e. familiar) book more quickly. Whilst the reason for presenting the unfamiliar book first was in order to assess the infants' baseline understanding of how to behave with books, future research may overcome this potential limitation by counterbalancing the order of the books as well as controlling the amount of text and pages more, in order to analyse the impact on maternal referential language as well as direct text reading.

As previous research (e.g. Kuchirko et al, 2020; Murase et al, 2015) suggests the need to analyse the subcategories of the general functions, these more specific functions (e.g. labelling or attention directives) were analysed in more detail. Whilst there were no differences between the two books with action directives, it seems the increased use of attention directives which were produced with the unfamiliar books at 10 and 16 months were driving the difference seen with the overall regulatory utterances. Similarly, although there were no differences in the feedback given about the infants' language across the ages, more feedback was given regarding the infants' actions with the unfamiliar book at the 10 months visit. Whilst there were no differences in the rates of questions across the ages, there were more labels with unfamiliar books when the infants were 10-months-old which was mirrored by the finding that more elaborative information was given with the familiar books at this age as well as when the infants were 28-months-old. These findings support the notion that the referential and regulatory categories are too broad to capture the functional differences in caregivers' speech (Kuchirko et al, 2020).

These findings are also in line with previous research with older children where it was found that more labels were produced with unfamiliar books (Haden et al., 1996; McArthur et al., 2005) and more elaborative information was produced with familiar books (Haden et al, 1996; Sonnenschein & Munsterman, 2002). McArthur et al (2005) found that

with familiar books, caregivers tend to assess the infants' level of understanding with more questions. For the most part, this was not supported in the current study as there were no differences in the rates of questions between the two books. However, a similar argument could be presented here as for the general functions as there may be a difference in the types of questions presented for each of the books. As has been pointed out in a number of studies, yes/no questions are often less challenging than *Wh*-questions and similarly within *Wh*-questions, differing demands are placed on the child (e.g. Rowe, Leech, & Cabrera, 2017). For example, *where* questions simply require the child to locate and potentially point to the referent whereas *what* questions require more understanding and more verbal input such as labelling. Given the age of the infants in this study, it is likely that more *where* questions requiring points will be produced than other *Wh*-questions as seen in Ninio (1983) whereas in the studies with older children (e.g. McArthur et al 2005) more complex questions are likely utilised. Future research could investigate this further in terms of whether there is a functional difference in the questions asked between the two books. Ninio's (1983) study suggests that caregivers assess and continually update their own understanding of the infants' competencies with vocabulary by varying the degree to which they place demands on the infants in their questions to them. Future research could look at when infants of this age have less experience with the vocabulary such as with unfamiliar books, in terms of whether the caregivers produce simpler questions requiring more minimal input from the infants. Whereas with familiar books. more complex questions may be produced as the caregivers may have a better understanding of the infants' vocabulary knowledge with these books.

Similarly, in McArthur et al's (2005) study, in line with the idea that caregivers tend to assess their infants' understanding, they found that more feedback was given with the familiar books. Although this was not supported for the feedback regarding the infants' language, when the infants were 10-months old, there were differences between the two books in terms of the feedback regarding the infants' actions on the books. However, contrary to McArthur et al's (2005) suggestion, more feedback was given with the unfamiliar books. As with the questions, future research could investigate the similar argument for feedback to be analysed in more detail in terms of whether the feedback was positive or negative. For instance, if the feedback was more generally negative, taken together with the finding that more attention directives were also produced at this age, this is in line with the idea that the mothers are teaching the infants how to behave with the

unfamiliar books. On the other hand, if the feedback was more generally positive, this could be in terms of praise for completing the actions or paying attention i.e. giving them more positive reinforcement and could partially explain why there were no differences in the infants' actions between the two books.

The key findings of interest are that when the infants were 10-months old, with the unfamiliar books the mothers produced more labels, attention directives and feedback regarding the infants' actions on the book. Taken together, these support McArthur et al's (2005) suggestion that at this stage, the reading sessions are about the transfer of knowledge which in turn is in line with Vygotsky's (1978) zone of proximal development where the infants' understanding is 'scaffolded' by a more knowledgeable partner, in this case the caregiver. It is at this age (i.e. 10 months) and in this situation (i.e. with the unfamiliar book), that the infants are likely to need the scaffolding and support the most. This is why these differences were not apparent in the 16- and 28-month visits as at these stages the infants have a better mastery of how to behave with books and simple words.

Differences in infants' behaviours and language

Despite the predictions that the infants themselves would engage more with the familiar books in terms of using the correct SBR actions and jointly attending more, and more object like actions being suggested with unfamiliar books, there were no differences found at any of the visits between the two books here. The only difference found in the infants' behaviours between the two books was that they engaged in more exploratory behaviours with the unfamiliar book at the 10 months visit.

There are three possible reasons why no differences occurred in the infants' correct and incorrect behaviours across the two books. Firstly, whilst this may seemingly contradict the findings of previous research with older children showing more engagement with familiar books (e.g. Martinez & Roser, 1985), the main focus of previous research has been on the children's language rather than their behaviour. It could simply be that no differences in the infants' behaviours would typically occur between the two books or perhaps as a function of this sample. Given that at 10-months old, object-like actions and correct SBR actions occurred with similar frequencies in comparison to each other and across the two books, this suggests the infants of this study had some abilities in this area prior to the study. Therefore, although the content of the books was different between the two books, the 'object' (i.e. the book) itself was something the infants had some abilities with in terms

of how to treat leading to no differences in the incorrect and correct actions. Under this assumption, the exploration of the unfamiliar books at this stage could be thought of more in terms of the infants exploring the new content of the book rather than exploring how to behave, which they already have some knowledge of. Following on from this, with the infants' prior experience with books in the current sample, it could be argued that this sample's self-selection suggests these caregivers already placed a high value on reading in order for them to participate in reading research with a longitudinal design. Being a mainly middle-class sample supports this idea, suggesting reading is likely to have been introduced into their routines from an early age as in previous research (e.g. Bus et al., 1995). It seems likely therefore that more differences would occur in the behaviours across the two books, with infants from households where reading is practiced less, who therefore have had less experience with books from an early age.

Another possible reason why there were no differences in the infants' actions and attention to the books could be that the effect of familiarity, seen with older children engaging more with familiar books (e.g. McArthur et al, 2005), may be working in conjunction with the effect of novelty seen with younger children (e.g. Aslin, 2007). In these terms, the infants would both enjoy and engage with the familiarity of the 'old' book but also enjoy and engage with the novelty of the unfamiliar book. Although discussed in the terms of word learning, Horst (2013) points to research showing the benefits of contextual support i.e. familiarity (e.g. McLeod & McDade, 2011) as well as research showing the benefits of variability (e.g. Perry, Samuelson, Malloy, & Schiffer, 2010). Perhaps in the context of learning how to behave with books, at the ages looked at in this study, the contextual support of the familiar book as well as the novelty of the unfamiliar book were in the 'sweet-spot' of benefiting the infants' expression of their abilities. Alternatively, a third possible explanation for why there was no differences is that the effect of familiarity was counterbalanced by the additional scaffolding given by the mothers with the unfamiliar books, particularly during the 10-month visit where they gave more attention directives and feedback about the infants' actions.

In terms of the infants' attentional states, although there was no difference in the proportion of time spent in joint attention at the 10-month visit, this should also be taken in conjunction with the finding discussed earlier that the dyads spent longer with the unfamiliar book at this visit. Therefore, although the proportion of time was the same, the actual amount of time means the time spent in joint attention was longer with the

unfamiliar book. Whilst this may again go against the findings of previous research that infants engage more with familiar books (e.g. Martinez & Roser, 1985), children of the ages investigated in these previous studies, are typically better at regulating their own attention (Kopp, 1982). As discussed earlier, this may be more in line with the findings of habituation studies (e.g. Aslin, 2007) i.e. that the infants of this age were habituated to some extent to the familiar book and exhibited a preference for attending to the unfamiliar book for longer.

When considering the infants' language, although it was predicted that the infants would produce more vocalisations with familiar books, and that at the later visit, these would be more lexically diverse and complex, no such differences were found between the two books in the final visit. This contradicts the findings of previous research which showed more labels were produced with unfamiliar books and more complex sentences with familiar books (e.g. Fletcher & Jean-Francois, 1998; Goodsitt et al, 1988). However, as discussed above the children of these studies were all over the age of two, the majority being over the age of three, meaning that the participants were more linguistically able than the infants in the current study. The CLAN analysis looking at more nuanced lexical differences also found no differences between the two books.

Although previous research reporting the more participation from children with familiar books has typically been with older children (e.g. Martinez & Roser, 1985; McArthur et al, 2005), Fletcher and Finch's (2015) study was one of the few which looked at children of ages closer to those of the current study. Similar to the above-mentioned studies, they too found more responsiveness with familiar books. However, a key element of the design of their study was that they were also looking at the impact of the type of book on children's responsiveness. Whilst they found familiarity to impact on the infants' responsiveness, this was only true for the simpler books such as ABC books. With the book which had more narrative and text content, the results were much more inconsistent in terms of effect of familiarity on the levels of responsiveness. This is particularly notable in the case of the current study as the books selected for the 16- and 28-month visits had more narrative and text content in them which could potentially account for there being no difference between the familiar and unfamiliar books in the overall levels of vocalisations.

In relation to this, Horst et al (2011) pointed out that a key problem with reading research is that there is typically a lot of variation between commercially sourced books and

therefore went on argue that the books used should be specifically created to control for such variation. Indeed, in the current study, although strict criteria were used to select the books for each of the visits, there may have been differences between the two books selected which were much more subtle. These differences could have impacted on the infants' verbal behaviours (and maternal language) and likely did based on Fletcher and Finch's (2015) findings. For example, although the main criteria for the books used in the 10-month visit was one word per page with simple pictures, more narrative was generally used by the mothers with the familiar book which was about a character's actions in comparison to the unfamiliar book which was about going to the zoo. Overall, this lends support to the argument that commercially sourced books may not be suitable for some reading research (Horst et al, 2011) or more simply, that the genre or type of book needs to be carefully considered in terms of its impact on infants' responsiveness and maternal reading styles (Fletch & Finch, 2015).

Conclusions

Overall, the main differences between the familiar and unfamiliar books occurred in the functions of the maternal language and the key differences here were when the infants were 10 months old. For example, at this age, there was more elaborative information with familiar book and more labels, attention directives and feedback on the infants' behaviours with the unfamiliar book. Whilst some of these results did not support the findings of previous research, it is argued that this may in part be to do with the age of the infants taking part in this study being younger. Whilst there are a number of possible reasons why there were no differences between the two books in the infants' behaviours, the rates of the mothers' instructive language (i.e. the labels, attention directives and feedback on book actions) may have scaffolded the infants' abilities with unfamiliar books whilst allowing the children to express more independent abilities with familiar books. Discussions of maternal support for book reading will be taken up in more detail in the General Discussion.

General Discussion

Brief overview of the chapter

This chapter will begin with a summary of the rationale for investigating SBR in terms of the development of infants' socialisation with books and the factors which influence these interactions. This will include an overview of the previous chapters. Following this, a more detailed discussion of the three data chapters will be presented in terms of the aims, results and implications of each topic. The general implications of the thesis as a whole, in terms of the theory and methodology, will then be addressed. To conclude, suggestions for future research will be presented.

Thesis rationale & aims

This thesis investigated the development of infants' socialisation with books and the factors which influenced this process, namely the strategies used by mothers and the familiarity of the books. The importance of this topic is highlighted by the wealth of research demonstrating the benefits of SBR activities for language development and later academic achievement. For example, SBR has been found to be positively related to language development in a meta-analysis of 29 studies (Bus et al, 1995), with one study arguing that it accounts for 35% of the variance in infants' receptive vocabulary (DeBaryshe, 1993). Following on from this suggestion that SBR facilitates vocabulary growth, vocabulary size at 2 years old has also been shown to predict expressive vocabulary, literacy and maths skills at 5 years old (Tamis-LeMonda et al, 2014), which in turn can predict maths and reading outcomes at 8 years old (Romano et al, 2010). However, the majority of this research has focused on children over the age of 3 and on language and literacy development. Few have investigated SBR with infants younger than this and only one (Jones, 1996), a case study with two children, has looked at the process of becoming socialised with books, a key preparatory stage before infants can become 'readers'.

On the basis of previous research with older children, the Home Literacy Model (HLM) was proposed (Sénéchal & LeFevre, 2002), highlighting two key forms of literacy activities which are undertaken in the home environment and demonstrating how these impact on language and literacy development. These forms being informal reading activities and formal teaching such as letter naming. With Sénéchal (2006) arguing that a

model must also account for preparatory experiences, the focus of this thesis was on the informal stage with the key preparatory activities of socialising infants with books and how this develops, with a sample of infants from the age of 10 months old.

In order to learn these preparatory skills, according to Vygotsky (1978) and by extension Teale and Sulzby (1986), infants must engage in interactions with a 'more experienced' other (in this case the parent) to accomplish the task of 'reading' before it can be internalised and accomplished independently. Bronfenbrenner and Morris (2007) describe these interactions as 'microsystems' with the development of these 'reading' skills occurring due to the dynamic interplay of the child and (an)others in specific settings (i.e. SBR) with specific objects (i.e. books) and a restricted set of utterances, becoming more complex over time. The key commonality across these two theories is the emphasis they both place on the impact of interactions on development with all elements bidirectionally influencing each other. Therefore, each chapter of this thesis focussed on each element of the SBR interaction (i.e. the child, the mother and the book) with a view that the other elements also influence the development of infants' socialisation with books. *Chapter 3* looked at the development of infants' socialisation with books over time, along with other more general communicative skills thought to be facilitated by book reading; in this case, joint attention, turn-taking and referencing skills. The focus of *Chapter 4* was on maternal teaching strategies and maternal engagement strategies, looking at how these change as the infants' abilities developed as well as the impact these strategies had on infants' abilities. How the familiarity of the book impacted on the infants' behaviours and language as well as the maternal teaching strategies was investigated in *Chapter 5*.

Chapter 3 – the development of infants' socialisation with books

Rationale & aims

Before being able to begin to 'read' books, children must first learn to treat the book as an 'object of contemplation' (Werner & Kaplan, 1963) rather than a typical 'object'. This means learning associated actions such as turning the page in sequence and holding the book the right way up. Most research on SBR has focussed on infants over the age of 2 years in the language learning stage once these more basic book-related skills have developed (e.g. Goodsitt et al 1988). There are two notable exceptions to this, Muhinyi and Rowe (2019) looked at infants' interest or engagement in books at 10 months old and

found this was related to later language learning, however they did not investigate how engagement or other book-related skills develop. On the other hand, this was a key consideration of Jones' (1996) case study with two infants, tracking the development of these and other literacy skills from 8 months to 2 years old, which will be discussed in more detail throughout this chapter.

Jones (1996) also highlighted that other more general communicative skills are facilitated by SBR; namely sustained joint attention, turn-taking and referencing skills. Previous research has demonstrated that joint attention is important for language development (e.g. Carpenter et al, 1998; Morales et al, 2000) and also a key component of SBR (Danis et al, 2000) with the child and caregiver jointly attending to referents within the book. As well as increases in vocabulary development, SBR interventions have also shown increases in separate measures of sustained attention (e.g. Farrant & Zubrink, 2012; Vally et al, 2015). In the case of turn-taking, although this skill is thought to begin to emerge as early as 2 months old (Gratier et al, 2016), some argue that it is not fully mastered until around 3 years old (Casillas et al, 2016) due to the integration of language system (Levinson, 2006). However, there is some debate about when this disruption occurs; around 9 months coinciding with other communicative skills development such as pointing (Hilbrink et al, 2016) or around 12 months coinciding more specifically with the production of the first word (Casillas et al, 2016). Previous research suggests that due to the structure nature of SBR, turn-taking may be more easily mastered in these settings (e.g. Snow & Goldfield, 1983), particularly in periods of joint attention. For referencing, as pointing gestures are seen to establish periods of joint attention (Iverson et al, 1994) which in turn facilitates language acquisition (e.g. Tomasello & Farrar, 1986), pointing has a key function during SBR. With the referents more restricted during SBR interactions, pointing is thought to occur most often in these settings (Murphy, 1978). Following on from this, referencing is thought to become more fully fledged when pointing is combined with the vocal modality (Iverson & Goldin-Meadow, 2005). Given the propensity for pointing in SBR, it follows that these combinations will also occur most often during these activities. Therefore, the four aims of this chapter were to analyse 1) the development of infants' understanding of how to behave with books, including their skills in terms of 2) joint attention to the book, 3) turn-taking and 4) infants' referencing skills.

Results

At the 10-month visit, the most prevalent actions were object-like actions although there were some correct or at least attempted SBR actions at this stage. As expected, the number of object actions decreased and the correct SBR actions increased as the infants aged with an intermediary exploratory stage often encountered and the key transitory age being at 16 months. The infants' joint attention also increased over time. Whilst they were almost at ceiling in the final visit, the infants demonstrated high levels of joint attention at the first visit when they were 10 months old. Good infant turn-taking skills could be described as more vocalisations where there were no overlaps and fewer infant-initiated overlaps. Here, across the ages, there were more instances of no overlaps than overlapping vocalisations and the rates at which the infants-initiated overlap decreased as the infants grew older. However, there were no differences between the 10- and 16-month visits. It was expected that infants' turn-taking skills would be better in joint attentional episodes due to the collaborative nature of these instances (Kim et al, 2015) however there were no differences across the attentional states at 10 and 16 months. On the other hand, this was supported at the 28 month visit where there were more non-overlapping vocalisations in joint attention and fewer overall infant-initiated overlaps. In line with predictions for referencing, there were more book related points than non-book related which increased across the visits and the rates at which the infants produced book-related points plus vocalisation combinations also increased.

Implications

The data suggest that the infants of this study had already developed some understanding of how to behave with books by the age of 10 months old, at their first visit. Although object like actions were still prevalent at this stage, correct and attempted SBR actions were also used. It seems likely that the infants' manual dexterity may have limited their ability to demonstrate understanding in these cases. From the 16-month visit onwards, this had become more fully developed with correct SBR actions becoming more predominant. In support of Jones (1996), including the use of attempted SBR actions, there does appear to be an intermediary stage where the infants engage in exploration of the books such as opening and closing the book or turning the pages back and forth rather than in sequence. Theoretically speaking, it is in this stage where the infants are in the process of internalising the behaviours, moving from what they are able to accomplish in

collaboration with their mothers to be able to produce these actions independently (Vygotsky, 1978). Indeed, when looking at infants' first actions on the book, fewer infants produced correct book actions in comparison to when looking at their overall actions. This clearly demonstrates the different stages of internalisation because with these first actions, the mothers were asked to allow the infants to act on the book without any intervention, which was not the case in the remainder of the sessions.

Infants' understanding that books are not manipulated in the same way as other objects and should instead be treated as objects of contemplation (Werner & Kaplan, 1963) is perhaps more fully demonstrated when considering the amount of time the infants spent in joint attention during their first visit. Although there were periods where the infants did not jointly attend to the book and also periods where the infants were manipulating the book in some way, they were already demonstrating high levels of joint attention at this stage with extended periods of simply attending or looking at the book with the infants almost at ceiling in the final visit.

Because there were no key differences in the infants' turn-taking skills at the 10- and 16-month visits and there were high instances of vocalisations with no overlap, the results seem to be in line with the idea that disruption to the interaction system, due to the integration of the language system, may occur around 9 months with the development of other communicative skills (Hilbrink et al, 2016) rather than language per se around 12 months (Casillas et al, 2016). The implication being that the disruption had already occurred and improvement had begun. However, as there were still infant-initiated overlaps at 28 months, the implication here is that their turn-taking skills had not fully developed which is in line with the suggestion that this may not occur until around the age of 3 (Casillas et al, 2016). It should also be noted that there were also instances of maternal-initiated overlaps, which were likely to be due to an interplay between driving the story forward and demonstrating turn-taking skills. Due to the rates of maternal-initiated overlap being stable across the visits, another possible explanation for infant-initiated overlap is that they may view overlap as more accepted in SBR contexts given their continued production but still be in the process of fine tuning these skills as shown by the overall decrease in these instances.

Whilst the suggestion that infants would demonstrate better turn-taking skills when in episodes of joint attention was not supported here in the early visits, it is difficult to

ascertain and ensure the infants were looking at the same referent as the caregiver in SBR (Guo & Feng, 2013). Therefore, it could be that during these episodes of joint attention, when overlap occurred, the two were vocalising about different referents. In contrast, there were more instances of non-overlapping vocalisations and few infant-initiated overlaps in joint attention at the 28-month visit. Based on previous research and evidence presented here, at this stage the infants have a better understanding of books including a better ability to self-regulate their own attention (Kopp, 1982). With the addition of better language at this stage, this suggests they are more likely to be attending to the same referent as the mothers.

In terms of the infants' referencing skills, although there were high levels of pointing during SBR from the first visit onwards, the implication based on Tomasello and Haberl's (2003) work is that there is a shift in use and understanding of this gesture between the first and second visit of this study i.e. around 12 months. It seems that during the 10-month visit, the infants are more likely to have been pointing for themselves which fits with the idea that they may be vocalising about different referents than the mothers in instances of overlap at this stage. Conversely, at the 16-month visit, having a better understanding, the infants are therefore more likely to be using the point for others to signify their desire to share attention with the mother to a referent. Additionally, as overall there were higher levels of point-vocalisation combinations as well as more infants producing them with books in comparison to non-book related contexts, taken together with the points only results, this suggests that referencing during SBR appears to be a simpler task with the restricted set of possible referents available.

However, caution should be noted with the interpretation of some of the turn-taking and referencing results as there were not equal opportunities for the infants to demonstrate their abilities in 'non-joint attentional' episodes (for turn-taking) or non-book related contexts (for referencing). Perhaps a more applicable test of these questions would be to compare these results to turn-taking or referencing during toy play activities or in a home setting.

Chapter 4 – Maternal teaching and engagement strategies during book reading

Rationale & aims

This chapter covers two main areas in which mothers' input, i.e. their teaching and engagement strategies, is adapted in line with and/or in an effort to develop infants' SBR

abilities and also examines how these changes are related to the development of infants' socialisation with books. In the first area, maternal teaching strategies were considered from two angles; the first how the functions of CDS changed (and related to infants' abilities), the second how infants' actions were responded to by the mothers. Firstly, the three general functions of CDS were considered separately. Based on previous research, proportions of maternal referential language was expected to remain at similar levels over time (Chang & Luo, 2020; Kuchirko et al, 2020), whilst directly reading the book text was expected to increase as more text becomes available in the books (Chang & Luo, 2020). However, due to previous findings being contradictory Chang & Luo, 2020; Kuchirko et al, 2020), the predictions for regulatory language were unclear. Following this, as it may be too simplistic to focus on the more general functions of CDS (Kuchirko et al, 2020), more specific functions were then investigated. On the basis of previous research, whilst attention directives (e.g. *Look at this*) were expected to decrease, it was not clear what would happen with action directives due to the age of the current sample (e.g. *Turn the page*; Kuchirko et al, 2020). For specific referential functions, it was expected that the levels of labelling and information asking would not change over time whereas elaborative information was thought to increase (Murase et al, 2005). Following this, it was then investigated how these specific functions would relate to infants' abilities in terms of their language, attention and correct SBR actions.

The alternative perspective taken on maternal teaching strategies was how the mothers responded to infants' actions. Jones (1996) suggested that key book actions (e.g. book beginnings or infants' correct actions) were verbally marked whilst incorrect actions were largely ignored. Therefore, it was investigated whether this was specific to Jones' (1996) children or could be more broadly realised in the present sample. Although this was unclear, what was expected based on previous research was that if incorrect actions were marked, this would be done in a supportive manner rather than prohibitive (Kuchirko et al, 2020; Vallotton et al, 2017).

The second area covered in this chapter is that of maternal engagement strategies. Here, interest or engagement in SBR activities have been linked to language development (e.g. Lyytinen et al, 1998), with Malin et al (2014) arguing that this factor mediates the link between SBR and later language and literacy skills. Previous research looking at parental strategies have focused on strategies specific to reading abilities rather than gaining and

maintaining infants' engagement. Therefore, given the importance of this aspect for later language abilities these strategies were investigated. Predictions for these were based on previous research, for example, it was expected that use of strategies involving attention getting (Chang & Luo, 2020), physical actions (Moreno, 2000) would decrease over time as the infants' abilities developed whereas, questioning (Jones, 1996) was expected to increase. It was then investigated how these strategies related to infants' attention to the book, which was used as a measure of their interest or engagement in the activity (Sénéchal et al, 1995).

Therefore, the overall aims were to firstly investigate maternal teaching strategies in terms of general and specific functions, how these related to infants' language and behaviours and how infants' actions were responded to by mothers. Following this, maternal engagement strategies were also investigated in terms of how they change over time and how they relate to infants' joint attention to the book.

Results

For teaching strategies, in line with predictions, initial analyses suggested that mothers' reading of the actual text increased as the amount of available text increased, regulatory language decreased and referential language remained at a similar level across the ages. However, a more detailed picture is presented when looking at the more specific functions. For regulatory functions, although both attention and action directives decreased as the infants' abilities developed, action directives were more common. Whilst action directives were not seen to be related to the infants' correct book actions, attention directives were positively related to infants' joint attention to the book. For referential functions, labels and elaborative information decreased whereas asking for information about the book content increased. This differed to results found in previous research because of methodological differences, in particular their use of textless books (e.g. Kuchirko et al, 2020). Maternal questioning and elaborative information at 16 months were found to be related to infants' scores on a standardised comprehension test at 28 months whereas labels and elaborative information at 28 months were concurrently related to the infants' receptive and expressive vocabulary, respectively, based on parental reports. In terms of mothers' responses to infants' actions, both correct and incorrect actions were typically left unmarked and any which were marked were done supportively rather than prohibitively.

For maternal engagement strategies, the most frequent strategies were attention getting and pointing. The use of strategies involving attention getting, book-related activities, allowing exploration of the book, experiential referencing and more physical means all decreased was the infants grew older. Maternal questions, points and ignoring or engaging in the infants' non-book related activities were produced at stable levels throughout. At 10 months, the more external strategies, such as attention getting and points, were related to infants' levels of joint attention, whereas strategies in line with forcing engagement (e.g. physical strategies) were negatively related to joint attention in the later visits.

Implications

One important implication from the results of Chapter 4 is that to examine the overall functions of maternal utterances only (i.e. regulatory and referential language) would be to miss the pattern of nuanced differences, as well as the impact these have on infants' behaviours, which can be seen when looking at the more specific functions. For example, the overall category of regulatory language was seen to decrease as the infants aged and when looking at the specific functions, although the action and attention directives followed a similar pattern, there were more action directives produced than attention directives. Additionally, although attention directives were found to be related to infants' joint attention to the book, action directives were not related to infants' correct SBR actions as was expected. To this end, it could be that maternal feedback may be more related to infants' book-related behaviours, potentially in conjunction with infants' learning through imitation of the mothers' behaviour, as with Vygotsky's (1987) argument that "*instruction is possible only where there is the potential for imitation*" (p.210).

Although the levels of reading the actual text did not surpass the levels of maternal referential language, in line with Sénéchal et al (1995), the more text there was available in the books, the more likely mothers tended to stick to reading it. A number of previous studies (e.g. Kuchirko et al, 2020; Chang et al, 2020) used textless books when investigating changes to maternal language. However, it could be argued that the current study was more 'naturalistic' in that commercial books, which do not tend to be textless, were used here, with an increasing complexity of ideas meaning more text was presented than in previous studies.

Due to the mothers' use of questions about the content of the book increasing as the infants aged, the implication of this is that the mothers were 'raising the ante' by trying to encourage more participation from the infants (Ninio, 1983). Although a qualitative analysis of the questions was not conducted in this case, Ninio (1983) found that mothers tend to adapt their questioning within the infants' 'zone of proximal development'. In this case, it means they are sensitive to what the infants know and adapting their question to enable the infants to achieve more in collaboration. For example, based on previous experiences, if they believe the child can identify where a referent is, instead of asking '*where*' questions, they are more likely to ask the child to label it themselves using a '*what*' question. Therefore, giving the infants more responsibility in the SBR activities and encouraging more participation (to be discussed in relation to future research below).

Although Jones (1996) suggested that key book elements (e.g. the beginnings of books and correct book actions) were verbally marked in some way, the results from this current, larger sample did not support this idea as infants' book-related actions were typically left unmarked. If incorrect actions were given verbal feedback, this was done in a supportive rather than prohibitive way, in line with previous research (e.g. Vallotton et al, 2017). This implies that 'teaching' during SBR is done in a supportive learning environment and without much correction. From this perspective, the infants' participation in the activity is scaffolded, rather than corrected or instructed, by the mother's input. This supports the idea that CDS is not designed with teaching in mind but is rather more about communicating with a less skilled conversational partner (Pine, 1994).

The strategies used by mothers to gain and maintain the infants' attention or engagement in the activity were varied, ranging from verbal encouragement to more physical means. Although these results often differed to previous research, much of this was due to methodological differences including the main focus of previous research being about language learning strategies. However, the focus here was engagement in SBR due to its mediating link to language learning (Malin et al, 2014). The most frequently used strategies were attention getting and pointing whereas physical manipulation of either the child or the book was one of the least used. This suggests a resistance on the mothers' behalf to 'force' their infants to engage. In fact, when compared to measures of infants' attention, it was found to be negatively related in the later visits, implying that physical manipulation does not necessarily work as an engagement strategy. However, it could also

be suggested that these kinds of strategies may be used less in a home setting than in comparison to this more constrained context (although rates were still low) and may also be reflective of the nature of the sample.

Another key finding with the engagement strategies is with regards to those used at the 10-month visit, with attention getting, book-related activities and pointing being positively related to infants' attention. At this age, it seems clear that the infants needed more external encouragement to engage in SBR, with more overt strategies directing and encouraging infants' attention. As these strategies were not related to infants' attention in the later visits, it suggests that at 10 months old the infants' attention is being 'supported' by the mothers and perhaps their understanding of this is in the process of being internalised whilst in the later visits their ability to self-regulate their own attention has developed more fully.

Chapter 5 – How does book familiarity impact on children's engagement with books and maternal teaching strategies?

Rationale & aims

Repeatedly reading the same book in SBR interactions has been shown to be beneficial for language development (e.g. McArthur et al, 2005; Horst et al, 2011). This is likely to be due to the contextual repetition and cueing of words (Horst, 2013). Other routes to impacting on language development are that book familiarity also differentially affects both parental input and child participation. For example, mothers tend to use more non-immediate talk with familiar books (Sonnenschein & Munsterman, 2002) and rely on more descriptions and more labelling with unfamiliar books (Haden et al, 1996). In terms of children's participation, with familiar books, more overall talk has been found with 5-year-olds (Martinez & Roser, 1985) and more infant-initiated discussions with 2-year-olds (McArthur et al, 2005).

The majority of previous research has been with children over the age of 2. As a result, it is not known how book familiarity will affect SBR interactions with 10-month-old infants. Therefore, the aims of this chapter were to examine if book familiarity impacted on a) how the dyads treated the books in terms of time spent with the books and familiarity marking, b) the general and specific functions of maternal utterances and c) infants' language and behaviours with books.

Results

The results firstly suggest that the familiarity of the books was typically highlighted and more time was spent with the unfamiliar book in the first visit but there were no differences in treatment after this. In terms of the impact which book familiarity had on the functions of the language used by mothers, more regulatory language was used with unfamiliar books in the early visits. In the final visit, there were more referential utterances produced with unfamiliar books which may be explained by there being more reading of the direct text with familiar books in this visit. Examining these in more detail when looking at the specific functions, although there were no differences between the two books with action directives, there were more attention directives with unfamiliar books in the early visits as well as more feedback. At 10 months, there was also more labels produced with unfamiliar books whereas there were more utterances with elaborative information with the familiar books. There were no differences in the rates of questions here. Against the findings of previous research, there were also no differences in the infants' actions or language with the books across the ages except for more exploratory behaviours with the unfamiliar book at 10 months.

Implications

There were three key implications from the results in this chapter. The first of these was that during the early visits, the mothers produced more regulatory language with unfamiliar books. This suggests that in these visits they were in the process of 'socialising' the infants with how to behave with books and that providing more attention directives and feedback suggest they believed more guidance was needed with new books. As there were no differences in the infants' correct and incorrect behaviours between the two books, this suggests the mothers were scaffolding the infants' interactions with the books i.e. the infants' behaviours with the unfamiliar books showing what they can achieve with the help of the mothers' instruction and guidance, and their behaviours with familiar books showing what they can achieve independently once these skills have been (or are in the process of being) internalised. In line with this idea, mothers produced more labels with unfamiliar books but more elaborative information with familiar books. In this case supporting their vocabulary development, as providing a label for a referent can be seen as more basic information with elaborative information enabling a more fully developed representation of a referent as they become more familiar with the specific referent. There were no

differences in the rates of questions but, on the basis of the results for labels and elaborative information and previous research (e.g. Ninio, 1983), it could be that qualitative differences were present here too.

An alternative explanation for there being no differences in the infants' book-related behaviours is that, particularly for the younger infants, there is an interplay between the effect of familiarity and the effect of novelty. Both of which have been shown to impact on infants' behaviours (e.g. McArthur et al, 2005; Aslin, 2007). The idea here being that the infants engage with the 'old' books because they are familiar but also engage with the 'new' unfamiliar books due to their novelty. This suggestion is in line with that proposed by Horst (2013) about word learning, arguing that there is a 'sweet spot' where infants benefit from contextual cueing in repetition but also benefit from variability. In this case, the infants may have been benefitting from both, with support through repetition with familiar books as well as the support from mothers in the case of the unfamiliar books. Apart from more exploratory actions being exhibited with unfamiliar books at 10 months, this 'sweet spot' is what may have led to no further differences being demonstrated in the infants' abilities.

There were two findings in this chapter which can support the implications of the results in chapter 4 (and previous research). The first is that there was again the suggestion that mother are more likely to stick to reading the text the more text there is available (Sénéchal et al, 1995). In this case, there was more text available with the familiar book at the 16-month visit which may have impacted on the maternal production of referential language. The second finding is that dividing the functions of CDS into two overarching categories, i.e. referential and regulatory language, is too broad to capture the functional differences in caregivers' speech (Kuchirko et al, 2020). In this case, there were differences between the two books in the specific functions which were not addressed with these two general functions. For example, there was a suggestion that there were no differences between the two books in terms of the mothers' use of referential language at the 10-month visit. However, this was not the case with all of the specific referential functions. Although there were no differences in the rates of questions produced, as discussed earlier, there were more labels produced with unfamiliar books and more elaborative information with familiar books.

General theoretical implications

The first approach to SBR considered for this thesis was the Home Literacy Model (Sénéchal & LeFevre, 2002). The model discusses two activities which they claim have distinct routes to impact on language and literacy development; informal reading and formal literacy teaching (e.g. letter naming). This thesis focuses on the informal reading stage and perhaps earlier, in the more preparatory stage to this, in terms of socialising infants with books. At this informal reading stage, learning per se is thought to be incidental, supporting Pine's (1994) suggestion that with typical CDS, adults treat infants as a conversational partner, albeit with lower abilities, rather than with teaching in mind. In Chapter 4 of this thesis, the evidence suggests that activities typically occurred without much correction of the infants' actions. When mothers did give feedback, this tended to be done in a supportive manner rather than prohibitive or negatively as suggested by previous research (Kuchirko et al, 2020; Vallotton et al, 2017). In contrast to the HLM, the Emergent Literacy perspective (Teale & Sulzby, 1986) places more of an emphasis on this more preparatory stage, highlighting the key importance of early SBR interaction for shaping how infants become readers. Although the HLM model is supported by previous research in terms of the interconnections to literacy and language development and the experiences which promote these, it does not specifically take a theoretical stance on how the development occurs. For this, the broader theories of Vygotsky (1987) and Bronfenbrenner and Morris (2007) about infant development need to be considered for this key preparatory stage of infants' socialisation with books. This is similarly the case for the EL perspective, although here, the broader developmental theories of Vygotsky (1987) specifically, have been embedded within the perspective to focus on the development of skills within SBR interactions. Therefore, the results from this thesis will be considered using the ideas and terminology of both of these broader theories separately.

For Vygotsky (1987) and by extension for Teale and Sulzby (1986), development happens when children interact with a more competent other and the activities and skills achieved within the interaction becomes internalised over time. Tools and contexts mediate the process of internalisation; caregivers 'scaffold' infants' participation in the interaction and increase the demands they place on the infants and contexts operate with a restricted set of actions and utterances (Lucariello & Nelson, 1985; Snow, 1983). As Vygotsky (1987) emphasised the importance of historical context and that each experience builds upon previous interactions, a longitudinal design was selected for the current study. In Chapter

3, the maturational changes were focused on as well as the influence of the book context on the development of more general communicative skills thought to be facilitated by book reading. For Vygotsky (1987), the infants' abilities with how to handle the book develop as they 'internalise' the behaviours over the repeated SBR experiences.

Chapter 3 suggests that during the first visit at 10 months old, the infants' socialisation with books has not fully developed yet as some object-like actions were still produced, but that the process of internalisation had already begun at this stage with some correct actions, moving from what can be produced in collaboration with the mother to being able to produce these actions independently. The prevalence of the infants' exploratory behaviours can be viewed as the intermediary internalisation in action.

The structure and routine of the book reading interactions also seem to support the development and expression of infants' turn-taking and referencing skills with few instances of infant-initiated overlap and more points and point-vocalisation combinations in these contexts. However, a better test of these hypotheses may be to compare these skills during toy play activities (to be discussed in relation to future research below).

Vygotsky's theory suggests that investigating the processes involved in the development of infants' book-related behaviours is more important than the outcome itself (Wertsch & Hickman, 1987). Therefore, the qualities of the maternal input and characteristics of the books were examined and results showed that the 'more experienced other' scaffolded the interactions from the first visit onwards and slowly begin to increase the demands they place on the infants to encourage their increased participation in SBR. This can be seen in the reduction in the use of attention directives, suggesting in the later sessions the infants' attentional skills needed less external support as the infants began to self-regulate their own attention. Additionally, mothers' use of labels and elaborative information decreased as the use of questions increased, asking for more input from the infants. There was also a suggestion that infants may learn how to behave with books through modelling or imitation of the mothers' actions, which Vygotsky (1987) highlighted the importance of, for learning. This was because maternal action directives were not found to be related to infants' correct SBR actions which leaves the potential for their abilities in this area to be more related to imitation of the mothers' actions. Another result supporting this theory highlighted in Chapter 4 is that at the 10-month visit, the mothers' use of strategies which could be classed as external encouragement to engage in SBR (e.g. attention getting

strategies) were positively related to infants' attention to or 'engagement' with the book. Although these kinds of strategies are still used in the later sessions, they are less effective at engaging the infants as evidenced by the lack of correlations here. The infants are likely to be internalising the knowledge that books are different to other objects and should be 'contemplated' or attended to rather than manipulated.

'Scaffolding' can be provided by the mothers in a number of ways in SBR, including making these interactions supportive in their instruction rather than prohibitively. Two findings from Chapter 4 lend support to this notion. Firstly, when infants' book-related actions were incorrect, the mothers typically did not point these out but if they did, it was expressed as more of a comment (e.g. '*oh did you turn the page backwards?*') rather than highlighting that it is incorrect (e.g. '*no don't do that*'). Secondly, although there were occasions when mothers physically manipulated the infants or the books in an attempt to maintain engagement in the SBR activities, the production levels of these actions were low in comparison to other strategies which the mothers used.

The results from Chapter 5 are perhaps the clearest demonstration of the infants' 'zone of proximal development' and the mothers' sensitivity to this. In the first visit, there was evidence of more attention directives and feedback, with unfamiliar books showing the mothers producing more guidance and support. However, the finding that there were no key differences in the infants' behaviours with either of the books suggests that the behaviours produced with unfamiliar books were in collaboration with the mothers as a 'joint product' of the interaction. Their sensitivity to the infants' linguistic abilities is also shown in the finding that they produced more labels with unfamiliar books but more elaborative information with familiar books. In this case, the mothers' assessment seems to be to produce basic information when a referent is initially introduced with an unfamiliar book and build on this with familiar books as the infants already had some experience of the referents.

Considering the context and results from the bioecological perspective (Bronfenbrenner & Morris, 2007): although the influences of wider contexts are considered more so than the social interactionist theory (e.g. considering such 'exosystems' as parental education), focus has been primarily placed on microsystems in terms of where key developmental changes occur. In these contexts, there are patterns of activity with the infants and caregivers fulfilling specified roles in certain settings with predetermined features and

these activities increasing in complexity (Bronfenbrenner & Morris, 2007). Here, SBR activities are key proximal processes in development because they typically occur with regularity over extended periods of time, which supports the use of a longitudinal design, and the books can be classed as objects which 'invite exploration and manipulation'. In this case, the power of SBR proximal processes is dependent on characteristics both of the participants and the context. Infants who have an 'environmentally oriented disposition' will benefit most from these interactions and learning occurs through attention to the specified activity. From this perspective, the infants of the current study were either predisposed to orient towards the context or activity which enabled them to develop their SBR actions or perhaps, more simply, it was their ability to engage in joint attention from an early age, as evidenced in Chapter 3. Since these two characteristics are not mutually exclusive, it seems likely that the predisposition to orient to the context enables joint attentional abilities and they have reciprocal influence on each other.

Similar to Vygotsky, using the bioecological theory terminology, the progressive increase in complexity of the context can be seen most clearly in Chapter 4 in the input from the mothers and how they adapted this to 'meet the developmental needs' of the infant. In the early visits, more instruction in the form of attention directives was needed but less so in the later visits, hence the reduction. In line with this, the more engagement strategies using external encouragement in these visits, the more the infants engaged with SBR activities. The mothers also increased the complexity of the SBR context by using more questions about the content of the book requiring further involvement on the infants' behalf.

In line with typical commercial books, the books used in current study were specifically chosen to convey increasingly more complex ideas meaning more text was used throughout the study i.e. moving from single words per page to 2 to 4 sentences per page.

This was further supported in Chapter 5's exploration of the impact of book familiarity, with the differences in maternal language being similarly viewed as a form of increasing the complexity of the SBR context. More support and guidance (in the form of attention directives and feedback) and simple language (with more labels) was given with unfamiliar books in the first visit, while with familiar books, there were more utterances of elaborative information, therefore increasing the linguistic complexity. In terms of the infants' behaviours, although the differences were limited here, there was increased exploration of

the unfamiliar book in the first visit, supporting the notion that object exploration is a key feature of a context where development occurs (Bronfenbrenner and Morris, 2007).

Taken together, the increased infant attention suggestive of an environmentally oriented disposition, the increase in complexity provided by both the maternal input and the books, examined over an extended period of time, gave power to the proximal processes of SBR and supported the development of the infants' book-related behaviours.

Given the emphasis which both theories place on the importance of interaction in infants' development and the notion that the influence of each of the components of the interaction is bidirectional, these reciprocal influences seem clear throughout the results. With the infants exhibiting high levels of joint attention from the beginning and high levels of maternal engagement strategies used throughout, this indicates the high value with which reading is considered by these dyads. Mothers providing more support with new concepts, be they the book itself or referents within the book and increasing the demands they place on the infants as the infants' abilities grow or basing this on their understanding of what the infants' abilities are (Ninio, 1983). In addition, the book itself differentially impacted on the maternal support which in turn may have indirectly led to no major differences being seen in the infants' behaviours between the two books.

Methodological considerations

As noted in Chapter 3, the stated average household income of the current sample suggested a tendency for this sample to be identified as middle class (Office of National Statistics, 2016) with a number of studies highlighting the link between SES and language development via SBR (e.g. Forget-Dubois et al, 2009), in part due to middle class families tending to engage in SBR activities from an early age (e.g. Bus et al, 1995). Perhaps more importantly, however, given the longitudinal nature of the study design, the self-selected nature of the sample as well as the mothers' willingness to commit to, in some cases, bi-monthly visits to participate in the study suggests that the mothers (and perhaps the parents as a whole) placed a high value on reading activities. This is turn has been shown to impact on the quality of the home literacy environment (Rowe, 2008; Marjanovič-Umek, Hacin, & Fekonja, 2017). With the additional finding that parental beliefs about SBR are also thought to mediate the link between SES and language development as well as having independent influence (Vasilyeva, Dearing, Ivanova, Shen, & Kardanova, 2018), these two elements taken together suggest high quality, home literacy environments for this sample

which may explain the infants' pre-existing skills in books reading actions and the preference to jointly attend to and engage with the books. Although this means the results may be generalisable to other infants from households where high value is placed on literacy activities, this may be more difficult with instances where this is not the case.

Similarly, caution must be taken in consideration of these results in the home setting given that some studies have found mothers' behaviours to be influenced by the laboratory setting in comparison to the home setting (e.g. Stevenson, Leavitt, Roach, Chapman, & Miller, 1986). Indeed, in the current study, as discussed in Chapter 4, although relatively infrequently, the mothers sometimes resorted to strategies which could be classed as 'forcing' the infants to reengage with the SBR activities. This raises questions about how likely this would be to occur in a home setting. Additionally, although it has been pointed out that these settings do not appear to directly impact on the infants' behaviours, when considering the dyads as a 'unit' or even a 'microsystem' (Bronfenbrenner & Morris, 2007), it is likely that the infants may be affected as a result of the changes to the mothers' behaviours (Belsky, 1980). However, in a review of studies comparing setting differences, Gardner (2000) pointed out that the differences that may occur are dependent on the task and instructions and as familiarity with the task and setting develops, the differences tend to lessen (Stevenson et al, 1986). Overall, it can be claimed that the current study was conducted with more control than would have been in the home setting as it took place in an initially unfamiliar environment with fewer distractions and prescribed books. However, although only three of the visits were analysed for this thesis, the original longitudinal design of the study meant many of the dyads visited the lab every two months. This led to the setting becoming more familiar over the course of the study. In line with this, anecdotally, the mothers often remarked to the infants about the familiarity of the setting and seemed more at ease as the study progressed. Therefore, although this may be seen as a more constrained context in comparison to the home setting, given the semi-naturalistic design with the mothers being given few instructions, and the longitudinal nature potentially leading to fewer differences, this should not diminish the value of the evidence presented. Indeed, others have argued for the importance of more controlled settings in developmental research to enable 'testing models' for future research (e.g. Bronfenbrenner, 1977; Belsky, 1980). It should simply be added as a cautionary note that these are not independent of the setting as highlighted by the Bioecological model (Bronfenbrenner & Morris, 2007).

Future Research

In line with the methodological considerations above, there would be two obvious suggestions from these. Firstly, it would be of interest to examine SBR activities with infants from households where less value is placed on reading in terms of how and in what ways infant abilities and maternal strategies might differ, if at all. Placing less value on reading may have an impact on the onset of SBR activities which may in turn have knock-on effects for socialisation with books and later language development. As cultural values have been shown to impact on the functions of maternal language (e.g. Murase et al, 2005; Kuchirko et al, 2020), so too may beliefs about the importance of reading which again may have a differential impact on the infants' engagement. The second more obvious suggestion for future research would be to examine whether similar results would be evident in a home setting. As discussed above, previous research suggests that mothers' behaviours may be influenced more by this but in considering the dynamic interplay between the key elements of SBR interactions impacting on each other (e.g. Bronfenbrenner & Morris 2007), this is also likely to indirectly influence infant behaviours (Belsky, 1980). In this case, the implication would be that the maternal teaching and engagement strategies may be affected (e.g. less physical strategies) which in turn may differentially impact on the infants' behaviour and engagement.

As noted in Chapter 3, particularly for the analysis of turn-taking and referencing skills, with the more restricted nature of the lab environment with fewer distractions than would be in a home setting, as well as the high levels of joint attention demonstrated by this group, caution should be taken with the interpretation here. With these two factors together, there was more opportunity, and therefore potentially more evidence, available for the infants to demonstrate their turn-taking skills when in joint attention or their referencing skills in book-related contexts. As a result, it could be suggested that this may not have been the clearest test of the predictions for these elements. In these cases, it is sometimes unclear whether the results are typical of infants' behaviours in SBR contexts or due to either the self-selected nature of the sample or the more restricted setting. Previous research on turn-taking mainly focuses on free play contexts[14] (e.g. Hilbrink et al, 2016) and, with the exception of Murphy (1978), pointing or 'referencing' research has mainly been conducted using experimental set ups. Very little, if at all, has looked at these

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[14] No toys were used during these free play activities used in turn-taking research

elements in a book reading context or a comparison of contexts (c.f. Kim et al, 2015). Whilst it would be useful to examine whether the infants behave differently in a home setting, a comparison of contexts in terms of activities, such as comparing SBR to those produced during toy play, would also be of interest.

As seen in Chapter 4, there was an increase in the production of maternal questions in reference to the content of the books which was positively related to infants' receptive vocabulary. Additionally, in line with previous research (Jones, 1996; Muhinyi & Rowe, 2019), a broader category of questions was analysed as a form of engagement strategy which was positively related to infants' attention or engagement with the book. Ninio (1983) pointed out that the quality of maternal questions changes as the infants' linguistic competence grows with questions about comprehension being produced before questions about production. Scaffolding the infants' responses by slowly increasing the demands they place on them. Similar results were found in a study with 3-year-olds with higher demand questions coming later on in SBR sessions (Blewitt et al, 2009). It could be that perhaps more varied changes in maternal questioning occurs to scaffold the infants' participation more generally. In line with Jones' (1996) suggestion, it seems that a broad category of questions is used early to both engage the infants and also to introduce them to the question-and-answer format. In these instances, there is no expectation on the infants to respond (e.g. *can you see?*). The relation of the broad questions to infants' attention to the book in the early visits support this idea. This category includes supporting infants' socialisation with the books, for example, when the mothers ask them to turn the page. As the infants become more socialised with books as well as the question-and-answer format, the broader category of questions reduces with a stricter category of questions about the content of the book moving from comprehension to production questions. Future research could examine those qualitative changes in maternal questions including how this might be affected by the familiarity of the book. As noted in Chapter 5, there were more labels produced with unfamiliar books and more elaborative information with familiar books. Although there were no differences found with maternal questions, it could be that more qualitative differences occur here such as more comprehension questions with unfamiliar books but more production questions with familiar books.

One issue not examined in the current thesis is the individual differences in the dynamics of interactions of the dyads, in terms of both the mothers' and the infants' behavioural styles. Previous research looking at individual differences in maternal reading styles have

been able to relate these to differences in infants' language abilities. For example, Haden et al (1996) longitudinally examined the reading styles of a group of mothers with their children when they were 3 and 4 years old. Three main reading styles were identified; mothers who used a 'describer' style focussed on descriptions and labels whilst 'comprehenders' would focus of the meaning of the story more. The 'collaborator' reading style encouraged and confirmed their child's participation. Haden et al (1996) found that these reading styles related to differences in children's linguistic abilities when measured at 5 years old such as children having better comprehension when mothers typically used a comprehender reading style. In relation to infants' socialisation with books, DeLoache and DeMendoza (1987) argued that with the act of caregivers' scaffolding the early SBR sessions, this means the caregivers decide how the SBR activity will develop with this changing as the infants' participation increases. However, Jones (1996) suggests that it is more nunanced than that as caregivers follow into what the infants are focusing on. Ancedotally, in the current study, there were stylistic differences in terms of mother who assumed more 'control' of the activity and those who encouraged more infant exploration of the books. It would be of interest to examine whether this was evident more widely and if so, whether these would differentially impact on the development of infants' book-related behaviours.

Take home implications

The key implications of this study going forward are in relation to interventions and/or advice to parents and are three fold. Firstly, this study highlights the importance of focusing on infants' socialisation with books, as before they can be classed as 'readers', infants engage with books and demonstrate interest in SBR activities. As suggested by previous research, early socialisation with books fosters interest in SBR activities which in turn benefits language development and encourages engagement in further SBR activities, demonstrating a 'snowball effect' (e.g. Debaryshe, 1993, Raikes et al 2006, Muhinyi & Rowe, 2019). In relation to this, with the wealth of evidence demonstrating the importance of joint attentional skills for infants' development (e.g. Tomasello & Farrar, 1986), early socialisation with books is highlighted by this study as beneficial for the development of these skills as well as joint attentional skills being a key contributor for infants being able to learn about books – these two aspects having bidirectional influence. The final key implication from the study is that there was a clear suggestion that there may be a 'sweet spot' in infants' engagement with books. In relation to both parents and interventions, a

balance should be struck between the familiarity and variability of the books which they use, with infants engaging with 'old' books because they are familiar as well as 'new' books because they are novel. Infants can learn more about certain topics or referents from familiar books whereas more new words may be learned with novel books.

Conclusions

This thesis is the most detailed examination of shared book reading with 24 infant-mother dyads. It details both the infants' developing behaviours with the book, the ways in which mother can and do scaffold these behaviours both linguistically and physically, and the way in which book familiarity can influence both participants. As with previous research, there were positive relations between maternal language and infants' language development including maternal questioning at 16 months. However, overall, it should be noted that this was based on a relatively narrow SES sample therefore it is important to conduct similar researches with a wider SES group.

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Appendices

Appendix 1

General Method: Comparison of the two groups

CDIs

Descriptive statistics of receptive and expressive CDI scores for each group at each age

		Bi-monthly		6-monthly		Overall	
		Mdn	Range	Mdn	Range	Mdn	Range
10 months	Receptive	59.00	1.00 - 108.00	16.00	3.00 – 116.00	49.00	1.00 – 116.00
	Expressive	1.50	0.00 - 3.00	0.00	0.00 – 13.00	0.00	0.00 – 13.00
16 months	Receptive	143.50	20.00 - 181.00	118.00	30.00 – 226.00	132.00	20.00 – 226.00
	Expressive	19.00	6.00 - 121.00	39.00	5.00 – 74.00	25.00	5.00 – 121.00
28 months	Receptive	46.00	2.00 – 173.00	54.50	0.00 – 113.00	52.00	0.00 – 173.00
	Expressive	595.00	324.00– 666.00	533.50	433.00– 688.00	545.00	324.00– 688.00

Home Literacy Questionnaire

Descriptive statistics for Q1: Reading frequency per week, for each group for each age
(0 = Never, 1 = 1-3 times, 2 = More than 3 times)

	Bi-monthly		6-monthly		Overall	
	Mdn	Range	Mdn	Range	Mdn	Range
10 months	1.50	1.00 – 2.00	1.75	1.00 – 2.00	1.50	1.00 – 2.00
16 months	1.50	1.00 – 2.00	1.50	1.00 – 2.00	1.50	1.00 – 2.00
28 months	2.00	1.00 – 2.00	2.00	1.50 – 2.00	2.00	1.00 – 2.00

Descriptive statistics for Q2: Number of books available, for each group for each age
(0 = None; 5 = More than 20)

	Bi-monthly		6-monthly		Overall	
	Mdn	Range	Mdn	Range	Mdn	Range
10 months	5.00	2.00 – 5.00	4.00	2.00 – 5.00	4.00	2.00 – 5.00
16 months	5.00	3.00 – 5.00	5.00	4.00 – 5.00	5.00	3.00 – 5.00
28 months	5.00	4.00 – 5.00	4.00	4.00 – 4.00	5.00	4.00 – 5.00

Descriptive statistics for Q3: Rating of child's interest in SBR, for each group for each age (0 = Not interested; 4 = Very interested)

	Bi-monthly		6-monthly		Overall	
	Mdn	Range	Mdn	Range	Mdn	Range
10 months	3.00	2.00 – 4.00	3.50	2.00 – 4.00	3.00	2.00 – 4.00
16 months	4.00	3.00 – 4.00	3.00	2.00 – 4.00	3.00	2.00 – 4.00
28 months	5.00	5.00 – 5.00	4.00	3.00 – 4.00	4.00	3.00 – 4.00

PLS

Descriptive statistics for PLS scores at 28 months

	Raw Score		Standardised Score	
	Mdn	Range	Mdn	Range
Bi-monthly	38.50	33.00 – 44.00	120.50	107.00 – 133.00
6-monthly	37.00	33.00 – 51.00	116.00	107.00 – 145.00
Overall	37.50	33.00 – 51.00	117.00	107.00 – 145.00

Appendix 2

**Tier
1**   **Book:** What is happening to the book

Unfam:E	Experimenter holds unfamiliar book
Unfam:C	Child holds unfamiliar book
Unfam:P	Parent holds unfamiliar book
Fam:C	Child holds familiar book
Fam:P	Parent holds familiar book

**Tier
2**   **Attention -** crude measure: both caregiver and child attending to book/toy (NB treat all toys as one)

PO	Parent only attention on object (Ch not attend for more than 5s)
CO	Child only attention on object (P not attend for more than 5s)
BO	Both attending to object (for more than 5s)
NO	Neither attending to object - off task

**Tier
3**   **CDS:** Transcription of CDS

Tier
4   CDS Structure (parent: CDS)

F:1	Fragments/1 word	F:1:B:Out/Txt	Frag/1 word-related to book - around the text/actual text
F:NP	Fragments/Noun Phrase	F:NP:B:Out/Txt	Frag/NP-related to book - around the text/actual text
F:VP	Fragments/Verb Phrase	F:VP:B:Out/Txt	Frag/VP-related to book - around the text/actual text
F:PP	Fragments/Prep Phrase	F:PP:B:Out/Txt	Frag/PP-related to book - around the text/actual text
F:Other	Fragments/Other multi words	F:Other:B:Out/Txt	Frag/Other-related to book - around the text/actual text
Q:Wh	Questions/Wh	Q:Wh:B:Out/Txt	Qs/Wh-related to book - around the text/actual text
Q:YN	Questions/Yes No	Q:YN:B:Out/Txt	Qs/YN-related to book - around the text/actual text
Cop	Copulas	Cop:B:Out/Txt	Copulas-related to book - around the text/actual text
S-P:TR	Subject-predicate/Transitive	S-P:TR:B:Out/Txt	S-P/Transitive-related to book - around the text/actual text
S-P:IN	Subject-predicate/Intransitive	S-P:IN:B:Out/Txt	S-P/Intransitive-related to book - around the text/actual text
S-P:Other	Subject-predicate/Other	S-P:Other:B:Out/Txt	S-P/Other-related to book - around the text/actual text
Comp	Complex	Comp:B:Out/Txt	Complex-related to book - around the text/actual text
RS	Reported speech clause	RS:B:Out/Txt	Reported speech clause-related to book - around the text/actual
C	Communicator	C:B	Communicator-related to book

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Tier 5   **CDS Function** (parent: CDS)

BK:LBL	Label - related to content of book	EXT:LBL	*non-book related categor
BK:LBL:EXP	Label/experiential referencing - related to content of book	EXT:LBL:EXP	
BK:LBL:FBK	Label as feedback (imitation) - related to content of book	EXT:LBL:FBK	
BK:PMT:IA	Prompt/Information asking - related to content of book	EXT:PMT:IA	
BK:FBK:EI	Feedback/Elaborative Information - related to content of book	EXT:FBK:EI	
BK:FBK:INST:POS	Feedback/Instructional/positive - related to content of book	EXT:FBK:INST:POS	
BK:FBK:INST:NEG	Feedback/Instructional/negative - related to book	EXT:FBK:INST:NEG	
ACT:BK:PMT	Prompt for action on book	EXT:ACT:PMT	
ACT:BK:PMT+LBL	Prompt for action on book plus label	EXT:ACT:PMT+LBL	
ACT:BK:FBK:INST:POS	Feedback/Instructional/positive - related to behaviour with book	EXT:ACT:FBK:INST:POS	
ACT:BK:FBK:INST:NEG	Feedback/Instructional/negative - related to behaviour with book	EXT:ACT:FBK:INST:NEG	
DIRECT	Reading the actual text		

Tier 6

OPN	Open book
CLS	Close book
Up	Turn book right way up or over
T:Fwd	Turn page forward
T:Bk	Turn page backward
PNT	Point to referent in book
PNT:A	Point ambiguous
PNT:ER	Point Experiential reference
PNT:ACT	Point – Action from the book
TCH	Attempt to manipulate referent in book e.g. touch, grasp, scratch
TCH:A	Ambiguous touch
ACT	Renact action from book
RTB	Reach toward/take book
OPN:Corr	Open book – correcting child action

Up:Corr	Turn book right way up or over - correcting child action
T:Fwd:Corr	Turn page forward - correcting child action
T:Bk:Corr	Turn page backward - correcting child action
PREP	Prepare book for child action
PREV	Prevent child action

Tier 7   Child interaction with book

C:OPN	Open book	C:OBJ	Manipulate book as object eg hit, drop, mouth etc
C:CLS	Close book	C:TCH	Attempt to manipulate referent in book e.g. grasp, scratch
C:OPN:A	Attempt to open	C:TCH:A	Touch ambiguous - unclear if touching book as an object or touching the referent
C:CLS:A	Attempt to close	C:EXP	Sign of expectation e.g. knowledge of character
C:Up	Turn book right way up	C:HO	Hold out book for other
C:T:Fwd	Turn page forward	C:RTB	Reach toward/take book
C:T:Bk	Turn page backward	C:BR	Book refusal
C:T:Fwd:A	Attempt to turn page forward		

C:T:Bk:A	Attempt to turn page backward
C:PNT	Point to referent in book
C:PNT:A	Point ambiguous
C:PNT:ER	Point - Experiential referencing
C:PNT:Ext	Pointing to something external to the book

Tier 8   **C First Action - <u>Y</u>es** (Parent: C B Interaction)

Tier 9   **Parental responses**

Y	Parent responded to incorrect action
No Response	No response made

Tier 10   **Child vocalisation** - indication of sound/word with books/toy play

Tier 11   **C verbal interaction** (not including laughing/crying)

C:VOC	Vocalisation

C:VOC:L	Vocalisation - lexical-like label
C:VOC:B:Out	Vocalisation relating to book - child attending to book / related to the book
C:VOC:B:L:Out	Vocalisation relating to book - lexical-like label / related to the book
C:VOC:B:L:Out	Vocalisation relating to book - lexical-like label / actual text

**Tier
12   VOC Structure** (parent: C vocalisation) – C code to denote child use

C:F:1	Fragments/1 word
C:F:NP	Fragments/Noun Phrase
C:F:VP	Fragments/Verb Phrase
C:F:PP	Fragments/Prep Phrase
C:F:Other	Fragments/Other multi words
C:Q:Wh	Questions/Wh
C:Q:YN	Questions/Yes No
C:Cop	Copulas

C:S-P:TR	Subject-predicate/Transitive
C:S-P:IN	Subject-predicate/Intransitive
C:S-P:Other	Subject-predicate/Other
C:Comp	Complex
C:RS	Reported speech clause
C:C	Communicator

Tier
13   **VOC Function** (parent: C vocalisation)

BK:LBL	Label - related to content of book	EXT:LBL	*non-book related categor
BK:LBL:EXP	Label/experiential referencing - related to content of book	EXT:LBL:EXP	
BK:LBL:FBK	Label as feedback (imitation) - related to content of book	EXT:LBL:FBK	
BK:PMT:IA	Prompt/Information asking - related to content of book	EXT:PMT:IA	
BK:FBK:EI	Feedback/Elaborative Information - related to content of book	EXT:FBK:EI	
ACT:BK:PMT	Prompt for action on book	EXT:ACT:PMT	
ACT:BK:PMT+LBL	Prompt for action on book plus label	EXT:ACT:PMT+LBL	

Tier
14   Book Elements

BEG_Y	Beginning of book verbally marked
BEG_N	Beginning of book not marked
END_Y	End of book verbally marked
END_N	End of book not marked
CORR_Y	Correct child action verbally marked
CORR_N	Correct child action not marked
INCORR_COM_Y	Incorrect child action commented on
INCORR_NEG_Y	Incorrect child action verbally corrected
INCORR_N	Incorrect action not marked

Tier
15   Engagement Strategies

Surprise	Maternal expression of surprise
Excited	Expressing excitement

Attention	Attempts to draw child's attention
Question	Asking questions
Visual	Moving the book into child's field of vision
Activities	Engaging in activities from the book
Ignore	Ignore the child's non-book related actions
Engage	Engage in child's non-book related actions
Physical	Restrain child physically

Appendix 3

Chapter 4: Descriptive statistics for the infants' language scores at 28 months

|	Mean	SD
CDI Receptive	47.13	50.61
CDI Expressive	423.71	237.39
PLS Standardised Score	119.71	9.76

Appendix 4

Chapter 4: Descriptive statistics for the combined proportions of maternal non-book related utterances

	Mean	SD
10 months	0.07	0.11
16 months	0.11	0.09
28 months	0.05	0.05

A Friedman's signed ranks test was carried out to whether there were any differences in the proportions of non-book related utterances by the mothers. A significant difference was found here (χ^2 (2) = 12.33, p = .002, W = .439) mean three wilcoxons tests were conducted with a Bonferroni adjusted criterion of $p < .017$. The proportion of non-book related utterances were significantly higher at the 16 months visit in comparison to both 10 month visit (p = .003, r = 0.61) and the 28 month visit (p = .002, r = 0.64). However, there were no differences between the 10- and 28-month visits (p = .789, r = 0.05).

Appendix 5

Chapter 4: General functions excluding direct text reading and non-book related utterances
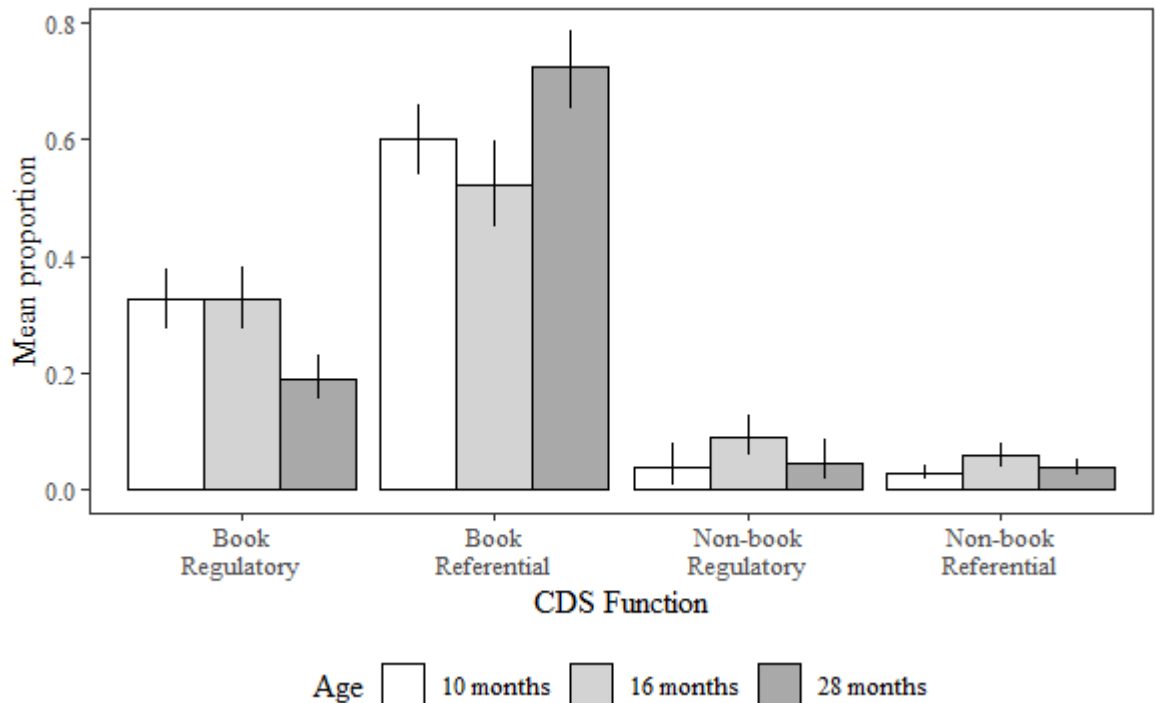
The mean proportion of maternal utterances using general functions across the ages

In order to investigate what proportion of utterances are spent using the key functions of regulatory and referential language, the direct text reading utterances were removed and the proportions recalculated. The results suggest that this did not impact on the rates at which the mothers produced regulatory utterances - χ^2 (3) = 14.08, p < .001, W = .527: No difference between 10 and 16 months (p = .976, r = 0.01) but significantly fewer at 28 months compared to 10 months (p < .001, r = 0.79) and 16 months (p < .001, r = 0.69). However, the pattern differed in the proportions of referential utterances - χ^2 (3) = 17.58, p < .001, W = .583: No difference between 10 and 16 months (p = .152, r = 0.29) but significantly more at 28 months compared to 10 months (p < .001, r = 0.58) and 16 months (p < .001, r = 0.72).

Chapter 5: Analysis of Omitted Actions
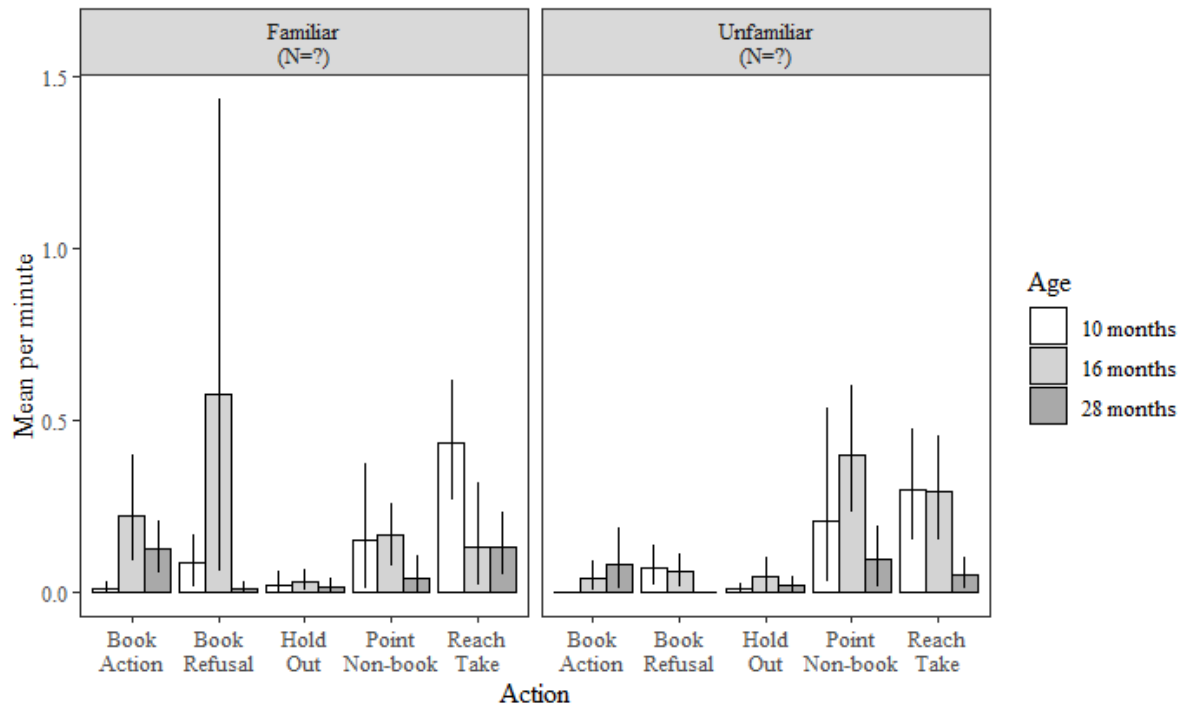
The mean omitted infant actions per minute across the three ages with the familiar and unfamiliar books.

Book actions: 10 months ($z = 0.95$, $p = .342$, $r = 0.19$), 16 months ($z = 1.97$, $p = .049$, $r = 0.40$) and 28 months ($z = 1.45$, $p = .147$, $r = 0.30$).

Book refusal: 10 months ($z = 0$, $p = 1.000$, $r = 0$), 16 months ($z = 0.62$, $p = .536$, $r = 0.13$) and 28 months ($z = 0.94$, $p = .349$, $r = 0.19$).

Hold outs: 10 months ($z = 0$, $p = 1.000$, $r = 0$), 16 months ($z = 0.19$, $p = .846$, $r = 0.04$) and 28 months ($z = 0.48$, $p = .628$, $r = 0.10$).

Non-book points: 10 months ($z = 0.84$, $p = .400$, $r = 0.17$), 16 months ($z = 1.58$, $p = .113$, $r = 0.32$) and 28 months ($z = 0.91$, $p = .361$, $r = 0.19$).

Reach towards or take book: 10 months ($z = 1.13$, $p = .257$, $r = 0.23$), 16 months ($z = 2.18$, $p = .029$, $r = 0.45$) and 28 months ($z = 1.45$, $p = .147$, $r = 0.30$).

Appendix 7

Chapter 5: Analysis of Book Text

16 months: Significantly more text in the familiar book in comparison to the familiar book ($z = 3.85$, $p < .001$, $r = 0.79$).

28 months: There was no significant difference in the amount of text between the two books ($z = 1.66$, $p = .010$, $r = 0.34$).