

Building Connections through Play:
An exploration of social play in children's early relationships

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Declaration

This thesis is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the preface and specified in the text. It is not substantially the same as any work that has already been submitted before for any degree or other qualification except as declared in the preface and specified in the text. It does not exceed the prescribed word limit for the Education Degree Committee.

As part of this thesis, two chapters were prepared for publication in collaboration with co-authors, as follows: I conducted the research in 2.1 in collaboration with Christine O'Farrelly, Jenny Gibson, and Paul Ramchandani, and I conducted the research in 3.1 in collaboration with Elian Fink, Paul Ramchandani, and Jenny Gibson.

Abstract

Social play has long been considered a key context for exploring children's early social relationships, with substantial research exploring children's interactions with parents and peers. As part of social play, children use verbal and non-verbal communication strategies to create a shared experience with the play partner. These strategies help play partners to build intersubjectivity, or a shared understanding of the play, together. The present thesis builds on this body of research by focusing on how children engage in shared interactions and the influences on these interactions. Over three studies, it explores social play in the context of children's early relationships, concentrating on the social processes at work when children play with a partner.

Using a multi-method approach, where the first study employs qualitative methods and the latter two studies apply quantitative methods, this thesis explores children's early play across activities by investigating fathers' experiences of intersubjective interactions with their infants and analysing individual, group, and activity influences on intersubjective communication with peers in early childhood. Across these studies, results show the importance of intersubjectivity for social play and the wide social influences on intersubjective communication in children's play. Through reflexive thematic analysis of qualitative interviews in Study 1, fathers of 6- to 24-month-olds were found to enjoy bonding during interactions with their infants and preferred activities they felt served a purpose. In Study 2, multi-level modelling of secondary data showed substantial dyadic effects on 6- to 7-year-old children's intersubjective communication. Building on the results of Study 2 using the same sample, Study 3 reveals interaction effects between dyadic characteristics and activity context on this communication, where the relationship between play partners predicted communication differently across two activities.

Together, these findings show the importance of social influences on children's play with others, including how social play is experienced and how it manifests. They also suggest that viewing social play through an intersubjective lens can inform social theories of play. By exploring social play across play partners and activity contexts, this thesis provides a conceptual basis for understanding the influences on social play and how social play can be researched beyond previous attention to children's individual characteristics.

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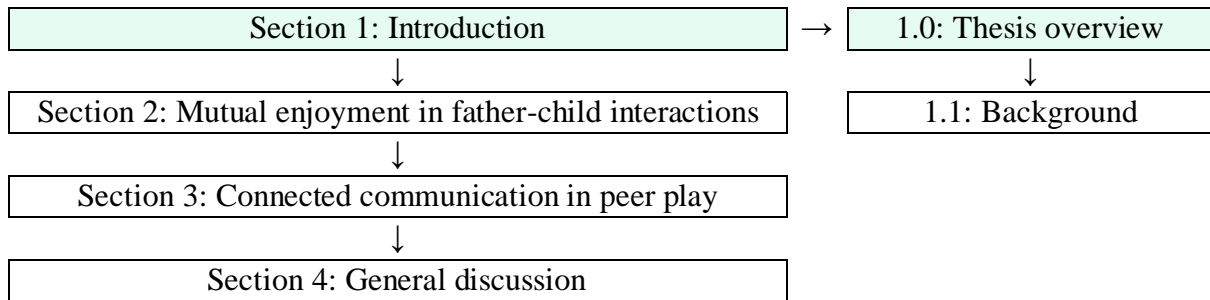
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Section 1:

Introduction

1.0: Thesis overview



Structure

This thesis is divided into four sections. Section 1 introduces the thesis. It is composed of this short Thesis overview (1.0) and a Background chapter (1.1). Section 2 presents research on father-child interactions, analysing fathers' perspectives of their social communication with their young children through qualitative interviews. It is composed of a short Section overview (2.0) and two chapters: Study 1 (2.1) and a Section discussion (2.2). Section 3 presents research on children's social communication with same-age peers during play using secondary quantitative data. It is composed of a short Section overview (3.0) and three chapters: Study 2 (3.1), Study 3 (3.2), and a Section discussion (3.3). Finally, Section 4 is composed of one chapter, a General discussion (4.1) covering ideas from across the thesis and providing concluding remarks.

Research content

This thesis focuses on intersubjectivity in children's social play, with research exploring children's shared experiences of play interactions in infancy and early childhood. The research is reported across three studies in Section 2 and Section 3. These are as follows: a qualitative analysis of fathers' experiences of play and book sharing (2.1) and two quantitative analyses of connectedness in peer dyads (3.1 and 3.2). Together, these studies explore how children engage in intersubjective interactions with play partners. Using diverse methods, these studies investigate children's shared experiences, early relationships, and social play. The research aims and methods for Section 2 and Section 3 are briefly outlined here and summarised in Table 1.0.1.

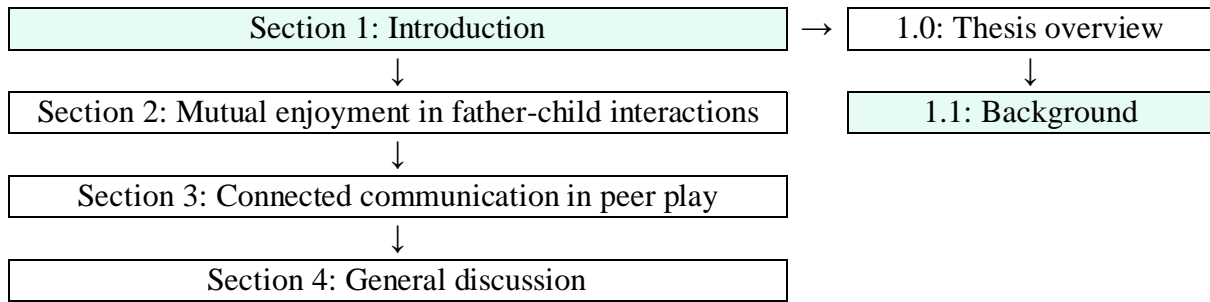
Section 2 focuses on father-child intersubjective interactions, using qualitative interviews to explore how fathers feel about their shared experiences with their 6- to 24-month-olds. To do this, I focus on two intersubjective activity contexts: play and book sharing. By interviewing fathers about their experiences of these activities, I intend to inform the literature not only on parent-infant interactions, but also on parent views of early playful experiences, especially by focusing on the perspectives of fathers. By interviewing fathers about specific interactions with their infants, I provide a new perspective on fathers' own perceptions of their interactions and reveal insights into fathers' first-hand experience of their relationships with their infants. Insight into fathers' perspectives of shared experiences with their infants will build on the present literature looking at the qualities of intersubjectivity in parent-infant relationships.

Section 3 explores children's social communication with same-age peers during play, analysing observational data to explore 6- to 7-year-olds' intersubjective communication. To do this, I use quantitative data gathered as part of the Children's Relationships with Peers through Play (ChiRPP) study, a longitudinal study into children's social relationships in early primary school that explores peer relationships and play interactions. By undertaking detailed coding and analysing dyadic observations of two intersubjective activity contexts, freeplay and goal-directed drawing, I observe the social communication of the dyad across interaction contexts and explore dyadic influences on children's intersubjective communication. Additionally, using individual socio-cognitive data gathered over three timepoints, one in each of children's first three years of school, I uncover previously under-researched influences on children's engagement in intersubjective communication.

Table 1.0.1: Key features of Section 2 and Section 3.

	Section 2	Section 3
Section title	‘Mutual enjoyment in father-child interactions’	‘Connected communication in peer play’
Study title(s)	‘Fathers’ Perspectives on Everyday Interactions: An interview study about play and book sharing with fathers of young children’	- ‘Building Connections through Play: Influences on children’s connected talk with peers’ - ‘Communication with Friends and Peers: An investigation of dyadic connectedness across two activities’
Research questions	- What are fathers’ perspectives on their book sharing and play interactions with their young children? - How do different interaction contexts foster feelings of mutual enjoyment for fathers when interacting with their young children?	- How much of the variation in connected talk during play can be explained by variation between dyads? - To what extent do children’s individual differences in theory of mind, emotion comprehension, and language ability, concurrently and at two earlier timepoints, predict their engagement in connected talk with a partner during play? - Is there a difference in the rate of dyads’ connected talk between freeplay and a goal-directed drawing activity? - Are there interactions between activity context and dyadic variables in our dataset in predicting connectedness?
Participants	9 fathers of children aged 6 to 24 months	148 children in Year 2 at school
Data	Qualitative interviews about play and book sharing interactions	Secondary quantitative data, including dyadic observations, individual measures of socio-cognitive skills, and dyadic characteristics
Play contexts	- Toy play - Book sharing	- Freeplay - Goal-directed drawing
Analysis	Reflexive thematic analysis	Multi-level models

1.1: Background



Chapter overview

This chapter introduces key ideas for the present thesis, providing background information that informed development of the studies that follow. It provides a broad overview of children’s social play and early relationships from birth through middle childhood, focusing on social communication and intersubjectivity across these developmental stages. Following an outline of key topics and general literature in this chapter, Section 2 and Section 3 contain more focused reviews and critiques of the literature and core concepts relevant for each study.

I begin this chapter by introducing the importance of play in child development. Next, I continue by defining the key constructs of relevance to the present thesis before outlining some of the key literature that has contributed to the conceptualisation of the research. This includes situating my research within the wider body of research on infants’ social communication and early intersubjectivity, focusing on interactions between adults and infants. Finally, I outline the literature on children’s communication with their peers in early and middle childhood, focusing on how children use verbal communication to develop intersubjectivity during social play.

Defining and researching play

Play is considered to be a typical activity of childhood, where children spend much of their time playing (Lillard, 2015). Children’s play may therefore be an important context for child development and is likely to support children’s mental health and general wellbeing (Coplan & Arbeau, 2009; Graber et al., 2021; Gray, 2011; Zhao & Gibson, 2022). In particular, play with others is thought to have important benefits: Gray (2011) proposes that decreases over several decades in children’s opportunities for social play has had a direct negative impact on children’s mental health. Social play may have a crucial role in supporting children’s healthy

development because it provides opportunities for children to build relationships and develop strong language and communication skills (Coelho et al., 2017; Coplan & Arbeau, 2009; Gibson et al., 2019).

To understand how and why play is important, researchers must first consider what play is, including its characteristics and components. The conceptualisation of play varies widely, with some definitions requiring certain criteria to be met (e.g. Burghardt, 2010) and others positing that it is not an all-or-nothing construct (e.g. Krasnor & Pepler, 1980). Krasnor and Pepler (1980), for example, suggest that anything children do when left to do what they want can be defined as play. Others define play based on observable behaviours, but Lillard (2015) points out that such definitions fail to encompass the internal side of play: observable behaviours when pretending to be a cleaner, for example, may be indistinguishable from actually cleaning. In all, there is consensus that play is multi-faceted, with characteristics such as positive affect, pleasure, and intrinsic motivation appearing prominently in definitions (Burghardt, 2010; Eberle, 2014; Krasnor & Pepler, 1980).

While broad and inconsistent definitions of play may in part contribute to a lack of clarity regarding how and why play is important (Lillard et al., 2013), a focus on the multiple facets of play and viewing play on a continuum of playfulness may support drawing conclusions about certain elements or characteristics of play. For this reason, the definition of play proposed by Krasnor and Pepler (1980) is most appropriate for the present research, as it allows consideration of play along a spectrum of playful activities. This definition focuses on four criteria – flexibility, positive affect, nonliterality, and intrinsic motivation – where full engagement in all four signifies definitive play, but partial engagement in or engagement in only some criteria can be considered play to a lesser extent (Krasnor & Pepler, 1980). With the exception of intrinsic motivation, which may be less observable than the other three, these criteria have been found to align with adults' perceptions of observed play (Smith & Vollstedt, 1985).

Viewing play using these criteria, the present thesis focuses on social play based on its capacity to support children's early relationships and communication skills. This support can be seen when comparing social pretend play to solitary pretend play: it is likely that social pretend play is particularly important because it requires that children not only generate the pretend ideas necessary for solitary pretend play, but also coordinate with other children to effectively enact them. This may mean that the interactions that occur through social play are particularly important for social and cognitive development as they combine the skills needed when playing alone with the coordination necessary to play with a partner (Rubin, 1980).

Considering the difficulties of untangling causal relations in play research (Lillard et al., 2013), applying the transactional model of development is useful to comprehensively understand if and how play impacts development. The transactional model of development is an integration of nature and nurture theories proposing that child outcomes result from interdependent effects of the child and the environment (Sameroff, 2010). Sameroff (2010) emphasises that it is now widely accepted that child development is not only down to “child and parent, but it is also neurons and neighborhoods, synapses and schools, proteins and peers, and genes and governments” (p. 7), and the transactional model explains that these factors interact and depend on each other to determine outcomes. Importantly, this model considers how influences in child development are often bi-directional and reciprocal. Because it acknowledges how the individual child and the child’s environment influence one another, the transactional model is valuable in developmental psychology and play research for explaining the complex causal relationships that may exist.

The present thesis provides a theoretical and empirical basis for future work on social play as a context for children’s early relationships and communication. By focusing on the intersubjective facet of social play, considering how play is constructed between partners, the research presented drives forward understanding of the intricacies of social play and provides context for future consideration of why they may be important for children’s development. By beginning to untangle the features of play, this thesis assists future research aiming to better understand how and why social play may support positive outcomes, paving the way for improved intervention design and educational practice.

Key terms and constructs

Here I outline and define key terms for the present thesis. These include general constructs relating to children’s early interactions and relationships to provide a basis for the research, as well as terms directly relevant to the remaining sections of the thesis. These key terms all exist within the context of play and playful interactions, which are important contexts for children’s social relationships during early childhood and are explored in this thesis to reveal how children’s playful interactions manifest with caregivers and peers.

Early childhood begins at birth (UNESCO, 2013), but defining the end of this period of childhood is blurry, with ages 6 to 8 years inconsistently included within or excluded from its bounds. For example, the American Psychological Association (*APA Dictionary of Psychology*, n.d.) defines age six as the end of early childhood and the beginning of middle childhood,

whereas the United Nations Educational, Scientific, and Cultural Organisation (*UNESCO*, 2013) defines early childhood as the period from birth to age 8 years. This inconsistency may be because children at this age undergo several life changes that distinguish them from younger children, including attending school and experiencing wider social circles, while still exhibiting some of the developmental features of early childhood. The present thesis examines play across the widest bounds of this early childhood age range: fathers of infants (aged 6 to 24 months) and children in Year 2 (aged 6 to 7 years). Given the age of Section 3 participants verging on middle childhood, I discuss these findings with reference to their implications for research on middle childhood in addition to the early childhood period.

The present thesis centres around *intersubjectivity* in children's early play and social interactions. Intersubjectivity occurs when both partners in a social interaction have a mutual understanding of the activity, which often includes having a shared goal or purpose, and it develops and changes throughout play as partners exchange and share ideas (Göncü, 1993). For example, by communicating effectively, play partners can build on and extend each other's ideas and create a shared understanding of the play story and events and work towards establishing and maintaining intersubjectivity. This means that both partners have a shared or overlapping understanding of the theme or topic of the play, play transformations, and other elements of a pretend scenario. The creation of shared play scenarios was the focus of work by Parten (1932), Piaget (1945), and Vygotsky (1978), whose theories were concisely outlined by Göncü (1993): 'Piaget (1945) argued that in order to play together children construct collective and standardized play symbols. Similarly, Vygotsky claimed that children jointly develop rules that guide the social activity. Finally, Parten demonstrated that social play, in its full-blown cooperative form, requires intersubjectivity regarding its goals, plans, roles and division of labor' (p. 100). Göncü (1993) builds on these theories by emphasising the need for intersubjectivity in order for children to successfully participate in social play.

Intersubjectivity can be fostered in many playful activities: it is thought to be fundamental to *social play* (Göncü, 1993) and may be facilitated particularly well through *book sharing* (Murray et al., 2022). Social play is defined as an interaction in which one person, a child in the present research, engages in play with another person, such as a caregiver or another child. During social play, partners must share ideas, negotiate, and create shared understandings of the activity. As successful social play requires cooperation and collaboration between play partners to reach a shared understanding of play elements, intersubjectivity is thought to be essential for engaging in and maintaining social play (Göncü, 1993). In addition to social play, book sharing is thought to be an activity particularly suited to intersubjective interactions

(Murray et al., 2022). Book sharing is defined as an interaction, usually between an adult and a child, during which partners look at and explore or play with a book together. Book sharing is likely to support intersubjectivity by providing a space for joint attention and physical contact, encouraging the adult's attention to the child's interests, and supporting questions and comments about the book's content (Murray et al., 2022).

To develop intersubjectivity during these activities, partners must engage in effective *social communication* to coordinate and share ideas. Social communication is defined as a person's use of language and non-verbal behavioural cues used to interact with a partner, as well as understanding others' intentions and cues (Norbury, 2014). One of the primary contexts that children practise and use their communication skills is social play, and this may involve the use of verbal social communication characteristics such as sharing ideas, negotiating, responding to a partner's idea, and turn-taking in a conversation. Each of these examples refers to the use of language in a social context, but social communication also requires the integration of such language with prior knowledge and experiences to convey and infer meaning (Norbury, 2014). This integration is key to book sharing, where social communication may involve gestures such as pointing, as well as using language to name and elaborate on pictures and link the book content to experiences (Murray et al., 2022). In wider research, the exact definition of social communication is widely debated (Norbury, 2014). In particular, the distinction between social communication and other areas of language and communication, such as pragmatic and semantic language skills, is a point of discussion, but these terms are generally seen as overlapping and often interchangeable (Norbury, 2014). In all, social communication is a nuanced process that requires a combination of different skills to be successful.

The importance of being able to adapt social communication based on the conversation partner's contributions is of specific interest for Section 3, which focuses on *connectedness*. Connectedness (used interchangeably with *connected talk* and *connected communication*) refers to the topical relation from one partner's utterance to the other's: when partners frequently make utterances that are topically related, they have high connectedness. For example, one child may initiate a connected sequence by saying, 'The girl's crying!'; the play partner then responds with a connected utterance, 'Oh, it's because she's hungry!'; then the first child continues the connected sequence by saying, 'Let's make her some dinner' (Goodacre, 2019). Connectedness specifically takes into account the content of the talk and whether this content is socially coordinated between the conversational partners (Leach et al., 2019). It therefore requires coordination on both sides of the conversation and is widely viewed as an essential characteristic of effective social communication (Leach et al., 2019). For example, Rapin and

Allen (1983) describe deficits in social communication, such as impaired understanding ‘of the connected discourse of the conversational partner’ (p. 174), in their definition of semantic-pragmatic syndrome. Though connectedness is generally defined based on the topical coherence of the content of talk (Dunn & Cutting, 1999; Ensor & Hughes, 2008; Leach et al., 2019), some studies extend this definition to include further qualities of mutual or responsive communication, such as verbally responding to a non-verbal behaviour or action of the partner (e.g. Brophy & Dunn, 2002). Based on the much larger body of research conceptualising connectedness as grounded in the content of the talk, I use this definition in the present research.

Early communication and the development of intersubjectivity

While the ability for partners to develop intersubjectivity is a must for engaging in social play, it first appears in its earliest forms long before these types of play interactions are common. In line with Göncü’s (1993) proposition that intersubjectivity is not simply present or absent between partners and instead exists on a continuum, this early intersubjectivity first appears as infants begin communicating with others. Communication is a skill that children begin to develop from a young age and is key for developing social relationships throughout life. Children first practise communicating with their caregivers through various non-verbal means, and they soon develop friendships and other social relationships that require communication through talking and use of more advanced behavioural cues. Though social communication and intersubjectivity can be seen most clearly as children’s communication becomes more advanced, their origins appear early in life during caregiver-infant interactions. From birth, infants engage in communication with their caregivers and throughout infancy develop the skills to convey messages to a communicative partner. Here I outline these early instances of communication and how they contribute to intersubjective interactions. I begin by outlining infants’ engagement in dyadic communication from birth, then I move on to infants’ intentional communication, then I describe how intersubjectivity develops as a process during infancy, and finally I discuss caregivers’ experiences of this early communication.

Dyadic communication from birth

Dyadic communication begins to occur long before the intersubjectivity and construction of play scenarios that are described with respect to social play. From birth, infants are able to communicate with caregivers (Dominguez et al., 2016). The infant cries, coughs, moves, or otherwise behaves in a way that elicits a response from the caregiver, and the caregiver reacts

to these behaviours. This early communication is a precursor to the communicative behaviours that are used by older infants to develop intersubjectivity with a communication partner.

The caregiver-infant dyadic interactions that occur in the first few days, weeks, and months of a child's life have been the focus of much research into children's developing ability to communicate: Meltzoff and Moore (1983) famously found that newborn infants mimicked the facial gestures (mouth opening and tongue protrusion) of adults just hours after birth. They suggest that the turn-taking characteristic of their procedure, where the adult produced the facial gesture but then returned to a passive face and repeated this pattern several times, may have been productive in eliciting the imitative responses from the infants (Meltzoff & Moore, 1983). There is also some evidence that infants may be capable of vocal turn-taking in the first few days of life (Dominguez et al., 2016). Turn-taking is an important element of dyadic interactions: in childhood and adulthood, turn-taking is essential for a conversation to take place. In early life, infants often take turns with a caregiver during interactions by waiting for the caregiver to finish speaking before making a vocalization and maintain this conversation-like turn-taking for several turns (Bateson, 1975; Gratier et al., 2015).

Interactions like these require a level of sensitivity on the part of the caregiver. Caregiver sensitivity refers to the caregiver's awareness of the infant's signals and the caregiver's timely responsiveness to these signals (Bretherton, 2013). When infants display communicative cues, caregivers then have the opportunity to respond to these cues. Although the infants' cues at this stage are pre-intentional, the caregiver in many cases will interpret the cue and respond in an intentional way. As infants recognize this repeated sensitive responding, they can initiate communications and expect a certain response. This sensitive and reciprocal quality of interactions soon develops into intentional communication on the part of the infant.

Intentional communication in infancy

Intentional communication is evident throughout infancy and can be seen in both play and book sharing interactions. Engaging in these intentional communicative behaviours is a key part of infant and caregiver intersubjectivity, may support the development of intersubjectivity through directing the partner's attention, and may be an indication of the presence of intersubjectivity in an interaction. Here I outline some of the early communicative acts that are central to early intersubjectivity, summarising their developmental place and emphasising how they may manifest in play and book sharing interactions as these are the focus of Section 2.

From infancy, children engage in intentional communication strategies that are thought to support and indicate the presence of intersubjectivity. One of the earliest of these to appear

is joint attention, as early as 6 months and usually by 12 months (Bakeman & Adamson, 1984; Carpenter et al., 1998), which occurs when both the infant and the caregiver are focused on an object and both are also aware of the other's focus on that object (Bigelow et al., 2004). Joint attention is inherently intersubjective based on both partners' shared interest, and book sharing and play with toys may promote joint attention between caregivers and infants through providing such an object for this mutual focus to occur (Murray et al., 2022). Following joint attention, several communicative gestures begin to demonstrate intersubjectivity in caregiver-infant interactions, often via a focus for joint attention. For example, at around age 9 months, infants begin to understand and follow pointing gestures made by adults (Lempers, 1979), which not only signals an intersubjective interaction but can further support engagement in joint attention as both caregiver and infant can attend to the point's focus. This aligns with findings that most caregiver-infant dyads engage in book sharing by 9 months of age (Leech et al., 2022), though timing of onset varies substantially between families (Khan et al., 2017). In book sharing, intersubjectivity appears as the caregiver either points to pictures in the book in an effort to direct the infant's attention or points to the focus of the infant's gaze (Murray et al., 2022). Infants' gestures aiming to direct caregiver attention also indicate intersubjectivity, where infants begin to show objects, such as toys, to others around 10 to 11 months and point around age 12 to 13 months (Carpenter et al., 1998). Like caregiver pointing, infant gestures may support or signal intersubjective play interactions: for example, by picking up a toy to show to the caregiver, an infant directs the caregiver's attention to a shared object of interest. These examples demonstrate how infants begin to share knowledge with others through intentional communication during book sharing and play interactions.

These early forms of intentional communication are not only present in intersubjective interactions but may also be predictive of children's developmental outcomes. For example, joint attention is considered to be a precursor to later socio-cognitive skills, such as theory of mind and verbal communication (Baron-Cohen & Ring, 1994; Carpenter et al., 1998). Infants who engage in joint attention with their caregivers at an earlier age have been found to have greater word comprehension, and the amount of time spent in joint attention has been found to predict word production (Carpenter et al., 1998). This may be why engagement in book sharing has been found to support child language outcomes (Dowdall et al., 2019; Leech et al., 2022; Noble et al., 2019), including in an intervention study (Vally et al., 2015). Furthermore, infants who engage in more joint attention with their caregivers subsequently engage in more communicative behaviours, such as making gestures (Carpenter et al., 1998). This link between caregiver-infant joint attention and child language development may occur because it allows the

caregiver's talk to focus on an object of mutual interest (Tomasello & Farrar, 1986), though it is also possible that higher communicative skills in infancy result in both more engagement in joint attention and later language skills. Likewise, joint attention may promote socio-cognitive development by drawing attention to the communication partner's interests and intentions or may result from the presence of early socio-cognitive skills in infancy.

Communicative behaviours may contribute to intersubjective interactions from infancy, and these early interactions provide opportunities for infants and young children to practise social communication skills. Each of the intentional communication strategies outlined here can be seen in caregiver-infant play and book sharing interactions, which may be why book sharing is identified as an important context for developing intersubjectivity in early interactions (Murray et al., 2022). Following the use of these non-verbal communication strategies, children soon develop verbal language (Colonnesi et al., 2010), which becomes a key form of communication, for example by naming toys or labelling pictures in a book (Murray et al., 2022). Through verbal communication children begin to share ideas, negotiate, and provide clarification to communication partners. These behaviours and skills are then used in interactions with other children, where they practise developing intersubjectivity during play and other activities, much of the time doing this using connected talk with peers, which is examined later in this chapter.

Intersubjectivity as a process

Intersubjectivity requires the awareness of both one's own and others' subjectivity (Kokkinaki et al., 2023) and can be viewed as the precursor to advanced understanding of others' minds. First appearing soon after birth, primary intersubjectivity is defined as the face-to-face communicative exchanges in caregiver-infant dyads featuring eye contact, smiling, and vocalisations and is considered by many to be the earliest form of intersubjectivity (Bråten & Trevarthen, 2007; Moll et al., 2021; Trevarthen, 1979) as well as the underpinning of all subsequent intersubjective interactions (Gallagher & Hutto, 2008). Infants' later ability to engage in triadic joint attention with the caregiver and an external object is referred to as secondary intersubjectivity (Huble & Trevarthen, 1979). Though children's awareness of others' minds develops in infancy and early childhood, there is disagreement regarding which stage of this social engagement represents a true understanding of others' minds (Moll et al., 2021). Here I outline ideas about when intersubjectivity first occurs, whether intersubjectivity is a form of mind reading, and how intersubjectivity can be viewed as a process.

There is wide debate about when true intersubjectivity first appears in child development (Moll et al., 2021). Many would suggest that intersubjectivity can be seen from birth. For example, Boiteau et al. (2021) analysed the intersubjective communication of fathers and infants in the days after birth, finding turn-taking and coordinated timing of vocalisations as evidence for innate intersubjectivity. While some (e.g. Trevarthen, 1979) posit that this primary intersubjectivity is an early form of true intersubjectivity based on its synchrony and shared social qualities, others (e.g. Tomasello, 2018) argue that while these early interactions are important for bonding, they are not truly intersubjective because the infant is not yet able to understand others' subjectivity (Moll et al., 2021). Instead, they suggest that intersubjectivity emerges much later with the ability to understand both shared goals and individual perspectives, which they link with the development of triadic joint attention (Moll et al., 2021; Tomasello, 2018). They say this is evidenced by the development of many new intersubjective skills, including gesturing to objects and imitation (Carpenter et al., 1998; Moll et al., 2021; Salo et al., 2018). The age at which intersubjectivity first emerges has implications for how we study socio-cognitive development and the development of so-called mind reading capabilities.

Because joint attention requires the infant to understand both individuals' interest in the object and the shared experience of looking at the object together, it is often viewed as an early instance of mind reading (Moll et al., 2021). Tomasello (2018, p. 8494) illustrates, "We both are attending to X, but you see it this way, and I see it that way. We understand that the two of us are sharing attention to the same entity [...], but at the same time we each have our own perspective on it." This view is supported by evidence linking joint attention to later language and social outcomes, both of which require understanding of others' minds (Charman et al., 2000; Salo et al., 2018; Tomasello, 2018). However, some dispute this idea of mind reading, including in primary and secondary intersubjectivity, suggesting instead that it is not necessary to read others' minds as people's minds can be understood from their actions and expressions without the need for imagining or simulating others' minds (Gallagher & Hutto, 2008). Trevarthen (2013) advocates for this idea, describing a person's sequences of movement as signalling to create synchrony and shared meaning with others, calling it embodied intersubjectivity. He argues that individual cognitive approaches disregard how social interaction and communication depend on this mutual movement and timing (Trevarthen, 2013). Instead he proposes that people engage in rhythmic and sympathetic actions that convey their intentions and emotions, such as hand gestures, and points to evidence that infants engage in such behaviours (Trevarthen, 2013). According to this view, the intersubjectivity of shared experiences

goes beyond sharing knowledge and “is as much about feeling as knowing” (Sinha & Rodríguez, 2008, p. 359).

Despite these disagreements, Moll et al. (2021) suggest that perspectives can be combined to view intersubjectivity as a process. They point out that while primary intersubjectivity shows clear evidence of being truly intersubjective in the ways described by Trevarthen (1979), notably through the infant’s desire to interact and share experiences, it does not show variability between individuals or cultures (Wörmann et al., 2012) and therefore cannot meaningfully be linked to subsequent cognitive developments such as theory of mind (Moll et al., 2021). Despite this, some precursors to secondary intersubjectivity are evident before the appearance of joint attention, such as caregivers and 3-month-old infants both attending to books during book sharing interactions (Rossmanith et al., 2014) even though the infant may not experience this as a shared interaction as described by Sinha and Rodríguez (2008; Moll et al., 2021). In contrast to primary intersubjectivity, engagement in joint attention shows variability in frequency and age of onset and has been shown to predict socio-cognitive outcomes, including language (Salo et al., 2018) and theory of mind (Charman et al., 2000), suggesting that engagement in intersubjective interactions continues to develop throughout and beyond infancy (Tomasello, 2018). Together, this evidence suggests that infants have an early drive to form social connections with others through primary intersubjectivity, which continues to develop throughout infancy through the development of joint attention in older infants, and beyond infancy as children advance their language and social understanding.

Moll et al. (2021) propose that intersubjectivity develops as a process throughout infancy, paving the way for later socio-cognitive development. Tomasello (2018) suggests that the use of language itself is a direct application of joint attentional skills, where partners engage in joint attention to a shared topic of conversation, taking turns talking about and exchanging perspectives on the topic. Tomasello (2018, p. 8494) expands his earlier explanation of joint attention into conversations: ‘You make an utterance expressing some kind of mental content, e.g., “Look at that cat,” and I respond with a comment on the same mutually understood topic, e.g., “It’s an Abyssinian.” You may then respond with “It’s my sister’s cat.”’ These ideas of intersubjectivity are explored throughout this thesis, beginning with fathers and infants in Section 2 engaging in intersubjective activities thought to foster joint attention, and later by analysing children’s intersubjective conversational exchanges, such as those described by Tomasello (2018), in Section 3.

Caregiver experiences of intersubjective interactions

Though caregivers are some of infants' earliest communication partners, little research has explored their experiences of intersubjectivity and early communication with their infants. In a discussion of book sharing interactions, Murray et al. (2022) propose that book sharing may provide a unique context for caregivers and children to engage in some of the intersubjective communication behaviours previously outlined, including joint attention, gaze following, vocalisations, and gestures. Murray et al. (2022) define book sharing as having several key features, including that the adult pays attention to and follows the child's interest and actively involves the child. This may include intersubjective behaviours such as pointing to and naming what the child is looking at and linking book content to the child's prior knowledge and experiences (Murray et al., 2022). Several intervention studies have found that training caregivers to engage in these intersubjective behaviours during book sharing interactions can have an impact on children's communication, including improved child vocabulary and increased imitation (Murray et al., 2016; Vally et al., 2015), which may be among reasons that parent reports of book sharing in infancy were found to predict child vocabulary at 36 months in a nationally representative sample of Irish families (Leech et al., 2022). These findings have crucial implications for educational policy in early childhood, where Leech et al. (2022) emphasise the importance of engaging caregivers in practices such as book sharing from early in children's lives. In particular, Leech et al. (2022) found a link between some socio-demographic characteristics and book sharing, suggesting that policy should target groups such as mothers with depressive symptoms or lower levels of education to reach families who will benefit most from support. In all, this evidence suggests the importance of policy interventions aiming to engage caregivers in enjoyable and intersubjective activities such as book sharing to support outcomes in early childhood.

While the literature reviewed so far has focused on intersubjective interactions with a focus on the child, some research suggests that experiencing these close interactions is also linked to happiness and satisfaction for the caregiver (Nelson-Coffey et al., 2019). This pattern has primarily been seen in fathers, whose time spent with their children often involves playful activities that are associated with feelings of closeness to others (Nelson-Coffey et al., 2019). Nelson-Coffey et al. (2019) found that, when compared to men without children, fathers showed greater levels of happiness and life satisfaction and fewer depressive symptoms, but this effect was not seen for mothers. They suggest that this may be down to the positive emotions and closeness that are experienced during father-child play (Nelson-Coffey et al., 2019). This link may have been strengthened during the COVID-19 lockdowns, when fathers in two-

parent households spent more time with their children and reported feeling closer to them (*The Fatherhood Institute*, 2021). Although there are clear indications that caregivers', and particularly fathers', experiences of intersubjectivity in interactions are relevant to both the caregiver and child's outcomes, I am not aware of any research that has explored caregivers' experiences and perspectives of intersubjectivity. This is the focus of Section 2, which builds on previous research into father-child play by analysing fathers' experiences of and perspectives on intersubjective interactions with their infants.

Social communication with peers in early and middle childhood

Beyond the caregiver-child communication that occurs during infancy, children begin to engage in communication with other partners. Attachment theory posits that children's social play and peer competence are influenced by their relationships with adults (Howes, 2010). When children are able to securely and successfully interact with the caregiver, they are better equipped to approach new play partners for social play (Howes, 2010). For many children during toddlerhood and into school-age, these communication partners are their peers at day care and school settings. During this time, children must be able to communicate effectively with peers in order to form friendships and must be able to appropriately respond in social situations in order to be accepted by peers (Stafford, 2004). Here I introduce children's social communication with peer partners, beginning with children's continued development of communication skills through middle childhood, then outlining how children put these skills to use in peer and friendship interactions, and finally introducing the literature on children's connected conversations with peers.

Developing communication skills

Children's social communication develops and changes with age. From infancy, children learn to use certain techniques more often, such as joint attention which rapidly increases in frequency during infancy (Bakeman & Adamson, 1984). These changes in social communication are likely to still be occurring in the early primary school years as children expand their social circles and practise communicating with friends and peers. In early childhood children begin to take part in social communication that involves reading and responding to another person's subtle cues. For example, children begin to demonstrate the ability to provide emotional support by age 2 years (Stafford, 2004; Zahn-Waxler & Radke-Yarrow, 1990). This is a complex communication skill as it requires an understanding of the peer's perspective, the recognition and interpretation of emotional cues, and the motivation to offer support in order

to respond in a caring manner (Stafford, 2004). Other communication behaviours that emerge during this time include helping and sharing, which require similar use of these skills (Stafford, 2004).

When children begin to attend school, they must use their developing communication skills in an entirely new setting. Not only must they continue to communicate effectively to socialise and make friends, but they are also often required to work in groups and play games with rules. These new situations require increases in cooperation and communication that children would not have used at earlier stages. During middle childhood, children also advance their argumentation and conflict resolution skills (Stafford, 2004). The ability to negotiate with peers increases significantly from early to middle childhood, while the use of coercion decreases during this time (Laursen et al., 2001). This capability to solve problems cooperatively with a peer indicates further understanding of others' perspectives and how to appropriately convey one's own perspective.

Social communication with peers

Children's interactions with their peers provide an important context for their developing social and communication skills in early and middle childhood. The skills mentioned here, among others, are often put to use as part of social play. Communication is an integral element of all types of social play, which requires children to engage in verbal communication that allows partners to negotiate and maintain play, and play-based interventions have been shown to support developing social communication skills among autistic children (Gibson et al., 2021; O'Keeffe & McNally, 2021). In particular, certain play types, such as social pretend play, require complex communication between partners in order for children to 'work toward a consensus about what will constitute a shared symbolisation of objects, identities, and situations' (Göncü & Kessel, 1984, p. 8) or achieve intersubjectivity. To create this shared understanding of the play scenario, children must communicate their ideas to their play partners, understand the ideas presented to them, and develop these ideas by building on each utterance and connecting their talk. Beyond this, when children engage in these discussions and negotiations, they also co-construct new shared knowledge together (Azmitia & Perlmutter, 1989). This may involve changing rules and adjusting perceptions to reach a shared and intersubjective understanding of the play scenario and wider views of the world (Azmitia & Perlmutter, 1989).

Many theorists and researchers have attempted to observe, classify, and explain the types of social communication that occur in young children's play. Studies into the communication that takes place during children's play, and social pretend play in particular, have

identified many different ways children communicate (e.g. Garvey & Berndt, 1975; Giffin, 1984; Göncü & Kessel, 1984; Trawick-Smith, 1998). These studies have primarily looked at the content of children's talk: for example, several studies have looked at play communication by classifying different types of play negotiation, observing their frequencies, and linking them to different developmental outcomes (e.g. Jenkins & Astington, 2000). Although research into children's play communication is not a new area, few studies have looked at the dyadic nature of children's play communication, and questions around how children work together to develop intersubjective play are relatively new. There is also a general lack of understanding around how children's communication may be influenced by the communication of the partner, though some research has begun looking at children's patterns of dyadic communication by measuring the quantity of connectedness in the conversation (e.g. Leach et al., 2019).

When children engage in connected talk during a play session, there are several possible benefits. In order to form a consensus on pretend elements (e.g. object transformations, roles, and plot) children must be able to understand and comment on each other's ideas. Furthermore, to move the plot forwards, they must be able to build on ideas and communicate their own ideas effectively. None of this can happen without connected communication between partners. Connected communication is also essential for resolving disputes and disagreements. By negotiating about the pretend elements, children can reach a consensus and continue to play within the mutually established play scenario.

These continued interactions that are facilitated by connected communication may have some longer-term developmental benefits. Connectedness allows play to be maintained and provides opportunities for children to practise other skills that may be benefitted through engaging in play. There is also the possibility that engaging in the connected communication itself may directly benefit certain areas of development. For example, some studies have found links between connected communication and social understanding (Ensor & Hughes, 2008; Slomkowski & Dunn, 1996). Few studies have looked at links between connectedness and other areas of development, which is the focus of Section 3.

The special case of friendships

In recent research, connectedness has been recognised as an important communication characteristic in children's friendships (Leach et al., 2019). This may be because connectedness reflects the social coordination of the dyad: one partner initiates a verbal interaction, the other partner responds to this initiation, and the initial speaker then responds again or ends the sequence of connected turns (Leach et al., 2019). However, despite wide research into children's

communication during play, and even some research comparing dyad types (e.g. Leach et al., 2019), little research has compared the intersubjective communication of friends and non-friends during play. This is surprising considering the many research findings that having at least one friend is beneficial to development (Fink et al., 2015), suggesting that there are likely to be some differences in the way friends communicate during play.

Children aged 5 to 7 who have at least one reciprocal friendship, defined as a relationship where both children consider the other to be a friend, have higher scores on theory of mind tasks when compared to children who do not have a reciprocal friendship (Fink et al., 2015). Friendships may also protect against cycles of negative outcomes: Laursen et al. (2007) found that 7- to 8-year-olds without friendships were more likely to experience social isolation a year after showing internalising and externalising problems and vice versa, whereas there were no longitudinal links between internalising and externalising problems and social isolation for children who had friends. Later in childhood, friendlessness at ages 8 to 11 is linked with further problems including depressive symptoms and loneliness at ages 12 to 13 (Pedersen et al., 2007).

There are a few ideas about why exactly having a reciprocal friendship may be beneficial for children. For example, children who have at least one friend may be less likely to experience victimization from other children, warding off some of the negative effects of friendlessness (Hodges et al., 1999). Children who have a friend or multiple friends with whom they can interact on a regular basis may also have more opportunities to practise communication and social skills, where friends model social behaviours and promote social learning (Laursen et al., 2007). This idea that friends interact differently from non-friends has been the focus of research across various activity types, with some studies focused on communication characteristics. For example, in a study of 8-year-olds, friends were found to engage in more negotiation and compromise when compared to non-friends during a sharing task (Fonzi et al., 1997). Likewise, a meta-analysis comparing friend and non-friend interactions found greater levels of cooperation, affective interaction, such as smiling and laughing, and conflict resolution in friends (Newcomb & Bagwell, 1995). Newcomb and Bagwell (1995) suggest based on their meta-analysis that friendships provide opportunities for children to practise engaging in effective social interactions, thereby supporting socio-cognitive development through conversational cooperation, sharing ideas, and exchanging viewpoints.

Given the many identified benefits to development of having at least one friendship, in addition to findings that friends and non-friends interact and communicate differently, it appears that friendship interactions provide a unique context for development and social

interaction. Section 3 builds on this proposition by identifying how this may be reflected in the intersubjective communication of friend and non-friend peer dyads during play.

Connectedness in dyadic peer play

Connected communication may reflect the degree to which partners are in tune with each other (Dunn & Brophy, 2005; Ensor & Hughes, 2008), and children who take part in more frequent connected conversations with peers have higher theory of mind scores (Slomkowski & Dunn, 1996). Ensor and Hughes (2008) also found that connected talk may be related to other areas of social development: in their study, mothers' connected talk with children was significantly related to a general measure of children's social understanding (a composite of false-belief, emotion understanding, and deception scores).

In social play, connected communication allows partners to develop and maintain a shared understanding of the play scenario (Göncü, 1993). The idea that children must develop a shared understanding during social play interactions originates from ideas of intersubjectivity that suggest children's ability to create shared understanding of play scenarios develops during early childhood (Parten, 1932). Göncü (1993) examined this idea in a small sample of young children and recognised some key features of connected communication, such as building on and extending the partner's ideas, as important in allowing this intersubjectivity to develop. This building on and extending of one another's ideas must first begin with the initiation of an idea (e.g. 'The girl's crying.'; Goodacre, 2019); the other child may then build on that idea (e.g. 'Oh, it's because she's hungry!'; Goodacre, 2019); and both partners may continue developing and extending the other's ideas until they end the connected sequence. In this example, the children develop a shared understanding of their current activity and establish a level of intersubjectivity.

When children successfully build on each other's ideas in this way, they have been found to engage in more pretense (Howe et al., 2005). This could be because building on each other's ideas helps children to create this shared understanding of the pretense plot, including who will act out different roles and how the story will develop, which allows the pretense to continue (Howe et al., 2005). It may also be because engaging in connected conversation demonstrates that the children have a shared understanding of the play, with this intersubjectivity resulting in more pretense. Furthermore, Howe et al. (2005) found that sibling dyads who more often engaged in behaviours that were entirely irrelevant to the previous idea also engaged in less pretend play. This demonstrates how successfully connecting ideas may facilitate the maintenance of play, or perhaps that these are both signs of intersubjectivity in the

interaction. Children may even negotiate disagreements through a series of connected utterances and settle on a shared understanding, allowing them to maintain the play and find more opportunities to continue collaborating.

A study by Leach et al. (2019) looked at connectedness across friend and sibling dyads during play, comparing the characteristics and quantity of connectedness in the two dyad types. The study included a sample of 44 focal children, who were observed with both a sibling and a friend, and analysed the length and emotional tone of connected sequences across two timepoints (Leach et al., 2019). Friends engaged most often in longer connected sequences and engaged in more positive sequences than negative (Leach et al., 2019). Negative sequences declined in frequency at the second timepoint for both siblings and friends, suggesting that as children get older their connected conversations during play are more cooperative (Leach et al., 2019). However, over time there were no overall differences in the quantity of connected talk in friend dyads (though there was an increase for siblings; Leach et al., 2019). Across partners, they found several differences in the qualities of connectedness between friends and siblings. For example, siblings more often engaged in short sequences, which was the opposite for friends (Leach et al., 2019). Differences in the connected talk between siblings and friends demonstrate the possible influence of the play partner on the qualities of the interaction, but studies comparing connectedness across partners are relatively uncommon (exceptions include Leach et al., 2019; 2021).

Leach et al.'s (2019) study is one of the first to address the qualities of connectedness in such depth, not only looking at characteristics of the connectedness such as the length of sequences and the emotional tone, but also considering these characteristics both over time and with different play partners. Section 3 expands on Leach et al.'s (2019) results by analysing potential predictors of connectedness, including children's individual differences in socio-cognitive skills, characteristics of the dyad, and the activity context.

Conclusion

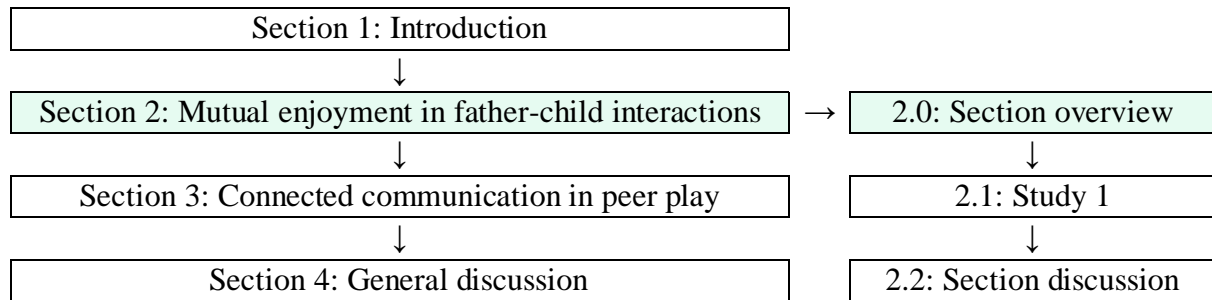
By looking at how children communicate with a play partner, more can be known about how and why play is important, including how play manifests as a context for children to practise establishing intersubjectivity. This aims to support efforts to identify the qualities of play that promote child development. While the contribution of play as a whole to child development is important to understand, 'it is also important to identify the contributions made by specific aspects of play, since play is a multifaceted construct' (Pellegrini & Galda, 1993, p.

169). This background chapter outlines the key ideas that are relevant for the remaining sections of this thesis, with a focus on children's ability to foster intersubjectivity with a play partner. These intersubjective interactions begin between infants and caregivers, which are further explored in Section 2, before being applied in peer relationships and friendships, which are the focus of Section 3.

Section 2:

Mutual enjoyment in father-child interactions

2.0: Section overview



Purpose

In this section, I present the first of three studies, which uses qualitative interviews to explore fathers' experiences of mutual enjoyment in interactions with their young children, aged 6 to 24 months. This section focuses on play and book sharing interactions, which were chosen as comparable activities that provide opportunities for dyadic intersubjectivity to occur. This allows investigation of how different activity contexts facilitate and promote intersubjective interactions, a question that is revisited in Section 3.

The purpose of this section is to analyse children's early interactions from an under-researched angle: fathers' perspectives. In doing so, I provide insight on social play in early childhood with a focus on a prominent play partner for young children. This study sets the stage for the following two studies, both of which analyse intersubjectivity and communication with peers in the early years of school, by analysing foundational interactions in infancy and early childhood.

Skill development

In addition to this section's purpose within the thesis, conducting the research has provided valuable opportunities for development of my own research skills as part of my PhD. As it was designed with the intention of informing a larger scale randomised controlled trial on parent-child interactions with a focus on parent-child book sharing that is currently under development in PEDAL, Section 2 also provided the opportunity to get involved with this project. The new research skills and experiences developed while undertaking the research reported in this section include:

- Designing a primary research study
- Adapting research methods based on unexpected external factors¹
- Conducting a primary research study throughout all stages, including design, ethical considerations, data collection, and analysis
- Collecting qualitative data through interviews and communicating with participants
- Analysing qualitative data through reflexive thematic analysis
- Using NVivo software for analysis
- Writing, discussing, and presenting qualitative results

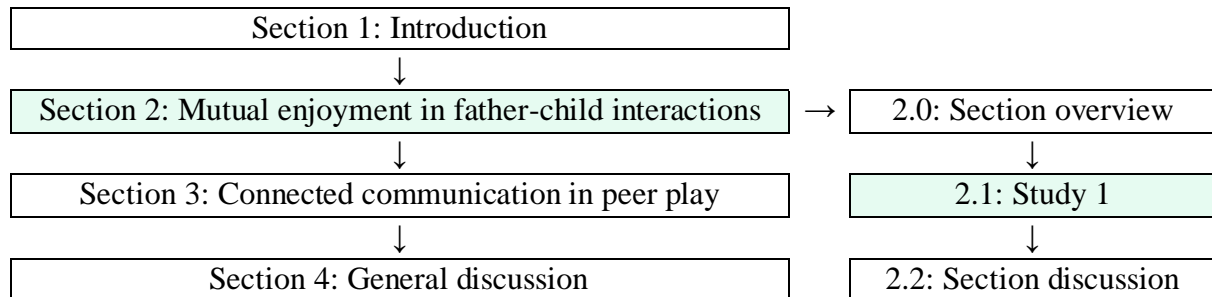
Outline

Section 2 is composed of this Section overview (2.0) followed by two chapters. The first chapter (2.1) is a research article which was conducted in collaboration with co-authors Christine O'Farrelly, Jenny Gibson, and Paul Ramchandani and, as of writing, is under peer review. It outlines the literature relevant to the study, the methods I used in conducting the study, the study's results, and a discussion of these results with respect to the wider literature. The following chapter (2.2) offers an extended discussion of the study, where I focus on positioning its results within this thesis. Throughout both chapters, I use highlighted text to colour code interview quotes by participant.

For the Section discussion (2.2), I draw on the first of two themes reported based on its relevance to wider discussions of intersubjectivity in children's social play and early relationships. This is because the content of this theme is directly relevant for discussions of dyadic intersubjectivity in children's social relationships that are revisited later in the thesis. Following an extended discussion of this theme, I move to discussing methodological decisions made throughout the research process and how these decisions impacted both the content of the study and my own development as a researcher. Topics covered in this methodological discussion include a redesign of the study necessary due to the COVID-19 pandemic, the use of a novel video playback method to support interviews, my experiences of recruitment and sampling, and the application of reflexive thematic analysis. Both the extended discussion of the first theme and the methodological discussion provide more detailed and in-depth insights not possible within a traditional research publication.

¹ This research was initially designed prior to the COVID-19 pandemic but was redesigned during the March 2020 national lockdown. The effects of the pandemic on this study are discussed in 2.2.

2.1: Study 1 – ‘Fathers’ Perspectives on Everyday Interactions: An interview study about play and book sharing with fathers of young children’



Abstract

There is growing interest in perspectives on parenting experiences, yet little research has looked at fathers’ perspectives, and questions about fathers’ views on everyday interactions with their young children remain unanswered. The present study examines fathers’ perspectives of everyday interactions, with a focus on book sharing and play, by interviewing 9 fathers about their experiences of these activities with their 6- to 24-month-old children. We investigate what fathers value and enjoy about their everyday interactions with their children and what the features of these interactions may be, with a focus on the intersubjective qualities of the activities. Using reflexive thematic analysis of qualitative interviews, we explore two themes focused on fathers’ enjoyment of activities that promote bonding and their preference for purposeful activities. We discuss the importance of these findings for fathers, including implications for intervention and in the context of the COVID-19 pandemic.

Keywords: play, book sharing, fathers’ perspectives, interviews

Introduction

Parent-child interactions have well-established impacts on child development, but fathers’ roles are under-researched despite evidence showing their importance (e.g. Cabrera et al., 2007; Lamb, 2004; Rodrigues et al., 2021; Sarkadi et al., 2008). As family structures and fathers’ roles are changing, with fathers in the UK and elsewhere spending more time on child-care than they did a few decades ago (Craig et al., 2014; Gimenez-Nadal & Sevilla, 2012), fathers’ interactions with their children are becoming increasingly relevant. In many cases, this change involves fathers spending more time in play, leisure, and recreational activities (Craig

et al., 2014), making activities such as play and book sharing prime opportunities for research into father-child interactions.

Both play and book sharing have a wide body of research indicating their value. Here we outline this research, focusing on fathers wherever possible, where we conceptualise book sharing as reading or talking together about books (Haight et al., 1997) and play as a spontaneous, pleasurable, rewarding, or voluntary activity (Burghardt, 2010). Parent play behaviours are related to various areas of children's development (Cabrera et al., 2007; Kochanska et al., 2013; Tamis-LeMonda et al., 2004), and such patterns of influence appear to be present specifically in father-child interactions (Amodia-Bidakowska et al., 2020). In a systematic review of father-child play, Amodia-Bidakowska et al. (2020) found positive contributions of father-child play on child self-regulation and peer competence, among other outcomes. While father engagement in rough-and-tumble and physical play is the focus of much research due to the frequency of this type of play (Amodia-Bidakowska et al., 2020), fathers' engagement in toy play also supports 2- to 5-year-olds' cognitive, language, social, and emotional development (Cabrera et al., 2007). Similarly, Tamis-LeMonda et al. (2004) found fathers' supportive parenting, which included sensitivity and cognitive stimulation, in toy play predicted child vocabulary and cognitive outcomes in 2- to 3-year-olds, independent of mothers' supportive parenting.

In addition to the benefits of parent-child play, research has also shown benefits of book sharing in early childhood, with improved child receptive and expressive language, child prosocial behaviour, child attention, and parent and child psycho-social functioning among outcomes reported in book sharing interventions (Dowdall et al., 2019; Murray et al., 2016; Noble et al., 2019; Vally et al., 2015; Xie et al., 2018). Such interventions have primarily been conducted with mothers and had limited inclusion of fathers (Xie et al., 2018), though some interventions have focused on fathers as participants (e.g. Chacko et al., 2018). In one of these studies focused on Latino fathers in the United States, Chacko et al. (2018) found moderate effects of book sharing on observed positive parenting and child language, among effects on other outcomes.

Among possible mechanisms for child outcomes reported in play and book sharing interventions is the intersubjectivity that these activities facilitate. Murray et al. (2022) suggest positive outcomes arise not only based on the frequency of these activities, but also the intersubjective way in which parents engage with their children. Book sharing in particular, they suggest, is an inherently intersubjective activity due to the reciprocal nature of the interaction (Murray et al., 2022). During an intersubjective interaction, parents and children attend to the

same focus, leading to increases in child vocabulary when the parent talks about the focus of joint attention (Farrant & Zubrick, 2012). Likewise, Brooks and Meltzoff (2008) found that 10-month-old infants who followed an adult's gaze or pointed at the target of the gaze showed higher levels of attention processing and vocabulary at 2 years old. These findings suggest that parent and child gaze, in addition to pointing to toys or the book's page, may support these outcomes during play and book sharing.

We focus on play and book sharing as frequent and valuable activities for parents of young children based on their use in many studies (e.g. Duursma & Pan, 2011; Haight et al., 1997; Salo et al., 2016; Yont et al., 2003). By selecting these activities, we also aim to provide a basis for fathers to compare their experiences across contexts. In one of the few studies comparing fathers' engagement in play and book sharing, fathers in the United States interacted differently across the two, asking more questions during book sharing, which was associated with higher child vocabulary, and using longer utterances when playing with toys (Salo et al., 2016). The different qualities that these activities elicit suggest they will provide opportunities for fathers to reflect on and compare their experiences of these everyday interactions.

Why do fathers' perspectives matter?

Research on parents' views is a growing topic (Fogle & Mendez, 2006; Jiang & Han, 2016; LaForett & Mendez, 2017; Lehrer & Petrakos, 2011; Manz & Bracaliello, 2016). Parents' beliefs may motivate their behaviours, where parents who value play are more likely to play with their children, contributing to children's social adjustment (Fogle & Mendez, 2006; Haight et al., 1997). Manz and Bracaliello (2016) found that beliefs about play as an educational tool were associated with parent involvement in toddlers' learning activities, including book sharing and play, though they did not disaggregate fathers' and mothers' data. This evidence that parents' beliefs are linked to their engagement, with possible benefits to child development, demonstrates the need for greater focus on parents' views. Despite this, research has not explored fathers' perspectives on interactions with their young children, and there is currently little understanding of what is important to fathers in their parenting experiences. In addition, studies investigating fathers' perspectives on book sharing are sparse (for an exception, see Haight et al., 1997, who investigate perspectives on reading to contextualise perspectives on pretend play), and the extent to which fathers value and enjoy different activities remains unknown.

Understanding fathers' perspectives is vital not only for child development, but also because of the impact of these experiences on the father. Fathers' experiences, and their

perceptions of those experiences, may influence their own happiness (Van Boven & Gilovich, 2003). Furthermore, positive experiences may buffer against daily stress and have benefits to one's affect and self-esteem among other outcomes (Nezlek et al., 2017). With parental and pandemic-related stress identified as affecting parent outcomes during COVID-19 lockdowns worldwide (Calvano et al., 2021; Chung et al., 2020; Spinelli et al., 2020), focus on fathers' perspectives are of particular importance during this period.

With many countries entering lockdowns in 2020, there were drastic changes to parents' roles as many were required to work from home and childcare settings closed (Viner et al., 2020). Egan et al. (2021) found that childcare closures affected parents in Ireland through changes to routine and structure in daily life. Among many changes, children missing peer play meant more opportunities to play with family members (Egan et al., 2021). For fathers in the UK, these changes meant increases in the time spent with their children, especially when paid working hours were reduced (Zamberlan et al., 2021). Given these impacts on fathers and their time spent with their children, researchers have called for greater focus on fathers in research conducted during lockdowns (Egan et al., 2021).

By considering fathers' perspectives on everyday interactions, we intend to inform efforts to improve and promote positive and meaningful father-child interactions. Fathers' engagement in parenting interventions has been limited, and Panter-Brick et al. (2014) suggest this is due to a focus on a deficit model portraying fathers as ineffective parents. Interventions would benefit from understanding how fathers' own perspectives of their interactions promote or hinder their involvement in everyday interactions with their children to allow the development of strength-based approaches. As such, understanding what motivates fathers to engage in interactions with their children may support effective engagement of fathers in intervention.

Given the importance of understanding fathers' beliefs regarding their everyday interactions, the present study explores these perspectives using qualitative interviews, which are often used to gather information from participants about their perspectives and experiences. In such interviews, stimuli or objects are sometimes used to elicit comments or reflections from research participants (StGeorge et al., 2018; Stone-MacDonald & Stone, 2013). For the present study, we ask participants to record their play and book sharing interactions for this purpose as videos contain rich social information and allow the interviewer to elicit deeper reflections than may be possible with questions alone (Stone-MacDonald & Stone, 2013; see methods section for details). To our knowledge, such methods have not previously been used to explore fathers' perspectives on everyday interactions.

The present study explores the following research questions:

- (1) What are fathers' perspectives on their book sharing and play interactions with their young children?
- (2) How do different interaction contexts foster feelings of mutual enjoyment for fathers when interacting with their young children?

Methods

Ethics and recruitment

The methods described were ethically reviewed and approved by the Faculty of Education Research Committee at the University of Cambridge. Eligible participants were English-speaking, self-identifying fathers located in the United Kingdom with a child between age 6 and 24 months as fathers are typically most engaged in play with their children at this age (Amodia-Bidakowska et al., 2020). The participants were recruited through online advertising in parent groups, mailing lists, and other online means. We advertised both through channels aimed at all parents and those directed at fathers to recruit dads with diverse perspectives on and experiences of fatherhood. We provided prospective participants with a Participant Information Sheet and gave them the opportunity to ask questions before completing an online consent process. Following participation, each participant received a £20 voucher to cover their time.

Demographics

In total, 11 fathers were recruited. However, an issue with our recording software caused the loss of 2 interviews, so 9 participants are included in this study. Participants all lived in England with a partner, the focus child, and no more than one additional child; 8 were aged between 28 and 42 years, and 1 did not provide age; 2 completed secondary education, 6 completed tertiary qualifications, and 1 did not provide highest level of education; when asked about race or ethnicity, 6 identified as White-British, 1 identified as White-Other, 1 identified as Caucasian, and 1 did not respond.

Interview preparation

We asked participants to prepare for the interview by recording two five-minute videos of themselves with the focus child, one book sharing and another playing with a toy. These interaction contexts were chosen based on fathers' involvement in such activities (Craig et al., 2014), their wide inclusion in child development and parenting research (e.g. Farkas et al.,

2018; Haight et al., 1997; Salo et al., 2016; Yont et al., 2003), and their comparability as social and highly verbal activities that promote dyadic interaction (Haight et al., 1997).

We asked participants to watch the videos before interview, aiming to support fathers to comment on details of the interactions and provide a deeper insight into their perspectives. We intended for these videos to provide a conversation starter for fathers to discuss their perspectives during the interviews (Stone-MacDonald & Stone, 2013). As we did not need to draw fathers' attention to particular behaviours or actions (Gaudin & Chaliès, 2015), we did not access nor view participants' videos. We asked participants to watch and reflect on the video content before interview based on recommendations by Rowe (2009) on uncovering participant perspectives and stimulating discussions beyond the recall of memory. To support this, we provided questions for fathers to reflect on while watching their videos, which included:

- When were you having the most fun? Why?
- When were you having the least fun? Why?
- Which of the two activities did you prefer? Why?

Data collection

Participants took part in individual semi-structured interviews recorded over video-conferencing platforms for approximately one hour. In line with recommendations made by Stone-MacDonald and Stone (2013), interviews contained a combination of directed and non-directed questions, where some questions drew participants' attention to particular interaction elements of interest, while others gave participants the opportunity to speak about more general beliefs or mention reflections important to them. We asked fathers about their everyday interactions, with a particular focus on book sharing and play, including how and when they most enjoy different activities. We also asked about the interactions recorded in their videos, such as which parts of the interactions were most fun for the father, and about the experience of watching the videos. We include an outline of our interview questions in Appendix 2.1.1.

We designed the present study during England's first COVID-19 lockdown in Spring 2020 and collected all data between England's first and second national lockdowns, from July to October 2020, though local lockdowns were in effect in some parts of England during this period. This period of data collection allowed reflection on the effects of lockdown on interactions before, during, and after England's first national lockdown.

Analysis

Our analysis was conducted primarily by the first author, with discussions with the remaining authors throughout the process. We used reflexive thematic analysis with key themes

of father views, perceptions, and beliefs about shared interactions examined. Our primary goal was to establish an understanding of the ways fathers view their everyday interactions with their children, uncovering some of the qualities of interactions that might motivate fathers to engage in or put fathers off those activities. Reflexive thematic analysis has been well-established for use in analysing perspectives where interest is in the diversity and importance of differing perspectives, rather than in the identification or frequency of certain perspectives. Furthermore, reflexive thematic analysis is fitting for topics that are under-researched (Braun & Clarke, 2006). The reflexive thematic analysis in this study is primarily based on the process outlined by Braun and Clarke (2006, 2019), and we have used their (2021b) recommendations throughout, specifying and justifying any divergence from them.

We transcribed recordings and removed direct identifiers before beginning analysis. During transcription, we made notes of initial thoughts and points of interest relating to our research questions. This was followed by annotation of the transcripts, where we briefly paraphrased each utterance to closely familiarise ourselves with the interview content. Next, we coded the transcripts based on the semantic meanings of the data, where we interpreted the direct meanings of participants' answers because fathers' own views on these activities was a key interest for the study. At this initial coding stage, we focused on fathers' direct statements about their likes, dislikes, preferences, and motivations. Some examples of initial codes include *observing development*, *educational activities*, *success and validation*, and *pace of activity*. We then created several preliminary themes from these codes before completing an additional round of coding to further explore these themes with codes such as *closeness*, *physical contact*, *engagement*, *child's thoughts and internal processes*, and *comparisons to partner*. At this latter coding stage, we continued to focus on the semantic meanings of fathers' answers while also coding based on implied meanings where relevant to our research questions and preliminary themes. We then drew these codes and preliminary themes together, creating more rich and complex final themes, which we present in our results.

Researcher positionality

The positionality of the researchers, which we describe here, is a key element of reflexive thematic analysis (Braun & Clarke, 2021b). The first author's primary research interests are children's communication and social relationships, including research on parent language use, children's peer communication, and children's socio-cognitive development. Three of the authors are involved in research on a parent-child book sharing intervention, with interests in

parent-child interactions and parent sensitivity. These research interests led to the design of the present study and shaped the themes that we present in the results.

Results

Our results are comprised of two themes, summarised in Tables 2.1.1 and 2.1.2, focusing on father-child bonding and the enjoyment of purposeful activities. Both book sharing and play were raised by fathers under each of these themes, with diversity in how fathers viewed the activities within the themes. In some cases, we recognised patterns in how fathers referenced play and book sharing, and we emphasise these in the results wherever relevant.

Theme 1: Play and book sharing as opportunities for father-child bonding

Our first theme focuses on father-child bonding through social interaction and communication; physical contact and affection facilitating bonding; and fathers getting to know their children. This theme's main ideas are outlined in Table 2.1.1 with an illustrative quote corresponding to each main idea.

Table 2.1.1: Overview of Theme 1.

Theme name	Main ideas	Illustrative quotes
Play and book sharing as opportunities for father-child bonding	<ul style="list-style-type: none"> - Fathers bond with their children through activities that facilitate social interaction and communication, and limited child language can limit father enjoyment of these activities. - Calm activities, especially book sharing, promote bonding through physical contact and affection. - Playing and sharing books provide opportunities for fathers to watch their children and get to know them better. 	<ul style="list-style-type: none"> - 'He can't talk yet, so it's quite frustrating when he's screaming about what he wants to do, or not do, but he can't tell you yet.' - 'It's nice he's really engaged and still, and you can just get some really peaceful time with him.' - 'I think I'm smiling because I can see him thinking about things and figuring it out.'

Fathers referred to close bonding time with their children as key in their relationships and talked about enjoying activities that facilitated this. Fathers talked about bonding through various everyday activities, including both book sharing and play, in addition to others such as watching television.

For some fathers, activities that promoted interaction between father and child were key for the bonding experience and increased their enjoyment of the activity. One father found that crawling around on the floor with his daughter resulted in increased enjoyment of play as it provided opportunities for him to actively interact with his daughter: ‘When I crawl around with her, I can interact with her in any way like suggesting toys, touching her, smiling at each other, or talking to her closely. [...] Crawling enables me to do more active interaction with her. That’s why I probably started that crawling.’ (Participant I, talking about crawling on the floor) Exchanges of smiles, pointing, and joint attention were important for another father, who mentioned particularly enjoying his daughter’s engagement with him during book sharing and noted how this facilitates bonding: ‘The fact that she smiles and points things out, it’s just like she’s really trying to pay attention or draw your attention to something, so it was just like this little extra bit of bonding.’ (Participant B, talking about book sharing)

Fathers also raised this importance of bonding through discussions of certain toys that limit social interactivity during play. For one father and his son, playing with puzzles did not allow for the same affective interactivity that was possible during rough-and-tumble play: ‘He doesn’t laugh, and you know give me that sort of connection as much as playing puzzles as if we were like rough housing or if I lay on the floor as a human assault course and let him climb and dribble all over me. That’s way more fun for me.’ (Participant F, comparing playing with puzzles to rough-and-tumble play) Similarly, another father noted that playing with toys that make noises was less appealing as it was difficult for him to get involved: ‘I suppose the ones that are least enjoyable to me are the ones – the toys that he has that make noises to him, you know just for him. So I can’t really get involved with that. [...] That’s just for him really.’ (Participant A, talking about toys that make noises)

Limitations in young children’s language abilities also diminished fathers’ enjoyment of interactions, emphasising the importance of social interactivity and effective communication to fathers. For one father, the frustration caused by unsuccessful communication limited his enjoyment of outdoor play with his son, but he implied that this may change as his child’s language improves with age: ‘He can’t talk yet, so it’s quite frustrating when he’s screaming about what he wants to do, or not do, but he can’t tell you yet.’ (Participant D, talking about playing at the playground) Likewise, the father who enjoyed rough-and-tumble play over playing with puzzles suggested that future improvements in the child’s language might make playing with puzzles more enjoyable as they can talk about the puzzle together: ‘When he can talk to me it will be much more fun because we’ll be able to interact more about what he’s picking

up, colours, you know. That will be more fun for me I think.’ (Participant F, talking about playing with puzzles)

Several fathers also talked about bonding time with their children when referring to calmer activities. Fathers mentioned physical contact and closeness with their children as key benefits of calmer activities. For example, one father discussed the physical affection he shared with his daughter during book sharing: ‘It’s really sweet when she sort of puts her head on you and sort of rests on you. [...] It just shows that sort of little bit of affection.’ (Participant B, talking about book sharing) Another father spoke similarly about the physical closeness of watching television together, noting that it is an opportunity for affection that he misses in other interactions: ‘He’s quite nice to have on my lap, and yeah. Then that sort of close time with him. Like I said, he prefers his mum, and so she gets all the hugs and all the kisses, and I sort of get some every now and again.’ (Participant D, talking about watching television)

Book sharing in particular was often referred to as a calmer activity, more so than play, with fathers speaking about bonding and affection during book sharing particularly often. The opportunity to cuddle together may be a particular benefit of book sharing for fathers: ‘I think it’s more so at the moment more so of a bonding time, so it’s just time where everyone’s sort of calm and you can cuddle (in) and just actually talk about what’s in the book.’ (Participant B, talking about book sharing) The closeness of book sharing was particularly important to one father, who mentioned book sharing as a rare opportunity to share peaceful time with his active son: ‘He’s a very very active child, [...] so there’s not much time you get to sit down and hug him and stuff like that. [...] It’s nice he’s really engaged and still, and you can just get some really peaceful time with him.’ (Participant E, talking about closeness during book sharing)

Fathers also expressed that both play and book sharing provided a time to bond by observing their children and speculating on their thoughts. Fathers spoke about how they got to know their children better through observing them during these activities and understand their perspectives better. For one father, watching his child figuring things out during book sharing made him smile: ‘I think I’m smiling because I can see him thinking about things and figuring it out, and I think he likes that, so that’s why he smiles.’ (Participant A, talking about the book sharing video) Another father enjoyed seeing similarities between his own thought processes and his child’s, finding this the most enjoyable element of playing together: ‘I find very interesting how my children, watching them learn about the world themselves and I think it’s probably the way I think and the way I like to do things. I like to find things for myself, so I think that’s probably what I enjoyed most.’ (Participant G, talking about watching his child play) For one father whose struggles communicating with his child interfered with his

enjoyment of their interactions, being able to watch and concentrate on his child helped him to understand his child better and enjoy quiet time together: ‘I enjoy the periods [...] where I can look at him [...] and concentrate on him. [...] If my wife goes out and takes my daughter, and I’m just left with him, it’s quiet in the house then, so [...] then I can look at him. That’s nice to be able to just look at him and understand him, and you can see what children are thinking generally. [...] You can see what’s going on in that head at times, and so that’s nice to watch.’ (Participant D, talking about observing his child)

Theme 2: Father enjoyment of purposeful activities

Our second theme focuses on the activities that fathers view as purposeful; fathers enjoying feeling successful; and fathers’ views of their roles as parents. This theme’s main ideas are outlined in Table 2.1.2.

Table 2.1.2: Overview of Theme 2.

Theme name	Main ideas	Illustrative quotes
Father enjoyment of purposeful activities	<ul style="list-style-type: none"> - Fathers feel motivated to engage in activities that serve a purpose, including their own hobbies and activities they see as building the child’s skills. - Fathers enjoy feeling successful and find validation in their child’s enjoyment and developmental progress, enjoying activities less when there is no reward or when they feel as though they have failed. - Fathers view their own parenting roles in relation to their partners’, especially when comparing their book sharing practices. 	<ul style="list-style-type: none"> - ‘They kind of do a less precise version of whatever it is I’m up to, which is really really fun.’ - ‘I quite enjoy reading him a book because [child’s name] really likes when I do it, so I’m quite proud of it.’ - ‘Looking after them I find can be more stressful than I – or my wife copes with it better than I do.’

For this theme, we found that fathers discussed disliking activities that did not serve a purpose, feeling that some activities or interactions were pointless. For example, one father expressed not feeling as though he would benefit from most interactions with his children until they were older: ‘If I didn’t see them up until the age of 3, after that point they’re very useful to me because we can do things together and get on with things together. [...] There’s this sort of period [...] where it’s kind of like, I’m not getting a massive lot out of this.’ (Participant D, talking about interactions with his child) Another felt that book sharing in particular seemed more like a chore at first because it did not have a clear purpose: ‘By the time we got into

parenting, I was so tired and stuff. I was like, “This is just another chore. It doesn’t serve a purpose.”” (Participant E, talking about first impressions of book sharing)

Although fathers spoke about some activities lacking purpose, fathers often talked about enjoying the educational function of certain activities. Several shared that promoting the child’s learning and development were among the reasons to engage in both play and book sharing. For one father, seeing that his child had learnt something made him feel that play was worthwhile, suggesting that without this play would feel less useful: ‘It’s nice to see that there’s something, that something good is coming out of it. Not just passing the time, you can see that he’s learnt something.’ (Participant D, talking about play) Another expressed similar sentiment, sharing that learning is a reason to engage in toy play frequently: ‘Every time that I’m with her, most of the time it’s with toys. One because it keeps us both entertained, and two it sort of is a learning curve for her at her age, I feel.’ (Participant B, talking about playing with toys)

In addition, fathers discussed the desire to involve their children in their own hobbies. For one father, the desire for activities to serve a purpose meant traditional toy play was less appealing, but playfully involving children in his own hobbies and activities was more motivating: ‘They like drawing, and whenever I’m writing they’ll be drawing. They kind of do a less precise version of whatever it is I’m up to, which is really really fun.’ (Participant C, talking about enjoyable activities) Another father expressed that a lack of shared hobbies limited his ability to enjoy activities with his son but speculated about enjoying hobbies together in the future: ‘It’s not like we can go, “Oh, shall we go fishing, Dad?” You know, and then we’ll both go off and do a thing that we both enjoy together. There’s no such thing, not yet anyway.’ (Participant D, talking about enjoying activities together)

Fathers also felt purpose through seeing their own successes, including through observing their children’s developmental progress during their interactions. For many fathers, feeling successful made activities seem worthwhile or purposeful. Both play and book sharing were opportunities for fathers to observe such progress, with one father commenting that play provided an opportunity to watch his daughter learn new skills: ‘I think it was just so watching her learn the new skills. It was sort of like an instant feedback from there. Her progressing, even if it was just a little bit, you could see the change slowly happening and her sort of really getting to grips with it.’ (Participant B, talking about play) Another father commented on the improvements he could see in his child’s language development and understanding of narrative during book sharing as something he enjoys: ‘It’s also nice to kind of see her kind of development, her language development, being able to kind of read bits herself and understand bits and understand the kind of narrative, which is nice.’ (Participant H, talking about book sharing)

Fathers also felt validated by their children's responses to their actions, with fathers often raising the child's happiness and engagement as particularly validating. One father commented that while playing together, he enjoyed seeing how his own actions made his child happy: 'It's nice to see that he's happy. It's not just like him being happy with what he's doing. It's also because I'm the one playing with him. It's nice to know that he's happy playing with me. [...] I still want to know that he's happy with what I've done, in a way. [...] I want to know that I am pleasing him.' (Participant D, talking about validation during the play video) Likewise, another father felt successful in his own skills during book sharing, sharing that his child's enjoyment and engagement made him feel proud: 'I quite enjoy reading him a book because [child's name] really likes when I do it, so I'm quite proud of it and I think I can do it well, and then he's really engaged.' (Participant E, talking about validation in book sharing)

Some fathers compared themselves to others, seeing their own roles as parents in relation to their partners and other parenting figures. For example, one father felt selfish for finding time with his children more stressful than his partner does: 'Looking after them I find can be more stressful than I – or my wife copes with it better than I do. You know, maybe it's just a sort of a selfish trait that I have.' (Participant D, talking about spending time with his children) Another father noted how the lack of a father figure in his own life influences his own aspirations for fatherhood and incentivises him to be present and engaged in his child's life: 'I never had that father figure in my life. [...] I knew that I wanted to be the best dad I could possibly be for my son, so that's what I missed out on, and that's what I wanted to make sure he had plenty of.' (Participant F, talking about his role as a father) Some fathers saw differences between their own and their partners' book sharing interactions, but such comparisons did not arise when discussing play. One father compared his own lack of interest in reading to his partner's love of books, suggesting his son loves books due to his partner and commenting on this observation positively: 'I'm not a reader. I never have been. My wife loves to read books, so (I guess) that must be. But I love the fact that he likes to read.' (Participant A, talking about reading) For this father, comparisons to his partner did not disincentivise engagement, and his son's enjoyment of books was motivation to sign up for the present study: 'One of his absolute favourite things to do is to read books, which is [...] one of the two videos that you (asked us to do). And when we saw that and I told [partner's name] (well) that's perfect.' (Participant A, talking about signing up for the study) On the other hand, another father noticed differences when watching his partner book share compared to watching his own book sharing video, implying feelings of lower self-efficacy as he contrasted their enthusiasm and noticed the child's responses: 'My wife's a massive fan of reading. She loves reading books, and she approached

it with the enthusiasm that I approach the toys, and you could see the reaction. [Child's name] was a little bit more sort of upbeat, rather than just sort of like night-night time.' (Participant B, talking about watching his wife share books)

Discussion

We explored fathers' perceptions of their everyday interactions with their young children by interviewing fathers about their play and book sharing experiences. Fathers discussed enjoying activities that allowed them to bond with their children, while feeling that their interactions needed to serve a purpose. Fathers' perspectives on which activities promoted these goals varied, but fathers often spoke about particular interaction characteristics that supported these ideas. Here we discuss the two themes, both of which encompass book sharing and play in their main ideas. We situate these results within the wider literature and discuss their importance.

Father-child bonding

Our first theme, *Play and book sharing as opportunities for father-child bonding*, shows fathers enjoy everyday interactions as times to bond and develop their relationships with their children. This idea of play as an opportunity for bonding was raised in one of the few previous studies exploring parent perspectives on father-child play, where StGeorge et al. (2018) found parents viewed rough-and-tumble play as either helping build a strong connection with the father or as the result of such a connection. The present study expands these findings beyond rough-and-tumble play to play more generally.

Fathers discussed bonding during activities that were socially interactive, some referencing play and others book sharing. Fathers' emphasis on social interactivity and communication as important for enjoyment suggests the intersubjective characteristics of these activities are key. They spoke about exchanging smiles, feeling a connection with the child through laughter during play, and bonding through the child pointing and directing attention during book sharing, in many cases noticing these in their videos. These intersubjective actions, among others such as paying attention to and following one another's interests, shared gaze, pointing, asking questions, commenting, and making gestures, promote the reciprocally interactive nature of the activities (Murray et al., 2022). In adults, joint attention can result in feelings of social bonding with strangers, with positive impacts on how adults feel about those around them (Wolf et al., 2016). This indication that an intersubjective task can promote social bonding supports the idea that the social interactivity of activities like book sharing, which by

nature involve attending to the same focus among other intersubjective characteristics, can promote father-child bonding.

Fathers primarily discussed opportunities for bonding occurring during calmer activities, often referring to book sharing in this way, and focused on physical contact and affection as benefits of calmer activities. This finding appears to contrast with much of the literature that focuses on fathers' engagement in more lively and adventurous activities such as rough-and-tumble play, particularly during infancy and toddlerhood (Amodia-Bidakowska et al., 2020). In their study on father-child rough-and-tumble play, StGeorge et al. (2018) identify opportunities for physical contact as facilitating bonding. In particular, rough-and-tumble play was viewed as important for building the father-child relationship through opportunities for one-to-one interaction with high affect and physical contact (StGeorge et al., 2018). In a study of parents' interactions with children aged 7 to 11 years, Oliphant and Kuczynski (2011) also found physical contact promoted feelings of intimacy, where fathers in particular talked about physical intimacy during leisure activities such as watching television. These studies show father-child bonding through physical contact across childhood, and our results suggest this may occur not only during rough-and-tumble play and when watching television, but also with younger children in book sharing interactions.

Fathers also identified play and book sharing as opportunities to bond by observing their children and getting to know them better. Fathers spoke about their own enjoyment watching their children thinking and discovering new things, and one father noted observing this while watching his videos. Increased opportunities for fathers to get to know their children have been reported as a result of lockdowns, beyond the present study. In a report of the impact of the pandemic on father-child relationships, Weissbourd et al. (2020) report that in their sample of American fathers, over half felt they were getting to know their children better. It is therefore possible that this perceived benefit of play and book sharing in our sample was heightened due to the timing of our interviews. Beyond the pandemic, a study of Swedish fathers' experiences of shared parental leave found first-time fathers emphasised the importance of getting to know their child during their time as primary caregiver (Lidbeck & Boström, 2021), suggesting that from infancy fathers recognise the benefit of time spent with their children and enjoy getting to know them.

Purposeful activities

Our second theme, *Father enjoyment of purposeful activities*, reveals that fathers particularly enjoy activities they feel have a purpose or outcome. This finding is pertinent based

on previous research comparing parents and non-parents, which found not only that parents derived a greater sense of meaning from their daily activities, but also that fathers in particular were happier and had greater life satisfaction than childless men (Nelson et al., 2013). Research by Tonietto et al. (2021) suggests adults are less likely to enjoy leisure time, defined as time not engaging in paid work, when they view it as wasteful. This may be because viewing an activity as wasteful decreases engagement in that activity, resulting in lower enjoyment (Diehl et al., 2016). Feeling a sense of purpose from parenting activities may contribute to parents' happiness by providing goals for activities and making them feel productive (Nelson et al., 2014).

Fathers discussed their own hobbies and activities with educational elements as having purpose. The desire to engage in educational activities is mirrored by Oliphant and Kuczynski's (2011) study on parent-child intimacy in middle childhood, which found engaging in shared projects, such as homework and household activities, supported parent feelings of intimacy with their children. While there is ample evidence demonstrating the developmental value of both play and book sharing, limited awareness of these benefits may impact fathers' views, and fathers may not feel incentivised to engage in such activities if they do not feel they are beneficial for the child's learning. Raising fathers' awareness of the importance of everyday interactions for children's learning and development, including how fathers contribute to these benefits, may therefore provide fruitful opportunities for future research and intervention.

The preference for purposeful activities also manifested through fathers' desire to engage their children in their own hobbies, where fathers discussed participating in equivalent activities side-by-side and expressed a desire for greater engagement in shared hobbies as their children get older. The importance of common interests was raised in a sample of Canadian fathers of 7- and 8-year-olds, where fathers reported enjoying discussions with their children about shared hobbies and interests, such as discussing a shared interest in music (Lynch, 2019). In this study, involvement in shared activities provided a source of mutual enjoyment and served a purpose in both the father and the child's life (Lynch, 2019). Like our study, Lynch (2019) found that no particular activity provided this feeling across fathers, and the activities that served this purpose varied.

Fathers referenced their own successes and feelings of validation when discussing their everyday interactions, suggesting that feeling successful is an important component of fathers' participation. White and Dolan (2009) found that, when compared to other daily activities, adults' time spent with their children was considered to be among the most rewarding. In the present study, fathers' feelings of success often resulted from their children's enjoyment of the

activity and led to mutual enjoyment, suggesting that the mutual enjoyment itself was rewarding. Hoover-Dempsey and Sandler (1997) theorise that a sense of self-efficacy incentivises parents' engagement in children's education. In research on fathers of 1- to 5-year-olds, Freeman et al. (2008) found support for this theory, where fathers' feelings of self-efficacy mediated the influence of contextual barriers on their involvement in physical play, didactic play (which included reading books and telling stories), and caregiving. These findings suggest fathers' feelings of success have the power to counter existing barriers to involvement (Freeman et al., 2008), which may be explained by their increased enjoyment of everyday interactions that provide this validation. This effect may be particularly pronounced in fathers of young children, who may not yet have established confidence in their roles as fathers, and suggests that their engagement in everyday interactions could be motivated by cultivating these feelings of self-efficacy.

In addition to self-efficacy, Hoover-Dempsey and Sandler (1997) also theorised the importance of parent role construction for involvement. In the present study, some fathers suggested their job was to make sure their child was having fun, with fathers comparing themselves to others. Comparisons to the partner arose almost exclusively when fathers discussed book sharing, with fathers sometimes suggesting their partners were better at book sharing or enjoyed it more, implying lower self-efficacy for fathers. It is possible such feelings of inadequacy may disincentivise fathers from involvement with book sharing, when compared with play where these comparisons were not raised. Fathers' beliefs about their roles are related to their involvement, according to Freeman et al. (2008), who found fathers' perceptions of their own roles in their child's development and education mediated the influence of contextual barriers on involvement in socialisation outside the home and caregiving but not the play outcomes. Together, self-efficacy and role beliefs countered barriers to all forms of involvement measured in Freeman et al.'s (2008) study, indicating the power of fathers' own beliefs in their participation in everyday interactions.

Implications and recommendations

With play and book sharing both widely used for parenting interventions, the present research has implications for involving fathers in intervention research. We found a couple of differences in fathers' views of play and book sharing: book sharing was viewed as a calm activity when compared to play, and fathers made more comparisons to their partners when discussing their book sharing practices. Fathers' comparisons to their partners in some cases suggest lower feelings of self-efficacy in book sharing, so seeking to boost fathers' feelings of

success in book sharing may be a suitable starting point for interventions. Beyond these differences, individual fathers often expressed preferences for one activity or another, but these preferences were not consistently shared among the fathers in our sample. Instead, the patterns we recognised were based on the reasons for these preferences: fathers preferred the activities they saw as promoting bonding or serving a purpose, but there was inconsistency in which activities these were for fathers. This finding therefore suggests interventions should focus on the characteristics of an activity that might support fathers' engagement.

Our findings have implications in the context of the COVID-19 pandemic, where fathers value everyday activities as opportunities to become closer with their young children. In recovering from the COVID-19 pandemic, Prime et al. (2020) present a conceptual framework positing that close family relationships can buffer against the negative effects of COVID-19 on caregiver well-being, family processes, and child adjustment among other social disruption. Given the likelihood that play in particular could provide a buffer against the negative effects of restrictions for children (Graber et al., 2021), a focus on father-child play may support researchers and practitioners to mitigate the impacts of isolation for children and families.

Regarding future research, this study's methods provide initial evidence on the utility of participants' own videos to research fathers' experiences. Our results saw fathers speak about viewing the videos, noticing their own and their child's enjoyment of the interactions and reflecting on when this mutual enjoyment occurred. By watching videos prior to interview, fathers refreshed their memories of the interactions while reflecting on instances of mutual enjoyment that they may not have recognised in the moment. Video-based methods have widely been used in parenting intervention (Fukkink, 2008) and teacher education (Gaudin & Chaliès, 2015) research, but the use of videos to aid parents in reflecting on their interactions is less common. To our knowledge, we are the first to use participants' own videos to answer our research questions, and we are not aware of any other studies using an approach where the researcher does not view the videos.

This study's findings also suggest routes for future research. Pathways from parent behaviours to many child outcomes have been theorised based on the intersubjectivity the activities promote (Murray et al., 2022). By engaging in intersubjective interactions, fathers promote positive outcomes such as increased child vocabulary (Murray et al., 2022), and our results show that they bond with the child while doing so. Future research should consider possible snowballing effects, where bonding and increased vocabulary result in more intersubjective interactions, consequently magnifying outcome effects. Such snowballing effects between maternal book sharing and child vocabulary were found by Raikes et al. (2006), but the role of

intersubjectivity and mutual enjoyment have not yet been considered in this relationship and would be relevant for future research.

Strengths and limitations

Our study has several notable strengths. First, our use of participants' videos provided rich stimuli for discussion without burdening participants with a substantial time commitment for participation. The videos also allowed fathers to discuss their everyday interactions in detail without the need to invite the researcher into their homes for observation. However, as this method is limited by the requirement for participants to record themselves, it may need adjustment before it can be implemented with populations with limited access to recording technology.

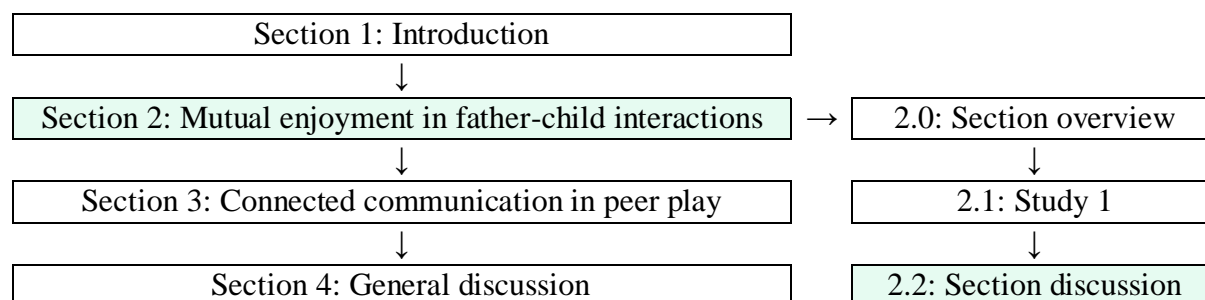
Our entirely remote recruitment and data collection procedures allowed participation across a wider geographic area than would have been possible with in-person interviews and allowed us to recruit beyond our university city. However, these procedures did result in fathers needing an internet connection and a device supporting video conferencing, which may have limited the inadvertently limited diversity in our sample. Additional sample limitations include the narrow range of racial and ethnic identities represented and the several father demographic groups whose views are not represented, such as single fathers, fathers who do not live with their children, and fathers in two-father families. While there are limitations in the diversity of our sample, we were successful in engaging fathers with various levels of education and work statuses, including those attending work in-person, working from home, and not participating in employment, all of whom may have different experiences of fatherhood.

Finally, fathers who engage in play and book sharing more frequently or enjoy them more may have been more likely to engage in the study, with one father mentioning his son's love of books as an incentive to participate. Despite this, participants were open about their dislikes and where their enjoyment was limited.

Conclusion

By using participants' own video recordings to stimulate reflections, we advance understanding of how fathers view play and book sharing and what motivates them to engage in interactions with their young children. We find evidence for fathers' enjoyment of activities that facilitate father-child bonding and a preference for activities that feel purposeful. In all, this study provides a first look at an under-researched topic by providing initial insight into fathers' perspectives of their everyday interactions and a foundation on which future research can build.

2.2: Section discussion



Chapter overview

This chapter discusses the methods and results reported in the previous chapter in further depth. Where relevant, I integrate additional interview excerpts and results within the discussion, based on recommendations by Braun and Clarke (2013), who suggest that it is appropriate to weave results and interpretation together in qualitative research. These quotes are highlighted by participant, maintaining the colour scheme used in the previous chapter.

First, I present an expanded discussion of Theme 1. I focus on this theme in particular based on its relevance to the topics of this thesis, focusing on its importance for intersubjectivity and interactions across activities. These are topics that I revisit in Section 3, where I focus on intersubjective communication in school-age children's friendships and peer relationships, comparing interactions across two activities. I end this expanded discussion of Theme 1 with reflections on the implications of its results for children's peer play and for intervention.

The second area of discussion presented in this chapter focuses on the study's methods, providing methodological discussion and critique and reflecting on how the methods were developed and why. This involves discussion of the redesign of the study necessary due to COVID-19, the use of video playback interviews, my recruitment and sampling methods, and the use of reflexive thematic analysis. This methodological discussion provides a more in-depth critique of the study's methods than was possible within the confines of the research publication presented in the previous chapter.

Expanded discussion of Theme 1

The study reported in the previous chapter finds two main themes, both of which inform the factors that result in mutual enjoyment during father-child interactions. Of particular

interest for this thesis are the findings of Theme 1, *Play and book sharing as opportunities for father-child bonding*, which suggest that creating a setting for the father to bond with the child contributes to the father's own enjoyment of the activity, while this enjoyment may further feelings of bonding. This theme can be viewed as transactional, where the father's own enjoyment of book sharing, his experience of bonding with the child, and the intersubjective behaviours in which the father and child engage all mutually and reciprocally influence one another. Here I discuss this theme in the context of the present thesis, analysing in more depth this bonding in intersubjective interactions, examining how it may manifest across different interaction settings, and exploring the implications of this theme for children's social relationships and for intervention.

Bonding in intersubjective interactions

Here I explore *Play and book sharing as opportunities for father-child bonding* with a focus on intersubjective features of fathers' bonding experiences. Based on ideas of embodied intersubjectivity (Harrison & Tronick, 2022; Trevarthen, 2013), I consider the behaviours and communicative acts of intersubjectivity as key components of this bonding. I focus on fathers' reflections on intersubjective interactions as supporting bonding with their infants to illustrate how intersubjective interactions and successful communication are key for fathers' enjoyment of social play, and suggest that this feeling of bonding with the child may result in further intersubjectivity in the interaction.

According to the mutual regulation model, both the caregiver and child mutually influence and are influenced by the communication of the partner, and intersubjectivity occurs when partners express intentions and convey meaning through these communicative behaviours (Banella & Tronick, 2019; Tronick et al., 1998). In many cases, fathers mentioned these communicative behaviours and interactions as supporting their involvement in and enjoyment of interactions, suggesting that reciprocal and intersubjective interactions support fathers bonding with their children. Referring to this social communication in spending time with his daughter, one father compared watching his child for her safety to hands-on engagement with her, implying greater enjoyment of the latter. For this father, it was not the time spent together that made it feel like a bonding experience, but the interactivity of playing together: 'Watching is just watching, but when I crawl around with her, I can interact with her in any way like suggesting toys, touching her, smiling at each other, or talking to her closely.' (Participant I, talking about crawling on the floor) Specifically, he refers to the intersubjectivity that occurs when he crawls on the floor with her and they smile at each other. These findings suggest that features

of intersubjectivity, such as eye contact and smiling at each other, are linked with fathers' enjoyment of interactions with their infants, perhaps bi-directionally causing and resulting from an experience of bonding. Tronick et al. (1998) suggest that these experiences are part of a shared intersubjective state existing in the dyad, or a dyadic state of consciousness, that supports feelings of social and emotional connection. For another father of a pre-verbal infant, elements of such reciprocal interactions were evident in his reflections: 'I love it when [...] I (actually) say, "Can daddy have it?" and he actually hands me the piece, that is, you know, 'cause he's obviously, you know, recognised that I want the piece that he's got and he gives it to me.' (Participant F, talking about playing with a puzzle) This father shares his enjoyment of his son interpreting and responding to his communicative cues as part of a reciprocal interaction. These reciprocal interactions lay the groundwork for future social interactions which were mentioned by some of the fathers of older children. For example, one father described a reciprocal routine with his son during book sharing, where he and his son exchange looks at certain cues in the book: 'When I say something and we finish the page, he usually looks at me, and then I'll look at him, and then he'll go (right) and carry on.' (Participant A, talking about book sharing) This intersubjective routine, where both father and son exchange glances during book sharing, is an example of turn-taking in early communication. Turn-taking in caregiver-child interactions, including non-verbal turn-taking, is evident from birth (Bateson, 1975; Dominguez et al., 2016; Gratier et al., 2015; Meltzoff & Moore, 1983), and these findings provide evidence not only that it is evident in father-child interactions, but also that it is a key component of fathers' enjoyment of these interactions.

Beyond the non-verbal interaction that many fathers discussed, others mentioned verbal communication as key in their enjoyment of interactions or mentioned that a lack of verbal communication limited their enjoyment. Cases of successful verbal communication between father and child may have supported the development of intersubjectivity in interactions or resulted from the intersubjective interaction, while some fathers shared their frustrations with communication difficulties. For example, one father, who had previously shared his preference for physically interactive rough-and-tumble play based on the connection he felt with his child, speculated that his child beginning to talk would increase his enjoyment of their puzzle play together: 'When he can talk to me it will be much more fun because we'll be able to interact more about what he's picking up.' (Participant F, talking about playing with a puzzle) For this father, being able to talk about play with his child was something to look forward to in their future interactions. Another father found unsuccessful communication attempts frustrating: 'He can't talk yet, so it's quite frustrating when he's screaming about what he wants to do, or not

do, but he can't tell you yet.' (Participant D, talking about communication with his child) This suggests a link between communication and fathers' enjoyment, where successful communication may increase enjoyment, which in turn may result in further communication success. On the other hand, a lack of successful communication may actively inhibit fathers' enjoyment of play or be a sign of not being on the same page about the play. These findings indicate the importance of successful communication for fathers' enjoyment of social play and reiterate the role of intersubjectivity in these interactions.

Fathers' references to intersubjective behaviours, as well as their direct discussion of enjoyment relating to verbal communication, emphasise the importance of intersubjectivity for fathers' bonding experiences with their young children during social play. Fathers' reflections of social play as more enjoyable when it is socially interactive, as well as frustration with troubles communicating, demonstrate the importance for fathers of being able to engage in shared experiences with their children. These early intersubjective interactions between father and child may form the basis for intersubjective communication in children's later social play, which is explored in Section 3.

Intersubjectivity across activities

Next, I discuss *Play and book sharing as opportunities for father-child bonding* with a focus on intersubjectivity across the activities. The present study provided two activities for fathers to compare in their interviews, and additional interview questions asked more generally about daily life and interactions. This format provided the opportunity to compare how fathers discussed various activities and how each may promote intersubjectivity differently. Though this design enabled comparison across activities, as mentioned in the previous chapter there were few concrete patterns relating to fathers' enjoyment of one activity over another. Instead, I recognised patterns in the activity characteristics fathers identified as promoting mutual enjoyment and bonding with their young children, where fathers referred to characteristics of intersubjectivity across both play and book sharing, and discuss these in further detail here.

Several fathers raised intersubjectivity when discussing play. However, in most cases fathers did not specify that playing together itself supported bonding from their perspectives. Instead, they spoke about what happened during play as an enjoyable bonding experience, suggesting that play simply facilitated intersubjective interactions, which in turn supported bonding. For example, one father of an infant spoke about intersubjectivity during shared toy play as supporting his enjoyment: 'When my eyes matches her eyes, she smiles. So that's a moment I have fun with her while playing toy.' (Participant I, talking about play) This focus on the

intersubjective details of the interaction was especially common for fathers talking about interactions with younger infants, possibly because these details form much of father-child interaction at this young age. Play may therefore facilitate bonding by providing a shared space for intersubjectivity to occur.

Creating a shared space for intersubjectivity to occur is one reason Murray et al. (2022) suggest that book sharing in particular may be special: it provides opportunities for these intersubjective interactions. This was evident among fathers in the present study, who discussed feeling as though book sharing provided opportunities to bond and described intersubjective interactions as facilitating this. One father, for example, discussed the combination of intersubjective characteristics evident in book sharing as important for his son's enjoyment: 'I think it's the whole [...] interaction of you reading to him, and maybe it's the constant talking. [...] The interaction of pointing something on a page. [...] Maybe it's the whole package of the interaction, the closeness of being sat together. [...] Maybe it's all those things.' (Participant A, talking about why his child enjoys book sharing) For this father, the combination of these intersubjective features was important, including sitting close together and pointing at the page. Likewise, Murray et al. (2022) propose that book sharing promotes intersubjectivity by providing opportunities for a shared experience. For example, when sharing a book together, partners can attend to the same focus on the page, point at pictures, and talk about the story. Each of these actions is likely to facilitate intersubjectivity by allowing partners to build this shared experience.

It is unclear which of these intersubjective properties may be unique to book sharing, but it is likely that some play activities may facilitate similar elements. However, the evidence on intersubjectivity in toy play is sparse, with most studies on intersubjectivity instead focusing on social pretend play (e.g. Whittington & Floyd, 2009). It is possible that toy play could facilitate similar actions to those previously mentioned with respect to book sharing: partners can have joint attention on a toy, point to part of a toy, and talk about the toy. Some evidence for this idea comes from research with etch-a-sketch toys, which are often used to facilitate caregiver-child reciprocity and cooperation in research settings (Carr & Dempster, 2021). These toys' facilitation of cooperation may be in part due to the shared goal they provide and the opportunities to engage in these actions that may promote intersubjectivity. However, to my knowledge such toys have not been directly used to research intersubjectivity in caregiver-child interactions, so there is not yet evidence to support this idea.

To my knowledge, no studies have quantitatively compared the frequency of intersubjective elements, such as joint attention, across book sharing and toy play. However, in a study

of caregiver-child interactions across play and non-play contexts, fathers and their 18-month-olds were found to show more shared positive affect, such as smiles and laughter, during play when compared to a caregiving activity (Lindsey et al., 2010). Based on the present study's findings, both play and book sharing appear to provide opportunities for fathers and infants to engage in intersubjective interactions. Features of intersubjectivity were often drawn on by fathers as ways book sharing promoted bonding, suggesting that some of these benefits may be particularly common in the book sharing context. Based on the present study, it is evident that both play and book sharing provide opportunities for intersubjective father-child interactions. Though it is not possible based on these results to state which activities may better facilitate intersubjective interactions, further comparisons of intersubjectivity across activity contexts may be a rich area for future research and are explored in Section 3.

Implications

The implications of this study are briefly reported in the previous chapter. Here I analyse the implications of *Play and book sharing as opportunities for father-child bonding* in greater depth, focusing on how early father-child interactions may contribute to children's subsequent social relationships and how fathers' perspectives on play and book sharing may be used to inform intervention research.

Subsequent social relationships

The present study focused on fathers' experiences of father-child interactions, with key findings suggesting that fathers find bonding experiences particularly important for their enjoyment of these interactions. Whereas in the previous chapter I discuss *Play and book sharing as opportunities for father-child bonding* in the context of father-child interactions and focused on fathers' experiences, here I consider its implications for children's social development and subsequent peer relationships. I discuss the evidence on caregiver-child and father-child interactions as precursors to peer interactions, outlining the evidence for this idea and its implications in the context of the present study.

There is substantial evidence linking caregiver-child interactions to child social outcomes. For example, attachment theory suggests that responsive caregivers support their children to feel secure in unfamiliar settings, which can result in the child's social exploration and engagement in peer play (Rose-Krasnor et al., 1996). Secure attachment with a caregiver is therefore thought to prepare children for interactions with other play partners (Booth, 1994; Howes, 2010; Rose-Krasnor et al., 1996), and some research suggests that attachment in

infancy may predict children's later play behaviours (Coplan et al., 2006). Beyond attachment, Fogle and Mendez (2006) found that mothers' beliefs about play were linked to the mothers' and teachers' reports of children's peer play, where mothers who enjoyed getting involved with their children's play and valued play for child development had children who were reported to engage in more interactive peer play and less disruptive peer play. These results indicate that caregiver engagement in and views of play can have a direct impact on children's peer play, suggesting that fathers valuing bonding experiences in, as well as the developmental value of, both play and book sharing activities may support children's peer interactions.

Though much of this literature linking caregiver-child interactions to child social outcomes has focused on mothers, there is a growing body of evidence suggesting that father-child play specifically contributes to child social outcomes (Amodia-Bidakowska et al., 2020). For example, a meta-analysis by StGeorge and Freeman (2017) found a strong association between father-child physical play and children's social competence, which included measures of popularity, peer competence, and social skills, and this effect was observed across seven studies with various designs and methods. Likewise, Amodia-Bidakowska et al. (2020) identified three studies addressing this relationship in their systematic review of father-child play with infants and young children. The first of these found a positive relationship between father-child physical play at age 3 to 4 years and children's concurrent peer relations, including teacher ratings of popularity, teacher report social behaviour, and observed peer interactions (MacDonald & Parke, 1984). In this study, boys' peer relations in particular appeared to benefit (MacDonald & Parke, 1984). Similarly, another study found that fathers' involvement in play predicted pre-school-aged boys' teacher-rated social skills and peer-rated acceptance (Pettit et al., 1998). However, based on their meta-analysis of father-child physical play, StGeorge and Freeman (2017) conclude that physical play is equally linked to social competence for girls and boys. More recently, father-child rough-and-tumble play quality was found to be negatively related to emotional and behavioural problems, including father-rated peer problems (Fletcher et al., 2013). Though none of these studies explored links between father-child play in infancy with peer relations, nor fathers' perspectives of these interactions, these studies demonstrate how children's social worlds are linked. The present study's finding that calm activities, especially those promoting physical contact, support fathers' feelings of bonding suggests that there may be wider implications of father-child interactions for children's social outcomes than previously researched with respect to physical and rough-and-tumble play.

In their systematic review, Amodia-Bidakowska et al. (2020) conclude that while only a few studies have explored links between early father-child play and peer relations, the

existing evidence suggests a positive relationship between fathers' play with their children and their children's social skills. Based on the present study's findings that fathers particularly value activities that support bonding through social interaction, physical contact, and getting to know their children, these areas will be important to explore in future research to untangle the precise implications of fathers' experiences on children's subsequent social relationships.

Intervention

The study reported in the previous chapter was devised alongside my involvement in designing a caregiver-child book sharing intervention, intending to provide the foundational knowledge for adapting the intervention for use with fathers. Here I briefly discuss implications for intervention research with a focus on this book sharing intervention of interest.

This study accompanied development of a theoretically informed approach to using specific aspects of play in interventions, building on existing and longstanding research on a book sharing intervention for use with mothers of young children in the UK and South Africa (Dowdall et al., 2017). The intervention uses intersubjective interactions to promote caregiver and child outcomes: during book sharing, caregivers and children engage in joint attention, among other intersubjective actions, leading to improvements in several child outcomes (Murray et al., 2022). The present study was designed in part to identify key components of play and book sharing interactions for adapting this intervention for use with fathers and assessing where book sharing and play may have complementary and differing impacts.

Book sharing interventions have widely been used with mothers (Dowdall et al., 2017), and this study intended to provide some initial insight into fathers' views of book sharing while also considering how fathers could best be engaged in future interventions. Focusing on engaging fathers in interventions, findings that fathers view play and book sharing as opportunities to bond with their children may mean that focusing on this characteristic could provide incentives for engagement. This idea is supported by previous research with mothers, where Leyendecker et al. (2002) found that the presence of mutual enjoyment between mother and child factored into whether mothers perceived various play interactions as desirable or undesirable. Additionally, in Canadian mothers and fathers of 7- to 11-year-olds, caregivers felt that engaging in mutually enjoyable interactions promoted caregiver-child intimacy (Oliphant & Kuczynski, 2011), which may similarly promote engagement in such interactions. By enjoying an activity together, caregivers may feel motivated to engage in such activities again in the future. Beyond the focus on the first theme, fathers valuing activities they view as serving a purpose, as found in the second theme, may be particularly useful for applying to intervention

research. This could involve, for example, highlighting activities' developmental benefits to fathers, adapting activities to have a more tangible outcome, or supporting fathers to reflect on their successes.

The present study identified several factors associated with book sharing and play that motivated fathers' engagement, which may be of direct interest to engaging fathers in interventions. These results suggest that providing opportunities for fathers to bond with their children, particularly through intersubjective interactions, and feel successful in their interactions may incentivise fathers' engagement, and this increased engagement could result in more frequent intersubjective interactions and greater intervention effects. Future interventions designed for fathers should focus on these characteristics of activities to motivate fathers' engagement.

Methodological discussion

This methodological discussion provides additional details and critique regarding the methods used in the previous chapter, contextualising and reflecting on the methodological decisions made. It includes a discussion of changes made to the study as a result of COVID-19, an evaluation of the video playback methods used, reflections on recruitment and the resulting sample, and an in-depth outline of the reflexive thematic analysis process.

COVID-19 redesign

This study was initially designed prior to the COVID-19 pandemic, with in-person recruitment and data collection planned. However, with the onset of lockdown in March 2020, I redesigned the study to allow for virtual recruitment and data collection. This resulted in the need to drop several elements from the original design while integrating some novel features into the new design. The primary change involved conducting interviews online without first observing father-child interactions, which resulted in a more comfortable and convenient research experience for participants as they were able to engage in the interactions of interest without a researcher present and choose the interview medium. However, downsides of this redesign included the need for participants to have access to both recording and video conferencing technology, which were not requirements for the original design, and new ethical and logistical concerns arising with the move to online data collection.

The original design of this study centred around visits to participants' homes, where I planned to record father-child interactions and watch the videos back with fathers, asking

questions about the interaction to learn more about fathers' experience and reflections. An excerpt from the original ethics proposal states:

'Following recruitment and informed consent, participants will take part individually in an audio recorded semi-structured interview conducted in their own language. The researcher will ask parents about their experiences with book sharing and play, including how and when they most enjoy these activities. During the interview, participants will be asked to take part in a short book sharing session and a short play session (5 minutes each) which will be video recorded. Each participant will also be invited to watch the video with the researcher, and the researcher will ask questions about the details of the video, such as which parts of the interaction were most fun for the parent.'

When this plan was no longer possible due to safety concerns around meeting in-person, I investigated methods that would allow collection of similar data virtually. For example, I considered requesting that participants engage in the interactions while video-conferencing with me so that I could observe them and ask about the interaction afterwards during a virtual interview. Alternatively, I considered asking that they pre-record videos and send them to me in advance of a scheduled virtual interview. However, following careful deliberation about the purpose of the video recordings, I decided that it would not be necessary for me as the researcher to view the recordings at all as their primary purpose was to stimulate the fathers' reflections on the interactions, and I did not plan to analyse the video content. For this reason, the study redesign involved fathers video recording themselves and watching these videos independently prior to interview, which provided the opportunity for fathers to observe themselves and reflect on this experience without my influence, a particular innovation of the present study.

Not observing father-child interactions had several unintended benefits for the research. In particular, it is likely that this improved the representativeness of the interactions used for reflection, as well as benefiting participants' own comfort and convenience in engaging in these interactions. In general, approaches in which researchers film participants have various drawbacks, such as participants (or others in the video, including the child) interacting differently due to the researcher's presence (Stone-MacDonald & Stone, 2013) or the participant feeling uncomfortable having their recording viewed by the researcher (Rowe, 2009). Furthermore, researcher-filmed videos may be recorded outside of the family's normal routine. For example, if I had filmed the interaction videos, this may have required book sharing in the middle of the day even if the family normally does this before bedtime, or families may have needed to be observed book sharing in a different location from usual. In contrast, participants in the present

study were able to record the videos at their own convenience, limiting any discomfort relating to being observed and allowing participants to find a convenient time and location to record the videos. This may have made the interactions more representative of participants' usual interactions with their children, allowing fathers to reflect more precisely on their everyday interactions, and taken focus away from any differences in interaction based on being out of their normal routine. Additionally, in virtual studies participants do not have to invite a researcher physically into their private space (Hanna & Mwale, 2017). This may have eliminated discomfort for participants with respect to hosting an expert in their home (Hanna & Mwale, 2017) and resulted in participants feeling more comfortable sharing their perspectives and opinions with me, perhaps reducing the feeling that they should justify or defend their perspectives based on my presence or observation. These reduced effects of the research setting on fathers' participation in the study were particular benefits of the study's redesign, and I discuss the effects of the research setting on participants more generally in Section 4.

Beyond the increased comfort and convenience of the interaction recording, the redesign also gave participants control over the interview medium (Hanna & Mwale, 2017), further improving the convenience of engaging in the study. This decision to allow participants to select the interview platform followed a long and ultimately unsuccessful process aiming to identify a suitable video conferencing platform that would preserve participant privacy, be convenient for participants to use, and contain all features necessary for recording the interviews. I aimed to conduct interviews in a privacy-preserving manner, ideally using end-to-end encrypted services, to protect participants' personal data. Additionally, I aimed to identify a platform that would make it easy for participants to join calls, not requiring registration for an account or downloading software, which would have put undue strain on participants' time and resources. Finally, I required the platform to have sufficient recording features. Unfortunately, I was unable to identify a platform with all of these features. Instead, following discussions with the Faculty of Education IT department and my supervisors regarding the ethical implications of various solutions, I concluded that asking participants to select their platform of choice for interview would be the most ethical way forwards. This solution prioritised participant convenience, where participants would most likely select a platform they already use or could access easily. This prior comfort with the platform and its features aimed to improve the research experience while eliminating any need for participants to create accounts or download new software, which would avoid requiring the disclosure of personal data to additional third parties. Given the difficulty finding an appropriate platform for interview that would preserve the privacy of research participants, provide a convenient participation experience, and include

all required recording features, I recommend that this should be an area for universities and research bodies to explore and improve in the future.

In addition to the limitations regarding selection of a video conferencing platform for virtual interviews, one further limitation to the redesign was that only participants with access to appropriate technology (e.g. a camera, an internet connection) could be included in the research (Hanna & Mwale, 2017). Though this likely limited sample demographics, during the COVID-19 pandemic much of the general public transitioned to online means of communication, work, and education (Vargo et al., 2021). To illustrate this shift, one video conferencing app, Zoom, saw an increase from 10 million daily users at the end of December 2019 to 200 million daily users in March 2020 (Yuan, 2020). As recruitment for this study was conducted entirely online, primarily through social media and email lists, it is likely that most potential participants coming across the recruitment materials had access to appropriate technology during the recruitment period, suggesting that the need for this technology may not have limited the sample to a greater degree than the recruitment strategies. However, an expansion of both recruitment and data collection to in-person means, if it had been safe to do so, would likely have resulted in a more diverse sample. Despite this limitation, online interviews allowed sampling across a wide geographical area (Hanna & Mwale, 2017), with participants in this study from various locations across England. This is a large benefit for the present study, as my location in a university town would have likely led to a more homogenous group of participants if in-person data collection had proceeded as originally planned. I discuss the demographics of the sample in further detail below.

The redesign of the present study that was required due to the COVID-19 pandemic resulted in several changes to my research plans. Although there were several ways in which the need for virtual recruitment and data collection could have adversely affected the study, these were in most cases mitigated by associated strengths of the new methods. These strengths most notably included the methodological innovation of not viewing participant interactions, which is discussed further below.

Video playback interviews

Video-based interview techniques have been used for research in various settings, often enabling participants to reflect on the content of recordings. These techniques have become easier to employ in recent years due to technical advancements in video recording and playback (Stone-MacDonald & Stone, 2013). This study used an innovative video playback interview methodology, which arose primarily due to the necessity of redesign in the COVID-19

pandemic. Here I describe similar and associated methods of relevance, focusing on the use of video stimuli in interviews to prompt participant reflections. Next, I discuss the use of video playback interviews for the present research, including fathers' own comments on the format.

One of the earliest appearances of similar, though not video-based, methods was by Bloom (1953), who used audio recordings of students to stimulate discussions relating to two educational contexts. Since then, video-based methods such as the 'feedback interview', 'video-stimulated recall', and 'video-mediated interview' have arisen, from which the method used in the present research was adapted. These methods are similar in that they all use video stimuli to prompt participant reflections: Stone and Stone (1981) define the feedback interview as 'the playback and recall of a completed event in which the researcher and participant attempt to reconstruct the event's meaning' (p. 215); Rowe (2009) defines video-stimulated recall as 'video-recording an activity and then replaying the recording to the participants so that they can comment on matters of interest' (p. 427); and Takeuchi and Bryan (2019) define video-mediated interviews as interviews in which 'activities of the participants are video recorded, and then it is replayed to the participants, so they can express their views on points of interest' (p. 124). However, they are distinct from the present study's methods in several ways, most notably that in each of these methods the researcher and participant watch the videos together, which was not the case for the present study. Though this study was initially designed with the intention of using video-mediated interviews, as described by Takeuchi and Bryan (2019), I adapted this method during redesign to eliminate the need for researcher and participant to watch the videos together. This allowed for a greater focus on the participant reflections, de-emphasising the fathers' and children's behaviours in discussions; a more naturalistic setting, without the researcher's presence, on which fathers could reflect; and virtual interviewing due to the COVID-19 pandemic. To describe the method used following redesign, I use the term 'video playback' to avoid confusion with other similar methods that also use videos as stimuli.

The use of stimuli in interview studies aims to prompt comments or thoughts from participants (Stone-MacDonald & Stone, 2013). Stone-MacDonald and Stone (2013) suggest that such stimuli do not themselves contain meaning, but that the information they contain is subject to interpretation by the individual. Video recordings in particular comprise of valuable social material that may elicit deeper reflections than would be possible otherwise (Stone-MacDonald & Stone, 2013). Depending on the research goal, the video stimulus can be used as a 'conversation starter' in which the video is viewed before a traditional structured or semi-structured interview or for 'in-depth analysis' in which the full interview focuses on the video content (Stone-MacDonald & Stone, 2013, p. 17). This study employed the conversation starter

technique to uncover fathers' opinions on their interactions because the minute details of one specific interaction were less relevant to the research questions than the broader picture. This meant that I asked fathers general questions about their day-to-day practices (e.g. 'What makes you more or less likely to share books on different days?'), focused in on their experiences of the videos (e.g. 'Which part was most enjoyable for you?'), and followed up on fathers' reflections of the videos. Using the conversation starter technique in this way aimed to elicit general reflections prompted by the recorded interaction.

To effectively apply the conversation starter technique, I began the interviews with non-directed questions (e.g. 'Can you walk me through what you did in the book sharing video?'), which allowed fathers to draw focus to elements of the interaction that were important to them and provided content for me to follow up with more directed questions (e.g. 'You mentioned X. How did that affect your enjoyment of the activity?'). In this way, the videos provided a focal point for the interviews and allowed fathers to reference specific elements of the video interactions, rather than being limited to speaking more generally. In some cases, fathers commented on things that went differently from usual when recording the video: 'He didn't actually do the thing he normally does when we're reading books, and that is he stops and looks at me. And if I look at him, then he'll turn back and carry on. But he didn't do that.' (Participant A, talking about book sharing) In other cases, fathers were able to draw on the finer details of the interaction that resulted in their or their child's enjoyment. 'The claps and the cheers whenever she did put it in there. A hundred percent. Just watching (it from the) videos. Just her face lights up. She knows what's coming. She's ready to do it, and she's like, "Yes!" And she'll join in with you with the claps.' (Participant B, talking about applauding his child when playing with a shape-sorter toy) This study provides evidence that the conversation starter technique (Stone-MacDonald & Stone, 2013) can be implemented in a manner where only the participant has viewed the video, allowing participants to discuss details of the video most important to them. I am not aware of any other studies using an approach where the researcher does not access or view the videos, though Rowe's (2009) method shares some similarities in that participants watched researcher-filmed videos independently prior to the interview. However, my method differed from Rowe's (2009) in that participants were in control of the process, including what was filmed and when it was filmed, without me viewing the recording.

Aside from providing a conversation starter and focal point for interviews, video content can refresh participants' memories, allow participants to recall details of thoughts and feelings easily, support participants to share detailed accounts of an event, and stimulate discussion of beliefs and opinions (Rowe, 2009; Stone-MacDonald & Stone, 2013). When research aims

to uncover participant perspectives on a topic, Rowe (2009) recommends that participants have time to watch and reflect on the video content prior to discussion, in order for video content to be used to stimulate discussions beyond the recall of memory (in contrast, where the goal is to stimulate recall of decisions, for example in teacher professional development, participants should view videos immediately after recording; Gaudin & Chaliès, 2015; Lyle, 2003). In line with Rowe's (2009) recommendation, the video playback interviews gave participants time to watch and reflect on their videos in advance of the interview. By asking fathers to watch the videos back while thinking about a few prompts provided (e.g. 'Were there any times that you felt both you and your child were enjoying the activity?'), I was able to draw their attention to elements of the video they may not have spotted during the interaction itself, such as instances when both father and child appear to be enjoying themselves. This provided insights that would not have been possible without video playback, such as one father's discussion of his and his child's mutual enjoyment each time the child figured out something new: 'Watching it back there were times when we were both smiling at the same time. I think I'm smiling because I can see him thinking about things and figuring it out, and I think he likes that, so that's why he smiles.' (Participant A, talking about the book sharing video) Similarly, another noticed himself and his child laughing together in the play video: 'I didn't really think of it at the time, but I looked back at the video, and I was laughing a lot [...] and he was laughing a lot. [...] That's what dad play is. It's just being silly.' (Participant E, talking about watching the play video) For this father, watching the videos back helped him to reflect on how he enjoyed both activities in different ways: 'Beforehand I would have said we're enjoying the books at the moment, but then when I watched the video of the playing, it seems really fun as well, so I think we enjoy both a lot really but just in different ways. [...] One's calm, peaceful, sensual time, like it's lovely. [...] And the other thing is just making him really happy, just trying to get as much [...] joy as we can and excitement.' (Participant E, reflecting on watching the videos)

A few fathers reported watching the videos multiple times, enjoying certain elements or wanting to remember the occasion: 'I've watched it quite a few times, that video, because it's quite nice to sort of remember it to be honest.' (Participant H, talking about rewatching the play video) This independent rewatching and reflection is one further unanticipated benefit of the participant-recorded videos, indicating that fathers reflected on and engaged with the videos for a longer time prior to the interviews. Another father shared that he showed the video to his partner, who pointed out her own thoughts: 'When I'm listening back, maybe I spoke about it a little bit more sort of upbeat, so I think that sort of conveyed across to her. [...] When you watch the video back, it took me a few times, and the Mrs pointed it out. She was like, "You

spoke a lot sort of like higher pitched and a bit more like enthusiastic at that point.” I was like, “Yeah, fair point.” (Participant B, talking about watching the book sharing video with his partner) Stone-MacDonald and Stone (2013) similarly discuss providing DVDs of their researcher-recorded videos to participants (teachers), allowing them full access to the recording, and report that this resulted in participants revisiting the videos, which resulted in an extension of the dialogue and more nuanced reflections.

In sum, fathers’ reflections on viewing the videos provide evidence for the utility of video playback interviews to support participants’ reflections. Use of the video playback method enriched the fathers’ reflections by supporting them to provide insight into their experiences that would not have been possible without video stimuli. Additionally, this novel method maintained a focus on participant reflections and demonstrated how such methods can be used without the researcher viewing the videos. These benefits were evidenced by fathers’ comments on their feelings towards the social and communicative elements of their interactions with their children, such as behavioural cues and laughter, and their thoughts about shared emotions with their children.

Recruitment and sample demographics

For this study, I aimed to recruit fathers with a range of different fatherhood experiences using online recruitment strategies. Though my final sample showed demographic diversity in several respects, it was limited in several important ways. Here I describe my recruitment efforts, outline the sample demographics I recorded, and reflect on how recruitment and sample diversity could be improved in future research.

My methods for recruitment were limited to online means, but I nevertheless aimed for recruitment of diverse fatherhood groups. As I conducted my recruitment entirely online due to the lockdown, I primarily found participants by asking organisations to share my recruitment posters with their mailing lists (Appendix 2.2.1) and on social media (Figure 2.2.1). To engage a wide range of fathers, I targeted organisations focused on all caregivers as well as those aimed specifically at fathers. Additionally, I approached several groups focused on certain fatherhood demographics, such as single fathers and fathers in prison with the intention of recruiting fathers with unique experiences. However, despite my efforts to recruit specific demographic groups, I found my final sample was homogenous in a few ways.

To assess the diversity of my sample, I collected data on a few key demographics from all participants. These included asking all participants how many children they had, how old their children were, their employment status and job if relevant, and who lived in their house.

I selected these demographic questions primarily because they were likely to have a direct effect on fathers' experiences and would therefore be valuable information for contextualising their perspectives. For example, a father with multiple children likely has different experiences of fatherhood when compared to a father of one child, or a father who is not employed likely has a different experience from a father who works full time.

Following an initial pilot phase of the study during which I gathered this demographic data, I expanded my demographic questions as I realised this would be necessary for describing the sample appropriately and situating their experiences within the general population. I therefore added further questions about age, education, and race or ethnicity, and I contacted all participants who had already participated in the study to request this data. In keeping with the qualitative framework of my interviews, all of these were open-ended and allowed participants to interpret or explain as they wished, including giving participants the option to disclose either race or ethnicity and self-define how they wished to be represented.

Figure 2.2.1: Recruitment poster distributed on social media.

Dads! Tell us about your experiences:

Take part in a research study to help us learn more about what it's like to be a dad.

Do you...

- ▶ Have a child aged 6-24 months?
- ▶ Live in the UK?
- ▶ Speak and understand English?

We'll ask you to...

- ▶ Take two 5-minute videos of you and your child together and watch them back.
- ▶ Video chat with us for 30-60 minutes.

You'll get...

- ▶ A £20 voucher to cover your time.

Get in touch!

- ▶ Sign up for more details: bit.ly/PEDALDads
- ▶ Contact **Emily** at ejg69@cam.ac.uk with any questions.

PEDAL
PLAY IN EDUCATION DEVELOPMENT AND LEARNING

CAMBRIDGE TRUST

UNIVERSITY OF CAMBRIDGE

The LEGO Foundation

Using this demographic data, I was able to consider areas in which my sample showed diversity and areas in which it was limited. The study's sample was diverse in employment scenarios, where some fathers were engaged in in-person work, some were working from home, and some were not engaged in paid employment. These differences likely gave rise to expression of varied perspectives as the time a father spends with his child is likely to influence the way he views those interactions. Additionally, there was variation in fathers' ages, levels

of education, and number of children. Despite these areas of diversity in the sample, the sample was homogenous in several ways, including limited racial and ethnic diversity and all fathers recruited living with the child and a partner. These limitations in sample diversity may have been in part due to the timeline of the study, where I interviewed fathers as soon as they expressed interest, rather than having the flexibility to turn fathers away and continue recruitment. This may have meant, for example, that fathers living with a second caregiver would have been more able to respond quickly to the recruitment poster than single fathers.

As I did not begin to consider questions of demographic diversity until the recruitment stage of the study, this was likely too late to effectively address or counter any systematic issues preventing certain demographic groups from participating. Planning for increased diversity in the sample prior to the recruitment stage, for example by considering factors that may disproportionately prevent participation for some groups, may help to address this issue of demographic homogeneity in future research. In addition, collecting data on important demographic characteristics from the beginning of the study may help identify and counter any homogeneity at an earlier stage. Given the diversity of perspectives that likely exists among UK fathers, this study only captures a small portion of these views but nevertheless provides valuable insights on fathers, who themselves are an under-researched demographic group.

Reflexive thematic analysis

Coming from a background in quantitative research, I am interested to reflect on some design and analytical decisions that were relevant to conducting my first qualitative study using reflexive thematic analysis. These include reflections of my role and experiences as an outsider in conducting the research and engaging with participants, a discussion of my decision to use reflexive thematic analysis for the present study, and a more detailed outline of the analytical process employed than was possible in the previous chapter.

Researcher role

The relevance of my own role as an outsider is an important consideration in reflexive thematic analysis, particularly at the design, data collection, and analysis stages. At the design stage, while many researchers are drawn to a research topic based on their own experiences (Hayfield & Huxley, 2015), a research interest in children's early relationships and communication drew me to be interested in fathers, an understudied group in children's early social lives. This meant that, in the present study, I am considered an outsider as I do not identify myself as part of the group I am researching. Being an outsider comes with many challenges, including decisions about disclosing my position to participants and limitations to

interpretation of participants' experiences. However, there may have been small benefits to being an outsider in the present study, including my presumed naivety to participants' experiences resulting in explicit explanations of their thoughts.

For researchers collecting data as outsiders, it is common to disclose one's own position as an outsider to participants (Hayfield & Huxley, 2015). This may support the participant-researcher relationship and make participants more comfortable with the researcher. In the present study, participants were aware of or could infer my position as an outsider (i.e. not a father) based on my gender presentation as a woman, so in most cases I did not feel that it was necessary to explicitly state to participants that I am not a father. However, in many cases I did make more explicit explanations of my role as participants often asked about the motivations behind the study. This allowed me to describe my position as a researcher and situate my interest in their answers, making my position as an outsider more explicit as I explained the study's purpose.

At the analysis stage, conducting the present study as an outsider presented several limitations but may have also been beneficial in some ways. Being an outsider meant there are limits to the understanding and interpretation I could place on my participants' experiences (Hayfield & Huxley, 2015). This distance between myself and my participants may have made it harder for me to accurately create themes from or convey my participants' experiences (Hayfield & Huxley, 2015). However, my identity as an outsider may have had inadvertent benefits: for example, several participants explained ideas and perceptions to me in detail as I was naïve to their experiences and assumed to be unknowledgeable: 'I know I'm not the only one who's said this. I've talked to my friends, and they're very similar. It's dads. It's a dad thing. [...] I obviously don't want to miss them ever and be without them ever, but I could understand why if I didn't see them up until the age of 3, after that point they're very useful to be because we can do things together, and he can talk to me, and he can chat to me. There's this sort of period [...] where it's kind of like, I'm not getting a massive lot out of this. [...] I think all men are selfish. Or certainly all the ones that I've talked to have agreed with me on this that () an awful lot out of this yet.' (Participant D, talking about spending time with his children) This father's explanation of what he believes all or most dads feel assumes that I lack knowledge or understanding of fatherhood experiences, and this detailed description of his thoughts on fatherhood may not have been as explicit had my own position as a researcher been different.

In all, reflecting on my experience as an outsider during the data collection and analysis phase helped me to see how research such as this can and must be viewed as subjective and shaped by the researcher. This focus on the subjectivity of the process and the researcher's role

in shaping the results was entirely new to me when I began working on this qualitative project, and it is among the reasons I chose to analyse my data using reflexive thematic analysis, a decision I discuss in more detail below.

Choosing an analytical method

There are many varied analysis techniques that can be employed to address qualitative research questions and data. I selected reflexive thematic analysis for use in the present study for several reasons, largely based on Braun and Clarke's (2021a) suggestions regarding when reflexive thematic analysis is, and is not, appropriate in analysing qualitative data. I outline some of these reasons with respect to the present study's aims in 2.1, which include its suitability for under-researched topics and its ability to encompass diverse and different perspectives in analysis. Further to these reasons, Braun and Clarke (2021a) suggest that, when compared to other qualitative approaches, reflexive thematic analysis is appropriate for use when the research aims to identify, describe, and interpret patterns in data. Together, these reasons meant that use of reflexive thematic analysis for the present study allowed me to explore fathers' perspectives, an under-researched topic, and describe patterns and diversity in perspectives that I recognised in the data. This materialised, for example, with my finding that fathers did not universally feel that either book sharing or play facilitated bonding; instead, some fathers spoke about bonding during calm activities, often mentioning book sharing, while others spoke about more active physical play providing this bonding experience. What was important in this case was the feeling of bonding, often facilitated through physical contact, but there was nuance and diversity in the ways fathers arrived at this feeling of bonding with their children. Reflexive thematic analysis provided the opportunity to create these nuanced and diverse themes based on patterns in the data.

Beyond these methodological reasons, I chose to engage in reflexive thematic analysis for my own skill development and exposure to methods beyond my previous quantitative experiences. Braun and Clarke (2021a) suggest that for researchers new to qualitative analysis, this can be a key reason to engage in reflexive TA as there is a wide range of advice available. In quantitative research, value is placed on the objectivity, generalisability, reliability, and replicability of findings, and these values in many cases influence the way qualitative research is conducted (Braun & Clarke, 2021a). In contrast, even when compared to other qualitative approaches, reflexive thematic analysis can be distinguished by its emphasis that coding is a subjective process, by its conceptualisation of themes as patterns of meaning, and by its focus on interpretation of these themes by the researcher (Braun & Clarke, 2021a). Braun and Clarke

(2021a) suggest that reflexive thematic analysis can therefore be considered ‘fully qualitative’ (p. 39) when compared to related methods as it applies qualitative tools within a framework of qualitative, rather than quantitative, research values. These values include situating researcher subjectivity as a component of the research and recognising that findings are partial and contextual (Braun & Clarke, 2021a). For these reasons, reflexive thematic analysis provided an opportunity to let go of my quantitative assumptions and predispositions, fully immersing myself in a new research framework.

Analytical process

Because the use of reflexive thematic analysis, and qualitative methods in general, was new to me when conducting this study, I aligned my analytical method with recommendations made by Braun and Clarke (2019, 2021b). Braun and Clarke (2006, 2019) describe six steps for conducting thematic analysis, which I broadly followed in the present research, often bouncing between steps and revisiting previous steps as required. For example, the first two steps overlapped, where I began the second step prior to completing the first step. Additionally, I cycled through the latter steps multiple times, often returning to earlier steps in the process before continuing to the final step. Here I describe how I engaged with each step of the process, outlining how this analytical process led me to the final themes included in the previous chapter.

Braun and Clarke (2006, 2019) recommend beginning by familiarising oneself with the data, which I achieved in two main ways. First, I transcribed the interviews, making notes of my thoughts on fathers’ experiences during the process. Following transcription, I paraphrased the interviews in short segments of around half a sentence to two sentences using NVivo’s annotation feature. This helped me to focus on the content of fathers’ responses and consider each response in detail.

Next, Braun and Clarke (2006, 2019) suggest generating initial codes for analysis. In the present study, many of these were based on ideas that had arisen during the paraphrasing process, especially where I had noticed repetition of a particular idea within one interview or across multiple interviews. These initial codes included *observing development*, which I coded when fathers mentioned enjoying seeing their child’s progression or development; *educational activities*, which I coded when fathers spoke about an activity’s educational or developmental benefits; *success and validation*, which I coded based on fathers discussing instances of feeling reinforced; *communication difficulties*, which I coded when fathers spoke about troubles communicating with their children; and *pace of activity*, which I coded when fathers spoke about

slow activities or higher energy activities. While coding transcripts for these initial codes, I added new codes as they arose and in some cases merged codes together, while cycling back to the first step concurrently with this process.

After generating initial codes, I generated several initial themes based on Braun and Clarke's (2006, 2019) third step. My initial themes included *obstacles and barriers*, which included a focal point on *mood and mindset*; *mutual enjoyment*, which included a focal point on *bonding and closeness in calm versus active activities*; *purpose in activities*, which included a focal point on *success, failure, and validation*, as well as a focal point on *educational activities*; and *getting to know child*, which included a focal point on *developmental progress*. I then developed and modified these themes in the subsequent steps.

The next step in Braun and Clarke's (2006, 2019) process is to review these initial themes. Upon review and based on Braun and Clarke's (2021b) distinction between themes and topic summaries, I dropped two themes. *Obstacles and barriers* was too broad to be classified as a theme and did not sufficiently capture the richness of a theme: according to Braun and Clarke (2021b), themes should be complex and tell a story about the data, drawing together multiple components of the data around a key idea, which was not sufficiently true for this theme. I instead looked more closely for patterns in the obstacles and barriers that fathers mentioned, working them into existing themes where relevant. Additionally, I dropped the *mutual enjoyment* theme as mutual enjoyment is a key component of the second research question ('How do different interaction contexts foster feelings of mutual enjoyment for fathers when interacting with their young children?') and therefore does not fit the definition of a theme: Braun and Clarke (2021b) suggest that themes should not be ideas introduced in a question by the interviewer as this results in simple summary of participants' answers to a question without the development of a story. Put simply, they recommend themes should be the analytic outputs, not inputs. I instead developed the focal point *bonding and closeness in calm versus active activities*, that was previously nested under the *mutual enjoyment* theme, into its own theme. This process of reviewing the initial themes continued as I embarked on the final two analytical steps.

While reviewing the themes, I defined and named them in line with the fifth step in Braun and Clarke's (2006, 2019) process. This resulted in the creation of two overarching themes, *Play and book sharing as opportunities for father-child bonding* and *Father enjoyment of purposeful activities*. As part of this process of defining the themes, I recognised that the other themes and focal points formed were closely related ideas within these two main themes. *Bonding and closeness in calm versus active activities* and *getting to know child* formed parts

of the first theme, and I added additional focal points on *social interaction and communication* and *physical contact and affection*. *Mood and mindset*; *purpose in activities*; *success, failure, and validation*; *educational activities*; and *developmental progress* were all components of the second theme, which was consolidated to focus on *purpose in activities*; *hobbies and educational activities*; *success, failure, and validation*; and *views of parenting roles*.

The final step in this process involved writing these themes into the research article included as 2.1. I began the writing process while working on steps three to five as I found that writing out the themes helped both with consolidation of ideas and with separating out nuances between themes. During the writing process, I colour coded participant quotes and references to participants to help with clearly visualising patterns. For example, this colour coding would help me to notice if certain participants' quotes appeared more frequently within certain themes or less within others. I have retained this colour coding in the present thesis to support readers in interpreting themes in the context of evidence presented in the quotes. By the end of the writing process, concisely describing the themes helped to tell each theme's story.

Following the steps described by Braun and Clarke (2006, 2019) for reflexive thematic analysis provided a clear but flexible framework for my analysis. The large quantity of guidance available on their method, particularly their (2021b) recommendations on common mistakes made in reflexive thematic analysis, provided a clear lead to follow. Their method also allowed for flexibility in the prescribed steps and methods. This allowed me to interpret the guidance as appropriate for my own process, for example by getting to know the data through annotation at the first step and by creating and finalising themes through writing in steps three to five.

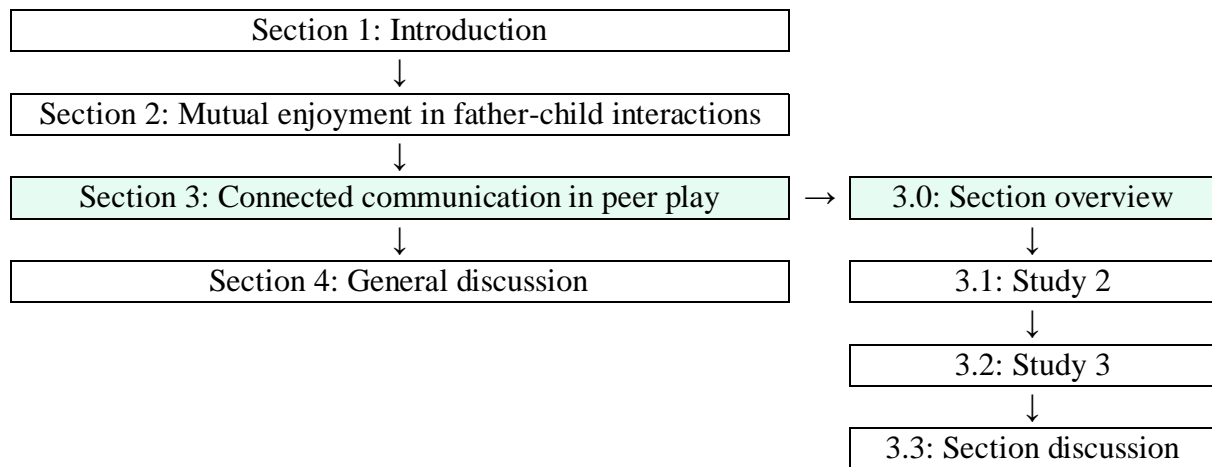
Conclusion

The research presented in this section advances knowledge of fathers' perspectives on their everyday interactions across two chapters. These chapters focus on mutual enjoyment in play and book sharing, showing how fathers value opportunities for bonding and activities that feel purposeful. The present Section discussion provides an expanded examination of the study's first theme, discussing father-child bonding with a focus on intersubjectivity. This in-depth discussion explored how intersubjectivity was particularly valuable for fathers' bonding experiences and featured across both play and book sharing activities. Finally, the methodological discussion reflects on the methods used to conduct the research, contextualising these decisions within the study's results in greater detail than was possible in the previous chapter.

In all, this section provides an initial exploration of intersubjectivity in children's early interactions, which are explored further in Section 3.

Section 3:
Connected communication in peer play

3.0: Section overview



Purpose

This section focuses on children’s social communication with same-age peers during play. I use secondary data gathered as part of the Children’s Relationships with Peers through Play (ChiRPP) study, a larger study into children’s social relationships in early primary school (Gibson & Fink, 2020), across three timepoints. The key construct of interest across this section is *connectedness*, a measure of topical coherence in conversation partners’ utterances, which I coded from observations of 6- and 7-year-olds’ dyadic interactions during two activities.

The purpose of this section is to explore how children communicate to form a shared understanding during play by focusing on the factors that may influence their connected talk. By analysing children’s peer play interactions from a dyadic perspective, I further understanding of dyadic influences on children’s social communication. The studies in this section build on the previous section by exploring how children apply advanced social communication to achieve intersubjectivity in peer interactions during the early years of school.

Skill development

Beyond the purpose of this section within the present thesis, the research process has also provided many opportunities for me to develop my own research skills and experiences during my PhD. These skills and experiences include:

- Pre-registration and peer review of methods
- Transcription of children’s conversations

- Reliability analysis for observational coding
- Dyadic and longitudinal data analysis through multi-level modelling
- Data cleaning, data visualisation, and statistical analysis in R and RStudio
- Sharing data and analysis scripts
- Interpretation and discussion of null results

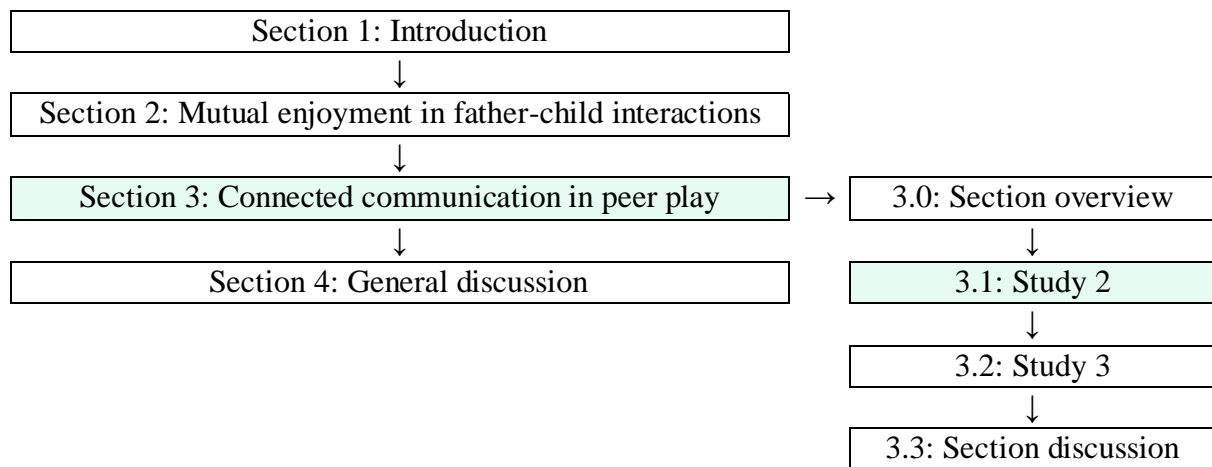
Outline

Section 3 is composed of this Section overview (3.0) followed by three chapters. The first chapter (3.1) focuses on individual and dyadic influences on children's peer interactions. It was conducted as a registered report in collaboration with co-authors Elian Fink, Paul Ramchandani, and Jenny Gibson and published in the *British Journal of Developmental Psychology*. This means that the research plans reported in 3.1 were peer reviewed and accepted for publication prior to the research being conducted. With the exception to minor changes such as tense and formatting, the Introduction and Methods sections included in 3.1 are identical to the peer reviewed and accepted Stage 1 Registered Report, and the full chapter has only minor differences from the published article. The second chapter (3.2) is a pre-registered study which, as of writing, is in preparation for journal submission. Based on the results of the first study, which finds a substantial dyadic effect on children's peer interactions, the second study hones in on specific dyadic influences. Both 3.1 and 3.2 provide introductions to the relevant literature, outline all methods, report results, and discuss their findings within the theoretical contexts of the wider literature. The key features of these two chapters are presented in Table 3.0.1. The final chapter (3.3) provides a discussion of the methods used in this section, which offers further context and critique of study methods by discussing the methodological decisions made in more detail than was possible within the included research publications.

Table 3.0.1: Key features of 3.1 and 3.2.

	3.1	3.2
Title	‘Building Connections through Play: Influences on children’s connected talk with peers’	‘Communication with Friends and Peers: An investigation of dyadic connectedness across two activities’
Pre-registration	Registered Report (Goodacre et al., 2021)	Open-Ended Pre-Registration (Goodacre, 2022)
Research questions	<ul style="list-style-type: none"> - How much of the variation in connected talk during play can be explained by variation between dyads? - To what extent do children’s individual differences in theory of mind, emotion comprehension, and language ability, concurrently and at two earlier timepoints, predict their engagement in connected talk with a partner during play? 	<ul style="list-style-type: none"> - Is there a difference in the rate of dyads’ connected talk between freeplay and a goal-directed drawing activity? - Are there interactions between activity context and dyadic variables in our dataset in predicting connectedness?
Sample Data	148 children in Year 2 at school <ul style="list-style-type: none"> - Measures of individual differences across three timepoints - Observations of dyadic freeplay at the third timepoint 	148 children in Year 2 at school <ul style="list-style-type: none"> - Dyadic variables at the third timepoint - Observations of dyadic freeplay at the third timepoint - Observations of dyadic goal-directed drawing at the third timepoint
Predictors	<ul style="list-style-type: none"> - Individual theory of mind - Individual emotion comprehension - Individual language ability 	<ul style="list-style-type: none"> - Dyad sex - Dyad friendship status - Observation activity
Outcomes	<ul style="list-style-type: none"> - Individual rate of connected turns in freeplay - Individual rate of successful initiations in freeplay 	<ul style="list-style-type: none"> - Dyad rate of connected turns in freeplay - Dyad rate of connected turns in goal-directed drawing

3.1: Study 2 – ‘Building Connections through Play: Influences on children’s connected talk with peers’



Abstract

Effective reciprocal communication is a vital component in forming and maintaining social relationships. Peer social play may provide a particularly important context for communicative skill development, as sophisticated negotiation and exchange are required to coordinate play. We focus on connectedness, a property of conversation referring to the topical relation between speakers’ turns, to understand how partners coordinate ideas to build a shared play experience. The present study uses a longitudinal secondary analysis approach to drive forward our understanding of the individual and shared influences that contribute to connectedness during peer social play. Using data from a three-wave, longitudinal study of children’s play and social relationships during the first three years of school in the UK (Gibson & Fink, 2020), we coded connectedness from transcripts of video observations of 148 children playing in pairs at wave three (mean age 6.79 years) and modelled individual differences in theory of mind, emotion comprehension, and language ability from all three waves as potential predictors of connectedness. Our results showed substantial dyadic effects on connectedness, but individual differences in socio-cognitive measures were not significant predictors of connectedness. These findings indicate the importance of dyadic and partner effects in children’s social interactions and implicate the dyad as an essential focus for future research.

Keywords: connectedness, theory of mind, emotion comprehension, language ability, play, communication

Introduction

Communication is key to forming and maintaining social relationships from early in life. Children first practise reciprocal communication skills with their caregivers through non-verbal means (Carpenter et al., 1998), and typically they later develop friendships and peer relationships that require communication through verbal language and more advanced behavioural cues (Stafford, 2004). We present a study that analyses children's verbal communication with friends and peers in their third year of school (mean age 6.79 years), investigates the socio-cognitive determinants of this communication in the first three years of school (mean ages 5.24, 6.05, and 6.79 years), and explores play as a context for developing communication skills. Such skills may help develop intersubjectivity, or a shared understanding, with a communication partner during play (Göncü, 1993). Strong communication skills also predict peer acceptance in early childhood (Kemple et al., 1992), and children's friendships protect against cycles of negative outcomes, including social isolation, depressive symptoms, and loneliness (Laursen et al., 2007; Pedersen et al., 2007). Communication skills continue to be important into adult relationships when conversation partners must recognise the other's perspective and respond appropriately. This study draws on such theories of communication as the basis for intersubjectivity in play with implications for children's social relationships in early childhood and beyond.

Piaget (1926) observed that in early verbal communication, children often fail to account for what the communication partner has said. However, many studies have concluded that children's conversation may be topically coherent more often than Piaget (1926) believed (e.g. Eckerman et al., 1989; Garvey & Hogan, 1973; Mueller, 1972). We focus on this topical coherence, often called connectedness (or 'connected talk'), to understand how partners coordinate ideas. When communication partners make utterances that are topically related, they have high connectedness. Connectedness considers the content of the talk and whether it is socially coordinated between conversational partners, requiring coordination on both sides (Leach et al., 2019). However, despite the importance of coordination by both partners, research into connectedness has generally failed to appropriately account for this mutual influence on the connected conversation.

Observational research on topic management in children's conversations has been ongoing for years using various terminology (e.g. Baines & Howe, 2010; Dorval et al., 1984), and various overlapping concepts exist. For example, some research refers to 'transactive dialogues' to describe conversations in which partners' utterances use the other's reasoning (Azmitia & Montgomery, 1993). Connectedness is a term most often used in developmental

psychology and related fields that considers all topically related talk to be connected without requiring building or elaborating on the partner's utterances. Like related constructs, connectedness is considered a key contributor to developing intersubjectivity in an interaction (Leach et al., 2019).

Despite this varied research on topical coherence and related constructs, studies into the relationship with socio-cognitive development has been sporadic. Various individual differences in socio-cognitive skills could increase engagement in connected communication. For example, children who engage in more connected talk with peers have better theory of mind and social understanding (Dunn & Brophy, 2005; Slomkowski & Dunn, 1996)², and language ability is associated with verbal behaviours in children's interactions (Gibson et al., 2019). These suggest an important role for individual differences in children's communication.

To engage in successful communication with a partner, a child may require some understanding of their partner's emotions, ideas, and intentions. Advanced social understanding, including theory of mind (ToM) and emotion comprehension (EC), may therefore result in more effective communication. ToM is linked to social relationships and communication throughout childhood (Bartsch & London, 2000; Hughes & Leekam, 2004). For example, ToM in the early years of school predicts later peer acceptance (Caputi et al., 2012). Children's use of perspective taking strategies in communication tasks increases with age (Bartsch & London, 2000; Clark & Delia, 1976; Kline & Clinton, 1998), and from age 8 children have been shown to consistently use information about a conversation partner's beliefs to inform their social interactions (Bartsch & London, 2000). Perspective-taking ability may also support children to form connected responses to the partner or to form initiations pitched appropriately for the partner's knowledge and elicit connected responses. In younger children, Ensor and Hughes, (2008) found that mother-child connectedness at age 2 was related to children's social understanding (a combination of EC and false-belief) at age 4, and Slomkowski and Dunn (1996) found that children who performed better on affective perspective taking and false-belief tasks at age 3 engaged in significantly more connected talk with their friends a few months later. These findings suggest that developing social understanding may contribute to higher levels of connectedness in early childhood, warranting further longitudinal exploration in older children.

In addition to social understanding, language ability (LA) has been linked to verbal play behaviours, indicating its importance for children's communication and interactions (Gibson

² At Stage 1, we mistakenly referenced Ensor and Hughes (2008), who look at connectedness in mother-child dyads. We have removed this reference at Stage 2.

et al., 2019). Receptive LA may help a child to understand the conversation partner, and expressive LA may permit the child to contribute to the conversation in a way that elicits connected responses. Dunn and Cutting (1999) found LA, among other individual differences including ToM and EC, predicted children's cooperative behaviours during play at age 4. Gibson et al. (2019) found at the first timepoint in the ChiRPP study (see details below) that verbal play behaviours, such as assigning roles to oneself or the partner, were particularly associated with LA. As connectedness is largely verbal, it is likely that it too will be associated with LA. However, based on Milligan et al.'s (2007) meta-analysis, which found strong effects linking early LA with later false-belief understanding and suggested that engaging in effective communication could be foundational for developing ToM, it is not clear whether LA may have a unique effect on connectedness beyond any associations between connectedness and social understanding.

The extent to which these individual differences directly result in engagement in connected communication is unclear, especially as many studies have not considered relationships longitudinally. In one longitudinal study of connectedness in friends and siblings, Leach et al. (2019) did not find a change in connectedness over time in friendship pairs – there was no change in the frequency of connected talk with friends from age 4 to age 7 years – but they did find increases in connected talk across timepoints in sibling pairs, providing unclear evidence that connecting talk may be something that children learn over time, possibly influenced by other developmental areas. However, they did not measure individual differences to determine why any changes in sibling pairs' connectedness might be occurring (Leach et al., 2019). Further longitudinal studies are needed to accurately determine the existence and direction of such associations.

Play as a special context for communication

Play has widely been theorised as a special context for child development, but research into how and why this may be the case is lacking (Lillard et al., 2013). The present study focuses on social play as a context for children to put their developing communication and socio-cognitive skills to use. Social play was the focus of theories by Parten (1932) and Vygotsky (1978), who looked at the requirement for effective communication to develop goals for the play, which may result in intersubjectivity. Göncü (1993) examined this idea in a small sample and recognised key features of connectedness, such as building on and extending the partner's ideas, as allowing intersubjectivity to develop and suggests that this is a necessary element for successful social play.

Children's interactions with their peers provide opportunities for developing social and communication skills in early and middle childhood, and these skills are often practised during social play. During play, connected communication may reflect the degree to which partners are in tune with each other (Dunn & Brophy, 2005; Ensor & Hughes, 2008). Pretend play, in particular, requires complex communication between partners to decide together on the play plot, props, and characters and achieve intersubjectivity (Göncü & Kessel, 1984). To form a consensus on pretend elements, children must be able to understand and comment on each other's ideas. Furthermore, to move the plot forwards, they must be able to build on and communicate their ideas effectively. When children successfully build on each other's ideas at age 5, as they do through connected conversations, they have been found to engage in more pre-tense (Howe et al., 2005).

Studies into communication during play, and social pretend play in particular, have identified many different characteristics of communication (e.g. Garvey & Berndt, 1975; Giffin, 1984; Göncü & Kessel, 1984; Trawick-Smith, 1998). Studies have primarily examined the content of talk: for example, several have classified different types of play negotiation, observing their frequencies and linking them to different developmental outcomes (e.g. Jenkins & Astington, 2000). In some cases, studies have focused on the influence of individual differences on play behaviours and connectedness, but the partner's role in these associations has rarely been addressed. Some recent research has found significant dyadic influences on connectedness (Leach et al., 2019) and on play behaviours more generally (Gibson et al., 2019). A dyad's characteristics may dictate its behaviours and interactions (Dunn & Cutting, 1999; Fabes et al., 2003). For example, there are differences in the way children interact with and talk to others depending on the partner's characteristics (Brown et al., 1996; Dunn & Cutting, 1999). Leach et al. (2019) found differences in children's connectedness when they played with a friend and a sibling, demonstrating the partner's influence on the qualities of the interaction and suggesting that differences in connectedness can be explained by mutual influences (also called dyad-level influences). Dunn and Cutting (1999) found that much of the variance in children's behaviours could be explained by the partner's individual differences and behaviours. A study looking at the first timepoint in ChiRPP (see details below) found that variability in social pretend play behaviours was explained by both contributions at the dyad level and by the individual (Gibson et al., 2019). In particular, dyad-level effects explained more of the children's social pretend play behaviours than did individual differences such as LA and sex (Gibson et al., 2019). Failing to consider these dyadic influences may result in over-statement of the associations at the individual level, and there is currently little understanding of the

dyadic influences on connectedness. We focus on these dyadic influences as an under-researched area in children's communication.

The present study

Study aims

The present study aims to further understanding of the individual and shared influences that contribute to effective, coordinated conversational exchanges during peer play by (1) analysing the extent to which variations in connectedness occur based on dyad effects by determining the extent to which variation in connectedness is explained by differences between dyads and (2) determining whether there are concurrent and longitudinal relationships between children's engagement in connected talk and their individual differences in ToM, EC, and LA.

Research question 1

First, we address the following question: How much of the variation in connected talk during play can be explained by variation between dyads? We hypothesise that variability in connectedness will be explained in part by variation between dyads and in part by variation within dyads. We hypothesise that the variation in connectedness explained by the dyad (between-dyad variation) will be greater than the that explained within dyads. This hypothesis is based on previously discussed literature finding importance in partner and dyadic effects on children's play behaviours (Dunn & Cutting, 1999; Gibson et al., 2019).

Research question 2

Next, we ask: To what extent do children's individual differences in ToM, EC, and LA, concurrently and at two earlier timepoints, predict their engagement in connected talk with a partner during play? We hypothesise that individual differences in ToM, EC, and LA will positively predict variance in connectedness during play (i.e. children with higher scores on these measures will engage in more connected talk). This hypothesis is informed by previously discussed literature suggesting play could be a crucial context where children put socio-cognitive and linguistic skills to work (Gibson et al., 2019; Slomkowski & Dunn, 1996). We expect to observe these effects longitudinally and concurrently.

Methods

To test our hypotheses, we used secondary data analyses of longitudinal observational data on children's play and social development. We analysed existing measures of individual

differences (ToM, EC, and LA) with a new measure of connectedness, coded from video transcripts of dyads engaged in play with a Playmobil toyset.

Dyadic datasets are often analysed as though each member of the dyad's behaviour is independent, but this assumption has been shown to be unlikely for other play behaviours and is not possible for connectedness by definition. Our rigorous analytical strategy enabled us to tease out individual and shared influences on connected talk. Therefore, we innovate in this field by considering the role of each child's individual differences, in tandem with those of the partner, for connected talk during play. Our methods were based on Kenny et al.'s (2006) recommendations for dyadic analyses.

Quality assurance

We have taken several steps to ensure this study's quality and rigour. Firstly, the connectedness measure was based upon observations and transcripts that had not previously been coded or analysed in any way, and this measure was not coded until the planned analyses were registered. Furthermore, a 20% sample of transcripts were independently coded for the connectedness measure by an external researcher who had no prior involvement with the dataset to ensure inter-rater reliability in coding. Finally, we offer transparency regarding the roles of the research team: the first author was not involved in the data collection nor in any previous analysis but was involved in transcribing the observations that were used to code outcome measures for this study; the second and fourth authors were involved in the initial design, conception, and implementation of the study from which the present dataset was derived; the third author had no prior involvement with the dataset. Further information about this dataset is given below.

Secondary dataset

This study used secondary data from the Children's Relationships with Peers through Play (ChiRPP) study, a three-wave, longitudinal study of children's play and social relationships during the first three years of school in the UK (Gibson & Fink, 2020). For the ChiRPP study, 244 children in reception classes at eight schools were recruited to take part in the first wave (T1), where a large sample was required for validation of certain measures not relevant to this study, and children at five of these schools (N=172) were designated for follow-up on two further occasions (T2 and T3). This sub-sample of the ChiRPP study, those who were followed-up, was the sample of interest for the present research.

Sample characteristics

The follow-up sample included 172 children, 73 female (42.4%) and 99 male (57.6%), at five schools. At T1, these children were aged between 4.48 and 6.49 years ($M=5.24$, $SD=0.33$). At T2, the sample included 161 children, 67 female (41.6%) and 94 male (58.4%), aged 5.34 to 7.50 years ($M=6.05$, $SD=0.38$). At T3, the sample included 152 children, 63 female (41.4%) and 89 male (58.6%), aged 6.12 to 8.26 years ($M=6.79$, $SD=0.38$). The small decreases in sample size between waves indicate children who no longer attended the participating schools.

Procedures

The procedures described here are those completed by the ChiRPP research team, which were ethically approved by the Cambridge Psychology Research Ethics Committee, prior to the present analyses. Data collection for the measures relevant to this study took place in children's schools.

Recruitment. Schools in the Cambridge area were approached by the research team, and eight agreed to participate in the study (including five in the follow-up sample). Classroom teachers from these schools were then recruited, study information was sent to parents, and informed consent was obtained. The consent rate for the follow-up sample was 64.2%.

Measures of individual differences. At each wave, children completed tasks to assess social and cognitive individual differences. Tasks relevant to this research were tests of ToM, EC, and LA.

Theory of mind. Children completed three second-order false-belief items to assess ToM. Second-order false-belief was chosen based on its appropriateness for ages at all three of the ChiRPP timepoints without floor or ceiling effects, in addition to its wide use in the field and reliability (Hughes et al., 2000; Perner & Wimmer, 1985; Sullivan et al., 1994).

Each of the three items began with an unexpected transfer false-belief question. Children who answered this question correctly were asked a corresponding second-order false-belief question. Those who answered the first incorrectly were not asked the corresponding second-order question. Children were then asked to justify their second-order answers. Justifications were later coded as appropriate or inappropriate based on previously used classifications (Perner & Wimmer, 1985; Sullivan et al., 1994).

Each story was scored where children would be given a point if all three questions for a story (unexpected transfer, second-order false-belief, and justification) were answered

correctly. The maximum score possible was three points, one for each story. These scores were then converted to z-scores.

Emotion comprehension. Children's EC was measured based on the procedure described by Fink et al. (2015), which was abridged at T3 as indicated. This procedure focuses on an understanding of the mental aspects of emotion and was selected based on the children's ages at the ChiRPP timepoints and the areas of interest for this study (Pons et al., 2004).

At T1 and T2, children were tested on emotion-based false-belief (2 items) and three EC components: desire (4 items), belief (6 items), and hiding (4 items). At T3, children were tested on emotion-based false-belief (2 items) and two EC components: belief (4 items) and hiding (4 items).

The EC responses were summed for total scores of 0 to 16 at T1 and T2 and of 0 to 10 at T3. Scores were converted to a proportion of correct answers between 0 and 1 by dividing by the total possible score. If children provided an incorrect answer to a control question, their answers on corresponding target questions were dropped from their score by reducing the total possible score. These proportions were then converted to z-scores.

Language ability. Children's receptive and expressive LA were measured using subscales of the Clinical Evaluation of Language Fundamentals 2 - Preschool (CELF; Wiig et al., 2004) and the Assessment of Comprehension and Expression 6-11 (ACE; Adams et al., 2001), which were chosen based on their wide use and well-established validity with the relevant ages. At T1 and T2, children's receptive LA was measured using the CELF's 22-item Sentence Structure subscale, and children's expressive LA was measured using its 13-item Recalling Sentences subscale. At T3, children's receptive LA was measured using its 31-item Sentence Comprehension subscale, and children's expressive LA was measured using the ACE's 25-item Naming subscale. Receptive and expressive LA raw scores at each timepoint were summed for overall LA scores, which were then converted to z-scores.

Observations. At T3, children were observed engaging in dyadic freeplay with a partner for approximately eight minutes. Each dyad was left alone to play with a Playmobil treehouse toyset, consisting of a large treehouse toy and various small pieces such as animals, people, and furniture. This toyset was selected to elicit play and provide opportunities to observe interaction between members of the dyad. Children were assigned to dyads for observation based on their answers to Sanderson and Siegal's (1995) interview of friendships. Each child was asked to name their 'very best friend' plus two additional best friends. Partners were selected based on their responses, where most children were paired with a reciprocated friend (i.e. dyads where both children nominated each other; N=107; note: odd Ns are possible here

as some children participated in freeplay separately with two different partners). Fewer children were paired with nominated but unreciprocated partners (i.e. dyads where only one child nominated the other; N=22) and non-nominated partners (i.e. dyads where neither child nominated the other; N=23).

Transcription. Observations were transcribed using the manual in Appendix 3.1.1 by two transcribers. 50 observations were transcribed by the first transcriber, who had no prior involvement with the dataset, and 32 were transcribed by the second transcriber (the first author)³. One observation was excluded from transcription due to the children being off-camera and inaudible for much of the observation. 11 of the first transcriber's transcripts were checked for quality control by the second transcriber to verify accuracy of the transcripts and associated timestamps.

Analysis plan

The procedures described in this section were conducted following in-principle acceptance of the present study at Stage 1 (Goodacre et al., 2021), unless otherwise specified. All deviations from our registered plans are described in our Results section.

Connectedness coding

We coded the transcripts using the manual in Appendix 3.1.2. Each utterance was scored on two codes: whether it was a *connected turn* and whether it was a *successful initiation*. Connected turns were utterances that were topically connected to any utterance made by the partner ending up to five seconds prior to the target utterance beginning. Successful initiations were utterances that were topically connected to any utterance made by the partner beginning up to five seconds after the target utterance's end. Coding began when the researcher exited the room; we paused coding if the researcher re-entered the room for any length of time (these periods were not transcribed). Coding was conducted by the first author, who planned to achieve inter-rater reliability on 20% of observations with a Kappa of at least 0.8 with an external coder who had no previous involvement in this study nor with the dataset.

Criteria for data inclusion and exclusion

We excluded all participants who did not participate at T3 as we used transcripts of observations from T3 to code our outcome measures. This means that 20 children who participated at earlier timepoints but not at T3 were excluded, and their data were not replaced. We

³ At Stage 1, we mistakenly report 51 by the first transcriber and 29 by the second transcriber. We correct this at Stage 2.

checked for any systematic differences between these children and those who remained in the study and report these with our results.

We excluded participants whose observations could not be transcribed. Reasons for not transcribing observations included video or audio issues and the children being off-camera for significant periods. All observations that were excluded from transcription were agreed by both transcribers. We did not anticipate any such barriers to coding transcripts that would result in the exclusion of transcripts from coding.

We did not plan to exclude outliers unless they appeared to be mistakes in our dataset (e.g. because they were above or below the possible range); however, we did not anticipate high frequencies of mistakes as all data entry for the original dataset was spot checked to ensure accuracy.

In the dataset, most children were organised into one dyad each. However, some children were assigned to two dyads. These children completed the freeplay observation twice: once with each partner. For these children, we excluded their individual connectedness data from their second freeplay observation and treated it as missing. The partners' data from both freeplay observations were included, and we imputed the missing connectedness data in these cases.

We conducted a missing data analysis to determine whether data were missing systematically or at random. If we found any systematically missing data, we planned to investigate further to determine the cause, drop these cases, and report the systematic reason for the missing data. For data that was missing at random, we used maximum likelihood estimation to account for these missing values.

Variables

Our variables were structured with lower levels of data nested within the higher levels. Our data structure included three levels, with measurement timepoint at level 1, child at level 2, and dyad at level 3. Within each dyad, there were two children. Within each child, there were three measurement timepoints.

Covariates. We planned to include gender and age as covariates, with gender as a level 2 variable as all children played in same-gender dyads and age as a level 1 variable.

Predictors. Our predictors of interest were ToM, EC, and LA, which were level 1 variables.

Outcomes. Our outcome variables were connected turns and successful initiations. As our outcome variables were coded from observations conducted at the third timepoint, there

were no outcome variables for T1 or T2. These variables were calculated as a proportion of utterances out of the total number of utterances, and we checked for floor and ceiling effects before proceeding with our analysis. We also checked for normality and planned to perform any necessary transformations before considering alternative analysis methods if these transformations were unsuccessful.

Model description

As our data had multiple levels, we expected that we would need to use multi-level models to answer our research questions, grouping children within dyads and timepoints within children. To confirm this, we calculated the intra-class correlation coefficient (ICC) for step one of our model below before proceeding with the following steps.

We constructed a random intercept model with fixed slopes (Kenny et al., 2006). We built our model in four steps, first running an empty model, then including only our covariates, and then adding our predictors of interest across two steps. We added our predictors of interest over two steps to consider the contribution of LA before and after ToM and EC were included in the model based on the previously discussed finding that LA is foundational for ToM (Milligan et al., 2007). We used maximum likelihood estimation for this model.

At our first step, for child j in dyad k at timepoint i , we defined the model as:

$$y_{ijk} = \beta_0 + u_{0jk} + v_{0k} + e_{ijk}$$

where β_0 represents the y-intercept, u_{0jk} represents the child-level residuals, v_{0k} represents the dyad-level residuals, and e_{ijk} represents the individual residuals of child j in dyad k at timepoint i .

At our second step, we defined the model as:

$$y_{ijk} = \beta_0 + u_{0jk} + v_{0k} + \beta_1(r_{jk}) + \beta_2(t_{ijk}) + e_{ijk}$$

where β_1 represents how much y increases for a 1-unit increase in r_{jk} (and so on for β_2). We planned to run this model twice in the following forms:

$$(\text{Connected Turns}_{ijk}) = \beta_0 + u_{0jk} + v_{0k} + \beta_1(\text{Gender}_{jk}) + \beta_2(\text{Age}_{ijk}) + e_{ijk}$$

$$(\text{Successful Initiations}_{ijk}) = \beta_0 + u_{0jk} + v_{0k} + \beta_1(\text{Gender}_{jk}) + \beta_2(\text{Age}_{ijk}) + e_{ijk}$$

At our third step, we defined the model as:

$$y_{ijk} = \beta_0 + u_{0jk} + v_{0k} + \beta_1(r_{jk}) + \beta_2(t_{ijk}) + \beta_3(w_{ijk}) + e_{ijk}$$

where β_1 represents how much y increases for a 1-unit increase in r_{jk} (and so on for β_2 and β_3).

We planned to run this model twice in the following forms:

$$(\text{Connected Turns}_{ijk}) = \beta_0 + u_{0jk} + v_{0k} + \beta_1(\text{Gender}_{jk}) + \beta_2(\text{Age}_{ijk}) + \beta_3(\text{LA}_{ijk}) + e_{ijk}$$

$$(\text{Successful Initiations}_{ijk}) = \beta_0 + u_{0jk} + v_{0k} + \beta_1(\text{Gender}_{jk}) + \beta_2(\text{Age}_{ijk}) + \beta_3(\text{LA}_{ijk}) + e_{ijk}$$

At our fourth step, we defined the model as:

$$y_{ijk} = \beta_0 + u_{0jk} + v_{0k} + \beta_1(r_{jk}) + \beta_2(t_{ijk}) + \beta_3(w_{ijk}) + \beta_4(x_{ijk}) + \beta_5(z_{ijk}) + e_{ijk}$$

where β_1 represents how much y increases for a 1-unit increase in r_{jk} (and so on for β_2 , β_3 , β_4 , and β_5). We planned to run this model twice in the following forms:

$$\begin{aligned} (\text{Connected Turns}_{ijk}) = & \beta_0 + u_{0jk} + v_{0k} + \beta_1(\text{Gender}_{jk}) + \beta_2(\text{Age}_{ijk}) + \beta_3(\text{LA}_{ijk}) + \beta_4(\text{ToM}_{ijk}) + \\ & \beta_5(\text{EC}_{ijk}) + e_{ijk} \end{aligned}$$

$$\begin{aligned} (\text{Successful Initiations}_{ijk}) = & \beta_0 + u_{0jk} + v_{0k} + \beta_1(\text{Gender}_{jk}) + \beta_2(\text{Age}_{ijk}) + \beta_3(\text{LA}_{ijk}) + \beta_4(\text{ToM}_{ijk}) \\ & + \beta_5(\text{EC}_{ijk}) + e_{ijk} \end{aligned}$$

Assessing model fit

We assessed the fit of our models using Akaike's Information Criterion (AIC) and chi-squared tests. We planned to test each step in the model described against the previous and tested different covariance structures to compare the fit. We initially used a first-order autoregressive structure as we expected higher correlations among our variables at consecutive timepoints but tested this against other covariance structures. We used this information to make a holistic judgement of our model.

Reporting and interpretation

We planned to report Pearson's correlations among our variables and the fit indices of our models at each step.

To address research question 1, we planned to report the ICC, which measures how much variance can be explained by differences between groups. The ICC indicates the proportion of the variation that can be explained between and within groups.

We planned to address research question 2 by reporting the β s and relevant standard errors. We also planned to report the partial ICCs as measures of effect size. Previous work addressing the effects of individual differences on children's talk during play found partial ICCs in the range of 0.08-0.41 (Gibson et al., 2019), and we planned to use these findings as benchmarks for our interpretation. We planned to look at changes in ICCs at each step to determine whether introducing new explanatory variables explained any further variation in the model. As this research covers new ground and is observational by design, we planned to base our interpretation primarily on effect sizes found. In addition to reporting and interpreting effect sizes, we also planned to report 95% confidence intervals and p-values for each β .

As our study has a pre-determined sample size, we performed a sensitivity analysis prior to conducting our analyses to determine the minimum detectable effect for each construct

Table 3.1.1: Sensitivity analysis for minimum detectable effects with power of 90%.

Parameter	Minimum detectable effect [†]
Intercept (β_0)	0.330
Gender (β_1)	0.038
Age (β_2)	0.026
LA (β_3)	0.038
ToM (β_4)	0.028
EC (β_5)	0.025

[†]Assuming estimated random effects variance of 0.5 at level 3, 0.2 at level 2, and 0.01 residual variance.

of interest with 90% power. We report this analysis, which informs interpretation of our results, in Table 3.1.1.

Friendship status

Given the possible influence of friendship status on children’s connected communication, we planned to explore and report whether any differences in connectedness occur among our dyads based on friendship status. We report the results of these exploratory analyses alongside our main analysis to inform the interpretation of results.

Timeline

We anticipated completing this research within eight months following in-principle acceptance. This allowed three months for coding, three months to analyse, and two months to write the Stage 2 manuscript.

Results

The findings described in this section follow the methods we registered at Stage 1 (Goodacre et al., 2021). We outline and explain any changes from our plans in the ‘Deviations from protocol’ sub-section.

Data inclusion and exclusion

In addition to the 20 children who were lost to follow-up, a further 4 children were not included due to missing or unintelligible observations at T3. Our final sample size is therefore 148 children. Table 3.1.2 presents summary statistics for T1 and T2 data for the non-included 24 children.

Table 3.1.2: Descriptive statistics from T1 and T2 for children not included in final analyses.

	Sex ^a	T1				T2			
		Age ^b	LA ^c	ToM ^c	EC ^c	Age ^b	LA ^c	ToM ^c	EC ^c
%	45.8, 54.2	-	-	-	-	-	-	-	-
M	-	62.359	30.750	.455	.444	72.459	37.462	.615	.538
(SD)		(4.977)	(13.029)	(.596)	(.211)	(7.298)	(9.735)	(.768)	(.164)
N	11, 13	19	24	22	18	13	13	13	11

^aFemale, male; ^bMonths; ^cRaw scores prior to z-score transformation

Missing data

There were no missing data for age, sex, nor language ability. Emotion comprehension data were collected at 4 of the 5 participating schools, resulting in missing EC data for 1 school (N=21). Additionally, 11 participants had missing EC data at T1, 4 had missing EC data at T2, and 1 had missing ToM data at T3. Table 3.1.4 reports valid Ns for each measure. Upon investigation, we concluded that these data are missing at random as we would not expect their missingness to depend on the missing values (Little & Rubin, 2002).

Observed connectedness

Connectedness coding

Sufficient inter-rater reliability on 20% of transcripts was achieved between two coders for connected turns ($\kappa=0.719$) and successful initiations ($\kappa=0.732$). Disagreements in practise coding were settled through discussions between the two coders alongside viewing example observations, and uncertainties during reliability coding were resolved through viewing the relevant observations. Following reliability coding, the remaining 80% of transcripts were coded by the first author using ELAN linguistic annotation software (ELAN).

Our Kappas are similar to those reported for other observational measures of children's conversations (e.g. Howe et al., 2005); however, they are below the benchmark of 0.8 that we set at Stage 1. Based on Hallgren's (2012) recommendation that reliability calculations are most informative when performed on variables in their final form, we subsequently calculated inter-rater reliability of our post-processing connectedness rates as an unplanned analysis. ICCs indicated high agreement on rates of connectedness (ICCs = 0.863 for connected turns and 0.856 for successful initiations) despite the low Kappas for pre-processing raw scores.

Figure 3.1.1: Boxplots showing distribution for rates of connected turns and successful initiations.

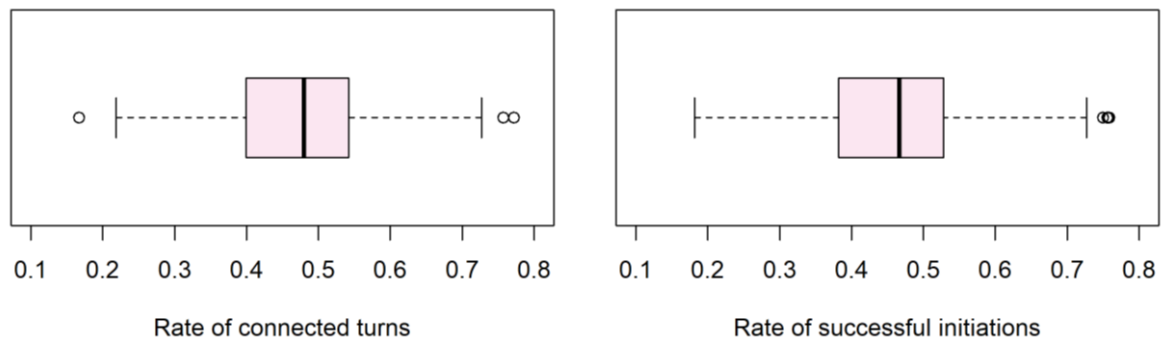


Table 3.1.3: Summary statistics for categorical study measures.

	Sex ^a	Partner status ^b
%	41.9, 58.1	71.6, 28.4
N	62, 86	106, 42

^aFemale, male; ^bReciprocal friend, not reciprocal friend

Table 3.1.4: Summary statistics for continuous study measures.

		Age ^a	LA ^b	ToM ^b	EC ^b	Connected turns ^c	Successful initiations ^c
M (SD)	T1	62.900 (3.766)	40.507 (10.052)	.919 (.973)	.563 (.178)	-	-
	T2	72.549 (4.292)	43.858 (8.849)	1.486 (1.134)	.703 (.146)	-	-
	T3	81.372 (4.444)	36.095 (6.364)	1.803 (1.083)	.758 (.196)	.471 (.121)	.463 (.118)
Min, Max	T1	53.717, 71.294	11, 56	0, 3	.083, .938	-	-
	T2	64.099, 84.041	14, 58	0, 3	.286, 1	-	-
	T3	72.608, 93.207	18, 48	0, 3	.200, 1	.167, .772	.182, .759
N	T1	148	148	148	116	-	-
	T2	148	148	148	123	-	-
	T3	148	148	147	127	148	148

^aMonths, ^bRaw scores prior to z-score transformation, ^cProportion of total utterances

Pre-analysis checks

Both connected turns and successful initiations were normally distributed without floor or ceiling effects (Figure 3.1.1), so no transformations were necessary.

Summary statistics

The dataset contained 7615 utterances in total. Individual children engaged in 4 to 85 utterances ($M=46.433$, $SD=14.131$) during the freeplay observations. Tables 3.1.3 and 3.1.4 present summary statistics for our categorical and continuous variables respectively. Table 3.1.5 reports Pearson's correlations between all continuous study variables.

The role of the dyad in connected talk

To address research question 1 and determine the variability in connectedness owing to the dyad, we constructed empty models and calculated the ICCs (Table 3.1.6). For connected turns, the ICCs indicated 56.3% of the variance was explained between dyads before inclusion of child-level predictors, and 23.6% of the variance in connected turns was explained within dyads. For successful initiations, 52.7% of the variance in connectedness was explained between dyads, and 41.9% was explained within dyads. In addition to supporting our hypothesis that more variance in connectedness would be explained by the dyad than within the dyad, these ICCs confirm that our observations of connectedness are not independent and that multi-level models are appropriate for analysing our data.

Socio-cognitive skills as predictors of connected talk

Next, to address research question 2, we added predictors to assess whether individual differences in LA, ToM, and EC predicted connected talk. All predictor β s were negligible in magnitude and below the minimum detectable effects calculated at Stage 1. No child variables were significant predictors of either connectedness outcome, and changes in ICCs were small. Table 3.1.6 reports β s, 95% confidence intervals, and standard errors for the four model steps.

Model fit

We tested two covariance structures: a first-order auto-regressive structure and a variance components structure. The first-order auto-regressive structure provided the better fit when compared to the variance components structure at the final step of both models, though chi-squared likelihood ratio tests showed this difference was only significant for connected turns (for connected turns, AICs = -1382.901 and -1380.479 respectively, $\chi^2(1)=4.422$, $p=0.036$; for successful initiations, AICs = -1319.267 and -1317.883 respectively, $\chi^2(1)=3.384$, $p=0.066$).

Table 3.1.5: Pearson's correlations between continuous study variables.

	1	2	3	4	5	6	7
1. T1 Age	-	.830**	.813**	.247**	.171*	.073	.164*
2. T2 Age	-	-	.992**	.243**	.230**	.141	.193*
3. T3 Age	-	-	-	.237**	.237**	.148	.184*
4. T1 LA	-	-	-	-	.739**	.720**	.609**
5. T2 LA	-	-	-	-	-	.727**	.520**
6. T3 LA	-	-	-	-	-	-	.506**
7. T1 ToM	-	-	-	-	-	-	-
8. T2 ToM	-	-	-	-	-	-	-
9. T3 ToM	-	-	-	-	-	-	-
10. T1 EC	-	-	-	-	-	-	-
11. T2 EC	-	-	-	-	-	-	-
12. T3 EC	-	-	-	-	-	-	-
13. Connected turns	-	-	-	-	-	-	-
14. Successful initi- ations	-	-	-	-	-	-	-
	8	9	10	11	12	13	14
1. T1 Age	.168*	.019	.308**	.167	.161	.031	-.044
2. T2 Age	.155	.006	.317**	.133	.211*	.017	-.069
3. T3 Age	.155	-.001	.315**	.138	.230**	.001	-.079
4. T1 LA	.591**	.505**	.438**	.595**	.615**	.033	.030
5. T2 LA	.583**	.450**	.380**	.550**	.607**	.102	.031
6. T3 LA	.452**	.512**	.290**	.412**	.564**	.131	.049
7. T1 ToM	.578**	.524**	.342**	.386**	.427**	.191*	.107
8. T2 ToM	-	.521**	.402**	.555**	.519**	.016	.033
9. T3 ToM	-	-	.261**	.438**	.538**	.149	.114
10. T1 EC	-	-	-	.368**	.348**	-.044	-.005
11. T2 EC	-	-	-	-	.504**	-.046	-.031
12. T3 EC	-	-	-	-	-	.082	.133
13. Connected turns	-	-	-	-	-	-	.624**
14. Successful initi- ations	-	-	-	-	-	-	-

*p < 0.05, **p < 0.01

Table 3.1.6: Results of main analysis.

Step	Parameter	Connected turns	Successful initiations
1	Random effects ^a		
	Dyad level	.563	.527
	Child level	.236	.419
	Fixed effects ^b		
	Intercept	.470 [.448, .492] (.011)**	.459 [.437, .481] (.011)**
2	Random effects ^a		
	Dyad level	.641	.528
	Child level	.219	.442
	Fixed effects ^b		
	Intercept	.477 [.442, .511] (.018)**	.456 [.422, .490] (.017)**
	Sex	-.021 [-.070, .028] (.025)	-.007 [-.053, .040] (.024)
3	Age	.000 [-.000, .000] (.000)	.000 [-.000, .000] (.000)
	Random effects ^a		
	Dyad level	.641	.528
	Child level	.224	.443
	Fixed effects ^b		
	Intercept	.476 [.441, .511] (.018)**	.456 [.422, .490] (.017)**
	Sex	-.021 [-.070, .028] (.025)	-.007 [-.053, .040] (.024)
	Age	.000 [-.000, .000] (.000)	.000 [-.000, .000] (.000)
4	LA	.001 [-.002, .004] (.001)	.000 [-.003, .004] (.002)
	Random effects ^a		
	Dyad level	.611	.494
	Child level	.344	.488
	Fixed effects ^b		
	Intercept	.492 [.453, .530] (.020)**	.471 [.436, .507] (.018)**
	Sex	-.026 [-.077, .025] (.026)	-.008 [-.057, .040] (.025)
	Age	.000 [-.000, .000] (.000)	.000 [-.000, .000] (.000)
	LA	.001 [-.002, .005] (.002)	-.001 [-.005, .003] (.002)
	ToM	-.000 [-.003, .003] (.001)	.001 [-.002, .004] (.002)
	EC	.001 [-.002, .003] (.001)	-.000 [-.003, .003] (.001)

*p < 0.05, **p < 0.01; ^aICC, ^bβ [95% CI] (SE)

We report AICs at each step of our models as registered, but we caution against interpretation of these due to the missing data resulting in an uneven sample size across steps (for connected turns, AICs = -1781.665 at Step 1, -1776.695 at Step 2, -1775.003 at Step 3, and -1382.901 at Step 4; for successful initiations, AICs = -1663.369 at Step 1, -1666.138 at Step 2, -1664.167 at Step 3, and -1319.267 at Step 4).

Exploratory analysis: Reciprocated friendship and connectedness

Research question

We conducted an exploratory analysis looking at reciprocated friendship and connectedness, aiming to answer the following question: Does the status of a child's play partner as a reciprocal friend predict engagement in connected talk during play?

Data structure

For this analysis, our data had two levels: children at level 1 grouped within dyads at level 2. As all relevant data were measured cross-sectionally at T3, we did not include timepoints nested within children.

Table 3.1.7: Results of exploratory analysis.

Step	Parameter	Connected turns	Successful initiations
1	Random effects ^a		
	Dyad level	.639	.537
	Fixed effects ^b		
	Intercept	.472 [.445, .498] (.013)**	.461 [.435, .487] (.013)**
2	Random effects ^a		
	Dyad level	.643	.568
	Fixed effects ^b		
	Intercept	.430 [.046, .814] (.195)*	.893 [.497, 1.288] (.201)**
	Sex	-.014 [-.067, .040] (.027)	-.009 [-.061, .043] (.027)
	Age	.001 [-.004, .005] (.002)	-.005 [-.010, -.000] (.002)*
3	Random effects ^a		
	Dyad level	.634	.554
	Fixed effects ^b		
	Intercept	.393 [.007, .778] (.196)*	.837 [.442, 1.232] (.201)**
	Sex	-.011 [-.064, .042] (.027)	-.006 [-.057, .046] (.026)
	Age	.001 [-.004, .005] (.002)	-.005 [-.010, -.000] (.002)*
	Partner status	.050 [-.020, .119] (.036)	.062 [-.007, .130] (.035)

*p < 0.05, **p < 0.01; ^aICC, ^bβ [95% CI] (SE)

Variables

We investigated partner status at level 2, where 0 represents a dyad who were not reciprocal friends, and 1 represents a dyad who were reciprocal friends. We included age at level 1 and sex at level 2 as covariates. Our outcome variables were connected turns and successful initiations, calculated as in our main analysis.

Data exclusion

As dyad assignment for observation was based on children's friendship nominations (Sanderson & Siegal, 1995), many of the children whose partners were not reciprocal friends did not have a reciprocal friend who could have been their partner. We exclude these children without a reciprocal friend (N=25) from this analysis, resulting in a sample of 123 children who had at least one reciprocal friend. 106 of these were observed playing with a reciprocal friend and 17 were observed with a partner who was not a reciprocal friend.

Model description

We constructed a random intercept model with fixed slopes, starting with an empty model, adding covariates at the second step, and then adding partner status at the third step. We used maximum likelihood estimation and a variance components structure. We did not find a significant effect of partner status on children's connectedness for connected turns nor successful initiations, but we note that the β s for partner status are larger than all other predictors of connectedness investigated in this research. The full results of this analysis are reported in Table 3.1.7.

Model fit

For connected turns, there were no improvements in fit across the three steps of the model (AICs = -194.459 at Step 1, -190.803 at Step 2, and -190.784 at Step 3). For successful initiations, inclusion of age and sex at Step 2 resulted in an insignificant improvement in model fit (AICs = -183.588 at Step 1 and -184.134 at Step 2, $\chi^2(2)=4.546$, $p=0.103$), and inclusion of partner status at Step 3 also led to an insignificant improvement in fit (AIC = -185.288 at Step 3, $\chi^2(1)=3.154$, $p=0.076$).

Deviations from protocol

Here we indicate and explain deviations from our Stage 1 plans.

Covariate labelling

At Stage 1, we included child gender as a covariate for our second research question. After referring to the original data collection materials, we realised that our survey included

the following response options: female, male. We therefore relabelled the gender covariate as sex to more accurately represent these response options.

Reliability

We set a benchmark for reliability at $\kappa=0.8$ at Stage 1. However, our reliability fell below this benchmark at $\kappa=0.719$ for connected turns and $\kappa=0.732$ for successful initiations. One possible reason for this deviation is the need for virtual reliability training due to COVID-19 restrictions, which may have made it more difficult for coders to reach a consensus on codes. However, our unplanned analysis of inter-rater reliability on connectedness rates revealed sufficient overall agreement (ICCs = 0.863 for connected turns and 0.856 for successful initiations) despite lower agreement on individual utterances.

Discussion

This study focuses on both dyadic influences and individual differences as under-researched areas in children's communication. We present two main research questions aiming to investigate the coordination of children's dyadic communication in a play context, in addition to an exploratory analysis intended to support interpretation of our results.

First, we investigate how much variation in connected talk is explained by variation between dyads. This question is addressed by the ICCs at Step 1 of our model, which indicate that over half of the variation in connectedness is explained at the dyad level. For both measures of connectedness, ICCs support our hypothesis that between-dyad variation would be greater than within-dyad variation and align with previous findings regarding dyadic effects on children's play behaviours (Dunn & Cutting, 1999; Etel & Slaughter, 2019; Gibson et al., 2019). This demonstrates that for both connectedness measures, children behaved more similarly to their play partners than they did to children in other dyads. That is, children's own communication depended on their partner's communication.

The effect sizes for our first research question are higher than those reported in similar studies. For comparison, Gibson et al. (2019) report 21.9% of the variation in joint proposals and 35.3% of variation in role assignment, both verbal play behaviours, were explained at the dyad level. Our findings highlight the substantial dyadic influence on connectedness and indicate that future research on connectedness and other verbal play behaviours should account for the dyad's role. Theoretically, this means that as presented at Stage 1, connectedness requires considerable coordination by both partners, resulting in mutual influence on the connected conversation.

Our findings build on previous research into the dyad's role in verbal communication. Much of the research in this area has compared focal children's interactions across partners. Brown et al. (1996), for example, found significant partner effects on children's use of mental state terms during unstructured observations at age 3 years: children made more frequent mental state references with friends and siblings than with their mothers. Similarly, Leach et al.'s (2019) study on friend and sibling connectedness identified differences in children's interactions across partners. Our findings expand on this extant research, indicating that communication between partners is strongly associated in a peer play context. That is, not only do children vary their communication and connectedness across partners as shown in previous research, but they also engage in similar levels of connectedness to their current play partner.

Our second research question investigates the extent to which children's socio-cognitive skills predict their engagement in connected talk during play. This question is addressed by the final step in our models. We expected children's receptive and expressive language, their understanding of others' perspectives and beliefs, and their comprehension of the situational determinants of emotions to facilitate engagement in connected conversations. Counter to our hypothesis, we did not find a significant association between connected talk and LA, ToM, nor EC. This finding indicates that, once accounting for dyadic effects, children's own socio-cognitive skills do not appear to have a strong influence on their connected talk with peers at this age. Our findings suggest that children's use of perspective taking strategies to inform their social interactions, as evidenced by Bartsch and London (2000), may not play a significant role in connected communication during freeplay.

Studies reporting similar findings are sparse, possibly owing to publication bias and failure to correct for group clustering (resulting in underestimated standard errors and p-values, leading to a higher rate of false significant results; Steele, 2008) among other factors. One exception is Dunn and Cutting (1999), who investigated individual differences in 4-year-old friends' play interactions. They found that neither focal child nor partner characteristics (which included socio-cognitive measures such as ToM, affective-perspective taking, and emotion understanding) were significantly correlated with connected communication other than partner age (Dunn & Cutting, 1999). This is despite finding significant correlations between several of these characteristics and cooperative pretend play, which itself was correlated with connected communication (Dunn & Cutting, 1999). This supports our finding that individual differences in children's socio-cognitive skills may not be directly related to their engagement in connected talk in a play setting.

Conversely, Slomkowski and Dunn (1996) did find links between social understanding and children's connectedness with their friends. However, these findings are reported in 3-year-olds, a sample much younger than that of the current study and that reported in Dunn and Cutting (1999). It is therefore possible that children's communication in early childhood is contingent on these socio-cognitive skills, but that this reliance weakens by middle childhood when children no longer depend on such abilities to maintain connected conversations in a freeplay context. Instead, children of this age may only employ such skills for communication in more challenging situations (for example, problem solving tasks). The relevance of task difficulty at different ages is suggested by Azmitia and Perlmutter (1989), who propose that by school age children may not find freeplay particularly challenging for collaboration. They suggest that as children's communicative skills improve during middle childhood, social interaction during familiar and open-ended tasks such as freeplay may become more routine, allowing the child to devote less effort to the activity's social requirements (Azmitia, 1996; Azmitia & Perlmutter, 1989). Instead, they suggest that unfamiliar activities as well as those requiring explanation and discussion may be more demanding for older children (Azmitia & Perlmutter, 1989).

In an even younger sample of mothers and their 2-year-olds, Ensor and Hughes (2008) did not find a significant relationship between social understanding and children's own engagement in connected communication. However, in this mother-child play context, they did find that mothers' connected communication predicted child social understanding concurrently and at two subsequent timepoints (ages 3 and 4), possibly owing to mothers scaffolding the interaction to the child's socio-cognitive abilities (Ensor & Hughes, 2008). In all, these mixed findings lead us to suggest that exposure to connected talk at age 2 may promote the development of socio-cognitive skills (Ensor & Hughes, 2008), which are then employed to aid children's own engagement in connected talk at age 3 (Slomkowski & Dunn, 1996). By age 4, this may become less challenging and no longer require advanced social cognition (Dunn & Cutting, 1999), resulting in no significant link between the two for freeplay in our sample. It is evident that further longitudinal study, assessing both connectedness and socio-cognitive development at multiple timepoints in early and middle childhood, in addition to exploring more challenging communication contexts, is needed to further examine this proposal.

Together, the findings from our two research questions provide evidence for Gibson et al.'s (2019) proposition that the characteristics of social play are not based on fixed individual differences and that more attention should instead be paid to the dyadic nature of peer play. Further evidence for this proposal comes from Etel and Slaughter (2019), who similarly found

that communication in joint play was overwhelmingly explained by the dyad without finding a significant effect of the individual's ToM. Additionally, Azmitia and Perlmutter (1989) propose that well-known partners, such as friends, may not need to draw on their social skills as heavily during interactions because they can rely on their past experiences with the partner for the social demands of the interaction, suggesting that there may be a dyadic effect on the extent to which socio-cognitive skills are applied. However, while we have identified a strong dyadic effect on communication in peer play with little effect of individual differences, importantly such findings may not hold across diverse groups of children. Although we do not exclude children based on developmental nor demographic factors, children with communication difficulties, for example, may present smaller dyadic effects and a greater reliance on socio-cognitive skills for communication.

Finally, our exploratory analysis investigates dyadic reciprocal friendship and connected talk to inform interpretation of our main results. We do not find a significant association between dyadic reciprocal friendship and child engagement in connected talk. However, the larger β s for partner status suggest it will be a rich area for future study. As this analysis is exploratory in nature and is not the primary purpose of our study, any further interpretation of its results should be made cautiously. Among several obstacles to interpreting these results more generally, the children in the present study were not randomly assigned to partners as would be preferable for drawing robust conclusions.

Strengths and limitations

Our study has many strengths, particularly those associated with being a Registered Report, such as pre-study peer review of methods and our ability to publish null results. Here we discuss additional strengths and limitations.

Our observational coding scheme for connectedness has several strengths: both measures showed sufficient frequency and variation in our sample, without floor or ceiling effects, indicating that measuring connectedness in this way is appropriate for future research with this age group. However, we planned to reach a higher level of inter-rater reliability on our raw coding of connectedness as a lower level of reliability indicates increased measurement error and may prevent detection of an effect (Hallgren, 2012). While the reliability levels achieved are widely considered to be sufficient for observation of children's conversations (e.g. Howe et al., 2005), our Kappas were lower than those reported in other studies of connectedness (e.g. Leach et al., 2019) and indicate that our coding scheme could be adapted in future research to help improve agreement. Nevertheless, our unplanned analysis of post-processing

reliability showed high agreement, meaning that the low reliability on raw coding may not have substantially impacted our results.

Additionally, we note that there are both strengths and limitations to our secondary dataset. The use of friendship nominations to pair children for observation allows us to draw conclusions about children's friendship interactions, an area important for development in middle childhood and beyond (Fink, 2021). However, as play pairs were not randomly allocated, we are unable to draw conclusions regarding whether dyadic effects are down to children adjusting their own communication to match the partner's or whether these dyadic effects are down to children selecting friends who communicate similarly.

Finally, while we are fortunate to be able to publish our null results and counter biases towards positive results in the current literature (Scheel et al., 2021), we are limited in our ability to interpret such results. Based on a hypothesis testing statistical framework, null results indicate that we do not have enough evidence to reject the null hypothesis, but they do not provide support for the null hypothesis. Null results could occur due to insufficient power to detect an effect, for example. While our pre-study sensitivity analysis aimed to counter this, it cannot be ruled out. Furthermore, several of our β s fell below the calculated minimum detectable effects, and our lower than anticipated reliability may have limited our ability to detect an effect (Hallgren, 2012). We therefore discuss our findings with caution, unable to draw concrete conclusions at the population level within our framework.

Recommendations for future research: Focus on the dyad

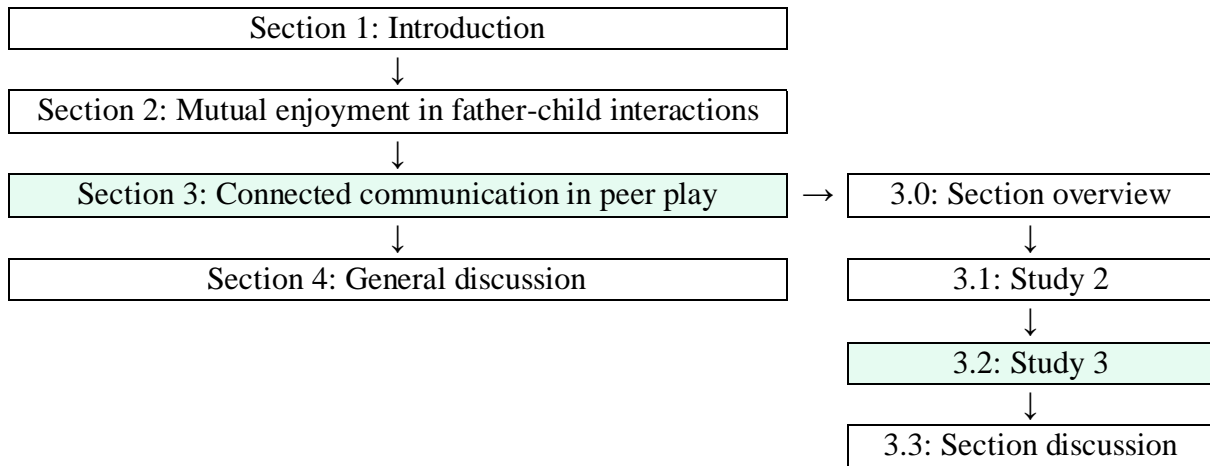
This study aims to provide a theoretical and empirical foundation for future research into play as a context for developing communication skills. Using individual measures, we confirm that connectedness in particular is a dyadic construct. In doing so, we provide substantial evidence for the partner's role in dyadic play communication. We therefore recommend that future observational play research addresses this by collecting and analysing data from both members of the dyad, accounting for dyadic effects in analysis, and measuring behaviours at the dyad level where appropriate. More specifically, measurement of connectedness at the dyad level may be fruitful, which to our knowledge has not yet been done.

In line with these recommendations, we suggest that the status of the dyad beyond our exploratory analysis (e.g., friend-friend, classmate-classmate, sibling-sibling, parent-child, teacher-child, etc.) will be a rich area for future research into connectedness and beyond. Some of this work has already begun, including Leach et al.'s (2019) analysis of connectedness in friend and sibling dyads, looking at within-child between-dyad effects on children's

connectedness. We suggest that future research into this area should consider dyadic designs in data collection while also accounting for the dyad in the analysis.

Finally, we advise that this focus will have relevance throughout developmental psychology research, from developing new measures of individual differences to communication research beyond connectedness. Future research should contemplate whether the individual measurement of socio-cognitive skills provides a complete picture of children's abilities as it may not capture how these skills are put to use in unfolding social interactions. Instead, researchers should consider how measuring these abilities through social means may offer an informative and complementary understanding of children's applied social cognition. Additionally, several of the overlapping research areas looking at topic management in conversations mentioned in our Introduction (such as transactive dialogues) would benefit from grouping in analysis, and we hope these methods will be adopted in such dyadic research in developmental psychology more widely.

3.2: Study 3 – ‘Communication with Friends and Peers: An investigation of dyadic connectedness across two activities’



Abstract

Children’s friendships and peer interactions provide important contexts for their developing communication and social skills. We analyse connectedness, the topical coherence of children’s conversational turns, to explore how partners coordinate their interactions across two activities. Using observational data, we code the connected talk of 82 same-sex dyads observed during freeplay and a goal-directed drawing activity during their third year of school (aged 6 to 7 years) in the UK, modelling the rates of connected talk in relation to dyad sex (female, male) and friendship status (reciprocal friends, non-friend peers). We find a significantly higher rate of connectedness in the goal-directed drawing activity, where both reciprocal friend and non-friend peer dyads engaged in more connected talk during goal-directed drawing than in freeplay. An interaction model between friendship status and activity revealed that during goal-directed drawing non-friend peer dyads engaged in a higher rate of connected talk than reciprocal friend dyads, whereas reciprocal friend dyads engaged in more connected talk than non-friend peers during freeplay. Our analyses did not find any significant effects of dyad sex, friendship status, nor interaction between dyad sex and activity on connected talk. These findings demonstrate the role of dyadic characteristics in children’s interactions and suggest that the characteristics of activities should be considered in the context of dyadic factors.

Keywords: connectedness, play, communication, activity, friends, peers

Introduction

Children's friendships are essential for social development and adjustment, protecting against social isolation, depressive symptoms, and loneliness (Laursen et al., 2007; Pedersen et al., 2007). From the time children begin formal schooling, interactions with friends and peers provide opportunities to practise social and communication skills, and the qualities of this communication have been the subject of research from early childhood through adolescence (Azmitia & Montgomery, 1993; Slomkowski & Dunn, 1996). Focusing on children in their third year of school (aged 6 to 7), we investigate connectedness, a characteristic of children's verbal communication quantifying the topical coherence of partners' utterances, a measure of the degree to which conversation partners are in tune with one another. Connectedness may support children to build a shared understanding of an activity by discussing and negotiating partners' roles and ideas, and children's communication skills have been linked to peer acceptance (Kemple et al., 1992). By analysing reciprocal friends' and non-friend peers' connected talk from a dyadic perspective in two activities, we aim to further understanding of how both dyadic characteristics and the interaction setting may play a role in children's communication.

Previous research has found that the characteristics of an activity influence the qualities of social interactions (Booren et al., 2012; Howe & McWilliam, 2001). For example, the familiarity of an activity may influence children's collaborative problem solving, where children are better able to problem solve in more familiar activities, perhaps because familiarity with an activity allows young children to balance the cognitive demands of the activity and the social demands of the interaction (Azmitia & Perlmutter, 1989). By school age, Azmitia and Perlmutter (1989) suggest that children are better able to balance the cognitive and social demands of collaborative activities but propose that by this age activity difficulty, rather than familiarity with the activity, may still influence the way children interact. Some activities may also facilitate different types of or increased complexity of communication. Howe and McWilliam (2001) compared preschool children's communication across four different play contexts, finding that children were most likely to argue during symbolic and construction play and were least likely to argue in individual and sand-and-water play. Furthermore, they found that more complex tactics were used in the symbolic and construction play contexts (Howe & McWilliam, 2001). These findings suggest that the interaction activity can facilitate different types of communication, an idea that has generally been overlooked in previous research (Howe & Leach, 2018).

With respect to connectedness, some activities may require or facilitate more connected talk than others. Much of the connectedness literature has examined its presence in play settings (e.g. Dunn & Cutting, 1999; Goodacre et al., 2023; Leach et al., 2019; Slomkowski & Dunn, 1996). Additionally, a few studies have looked at connectedness in non-play settings: for example, both Brophy and Dunn (2002) and Ensor and Hughes (2008) analysed connectedness between mothers and children during everyday activities and routines. However, as far as we are aware no research has assessed the stability of connectedness or compared it across settings, which means little is known about how this property of conversation might be fostered by certain activities or activity characteristics. Connectedness in many ways is a symptom of collaboration: to collaborate, children must be able to connect their talk to that of the partner. By analysing connectedness across two activities, we aim to draw conclusions around how the contexts of social interactions might be related to children's verbal collaboration with their friends and peers.

In the present study, we compare connectedness in freeplay and a goal-directed drawing activity. In an open-ended drawing activity framed as social play, Kukkonen and Chang-Kredl (2018) analysed children's ability to establish intersubjectivity and found use of many connectedness strategies, including maintaining the topic of conversation through repetition, building on ideas, and asking for clarification. In a goal-directed activity, children must discuss their ideas and build on them to create a final product. On the other hand, in an open-ended activity such as freeplay, children are free to set their own goals, which may not match up between partners and possibly result in lower levels of connectedness (or, alternatively, goals may not match up because of low levels of connectedness). This would mean that, when compared to a freeplay scenario, a goal-directed activity may facilitate more connected talk as children attempt to reach their goal together. However, as this speculation is not based on any substantive previous research on open-ended versus goal-directed activities, we present a non-directional hypothesis for the present study.

Beyond the effects of activity on children's connected talk, the present study explores the role of dyadic characteristics, including the sex of the dyad and the relationship between partners. Our previous research showed considerable dyadic effects on children's connectedness during freeplay (Goodacre et al., 2023), suggesting that further exploration of how the characteristics of the dyad may influence peer interaction is warranted. A few studies have found differences between how children behave with friends and peers, with Vespo and Caplan (1993) identifying the use of different conflict resolution strategies during play and Lindsey and Berks (2019) finding differences in emotion expression. Though we are not aware of any

studies comparing connectedness in reciprocal friends and non-friend peers, when comparing friends with siblings during freeplay, Leach et al. (2019) found differences in frequency and length of connected sequences, showing how different dyadic relationships could influence connectedness. This indication that children are better able to maintain connectedness with friends than with siblings (Leach et al., 2019, 2021) suggests that the relationship between play partners will be a rich area for investigation. Findings may have implications for classroom practice, for example, where differences in children's verbal collaboration across friends and peers may inform partner allocation during classroom activities.

Despite the wide research into children's communication during play, and even some research into dyadic characteristics and relationships (Leach et al., 2019, 2021), little research has compared the communication of reciprocal friends and non-friend peers. This is surprising considering evidence that having at least one friend is beneficial to several areas of development (Fink et al., 2015; Laursen et al., 2007). Friendships and peer relationships, when compared to children's other relationships, are unique because they are voluntary and feature more egalitarian interactions than those with other partners (e.g. parents, siblings; Howe & Leach, 2018). When compared to peer relationships, friendships are characterised by mutual interests and positive affect (Bukowski et al., 2009). The present study aims to identify how this may be reflected in the differences in communication between reciprocal friends and non-friend peers across activities.

The present study

The present study aims to further understanding of the activity characteristics and dyadic influences that facilitate coordinated communication between conversation partners by analysing connectedness across two activities: freeplay and goal-directed drawing. To achieve this, we address two research questions, which were pre-registered on the Open Science Framework on 15 June, 2022 (Goodacre, 2022; Appendix 3.2.1) along with the relevant aims and hypotheses. In all, we strive to build on previous research showing the importance of the dyad in children's connectedness (Goodacre et al., 2023; Leach et al., 2019, 2021) by informing how these differences between dyads may manifest across activities.

Research question 1

We first analyse differences in the rate of partners' connectedness between two activities to answer the following research question: Is there a difference in the rate of dyads' connected talk between freeplay and a goal-directed drawing activity? We hypothesised that there would be different quantities of connected talk across these two activities.

Research question 2

Next, we investigate whether certain dyads may interact differently across activities, focusing on dyad sex and friendship status, to answer the following research question: Are there interactions between activity context and dyadic variables in our dataset in predicting connectedness? Whereas our first research question looks at *if* there are differences in dyads' connected talk across activities, our second explores *which* dyads engage in different rates of connected talk across activities. As this is an open-ended and exploratory research question, we did not register a hypothesis.

Methods

The methods described here were pre-registered on the Open Science Framework on 15 June, 2022 (Goodacre, 2022).

Dataset

We used data from the Children's Relationships with Peers through Play (ChiRPP) study (Gibson & Fink, 2020), a longitudinal study which explores children's play and friendships during the first three years of school in the UK. The ChiRPP data was collected in children's schools by researchers at the PEDAL Centre, University of Cambridge. The ChiRPP study procedures were approved by the University of Cambridge Psychology Research Ethics Committee.

The present study uses data from the third timepoint of this study, which we selected as it includes dyadic observations in two activity contexts. At the third timepoint, 152 children, 63 female (41.4%) and 89 male (58.6%), aged 6.12 to 8.26 years ($M=6.79$, $SD=0.38$), at 5 schools participated in the ChiRPP study.

Observations

Children were observed interacting in dyads across two activity contexts: freeplay and a goal-directed drawing activity. These activities both aimed to provide ample opportunities for dyadic interaction while differing in their open-endedness to aid comparisons. Both activities selected intended to provide opportunities for conversation and dyadic interaction, based on previous research establishing the presence of connected talk in peer play and drawing activities (Dunn & Cutting, 1999; Goodacre et al., 2023; Kukkonen & Chang-Kredl, 2018; Leach et al., 2019; Slomkowski & Dunn, 1996).

Figure 3.2.1: Video still from freeplay activity recording.

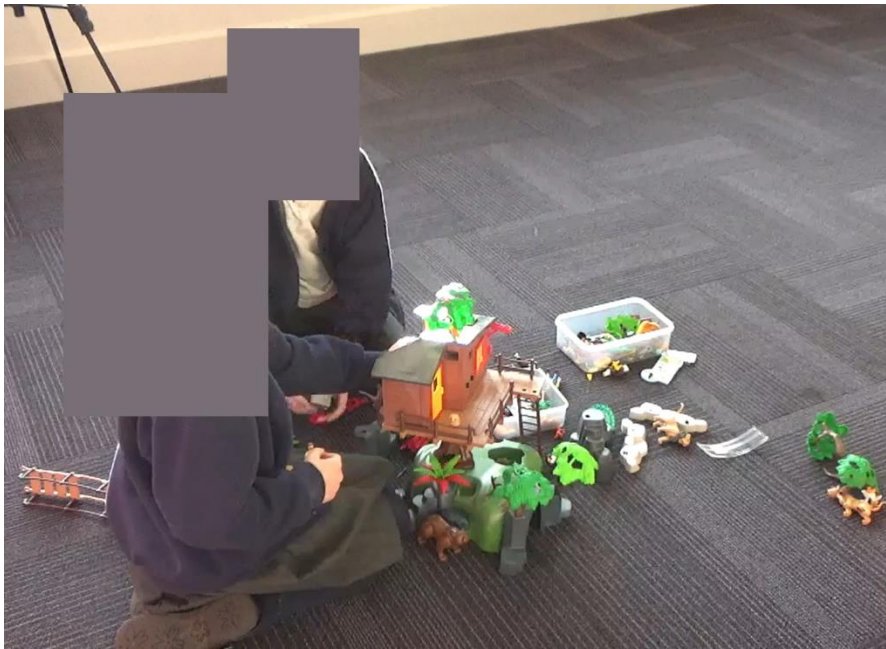
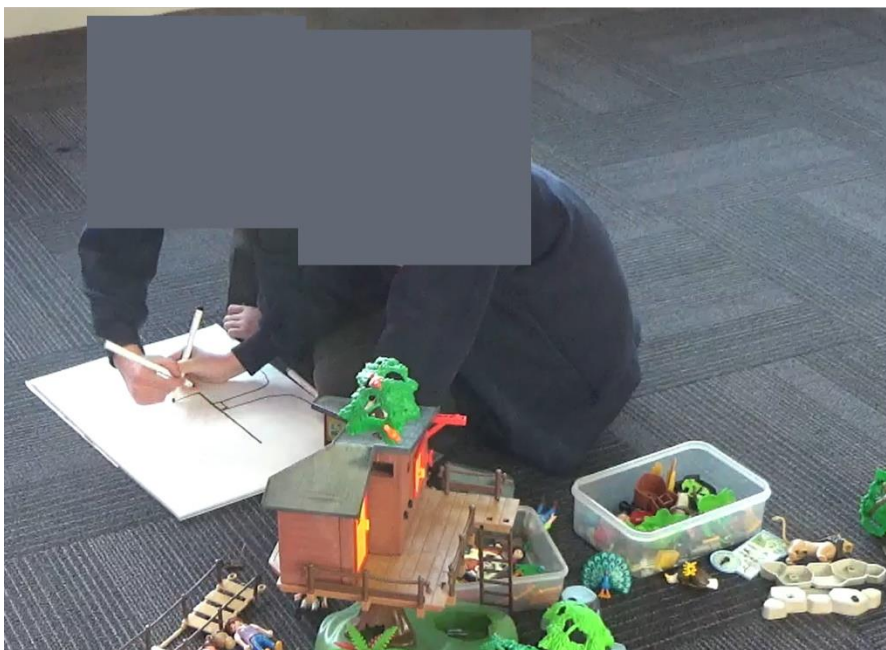


Figure 3.2.2: Video still from goal-directed drawing activity recording.



Dyad composition

Dyads for observation were assigned based on children's individual answers to Sanderson and Siegal's (1995) interview of friendships. Children were each asked to nominate a total of three best friends and in most cases were paired with one of their nominations who had also nominated them (i.e. a reciprocal friend), but in many cases children were paired with a partner who was not a reciprocal friend (i.e. a non-friend peer). Some children were observed twice with different partners. All dyads were composed of same-sex partners.

Freeplay

For the freeplay observations, dyads were video-recorded playing with a Playmobil treehouse toyset with a partner for approximately eight minutes (Figure 3.2.1). The researcher placed the toyset on the floor and instructed the dyad to play with it however they liked before exiting the room. The toyset included a large treehouse toy accompanied by many smaller toys, such as figures of animals, people, and furniture.

Goal-directed drawing

The goal-directed drawing observations were video-recorded for a further eight minutes immediately following the freeplay observations. The researcher re-entered the room following the freeplay observation and helped the dyad to place the smaller pieces of the toyset out of the way. The researcher then placed a pad of paper on the floor, drew a basic tree trunk, and asked the dyad to finish drawing the treehouse toyset with which they had played (Figure 3.2.2). Dyads were provided with limited felt tip pens and only one pad of paper to encourage interaction during this activity (Ostrov et al., 2004).

Transcription

Our transcription procedure was registered for use with the freeplay observations as part of our previous Registered Report (Goodacre et al., 2021). For the present study, we conduct these steps on both freeplay and goal-directed drawing observations, applying the same procedures to both observations. Observations were transcribed from video recordings by two transcribers, 32 by the first author and 50 by an external transcriber with no prior knowledge of the dataset using our registered transcription manual (Appendix 3.1.1). This involved transcribing each utterance, defined as bound by the other speaker's utterance or a gap of 5 seconds, and timestamping the beginning and end of each utterance using ELAN linguistic annotation software (*ELAN*). 11 of the external transcriber's transcripts were checked for quality and

accuracy by the first author. Transcribers excluded one observation from transcription because the dyad was off-camera throughout the recording.

Measures

Outcome

The outcome in this research was connectedness, which was measured through coding freeplay and goal-directed drawing video transcripts. Transcripts for both activities were coded for *connected turns* using part of our registered coding scheme (Appendix 3.1.2). We define connected turns as utterances with a topical link to an utterance by the partner within the previous 5 seconds.

We quantified connectedness at the dyad level, summing connected turns for both members of the dyad into one dyadic connectedness score per activity, based on evidence that the dyad plays a particularly important role in connectedness (Goodacre et al., 2023). We converted this score into a rate by dividing by the total number of utterances in the observation. The present study does not use the other code for connectedness described in our previous research (Goodacre et al., 2023) because, when combined into one dyadic score, these scores would be equivalent to the connected turns score described.

Coding was conducted by the first author following inter-rater reliability checks on 20% of observations with an external coder who had no prior knowledge of the dataset.

Predictors

For research question 1, we included activity (freeplay, goal-directed drawing) as our predictor variable. For research question 2, we included interaction terms between our dyadic characteristics, friendship status (reciprocal friends, non-friend peers) and dyad sex (female, male), and activity as predictors.

Analysis plan

To answer our research question 1, we registered a paired-samples t-test to determine if there was a difference between the quantity of connected talk during the freeplay and goal-directed drawing observations. To answer research question 2, we planned to use two-way repeated-measures ANOVAs to look for any interactions between dyad characteristics and the activity. In our analysis we modified this registered plan to answer both research questions using one model, as detailed below.

Results

Data inclusion and exclusion

We excluded dyads whose observations for both freeplay and goal-directed drawing were missing or could not be transcribed. One dyad was observed for freeplay but requested not to be recorded during goal-directed drawing, so their data from the goal-directed drawing observation was missing and not replaced. Our final sample included 148 children who were observed in 82 dyads, where 16 children were observed twice with different partners. As our previous research with this dataset has shown the importance of dyadic effects over individual effects on connectedness (Goodacre et al., 2023), we did not exclude based on individual characteristics.

Connectedness coding

We calculated inter-rater reliability for both pre-processing and post-processing agreement based on 20% of observations. Pre-processing Kappas for raw scores showed inter-rater reliability of 0.719 for freeplay and 0.716 for goal-directed drawing. Post-processing intra-class correlation coefficients (ICCs), which indicate inter-rater reliability for the data used for analysis, showed agreement of 0.889 for freeplay and 0.797 for goal-directed drawing.

Summary statistics

We focus on two dyadic characteristics for the present research: dyad sex and friendship status. 41.5% of dyads (N=34) were composed of female partners, and 58.5% of dyads (N=48) were composed of male partners. For friendship status, 69.5% of dyads (N=57) were reciprocal friends, where both children in the dyad nominated the other, and 30.5% of dyads (N=25) were non-friend peers, where either one child nominated the other or neither child nominated the other.

The dataset contained a total of 13085 utterances, 7615 in freeplay and 5470 in goal-directed drawing. Dyads engaged in 40 to 272 utterances each ($M=159.573$, $SD=40.244$), 15 to 167 in freeplay ($M=92.866$, $SD=28.186$) and 0 to 110 ($M=66.707$, $SD=21.886$) in goal-directed drawing. Connectedness rates for both freeplay and goal-directed drawing were normally distributed without floor or ceiling effects (Figure 3.2.3) and were significantly correlated (Pearson's $r=0.226$, $p=0.042$). Table 3.2.1 presents summary statistics for the continuous variables used in our analysis.

Figure 3.2.3: Histograms showing distribution for rate of connected turns in freeplay and goal-directed drawing.

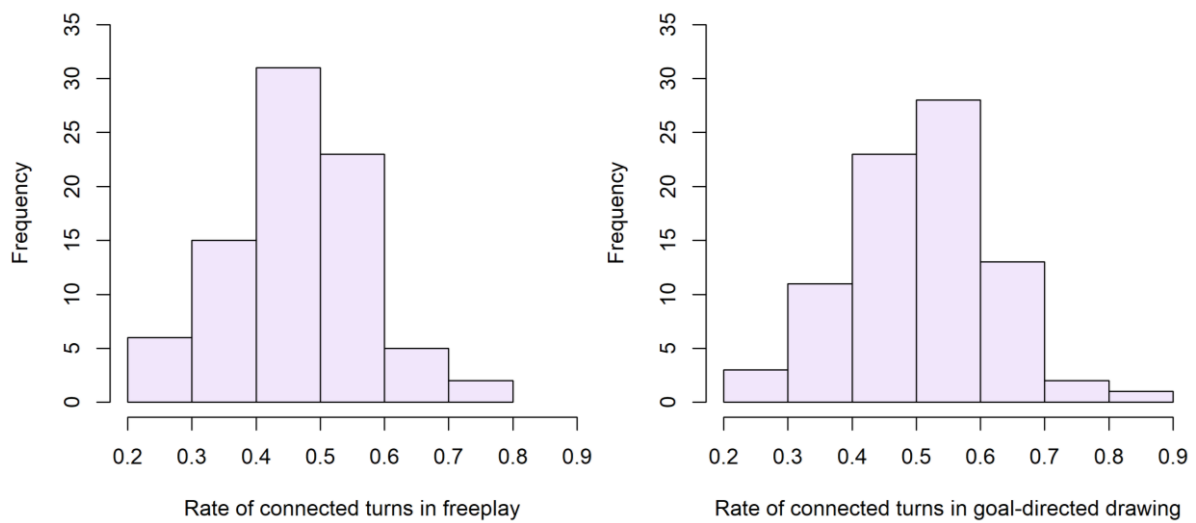


Table 3.2.1: Summary statistics for continuous study measures.

	Connected turns in freeplay ^a	Connected turns in goal-directed drawing ^a
M (SD)	0.468 (0.111)	0.512 (0.119)
Min, Max	0.200, 0.742	0.232, 0.853
N ^b	82	81

^aProportion of total utterances; ^bNumber of dyads

Statistical model

To answer our research questions, we constructed a factorial repeated measures ANOVA in the form of a multi-level model with activity nested within dyad. Though we registered two-way repeated-measures ANOVAs to answer research question 2, we deviated from this plan by combining all predictors into one model to reduce false-significance error⁴.

Our baseline model included only the intercept and no predictors. To answer research question 1, we report the second step in our model, adding activity as a predictor to the baseline model (note that this is statistically equivalent to our pre-registered paired-samples t-test). Next, we added our dyadic predictors (dyad sex and friendship status) to the model at step

⁴ For transparency, we also report the results of separate two-way repeated-measures ANOVAs as registered. Both show a significant effect of activity, as reported. The first ANOVA shows no significant effect of dyad sex, $\chi^2(1)=0.172$, $p=0.679$, nor dyad sex * activity, $\chi^2(1)=0.360$, $p=0.548$. The second shows no significant effect of friendship status, $\chi^2(1)=0.020$, $p=0.887$, and indicates a significant interaction between activity and friendship status, $\chi^2(1)=7.971$, $p=0.005$.

three. To answer research question 2, we added interaction terms (dyad sex * activity and friendship status * activity) at steps four and five respectively. The results of this model are reported in Table 3.2.2.

Differences between activities

For research question 1, we found a significant effect of activity on connectedness rate, $\chi^2(1)=7.551$, $p=0.006$, showing that on average dyads engaged in a significantly higher rate of connected talk during goal-directed drawing ($M=0.512$, $SD=0.119$) than during freeplay ($M=0.468$, $SD=0.111$).

Dyadic characteristics and interactions

We found no significant effect of adding dyad sex and friendship status to the model, $\chi^2(2)=0.184$, $p=0.912$, indicating that female and male dyads engaged in connected talk at similar rates, as did reciprocal friend and non-friend peer dyads.

Table 3.2.2: Results of main analysis.

Step	Parameter	β [95% CI] (SE)
1	Intercept	0.490 [0.470, 0.510] (0.010)**
2	Intercept	0.512 [0.487, 0.538] (0.013)**
	Activity	-0.044 [-0.076, -0.013] (0.016)**
3	Intercept	0.517 [0.476, 0.559] (0.021)**
	Activity	-0.044 [-0.076, -0.013] (0.016)**
	Dyad sex	-0.008 [-0.048, 0.032] (0.020)
	Friendship status	-0.002 [-0.045, 0.040] (0.022)
4	Intercept	0.514 [0.470, 0.557] (0.022)**
	Activity	-0.036 [-0.077, 0.004] (0.021)
	Dyad sex	0.002 [-0.050, 0.053] (0.026)
	Friendship status	-0.002 [-0.045, 0.041] (0.022)
	Dyad sex * Activity	-0.019 [-0.083, 0.044] (0.032)
5	Intercept	0.545 [0.497, 0.594] (0.025)**
	Activity	-0.100 [-0.158, -0.042] (0.030)**
	Dyad sex	0.005 [-0.046, 0.055] (0.026)
	Friendship status	-0.050 [-0.104, 0.003] (0.028)
	Dyad sex * Activity	-0.026 [-0.086, 0.035] (0.031)
	Friendship status * Activity	0.096 [0.031, 0.160] (0.033)**

* $p < 0.05$, ** $p < 0.01$

For research question 2, we found no significant interaction between activity and dyad sex, $\chi^2(1)=0.360$, $p=0.549$, showing that the effect of activity on connected talk was similar for female and male dyads. Adding the interaction between activity and dyad friendship status showed a significant effect, $\chi^2(1)=8.319$, $p=0.004$, whereby during freeplay reciprocal friends engaged in a higher rate of connected talk ($M=0.478$, $SD=0.104$) than non-friend peer dyads ($M=0.438$, $SD=0.116$), and during goal-directed drawing non-friend peer dyads engaged in a higher rate of connected talk ($M=0.547$, $SD=0.107$) than reciprocal friends ($M=0.496$, $SD=0.121$).

Discussion

We investigate two research questions focusing on connectedness in children's communication across two activities. Our key findings include a difference in the rate of connected talk across these activities and a significant interaction between friendship status and activity, where the lowest rate of connectedness occurred in non-friend peer dyads' freeplay and the highest rate occurred in non-friend peer dyads' goal-directed drawing.

Our first research question explores whether dyads engaged in different rates of connected talk across freeplay and a goal-directed drawing activity, finding that dyads engaged in a significantly higher rate of connected talk during goal-directed drawing than during freeplay. This effect remained even after adding our dyadic and interaction predictors into the model, indicating that the overall difference was not simply because of peer dyads' high rate of connected talk in goal-directed drawing. This may be because in the goal-directed drawing activity, dyads needed to discuss their ideas and build on them to create a final product; in contrast, children at this age may need to engage in less connected talk to sustain play with a partner, perhaps using more non-verbal communication instead to arrive at a consensus on play elements. Given how little play research has focused on the environment (Howe & Leach, 2018), including the materials provided for activities, the present results confirm that future research should consider how materials and activity types may facilitate different forms of interaction and communication.

Our second research question explores which dyads used more connected talk in each activity by exploring interactions between dyadic characteristics and activity. Though we found no evidence of an interaction between activity and dyad sex, we did find a significant interaction between activity and friendship status. During freeplay, reciprocal friends engaged in a

higher rate of connected talk than non-friend peer dyads; on the other hand, non-friend peer dyads engaged in more connected talk during goal-directed drawing than reciprocal friends.

These findings indicate that reciprocal friends may find it easier than non-friend peer dyads to connect their talk during freeplay. This idea is supported by Azmitia (1996), who suggests that both the partners' relationship and activity context are relevant for interactive processes. In particular, Azmitia and Perlmutter (1989) propose that interacting with a familiar partner in learning activities may reduce the social demands of the scenario and allow children to draw on their previous encounters with the partner, and this may support them to engage in more connected talk. Similarly, freeplay may be a particularly familiar activity to friendship dyads, who have likely engaged in similar activities together frequently when compared to peer dyads, though it is important to note that non-friend peer dyads in the present study were in the same class and therefore also familiar to one another. For non-friend peer dyads, the open-ended nature of the freeplay activity may have resulted in more unconnected utterances as partners explored different play ideas; non-friend peer dyads may have then struggled to form a consensus on play elements, instead more often opting for play independent of the partner.

In contrast, the goal-directed drawing activity may have facilitated particularly high rates of connected talk in non-friend peer dyads by providing a clear goal to work towards together. Reciprocal friends, on the other hand, may have been better able to communicate non-verbally during the goal-directed activity and interpreted the partners' wishes without the need for verbal requests, for example by anticipating that the partner needs something to be passed to them without the partner needing to ask. Some research indicates that friends have a collaborative advantage when working together towards a goal, though this is generally in the context of more, not less, collaborative communication between friends. For example, friends engage in more collaborative discourse during problem-solving activities when compared to peers (Hartup, 1998). Among young adolescents, Azmitia and Montgomery (1993) found benefits to scientific reasoning when collaborating with friends, in comparison to collaboration with acquaintances, though this difference was only observed in activities that were more difficult (i.e. those that showed lower completion accuracy). They suggest that where partners have equal and complete knowledge of a problem, working with a friend has no benefit to activity performance; on the other hand, when each partner has an incomplete understanding, there are advantages to collaborating with a friend over an acquaintance (Azmitia & Montgomery, 1993). This indicates that a combination of activity factors may be relevant to the interaction effect between friendship status and activity on children's communication and suggests that further

research may be needed to determine why certain activities promote greater rates of connected talk in different dyads.

The higher rate of connected talk by non-friend peers than reciprocal friends in goal-directed drawing may in part be down to the design of the observations, where dyads were first engaged in freeplay and then goal-directed drawing using the same treehouse toyset. As reciprocal friends may have been more successful than non-friend peers at establishing a shared pretense scenario during freeplay, evidenced by their higher rate of connected talk, they may have been more inclined to continue themes and plotlines from this pretense during goal-directed drawing (for example, by continuing to talk about the pretense themes while drawing or by incorporating and developing the themes as part of the drawing). By age 9, play scenarios are elaborate with plots and themes sometimes developing over a period of several days (Morgenthaler, 2006), suggesting that continuation of pretense ideas across two short observations is likely. This continuation of pretense ideas may explain the relatively similar connectedness rates seen between the two activities for reciprocal friend dyads, where there was only a small increase in connected talk during goal-directed drawing, as reciprocal friend dyads may have continued to develop pretense themes throughout both observations. On the other hand, non-friend peer dyads may have been less efficient in establishing shared pretense during freeplay, as evidenced by their lower rate of connected talk when compared to reciprocal friends, suggesting that they would have had fewer established elements to bring into the goal-directed drawing activity. Instead, their talk during goal-directed drawing may have been more focused on the activity and goal (for example, where to draw parts of the treehouse, which colours to use), facilitating high rates of connected talk when compared to reciprocal friends' continuation of pretense ideas.

Our findings contribute to the present understanding of different activities in friend and peer relationships, an area that has received little research attention (Howe & Leach, 2018). Finding differences in reciprocal friend and non-friend peer dyads across activities suggests that certain activity characteristics may promote communication and collaboration better than others depending on the characteristics of the dyad. This supports Hartup's (1998) suggestion that completing an activity with friends may benefit outcomes in some, but not all, activities.

Strengths and limitations

As discussed with respect to reciprocal friends' possible continuation of pretense themes across both activities, one limitation of the present study is that all dyads took part in the freeplay and drawing activities in the same order. There may therefore have been an effect

activity order on the results of our first research question. Additionally, activity order effects may have arisen if the dyads took time to get settled into the observation environment and began using more connected talk later in the observation or if the dyads engaged in more unconnected utterances at the very beginning of the session due to excitement of the new environment. We therefore cannot draw concrete conclusions about the effects of these specific activities and instead focus on how activity factors in general may affect connected talk.

Another possible limitation of the present study arises from the inadvertent effects of individual child characteristics on dyads. Though we focus on the dyad as the unit of analysis, individual child characteristics may have influenced dyad composition. In particular, individual children's friendship nominations were used to assign partners for observation, and in many cases children were paired with a non-friend peer partner because they did not have a reciprocal friend with whom they could be partnered. This results in a discrepancy across groups, where all children observed in reciprocal friend dyads by definition had at least one reciprocal friendship, but many of the children observed in non-friend peer dyads did not have any reciprocal friendships. This is important based on research showing that second- and third-grade children who are less-liked by their peer group are more likely to make unrelated suggestions and abruptly change the topic of conversation than those who are liked by their peers (Putallaz & Gottman, 1981). It is therefore possible that the non-friend peer dyads in our sample may have interacted differently based on these individual characteristics despite our previous findings that children's individual differences did not play a significant role in their engagement in connected talk (Goodacre et al., 2023).

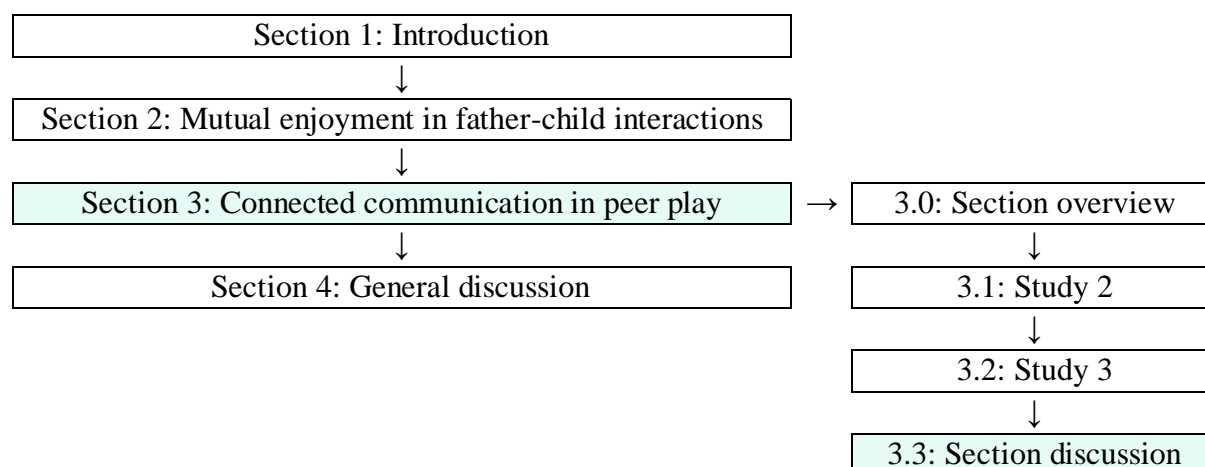
Finally, we note a strength in the design of our study as dyadic in focus. Based on previous research with this dataset (Gibson et al., 2019; Goodacre et al., 2023) and others showing the importance of the dyad's role in play research (Dunn & Cutting, 1999; Etel & Slaughter, 2019; Leach et al., 2019, 2021), we embarked on the present study with the goal of further exploring the dyad's role in connected talk. By focusing on dyadic characteristics as predictors, in addition to calculating our outcome measure at the dyad level, we were able to expand on previous research showing the importance of dyadic variables by exploring specific dyad characteristics.

Conclusion

This study furthers understanding of influences on children's connectedness. In doing so, it provides evidence of both dyadic and activity effects on children's connected communication. By including the dyad as the unit of analysis and exploring social communication across

dyadic relationships, we push forward knowledge on the role of children's social relationships on their communication. We therefore recommend that future research considers both social and activity factors in children's interactions and goes beyond these findings to explore how these effects manifest across a wider range of activities, social relationships, and factors beyond those directly explored here.

3.3: Section discussion



Chapter overview

The primary purpose of this chapter is to provide further discussion and critique of the methodological decisions made in this section, accompanying and supplementing the studies reported in the previous two chapters. This includes providing additional detail on the development of methods and the judgments made throughout the process. I briefly outline the impact of COVID-19 on these studies before focusing on registration of methods, the process of designing transcription and coding manuals, and the ethical considerations made.

Impact of COVID-19

Though this section is composed of research conducted entirely with secondary data, the COVID-19 lockdown of March 2020 impacted my ability to undertake this research in several ways, including through obstacles to accessing data and difficulty collaborating with colleagues for transcription and coding. Though I did not make any changes to the research questions addressed in this section based on these obstacles, they did result in certain changes to the research process. Most notably, limited access to data and uncertainty about research timelines in the early stages of the pandemic resulted in the decision to conduct the first study in this section as a Registered Report. This allowed me to complete large amounts of writing, including the methods of the study, at a much earlier stage than originally planned, while also benefiting from registration and peer review of methods, which I discuss in further detail below.

Registration of methods

The research reported in this section is composed of two studies, both with registered methods. The first (3.1) is a Registered Report, a type of publication that undergoes peer review of methods before the study is conducted. The second (3.2) is a pre-registered study, which involves specifying methods and uploading them to an online repository prior to conducting them. Here I discuss my experiences with each of these forms of registration. First, I outline general reasons for the decision to register these analysis plans, focusing on why registration is important when using secondary data. Next, I discuss the use of Registered Reports and how they benefit research as a whole, outline my experience of writing a Registered Report for 3.1, and reflect on some obstacles that arose as part of the process. Finally, I outline benefits of pre-registration, as well as my experience pre-registering methods for 3.2 in the context of data that I had already partially observed.

Registration and secondary data

As this section uses secondary data, I was conscious of the need to register methods to prevent searching the data for a significant result (known as fishing). While this can be a concern in any study, researchers working with large secondary datasets may be particularly prone to such practices because several possible predictors, covariates, and outcomes may be available in the dataset, and these can easily be added and removed in various combinations until the researcher finds a significant result. This problem can be compounded by changing the way variables are calculated and including or omitting measure items in search of significant results.

To illustrate the availability of potentially relevant variables in the ChiRPP dataset, I revisit my early plans for the first study (3.1), written in the first year of my PhD, where I outlined several variables that may have had a theoretical basis as potential individual predictors of connectedness; in addition to the predictors included (theory of mind, emotion comprehension, and language ability), I proposed use of teacher-report social skills, peer-rated socio-metric status, and birth order. Though I subsequently dropped plans to include these additional variables and instead focused on the researcher-assessed socio-cognitive measures, the presence of additional variables of interest in the dataset suggests how simple it would be, in an unregistered study, to drop non-significant predictors from analyses and replace them with other variables from the dataset aiming to find a significant result. For this reason, in addition to further benefits outlined below, I felt that the use of secondary data in this section made registering methods essential.

Conducting 3.1 as a Registered Report

The first study in this section (3.1) is a Registered Report. The process of writing a Registered Report occurs in two main stages. First, at Stage 1, the researcher submits Introduction and Methods sections to a journal for peer review. Peer reviewers assess the proposed study based on research questions, theory, hypotheses, methods, and analysis plan and may ask questions or provide suggestions for improvements (Chambers & Tzavella, 2022). When the study receives in-principle acceptance, the journal agrees to publish it no matter what the results are, as long as all specified methods are followed. At Stage 2, the researcher then conducts the methods, writes the Results and Discussion sections, and submits the full manuscript for further peer review. At this point, reviewers assess the completed study based on compliance with the Stage 1 protocol and the appropriateness of conclusions drawn from the results, and it cannot be rejected based on the factors reviewed at Stage 1 (Chambers & Tzavella, 2022).

Since their inception in 2012, Registered Reports have been found to have several of their intended benefits for research, including reduced publication bias, increased quality of research, and improved reproducibility (Chambers & Tzavella, 2022). These outcomes are evidenced by a higher proportion of null results, higher ratings of methodological rigour, and a higher proportion of articles with open data and code rated as computationally reproducible when compared to traditional publications (Chambers & Tzavella, 2022).

Noting these many benefits, I decided to write a Registered Report for several reasons specific to my study and circumstances. First, as previously noted, conducting a Registered Report allowed me to re-plan the research timeline in accordance with obstacles presented by the COVID-19 pandemic. Specifically, this meant I could complete much of the design and writing prior to beginning coding (in March 2020, I was in the late stages of developing the coding scheme, planning to begin reliability coding imminently, but encountered obstacles including difficulties with remote data access and limited availability of possible reliability coders). Second, peer review prior to coding provided a considerable benefit with respect to any potential issues with the coding scheme. Given the use of a novel, rather than established and validated, coding scheme, peer review aimed to verify rigour of the scheme before I put research hours into conducting the coding. Alternatively, without pre-study peer review, any major flaws with the coding scheme would not have been possible to correct due to the research hours already put into coding. More broadly, this pre-study peer review aimed to prevent any other significant design flaws, beyond the coding scheme, that may have caused false-significant or false-insignificant results. Third, accounting for group effects in the analytic strategy had not been done in previous studies on connectedness and had only rarely been done in play

research more widely. By accounting for connectedness's inherent interdependence, the analytic strategy more accurately calculated standard errors, making overestimation of statistical significance less likely and decreasing the likelihood of finding a false-significant effect of individual differences. Given this increased likelihood of null results, a Registered Report provided protection against publication bias.

Including a Registered Report in the present thesis resulted in several notable improvements to its methods. Based on comments from peer reviewers at Stage 1, I made several changes to the methods prior to conducting them. These included an increase in the size of the reliability set; improved distinction between and calculation of theory of mind and emotion comprehension measures, aligning both with previous research (Fink et al., 2015; Kuhnert et al., 2017); and the inclusion of a planned exploratory analysis to address any effects of friendship status and inform interpretation of results. Additionally, I encountered several unforeseen benefits associated with writing the Introduction and Methods sections in full prior to observing the data or conducting any analyses. These included the need to specify data processing decisions and make complex analytical decisions about the models prior to constructing them. The data processing decisions made prior to observing data included the conversion of socio-cognitive skill scores to z-scores, not excluding outliers unless they appeared to be mistakes in the dataset, dropping any data that appeared to be systematically missing, analysing connectedness as a rate of total utterances, and calculating two separate connectedness outcomes (connected turns and successful initiations). As this research was my first time using multi-level modelling, writing a plan for a model that I had not yet implemented required a strong understanding of the analytical decisions and their possible implications. For example, by nesting timepoints within child, I was able to maintain power for the model as predictors did not need to be included as three separate variables corresponding to the three timepoints while accounting for the correlation between an individual's score on the measures at each timepoint. However, this decision resulted in being unable to discern from the model whether scores from a certain timepoint showed greater predictive value than others. These benefits of the Registered Report format made it a particularly valuable component of the present thesis.

With respect to the Registered Report format, I also note one downside regarding inflexibility at the analysis stage. During analysis, there were some instances where I discovered minor flaws with the analytical plan but was unable to easily make the desired improvement. For example, including age as a covariate was redundant in the model given the clustering by timepoint, as evidenced by the estimates for the effect of age at 0.000 in both models. As its inclusion results in lower power in the model with no conceptual or analytical benefit, it would

have been logical to improve the model by removing age if I had not already registered the methods with age included as a covariate. Despite this minor issue with the inflexibility of the format, conducting the first study in this section (3.1) as a Registered Report resulted in several notable benefits both to my own practices and to research more widely.

Pre-registration of 3.2

Following my Registered Report experience, I pre-registered the second study in this section on the Open Science Framework. In contrast to Registered Reports, pre-registrations do not involve peer review of methods, nor do they guarantee publication. Instead, the researcher specifies the methods and uploads them to an online repository. This process aims to improve research integrity when compared to traditional publications by encouraging the researcher to make analytical decisions before observing the data (Munafò et al., 2017). Pre-registration boasts many of the same benefits as Registered Reports, though it lacks the key benefits associated with peer review of methods prior to them being conducted. In many cases pre-registration can be more timeline-friendly than writing a Registered Report as there is no need to wait for peer review before conducting the study (though the recently launched Peer Community in Registered Reports aims to counter this time factor while offering the benefits of pre-analysis peer review; Eder & Frings, 2021). Pre-registering research has many benefits to science and research integrity, including preventing researchers from reframing or changing hypotheses after observing results (known as HARKing or Hypothesising After Results are Known) and preventing analytical decisions being made based on statistical significance of the subsequent results (known as P-hacking; Munafò et al., 2017).

These benefits, in the context of the recently completed Registered Report, led to the decision to pre-register the second study. Despite the benefits of Registered Reports, it would not have been possible to conduct this study as a Registered Report both due to timeline limitations and based on requirements for many journals that secondary data must not have been previously observed for it to be used in a Registered Report: an excerpt from the *British Journal of Developmental Psychology*'s Registered Report guidelines states, 'The journal welcomes submissions proposing secondary analyses of existing data sets, provided authors can supply sufficient evidence (e.g. letter from the owner of the data set or an independent verifier) to confirm that they have had no prior access to the data in question' (*Registered Reports Guidelines*). As I had previously observed some of the outcome data while conducting analyses for the previous study (3.1), this ruled out conducting the second study (3.2) as a Registered Report, but it did not prevent pre-registration of methods.

I wrote the pre-registration for the second study (3.2) after completing analysis for the previous study (3.1) and after coding all observations that I planned to use. Having already observed the planned outcome data, it was important to clearly plan and specify via pre-registration how I would use this data. I was careful to both specify any intentional influence my previous observations would have on my plans while acknowledging where I could not prevent potential unintended influences. This meant, for example, outlining the outcome measure clearly, including how it would differ from previously used measures of connectedness, using previous observations of the data to inform these decisions and building on the results of the first study in the plans for the second. For example, the substantial dyadic effects on connectedness found in the first study (3.1) led me to focus only on dyadic predictors and outcomes for the second (3.2), a novel approach informed by the earlier analysis. On the other hand, specifying a directional hypothesis regarding differences in connectedness between the two activities would not have been appropriate as I had already coded the observations, and this could have inadvertently affected my prediction.

Pre-registering provided several notable benefits when compared to the previously discussed Registered Report process, including a quick research timeline and improved flexibility in analysis. Pre-registration allowed me to specify key study information, including research questions, hypotheses, methods, and analysis plan, while also facilitating a shorter timeline and allowing me to begin analysis immediately after completing the plan. Additionally, in contrast to the inflexibility of the Registered Report, pre-registration offered the flexibility to make more major modifications to the analysis based on changes in my own judgement. For example, though I registered multiple models to address the second research question, during analysis I modified this plan to combine the models together. Not only did this simplify analysis and reporting, but it also reduced the likelihood of a false-significant result stemming from conducting multiple statistical tests without correction.

In all, both the Registered Report and the pre-registration procedures were valuable parts of methodological process for the present thesis. Both provided benefits to the rigour and reproducibility of the research based on needing to plan ahead and consider various analytical decisions. Given that many of the methods used in the second study (3.2), including the coding scheme, had been previously registered for use in the first (3.1), pre-registration provided a valuable supplement to this by allowing me to further specify study plans in advance. Conducting both in close succession also demonstrated how each can be beneficial in different ways.

Transcription

Prior to creating the registered analysis plans, I transcribed the video recorded observations of dyadic interactions, specifically the freeplay interaction analysed in 3.1 and 3.2 and the goal-directed drawing interaction analysed in 3.2, with the support of a research assistant in preparation for subsequent coding and analysis. Here I briefly describe key elements of the transcription manual and the development of transcription process as these are directly relevant to decisions made when developing the coding scheme, which is described subsequently. Because I developed the transcription and coding schemes concurrently, in many cases my intentions for coding informed decisions for transcription and vice versa. The full transcription manual is included in Appendix 3.1.1.

In summary, transcription began when both children were on camera and the researcher had left the room, and it paused each time a child was no longer visible or the researcher re-entered. Transcription continued if children were off-task (i.e. if they were not actively engaged with the activity provided) as long as they remained on-camera. I transcribed children's talk verbatim, noting uncertain or indecipherable words or utterances and adding my own comments as needed for context or explanation. I did not transcribe pauses, intonation, pitch, or non-verbal noises as I intended to code from transcripts but refer to the recorded videos in certain cases. All utterances had a timestamped beginning and end point to the nearest 0.5 seconds and could overlap with utterances by the other speaker.

Though many of the decisions during the transcription manual's development were based on clear advantages to the transcription process or necessity for the planned analyses, some decisions were less clear cut. For example, at an early stage of designing the transcription manual, one of the major decisions was on how to define turns. I initially planned to define a turn as bound by the other speaker's utterances both for simplicity and to align with the procedures of previous studies on connectedness and similar constructs in children's conversations (Göncü, 1993; Slomkowski & Dunn, 1996). While this would have simplified transcription in many ways, it would have complicated the transcription in cases where children would speak at the same time or overlap their utterances. Additionally, it would have led to long turns that may cover several topics, especially in cases where neither child speaks for a long period, complicating the subsequent coding decisions. I therefore defined utterances as bound by the other speaker's utterances or a gap of 5 seconds. Other studies on connectedness similarly define utterances as bound by the utterances of the partner or by a gap, though Leach et al. (2019, 2021) use shorter gaps of 3 seconds while Dunn and Cutting (1999) use longer gaps of 20 seconds in their definitions.

Coding

The development of a coding scheme to quantify connectedness was a substantial element of the present research. This process began with a brief survey of available coding schemes for connectedness. Next, I coded a small sample of ChiRPP observations from an earlier timepoint that were not used for the present research to determine where issues may arise. Finally, I developed a novel coding scheme that would allow for both individual and dyadic analyses of connectedness. I outline each of these steps here, beginning by discussing existing coding schemes for dyadic interactions and the decision to focus on connectedness as a construct for coding, then describing the sample coding process, and finally outlining the design of the coding scheme used in the present research.

Existing coding schemes

Many coding schemes have been developed for analysis of dyadic interactions, and several of these incorporate elements of the initiation and response patterns seen in connectedness that may be relevant to the analysis of intersubjectivity (for examples, see Funamoto & Rinaldi, 2015). In most cases, these schemes focus on behavioural observations and how each member of the dyad responds to the behaviours of the other, though some also consider qualities of verbal exchanges. For the present research, I focused on analysing verbal exchanges through connectedness and did not directly analyse non-verbal behaviours.

Connectedness is generally defined based on the topical links in partners' talk (e.g. Brophy & Dunn, 2002; Dunn & Cutting, 1999; Ensor & Hughes, 2008; Leach et al., 2019; Slomkowski & Dunn, 1996; for one exception see Clark & Ladd, 2000). This lack of behavioural consideration may be a downside of selecting connectedness for analysis when compared to other dyadic constructs. This may leave out some information relevant to the broader research questions defined, such as limiting the extent to which the behavioural cues that occur as part of social communication can be observed. However, in some cases, connectedness coding has included connections to behavioural cues. For example, Brophy and Dunn (2002) define a connected utterance as one that is 'logically related to the other person's, regardless of whether it was related to the verbal or non-verbal behaviour of the other person' (p. 107). While coding in such a way could provide richer data for analysis, such coding may not be as relevant in the ChiRPP sample, which is slightly older than the sample in Brophy and Dunn's (2002) study. In addition, Brophy and Dunn's (2002) focus was mother-child interactions, where the mother's sensitivity or responsiveness to the child's behaviours is a relevant consideration in mother-child intersubjectivity. For the present research, behavioural cues were only considered

in that they were used to make coding decisions when the connectedness of an utterance was unclear.

When designing the coding scheme, I began by adapting the Leach (2016) connectedness coding scheme because it has been established as appropriate for use in child dyads of a similar age to those in the present research and has been used to compare across relationship types (siblings and friends; Leach et al., 2019). However, I decided to move away from using the Leach (2016) coding scheme and instead to develop my own to allow the use of the same codes for both individual and dyadic connectedness calculations, which may have been less feasible with the Leach (2016) coding scheme. Here I discuss the Leach (2016) coding scheme to frame the subsequent development of my own coding scheme.

The Leach (2016) coding scheme has been used to measure connectedness in peer and sibling dyads (Leach et al., 2019). The scheme was adapted from the scheme used by Ensor and Hughes (2008) and involves categorising each utterance that a child makes as an *initiation*, as *connected*, or as *other*. An initiation occurs when the child ‘initiates (or attempts to initiate) a new topic in the play’ (Leach, 2016, p. 1). An utterance is coded as connected if it is ‘semantically related to the partner’s previous turn (which could be either an initiation or connected) and sustains the interaction’ (Leach, 2016, p. 1). Finally, any utterance or talk that does not fit into either of the previous categories (e.g. self-talk) is coded as other (Leach, 2016). After this, there are several possible sub-codes. Utterances coded as initiations can be sub-coded as either *initiation-connected* or *initiation-end*. Initiation-connected occurs when the initiation is followed by a connected utterance from the partner. Initiation-end occurs when the initiation is not followed by a connected response from the partner. Utterances coded as connected can be sub-coded as either *connected-sustained* or *connected-end*. A connected-sustained utterance is not only connected to the partner’s previous utterance but also elicits a connected response from the partner. A connected-end utterance is connected to the partner’s previous utterance but does not elicit a connected response from the partner. Finally, other utterances may include *self-talk* (which could include noises) and *unclear statements*. Table 3.3.1 shows the relationships among these codes with some examples. Though I did not apply the Leach (2016) coding scheme in the present research, it was influential in the decision making for my own coding scheme development, which I discuss below.

Coding scheme development

Following exploration of various connectedness coding schemes, I began developing a coding scheme for use in the present research. This was informed by other existing schemes,

most notably by Leach (2016). This process began with sample coding of freeplay observations from the first ChiRPP timepoint to explore various options for coding and uncover any issues that may arise. Here I provide examples of some decisions made during this process, including how they informed the development of and changes to the coding scheme prior to registration of the scheme as part of the Stage 1 Registered Report. I end by briefly describing the final coding scheme, the manual for which is included in full in Appendix 3.1.2.

Several questions about coding practices arose during sample coding regarding what counts as connected and what does not. For example, does laughter count as connected? For the present study, laughter was not counted as connected as it was not considered a great enough indication of understanding or building on the partner's utterance. Another similar example was, does repetition count as connected talk, or does the child have to say something different but topically related for it to count as connected? For the present study, repetition was coded as connected. This is because it implies some level of interest in the partner's utterance and may also indicate that the children are on the same page or able to understand one another's ideas.

Table 3.3.1: Leach's (2016) connectedness coding scheme.

Code	Sub-code	Example
Initiation	Initiation-connected	Child 1: 'They're even bigger than the house.' (Initiation-connected) Child 2: 'No, because you didn't put the roof on.' (Connected-end)
	Initiation-end	Child 1: 'This is, this is like restricted area.' (Initiation-end) Child 2: 'Nah nah nam nam.' (Self-talk)
Connected	Connected-sustained	Child 1: 'Wait. I think this goes like this. Nope, need a red one.' (Initiation-connected)
	Connected-end	Child 2: 'Maybe this goes on that. Nope. What else might go on it?' (Connected-sustained) Child 1: 'This might go on it... Nope. This! This! Yes! That goes on it.' (Connected-end)
Other	Self-talk	Child 1: 'Ch ch ch ch ch [train noises].' (Self-talk)
	Unclear statement	

Note. All examples quoted from Leach (2016, p. 1-2) with some minor modifications.

Table 3.3.2: *Connectedness coding scheme developed for the present research.*

Category	Code	Example (Connected turn, successful initiation)
Connected turn	0 (Not connected)	Child 1: ‘Wait. I think this goes like this. Nope, need a red one.’ (0, 1) Child 2: ‘Maybe this goes on that. Nope. What else might go on it?’ (1, 1)
	1 (Connected)	
Successful initiation	0 (Not connected)	Child 1: ‘This might go on it... Nope. This! This! Yes! That goes on it.’ (1, 0)
	1 (Connected)	

Note. Examples quoted from Leach (2016, p. 1-2) with some minor modifications.

Beyond questions about what does or does not count as connected, another question that arose during sample coding was how to approach an ongoing conversation with two main topics, where an utterance may not necessarily be connected to the utterance made immediately prior but instead may be related to an earlier utterance. Although these instances would not be considered connected based on some other coding schemes (e.g. Leach, 2016) as there is no topical connection to the previous utterance, there is still an indication of interest and shared understanding. To encompass situations like this, I considered coding based on up to two or three prior utterances. However, this may have raised problems in certain circumstances: for example, if one child is speaking significantly more than the other, it is likely that the talkative child will eventually say something related to one of the previous few utterances of the less talkative child, possibly coincidentally. Based on the definition of utterances as bound by the other speaker’s utterances or a gap of 5 seconds, I decided to code connectedness within 5 seconds of a target utterance. This allowed utterances to be connected to any of the partner’s utterances within the 5 seconds, not just the immediately preceding utterance.

Following these decisions during sample coding, I finalised the coding manual for submission with the Stage 1 Registered Report. In brief, the final coding scheme involved coding connectedness by utterance, assigning each utterance two codes. Each utterance was assigned one code regarding whether it was a *connected turn* and another regarding whether it was a *successful initiation*. For each category, utterances were assigned either ‘0’ if they were not connected or ‘1’ if they were connected. To be coded as connected for connected turns, an utterance needed to be topically related to any utterance by the partner within the previous 5 seconds. To be coded as connected for successful initiations, an utterance needed to be topically related to any utterance by the partner within the following 5 seconds. Utterances could be

coded '1' for both or neither code; in other words, the codes were not mutually exclusive. Additionally, utterances could be connected to multiple utterances by the partner; while this does not change the '1' code for the target utterance, it means that the partner's utterances are also coded as '1' for connected turns or successful initiations, as appropriate. As general rules, utterances were not considered to be connected if the topical connection appeared to be coincidental. Likewise, utterances were considered to be connected if clearly said in response to the partner, even if the precise topical connection was unclear. Table 3.3.2 summarises the coding scheme and provides sample coding using Leach's (2016) examples for comparison.

Ethical considerations for secondary data

There are many ethical considerations to be made when working with secondary data. Among these, a review of the ethical considerations made for the original ChiRPP study was appropriate. Following these, I made additional considerations regarding my own use of the data for the present research.

Considerations made for the original study

Before agreeing to participate in the ChiRPP study, parents were informed of the study's purposes and procedures and were given the opportunity to ask questions as needed. Parents received a consent form, an information sheet, and the contact details of the lead researcher. No adverse consequences to participating in the study were identified. Children whose parents consented to their involvement in the study were told the purpose of the study and that they could withdraw at any time. Children were provided with an information sheet that explained the details of the study, including the broad research questions for the study ('How do you play with your toys?', 'How do you play with your friend?', and 'How did you make friends with your friends?'). It also outlined a few of the tasks in which the children would participate (e.g. 'I'll also ask you to tell me a bit about your friends.'). Only children who gave verbal assent participated in the study.

Ethical issues relating to the use of sociometric nominations in research with children, such as those used in the ChiRPP study, have been raised as potential concerns by researchers such as Mayeux et al. (2007). These include the possibility that children may be upset by testing procedures and the possibility that children be treated differently by peers following testing (Mayeux et al., 2007). However, they found in their study of children in primary school that children's and teachers' reports did not reveal any negative emotional outcomes to testing nor differential treatment by peers following testing (Mayeux et al., 2007). Other studies have

found similar results: Bell-Dolan et al. (1989) observed no changes in mood or reports of loneliness and no differences in social interaction behaviour for children who took part in sociometric procedures when compared to a control group, and Iverson and Iverson (1996) found no indications that any harm was caused by sociometric procedures and that many children reported enjoying taking part in sociometric testing, though they enjoyed making negative nominations the least. Following these considerations, it was determined that sociometric nominations would be ethical for use in the ChiRPP study.

Considerations made for the present research

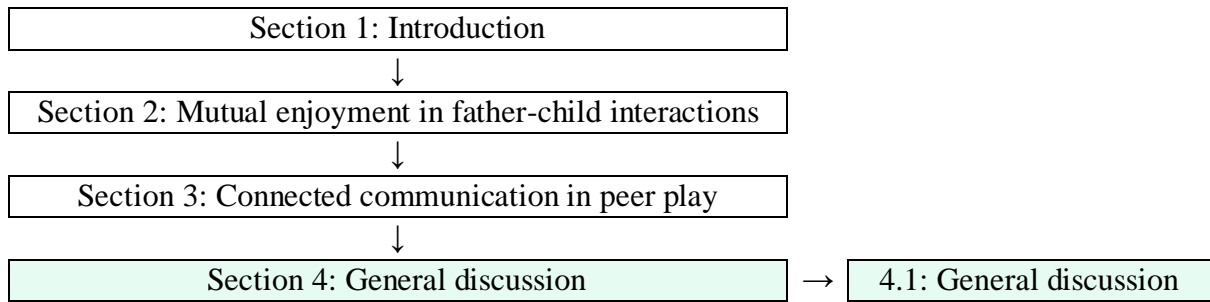
As these studies used secondary data gathered from children, it was important to consider the unique ethical issues of this situation. These considerations included maintaining confidentiality by following protocols for anonymity of data. The video observations I used included participants' faces, first names, and schools. Video data, as is protocol, was stored in the Faculty of Education on encrypted servers and not on personal devices, and the research questions were checked by the lead researcher on the ChiRPP study for ethical considerations relating to the content of the questions. The questions were approved with no issues arising based on their content. Following ethical approval of the study's methods, one further ethical consideration arose: in one dyad's goal-directed drawing observation, the participants tell the camera to stop recording soon after the researcher exited the observation room. In this case, I interpreted this as a withdrawal of assent and did not transcribe nor code the goal-directed drawing observation for analysis.

Conclusion

The research presented in Section 3 provides evidence for the dyadic influences on children's communication during play and across activities. This chapter provides additional details on the key methodological decisions made across the section to offer insight into how these results and conclusions were reached. In doing so, I provide additional context for the research presented, such as fundamental design choices that went into the development of my coding scheme, and discuss the implications of these decisions for the research. The research reported in this section also has wider implications for researching children's social play, which are discussed in Section 4.

Section 4:
General discussion

4.1: General discussion



Chapter overview

This chapter ends the present thesis with a discussion of the theoretical and research implications of the previously reported studies, focusing on intersubjectivity and social play. It begins by briefly outlining the key findings of this thesis before discussing them and providing recommendations for future research. First, it presents play with others as a social activity, centring intersubjectivity as a key component of social play and considering how this conceptualisation can be used to understand autistic social play. Then it discusses the relationship between intersubjectivity and social cognition, suggesting that conceptualising children's understanding of others' minds as intersubjective can better explain how children form social connections than theories focused on individual knowledge. Next, it explores how factors beyond the individual influence social play by discussing the influence of the play materials, the research setting, and the cultural context. Following this, it ends with methodological recommendations for future research, including a proposition for more mixed-methods research in this area and an emphasis on the importance of longitudinal research. Throughout this chapter, I draw on the results from all three studies and continue to highlight by participant using the previously established colour scheme when quoting Section 2 interviews.

Key findings

To begin this discussion, I outline the key aims and findings of this thesis across the three studies reported, which are summarised in Table 4.1.1. Together, the results from these studies show how factors beyond the individual can inform our understanding of social play, providing insight into the social component of play and showing how the environment, including but not limited to the activity context, can influence intersubjectivity.

First, Section 2 uncovers fathers' perspectives on early intersubjective interactions, focusing on play and book sharing. Through reflexive thematic analysis of qualitative interviews, 2.1 finds that fathers viewed play and book sharing as opportunities to bond with their young children and most enjoyed engaging in activities they felt served a purpose. Fathers shared that social interaction and communication, physical contact and affection, and getting to know their children better all supported bonding. Additionally, fathers' enjoyment of purposeful activities centred on their feelings of success and validation and their views of their parenting roles.

Next, Section 3 explores influences on children's intersubjective communication with their peers. Through multi-level modelling of secondary data, 3.1 untangles dyadic and individual effects on children's connected communication, finding a substantial dyadic effect but no significant influence of individual children's socio-cognitive skills. To build on these findings demonstrating the importance of group effects, 3.2 further explores dyadic influences by assessing which dyadic characteristics influence connected communication across freeplay and a goal-directed drawing activity. It found both activity and dyadic effects on communication, where dyads engaged overall in significantly more connected talk during goal-directed drawing than during freeplay, with reciprocal friends engaging in more connected talk than non-friend peers during freeplay and non-friend peers engaging in more connected talk than reciprocal friends during goal-directed drawing.

Together, these studies provide insight into the social component of play, where fathers in Section 2 reported bonding and building relationships as key incentives to engage in play and book sharing, and group influences on children's communication across both studies in Section 3 were substantial. This is evidenced through intersubjectivity, which in Section 2 involves fathers referring to behaviours such as exchanging smiles, pointing, and directing attention as promoting bonding. Likewise, Section 3 shows how intersubjective communication is influenced by social relationships, where the relationship between partners facilitated connected communication differently across activities. Finally, these studies show how the environment, most concretely the activity context, can affect intersubjective interactions, where fathers in Section 2 discussed the benefits of calm activities such as book sharing for bonding with their children, and in Section 3 children were found to engage in higher quantities of connected talk during a goal-directed drawing activity than during freeplay. In all, these studies reveal how intersubjectivity manifests in children's social play and early relationships and is influenced by various factors beyond the individual.

Table 4.1.1: Summary of findings.

Study	Research question	Finding
2.1	What are fathers' perspectives on their book sharing and play interactions with their young children?	Fathers viewed play and book sharing as opportunities to bond with their young children and most enjoyed engaging in activities they felt served a purpose.
	How do different interaction contexts foster feelings of mutual enjoyment for fathers when interacting with their young children?	Fathers bonded with their children through activities that promoted social interaction, communication, physical contact, and affection.
3.1	How much of the variation in connected talk during play can be explained by variation between dyads?	There was a substantial dyadic effect on children's connected communication.
	To what extent do children's individual differences in theory of mind, emotion comprehension, and language ability, concurrently and at two earlier timepoints, predict their engagement in connected talk with a partner during play?	There was no significant evidence for the influence of individual socio-cognitive skills on connected talk.
3.2	Is there a difference in the rate of dyads' connected talk between freeplay and a goal-directed drawing activity?	Dyads engaged in significantly more connected talk during goal-directed drawing than during freeplay.
	Are there interactions between activity context and dyadic variables in our dataset in predicting connectedness?	Reciprocal friend dyads engaged in more connected talk than peer dyads during freeplay but not during goal-directed drawing. There was no significant interaction between dyad sex and activity context.

Play as a social activity

The evidence in this thesis presents play with partners as a fundamentally social activity, where social incentives and bonding were key for fathers' enjoyment of play in Section 2 and where considerable social and group influences on children's communication were observed in Section 3. These findings have implications for the way social play is theorised and researched, where intersubjectivity must be central to the conceptualisation of social play. In addition to the methodological importance of considering social influences on play, previously discussed in 3.1, these findings have wider implications for how play is viewed beyond the individual.

Major theories of child development have long viewed play, and particularly pretend play, as an individual activity (Göncü & Gaskins, 2010). For example, neither Piaget nor Vygotsky consider in detail how social pretend play is constructed between partners (Göncü & Gaskins, 2010). Piaget (1945) proposed that pretend play is an individual activity, serving the function of reliving and making sense of individual experiences and personal interests through egocentric thought. This can be seen through his ideas about children's play communication, which he characterised as egocentric and rarely connected to the play partner's talk, though more recent evidence disputes this idea (Eckerman et al., 1989; Garvey & Hogan, 1973; Mueller, 1972; Piaget, 1926). This oversight may in part be explained by Piaget's (1945) focus on play in young children, as he suggests that play decreases in frequency by middle childhood and overlooks the importance of social play in older children. Likewise, Vygotsky (1967) focused on the individual child in constructing pretend play, though he did acknowledge that pretend play is a social activity in that it provides opportunities for a child to process social information, for example by enacting pretend parent-child relationships. Despite this acknowledgement, Vygotsky's theories fail to address the social processes of play itself (Göncü & Gaskins, 2010). Göncü and Gaskins (2010) suggest that this oversight by key theorists has led play researchers to continue viewing play in an individual manner, failing to account for social and cultural influences on play. The implications of this oversight include assuming that wide social and cultural contexts have no effect on children's play, leading play to be considered as universal in its development, expression, and outcomes. Göncü and Gaskins (2010) instead propose that play cannot be understood without considering social processes. Focusing on social pretend play as an opportunity to view social processes in action, Göncü (1993) suggests that intersubjectivity is key for partners to create a shared pretense scenario together through negotiation of plots, goals, and roles.

Göncü and Gaskins (2010) propose that play is influenced by both the individual child and the child's social experiences, requiring a social viewpoint to fully understand its purpose and consequences for development. This proposition is supported by the present research, which in 3.1 finds substantial dyadic effects on the way children communicate during social play when exploring children's intersubjective communication. These findings provide further evidence for the idea that social play cannot be comprehensively researched when considered as an individual activity and must be viewed as an intersubjective social experience. Specifically, by accounting for both individual and dyadic influences on communication, 3.1 reveals considerable social influences on intersubjective coordination between play partners. Likewise, fathers in 2.1 shared that the social elements of play and book sharing interactions with their infants were what made these interactions enjoyable and supported bonding in the pair, and this evidence that play is a fundamentally social activity has implications theoretically and for future research.

In contrast to theoretical oversights previously discussed with respect to pretend play, some theories have focused on the social nature of play (Coplan et al., 2006). For example, Parten (1932) proposes two types of socially-defined play, now most often referred to together as social play (Coplan et al., 2006): play in which children interact and discuss a shared activity without coordinating their actions or attempting to achieve a goal, and play in which children coordinate their actions to achieve a shared goal (Coplan et al., 2006). Likewise, Bateson's (1955) focus is social play, theorising about the co-construction and maintenance of play through communication inside and outside of the play scenario. Building on these social play theories, Göncü (1993) explores intersubjectivity in preschool-aged children's social pretend play, suggesting that social pretend play in particular is not possible without intersubjectivity.

Research into social pretend play has found that intersubjective techniques for exchanging knowledge and creating a shared understanding, such as building on the partner's ideas, increase during the preschool years and become more complex (Farver, 1992; Göncü, 1993; Göncü & Kessel, 1984). This reciprocal communication of shared meanings allows partners to build an intersubjective understanding of play elements and facilitates social pretend play (Howes, 2010). The results reported in Section 3 expand these findings into older children and demonstrate how the use of these techniques can vary based on social factors, such as the relationship between play partners, rather than simply the individual child's development. Section 3's findings regarding the group and social influences on play directly support the proposition by Göncü and Gaskins (2010) that play is socially constructed and influenced by factors beyond the individual.

Farver (1992) suggests social pretend play may be a unique context in children's communication for creating shared meanings as the communicated meanings do not align with the child's known reality. This means partners create and exchange shared knowledge about a pretense scenario that builds on, but does not necessarily align with, their shared knowledge of the world and may be why social pretend play has been prominently investigated in intersubjectivity research. The present studies expand this idea beyond social pretend play, looking at intersubjectivity across several activities and demonstrating not only that intersubjectivity is evident across several activity contexts, where intersubjective communication strategies are more frequent in a goal-directed drawing task than in freeplay, but also how these activity factors beyond the child's own skills and knowledge can influence intersubjectivity in social play.

Conceptualisation of social play as an intersubjective experience has direct implications for future research. Våpenstad and Bakkenget (2021) suggest that intersubjective interactions can be applied in child rights and decision making contexts to allow pre-verbal infants' voices to be heard in matters that affect their lives, and this principle can be applied directly to research with young children. They encourage adults to engage directly with children, which will increase awareness of infants' intentionality and allow them to interpret infants' wishes (Våpenstad & Bakkenget, 2021). O'Farrelly (2021) stresses the importance of listening to even the youngest children's voices in research, from qualitative research via interviews to quantitative research such as randomised-controlled trials. Future research with children can use intersubjective interactions to change the way adults involve children and support children's direct participation in the research process.

Beyond these implications, investigating the intersubjective nature of social play may also be of relevance to research on autistic social play, including the coordination of conversations. In a study on intersubjectivity during video gaming, Heasman and Gillespie (2019) found that autistic adults achieved intersubjectivity through various conversational means. For example, they recognised a pattern of participants shifting the conversation topic with the assumption of common ground, such as with reference to a film, followed by highly coordinated intersubjective exchanges if the partner understood the reference. Interestingly, a study on a small sample of autistic boys aged 3 to 6 years found that engagement in connected conversations with their mothers was stable over this period even while structural language skills progressed (Tager-Flusberg & Anderson, 1991). While it would not be appropriate to speculate about generalisation of Section 3's findings to a population not represented in its sample, Tager-Flusberg and Anderson (1991)'s finding in a younger sample of autistic children provides an indication

that connected conversations may not increase in frequency alongside advances in autistic children's socio-cognitive skills. An important recent finding comes from Pritchard-Rowe et al. (2023)'s study of autistic adults' play experiences, who found that many in their sample enjoyed social play that does not require coordination with the play partner. Participants referred to "play that takes place in close proximity to others but without requirement for interaction or collaboration" (Pritchard-Rowe et al., 2023, p. 5) as particularly enjoyable. This suggests that for autistic children, an intersubjective play experience may involve togetherness with another child without the need for a shared goal or the exchange of ideas.

Viewing autistic social play and communication as intersubjective may be particularly important because until recently autism research has widely focused on individual measures and deficit-based models. Milton (2012) proposes that difficulties in communication identified as characteristics of autistic individuals are actually problems in the social interaction experienced by both the autistic and non-autistic person in the dyad. Findings that autistic people often prefer to play with other autistic people and find these interactions less draining than playing with non-autistic people suggest the importance of the play partner and dyadic characteristics in autistic play (Pritchard-Rowe et al., 2023). In their study of autistic play, Pritchard-Rowe et al. (2023) found that autistic adults discussed the importance of social play for bonding and connecting with others. They found many autistic adults had a preference for playing with other autistic people (Pritchard-Rowe et al., 2023), possibly suggesting that shared experiences or similarities to the play partner were important. Pritchard-Rowe et al. (2023) also propose that this may be because autistic communication is different from non-autistic communication, resulting in autistic people finding it easier to communicate with one another than with non-autistic people (and possibly vice-versa, as in the "double-empathy problem"; Milton, 2012, p. 884). This dyadic view of social play should be applied in future research into social play, including on autistic social play, to appropriately consider how the dyadic and intersubjective nature of play is experienced by autistic children and adults.

Intersubjectivity and social cognition

Intersubjectivity is seen as children's first experience of others' minds, with interactions such as those in Section 2 viewed as particularly important for infants' developing understanding of others. According to Trevarthen (2011), infants are eager to engage and form social connections with others and are "motivated from birth to experiment with the exchange of fantasies and to find meaning in them" (Trevarthen, 2008, p. vii), with primary intersubjectivity

being infants' earliest opportunities to explore their social world. This is evidenced in part by infants' contributions to face-to-face interactions as early as 6 weeks old and continuing through the first year (Cohn & Tronick, 1987, 1988; Murray & Trevarthen, 1986). By school-age, intersubjectivity materialises through complex social interactions and is a key component of coordinating social play beyond individual social cognition, as indicated by the dyadic nature of intersubjective social interactions in Section 3. Here I discuss the concept of intersubjectivity and what it means for children's developing understanding of others, focusing on theorists who view social development as more complex than can be explained by individual-focused approaches alone.

Mainstream psychology has widely considered children's social lives from an individual perspective (Zlatev et al., 2008). According to Zlatev et al. (2008), this approach can be characterised by a conceptual separation between one's own and others' minds and a requirement that the individual learn to bridge this gap by applying cognitive skills to explain and predict others' behaviour. However, a growing number of theorists believe that this approach does not sufficiently explain children's understanding of others, suggesting that some of the fundamental questions of social cognition need reframing for consideration through a social lens, rather than an individual lens (Zlatev et al., 2008). Zlatev et al. (2008) propose that an intersubjective approach can be used to more comprehensively explain how children understand others, expanding beyond the cognitive component of sharing experiences to encompass the sharing of experiences through embodied interaction, including perception, imitation, and gesture (Zlatev et al., 2008). Likewise, Sinha and Rodríguez (2008) criticise the practice of reducing social constructs to theories attempting to explain individuals' minds, proposing instead that intersubjectivity is a participatory experience that explains what happens between people. They suggest that intersubjectivity should not be equated with individuals' shared knowledge as this view still focuses on what goes on inside individuals' minds; instead, this shared knowledge results from the intersubjectivity that exists between people (Sinha & Rodríguez, 2008). This view of how children understand others as more complex than can be explained by individual processes alone has the potential to provide a more comprehensive way of thinking about social cognition and the social play interactions analysed in this thesis.

This social approach can also provide a more accurate and representative conceptualisation of natural interactions. Gallagher and Hutto (2008) argue against theory of mind approaches as not representative of how children actually interact with one another, instead suggesting that Trevarthen (1979)'s ideas of intersubjectivity show how interactions occur in practice and can form a basis for theories aiming to explain social interactions throughout childhood

and into adulthood. They contend that one issue with false belief experiments, for example, is that they test explicit theory of mind processes, whereas in practice these processes do not appear explicitly in natural social interactions (Gallagher & Hutto, 2008). As seen in 3.1, there was no evidence that children were drawing on the measured individual socio-cognitive skills in their social interactions; though it is not possible to conclude why this was the case, reconsidering how socio-cognitive competencies can be measured in more applied and practical ways may shed light on the processes children employ in such interaction contexts. Even much earlier, Gallagher and Hutto (2008) emphasise that infants experience and interpret others' expressions, gestures, and movements through face-to-face interactions and primary intersubjectivity long before they are capable of speculating about explicit beliefs and desires or passing false belief tests, suggesting that the practical component of understanding others is not comprehensively captured by explicit testing. By the time secondary intersubjectivity develops, infants are able to understand that the communication partner has desires and intentions linked to an object despite not yet being able to explicitly model these perspectives: "[T]he other person *wants* food or *intends* to open the door" (Gallagher & Hutto, 2008, p. 23). By thinking about measurement of social processes in an intersubjective manner, research can more accurately reflect children's natural interactions.

There are wide and varied attempts to explain how children understand their social worlds. An intersubjective approach takes on this task, encompassing complex factors that cannot be accounted for by individual explanations alone. By embracing a view of play and interaction as intersubjective and inherently social, research can begin to build on and progress our current thinking to encompass what happens between individuals in natural settings. Such questions can shed further light on the experiences of bonding described by fathers in Section 2 and uncover more about how children such as those in Section 3 create pretend play worlds, characters, and plots together.

The environment for social play

The environment for play has generally been overlooked in previous research (Howe & Leach, 2018), which has primarily focused on individual influences on play. This is despite wide acknowledgement of the importance of the environment for child development (Sameroff, 2010). To comprehensively understand development, research must look beyond the individual's influences to consider how the individual and environment may influence each other in a transactional manner. Importantly, in the transactional model of development, these child and

context factors are not viewed as independent but as mutually affecting one another (Sameroff & Mackenzie, 2003). The complexities of these factors means that considering them independently would provide an incomplete picture, though it would be impossible to measure or even conceive of all possible influences. Each of the elements of the environment considered here can be viewed as transactional with the individual child's characteristics.

The play environment may include various wide-ranging characteristics (Howe & Leach, 2018), several of which are explored directly and indirectly in this thesis. The differences in fathers' perceptions of play and book sharing in Section 2 and the differences in children's connected communication across activities in Section 3 demonstrate how the environment can impact intersubjectivity in social play beyond the influences of the individual and have implications for how we view the play materials, the research setting, and the cultural context in which play occurs. For the present discussion, I focus on these three characteristics of the play environment and discuss them in relation to the results of the present thesis to consider factors beyond the individual as important for intersubjectivity in social play. I focus on these as elements of the social environment that are not directly analysed or discussed in the previous thesis sections but may be implicated by its findings.

The play materials

Play with different materials⁵ is likely to promote different behaviours and experiences, evidenced by both differences in fathers' perceptions of the father-child activities in Section 2 in addition to differences in connectedness between the peer activities in Section 3. The present thesis explores four different activities: a father-child toy play activity (2.1), a father-child book sharing activity (2.1), a peer freeplay activity (3.1 and 3.2), and a peer goal-directed drawing activity (3.2). These activities can largely be distinguished based on the materials available, as outlined in Table 4.1.2, which may promote intersubjectivity in different ways. Focusing on the materials provided, these activities provide contexts for comparisons between play with toys and books in Section 2 and between play with toys and drawing materials in Section 3.

Murray et al. (2022) propose that book sharing interactions may be a unique context for developing intersubjectivity. This may be because books provide a shared focus for joint attention and facilitate the creation of shared knowledge based on the book's content. Additionally, behaviours such as pointing at and talking about pictures may support the creation of or result

⁵ Though the father-child book sharing activity in Section 2 and the peer goal-directed drawing activity in Section 3 have not been explicitly named as play in this thesis, they can be considered on the continuum of play proposed by Krasnor and Pepler (1980), and similar activities have been classified as play in previous research (Amodia-Bidakowska et al., 2020; Kukkonen & Chang-Kredl, 2018).

from a shared intersubjective space. This idea is supported by the way fathers in Section 2 discussed book sharing as providing an opportunity for closeness and bonding, often referring to their child's interest in the book as enjoyable. For example, one father mentioned the content of the book as engaging for his child, who showed interest by pointing at the pictures: 'The book's colourful. It's got lots of pretty colours in it so started off really well. So for the first like two minutes she's just sort of like leaning (on you) her little head pointing at all the different pictures.' (Participant B, talking about his child's engagement during book sharing) This father spoke about his child pointing at the pictures and directing his attention to parts of the book, demonstrating how books can provide a context for intersubjective interaction to occur: 'The fact that she smiles and points things out, it's just like she's really trying to pay attention or draw your attention to something, so it was just like this little extra bit of bonding.' (Participant B, talking about bonding during book sharing)

Table 4.1.2: Materials available in activities.

Activity	Materials
Father-child toy play (2.1)	Any toy(s)
Father-child book sharing (2.1)	Any book(s)
Peer freeplay (3.1 and 3.2)	PlayMobil treehouse toyset (Figure 4.1.1)
Peer goal-directed drawing (3.2)	PlayMobil treehouse toyset (Figure 4.1.1)
	1 pad of paper
	Limited felt-tip pens

Likewise, the finding in 3.2 that peer and friendship dyads engaged in more connected talk during goal-directed drawing than during freeplay suggests a possible effect of the materials provided. The drawing materials may have provided a shared focus, like the books in Section 2, as dyads focused on the pad of paper, discussed what they were drawing, and talked about which coloured pens to use. The drawing materials may have also supported children to focus on particular toys within the toyset, possibly by honing in on drawing the branches or particular animal figures, and supported intersubjective communication in this way. For example, dyads often chose to focus on drawing certain toys from the toyset, and some placed individual toys on the pad of paper to trace around them. This more focused attention to just a few toys may have supported greater levels of intersubjectivity when the drawing materials were available compared to the toyset alone.

In comparison, the wide range of toys available as part of the provided toyset (Figure 4.1.1) for freeplay in Section 3 may have reduced the likelihood of joint attention to or shared

discussion of particular toys within the toyset. However, despite this evidence, toys may provide some intersubjective interaction opportunities. For example, fathers in Section 2 often discussed sharing laughter when playing with toys, a strong indication of intersubjective play. One father described his son's laughter while they played with a ball together, describing how they created a shared play experience as they lay on their backs and threw the ball in the air: 'He lay down next to me, so we were throwing it up and down, and I was catching it, and he was laughing. [...] He started to try and throw it in the air and catch it the same as me. [...] I was giving him the ball, and he was throwing it, and then I was getting it back, and I was throwing it. [...] He was just laughing the whole time, so I think he really enjoyed that.' (Participant A, talking about playing with a ball) This example suggests that this intersubjective shared attention to a particular toy or object allows partners to create a shared understanding of the play goals and rules. In 3.2, this creation of an intersubjective play space using a small number of the provided toys may have been easier for friendship dyads, when compared to peer dyads, as friends may have been better able to focus on just a few of the toys to create this shared play space. On the other hand, peer dyads may have found it difficult to create this intersubjective space for play with the wide range of toys provided.

Figure 4.1.1: PlayMobil treehouse toyset provided for Section 3 freeplay.



Image: Playmobil – Wildlife – 5557 Adventure Tree House

The materials used in the present thesis provide insight into how books, drawing materials, and toys can support children's intersubjective interactions. They provide support for the idea that play materials such as books can provide a shared point of focus for intersubjectivity while expanding on Murray et al.'s (2022) proposition that book sharing in particular provides opportunities for intersubjective interaction. Findings from across the studies in this thesis demonstrate how the materials available, as well as a shared focus on these materials, have a role in intersubjective interactions. This has implications for educational practice, where the toys and materials on offer in classroom activities may facilitate social interactions in different ways. More generally, these ways that different play materials can support intersubjective interactions further demonstrate how the development of intersubjectivity in social play is influenced by factors beyond the individual.

The research setting

The research setting has been shown to influence children's behaviour during observations (Smith, 2010), which in this thesis may have impacted how participants engaged in intersubjective social play. The present studies use naturalistic interactions in Section 2 and semi-structured observations in Section 3 to gather information about children's early social play. In Section 2, father-child dyads engaged in recorded naturalistic interactions of play and book sharing, which I did not view but used as a topic for later discussion during qualitative interviews. In Section 3, peer dyads engaged in recorded semi-structured observations of freeplay and goal-directed drawing, which I quantitatively coded from videos for analysis. Here I discuss the value of these research settings and how decisions regarding the format of interactions may have affected participant behaviours and experiences. More broadly, I propose that the environment for observation is important to consider with respect to intersubjectivity, focusing on how the research setting impacts social behaviour in the context of the present discussion on influences beyond the individual.

Direct observations, such as those used in Section 3, have high value for understanding behaviour, but they also have drawbacks (Smith, 2010). Observing children in a structured or semi-structured observation allows for controlled comparison of behaviours, but the unfamiliar settings used in such observations may promote less natural behaviours, including responses to the research setting itself (Smith, 2010). Because observational methods are generally used with the intention of providing some insight into typical interactions (Gardner, 1997), understanding the effects of the research setting on behaviour is essential. In Section 3, noticeable effects materialised through children commenting on being in a different or unfamiliar room

of their school, talking to the cameras, and in some cases referring back to their participation at earlier timepoints in the study. These details not only confirm the presence of research effects on the children's play communication but may also have served as opportunities for children to engage in greater quantities of connected talk than usual based on the intersubjective shared experience of the novel and unfamiliar research setting. Such effects of the research setting can be problematic when the research aims to be representative of children's usual behaviour (Aspland & Gardner, 2003). However, the imposition of a task by the researcher, such as the freeplay and goal-directed drawing tasks in Section 3, can also be used to intentionally elicit greater rates of the behaviour of interest (Gardner, 1997). This meant choosing activities that would promote interaction in the dyad, allowing for more efficient observation of intersubjective communication.

In contrast to more structured observations, naturalistic research settings lack control, making it difficult to draw conclusions about the causes of behaviours. This would have, for example, made it difficult to conclude whether the dyadic effects revealed in 3.1 are down to differences between dyads or differences in environment. Though no setting can be completely naturalistic, familiar settings such as schools can be considered more naturalistic than laboratory settings (Azmitia & Perlmutter, 1989; Smith, 2010) while still providing some level of control. The use of semi-structured observations in Section 3 allowed children to interact in the familiar setting of their schools (though in some cases these observations took place in an unfamiliar room) while maintaining the environmental control needed to make comparisons across individuals, dyads, and activities, which included controlling conditions such as the materials provided and the play partner.

In comparison, by exploring and analysing intersubjectivity without using direct observations in Section 2, the use of recorded interactions not viewed by the researcher allowed for almost entirely naturalistic interactions for fathers to discuss in interviews, specifically by allowing fathers to choose the timing, setting, and materials for their interactions with few controls. This aimed to support fathers to reflect candidly on their experiences without focusing on the differences brought about by the research setting. Despite this aim, a few fathers commented on differences between the recorded interactions and day-to-day interactions, indicating that even a research setting without an observer present may never be entirely naturalistic. For example, one father commented on his child's change in behaviour when he noticed the camera: 'He stayed still for a bit, then he noticed the camera was recording him, and so he wanted to go and pick up the phone and say cheese.' (Participant D, talking about recording the book sharing video) Another mentioned engaging in the book sharing interaction outside

of the child's usual routine: 'It was also at a different time for her, so where it was at five rather than night time. To start off with, it was just like, 'Why are we reading now?' so she would just look quite confused.' (Participant B, talking about recording the book sharing video) Nonetheless, fathers generally felt that the recorded interactions were similar to usual and were able to comment on and describe the differences they noticed: 'He was [...] kind of interested in the camera, which I thought I'd discreetly propped up on the side, but apart from that, it was just like any other time.' (Participant F, talking about recording the book sharing video) In all, fathers did not find that the research setting affected their experiences in atypical ways, but these comments nevertheless demonstrate how external factors such as the research setting can impact social behaviour.

The present research used two research settings for analysing intersubjectivity, with both aiming for a combination of naturalistic interaction alongside some degree of control. In Section 2, this meant interactions were almost entirely naturalistic, though fathers did mention effects of the research setting on the interactions. The semi-structured observations used in Section 3 also indicated effects of the research setting but provided important information about children's social interactions that may not have been possible to obtain with other methods, allowing for comparisons of communication with fewer confounds than an entirely naturalistic setting. Together, the present studies' methods provide a strong basis for drawing conclusions about intersubjectivity children's early social relationships notwithstanding ways that different research environments influence children's social play interactions.

The cultural context

There is wide-ranging evidence that children's play is culturally influenced (Lillard, 2015; Roopnarine, 2010; Tudge et al., 2010). However, developmental psychology research has historically assumed that children's development of play and social competencies is universal (Howes, 2010). Here I discuss how the results of the present thesis indicate the importance of considering the cultural context beyond children's individual characteristics. First, I discuss how viewing play as influenced by social factors, as demonstrated in 3.1, can inform socio-cultural theories of play. Next, I discuss how culture can influence parent views of play, drawing on fathers' desire for play to serve a developmental purpose in 2.1.

Worldwide, children experience differences in their daily lives, including with whom they interact and availability of various play partners, and these directly impact their knowledge of the world and their engagement in and experiences of play (Göncü & Gaskins, 2010). Children's social experiences with others must therefore be studied and contextualised within their

cultural communities (Rogoff, 2003), rather than viewed only as individually determined. This means considering the social co-construction of play, where Göncü and Gaskins (2010) propose that viewing social play in the context of intersubjectivity fills the gap in previous individually-focused theories of play. This may help to account for the social complexity of play and raises questions regarding how children's cultural contexts influence play (Göncü & Gaskins, 2010).

Though I hypothesised both individual and dyadic influences on children's play communication in 3.1, the dyadic influences emerged as prominent with no significant evidence of individual effects. This demonstrated the degree of social influence on children's intersubjective communication, indicating that group effects play a relatively greater role in children's play than I had initially hypothesised. These findings support Howes's (2010) idea that play cannot be viewed as only an individual process, emphasising that consideration of social factors, which include cultural factors within the social context, is essential. Conceptualising social play as intersubjective, as in the present thesis, may support this goal by allowing for the consideration of shared cultural knowledge and disputing the universality of earlier theories (Göncü & Gaskins, 2010). For example, in cultures where children participate in adults' daily lives, pretend play may manifest as enactment and interpretation of real experiences and events in preparation for the future, as theorised by Vygotsky (Gaskins, 2014; Vygotsky, 1967). For this type of play to be successful, play partners require some culturally-dependent shared knowledge of the world (Gaskins, 2014).

This importance of considering cultural context can be further illustrated when looking at fathers' play with their children. Across and within cultures, children vary in the amount of time spent playing with parents, siblings, and other partners (Lillard, 2015; Roopnarine, 2010). This applies particularly to children's play with fathers, which may vary across cultures in both its frequency and form (Lillard, 2015). Tudge et al. (2010) found that in the United States, mothers were more likely than fathers to play with their children, even when the amount of time spent with the child was accounted for, but they found differences in fathers' play based on class and race, including the likelihood of using different types of objects and the proportion of time spent engaged in various types of play. These differences may, among other factors, be linked to how parents and other figures view play (Lillard, 2015; Parmar et al., 2004; Roopnarine, 2010). Viewing play as important for child development, for example, and parents' beliefs that their own actions can influence development may result in parents providing more time for play, providing materials for play, providing locations for play, and even providing partners for play (Lillard, 2015).

Differences in parents' views on the developmental value of play can be seen across cultural groups, for example where parents in the United States have been found to vary in these views depending on their cultural background (Parmar et al., 2004). In Section 2, most fathers commented directly on the developmental or educational value of the activities, suggesting that the sample was drawn primarily from a cultural group in which such views are prevalent. For example, one father talked about choosing toys that he felt would promote his child's development: 'At his age, even though he's still young, it's all about skills. [...] We'll try and do the puzzles that get his motor skills working and building blocks, things that he can put in his mouth for hand eye coordination.' (Participant F, talking about building skills through play) Another spoke of the child's learning through both book sharing and play: 'If I'm reading to him, it's hopefully helping him [...] to learn at the same time. [...] We can learn through playing, [...] me showing him how to build and things like that, and him copying it. Catching the ball, you know, learning that. Or reading, same thing if he starts to understand words and things that I've said.' (Participant A, talking about learning through book sharing and play) In contrast, Ghanaian parents have been found to view play as separate from learning (Avornyo & Baker, 2021), further suggesting that parents' views on play and learning are culturally dependent and may influence how parents experience play. Beyond differences in views across cultures, Göncü and Gaskins (2010) suggest that the developmental value of play may differ between cultures that view play as a child's activity versus one for adults and children to engage in together. These examples of influences on parent-child play, and particularly father-child play, demonstrate how socio-cultural factors such as fathers' beliefs about play may influence how fathers experience play.

Rogoff (2003) theorises that within any culture, children develop interaction styles based on their interactions with others in the culture, such as adults and peers. The findings of the present thesis provide substantial evidence for the importance of viewing social, and therefore cultural, factors beyond the individual in social play research, where social influences in Section 3 suggest the importance of factors beyond the individual. Likewise, Section 2 indicates cultural influences on fathers' enjoyment, such as valuing activities they viewed as having developmental or educational value. While the present thesis does not directly analyse wider socio-cultural influences on children's play, Gaskins (2014) suggests that research emphasising the social construction of play sets the stage for widening socio-culturally informed conceptions of play to emerge, and the findings presented in this thesis underscore the importance of viewing play as culturally influenced, rather than universal.

Areas for future research

Based on the findings of the present research, I make two methodological recommendations for future research into intersubjectivity in children's social play and early relationships. These methodological suggestions focus on the use of mixed-methods approaches and collecting longitudinal data to further research children's social play with a focus on its social influences.

Mixed-methods approaches

As demonstrated in the current thesis, both qualitative and quantitative methodologies have potential to provide valuable insights about social play in children's early relationships. The present research used a multi-method approach, implementing both qualitative and quantitative methods independently across its studies. In future research, integrating these into mixed-methods approaches, where both qualitative and quantitative methods are applied as part of the same study, could provide a wider-ranging, though possibly less in-depth, analysis of children's social play. This may be valuable for future research by providing further insights about the social components of children's play that are not possible when using just one of these approaches.

Within a mixed-methods framework, data from multiple sources can be analysed to provide a more comprehensive picture of children's social lives. To date, play research has primarily used quantitative observational methods such as those applied in Section 3 (Howe & Leach, 2018; Smith, 2010). As observations are often conducted in contexts where a behaviour is most likely to occur, for example using activities in Section 2 known to facilitate intersubjectivity and contexts in Section 3 designed to encourage peer interaction, researchers may over-estimate the frequency of behaviours of interest (Tudge et al., 2010). Additional informants' data, or naturalistic information gathered through different means, may support more accurate representations and limit over-estimation (Tudge et al., 2010). Combining observational data with other sources of data, such as parent or teacher reports (Tudge et al., 2010) or peer nominations as in Section 3, is a common way to contextualise observational data (Humphreys & Smith, 1987; Smith, 2010), and doing so using mixed methods would provide further insight.

One benefit of mixed-methods approaches is the opportunity to contextualise data with children's own perspectives. Peer nominations are one quantitative method among many possible ways to consider the child's perspectives on social relationships. Future research could qualitatively consider children's experiences of intersubjectivity, potentially drawing on similar methods to those used in Section 2, to further explain their observable social behaviours.

This would be especially valuable in interpreting why dyadic engagement in connected talk varied across partner and activity in 3.2. From children's perspectives, it is possible that an interaction could be too connected, for example where there is too little variability in ideas or where there is an imbalance in the partners' influence on the play, which may result in less varied, and possibly less enjoyable, play. Insight into how children view their intersubjective social play, including what they enjoyed about the more connected interactions and how they felt about their relationship with the partner, may support understanding of exactly where connected talk may be important in children's development and early relationships and how social factors influence its prominence in an interaction.

Some potential methods for gathering data about children's play are outlined by Smith (2010), who suggests the use of observation, interviews, questionnaires, toy inventories, and diaries may all provide valuable insight. In future research the qualitative interview methods employed in Section 2 may benefit from a quantitative observational component, for example, to situate fathers' perceptions within observable social behaviours. Conversely, social play observations such as those applied in Section 3 can be supplemented with child interviews to provide the child's perspective on the social context and content of the play (Smith, 2010). Though the time and resource intensive nature of these suggestions meant that they were not possible in the present research, while the multi-method design provided a greater depth of analysis than would have been possible using mixed methods, they present an intriguing area on which future research can embark.

Longitudinal studies

Next, I propose that future research into children's social play would benefit from additional longitudinal study across multiple child ages. Longitudinal data provide a basis for theorising about the direction of effects in cause-and-effect relationships (Azmitia & Perlmutter, 1989), for example between a child's social skills and social play behaviours. This would be of particular interest in the area of children's social play as it may help to determine at what ages individual and social influences are most powerful. Furthermore, longitudinal research with sufficient measurement can be used to comprehensively test and understand the transactional processes of child development, capturing bi-directional and reciprocal influences over time (Sameroff & Mackenzie, 2003).

Previous play research has largely focused on pretend play in early childhood, rarely concentrating on older children (Howe & Leach, 2018). This is despite findings that pretend play continues into and beyond middle childhood (Rao et al., 2020; Smith & Lillard, 2012).

Howe and Leach (2018) suggest that the expense of observational research may be one reason for this as it may result in few longitudinal studies on play and a focus on a narrow age group of interest. Additionally, the research time required for observational research into communication in particular may provide a barrier to addressing these questions comprehensively using a longitudinal design.

Though the timescale and size of the present research meant transcription and coding of children's social play observations across multiple ChiRPP timepoints for Section 3 was not feasible, analysis of connectedness and individual differences longitudinally may provide valuable insights regarding the possible developmental pathways for children to put their socio-cognitive skills into practice. This may mean following children's relationships and interactions with their caregivers from infancy before assessing connectedness at school age, which could provide further support for the proposal discussed in 3.1 that children benefit from parent-child connected talk at age 2 (Ensor & Hughes, 2008) and put it into practice with their peers at age 3 (Slomkowski & Dunn, 1996).

Future research may therefore consider conducting longitudinal studies on a smaller scale using simplified, and less time consuming, methods to observe these patterns. This would allow the generation of theories regarding how children put their socio-cognitive skills to use in communication at various ages, as well as allowing exploration of the relative individual and social influences on children's social play over time.

Conclusion

The present thesis provides evidence supporting the move away from individual theories of social play and towards the conceptualisation of social play as influenced by factors beyond the individual, doing so with a focus on intersubjectivity. The studies in this thesis explore manifestations of intersubjectivity in social play in infancy and early childhood, focusing in Section 2 on how fathers of infants experience intersubjectivity and in Section 3 on how school-age peers use intersubjective communication strategies. The findings of these studies provide insight into children's intersubjective interactions and suggest several ways that factors beyond the individual can influence social play.

Intersubjectivity is a key element of social play, as evidenced through the intersubjective exchanges that supported father-child bonding and fathers' enjoyment of play activities in Section 2. This thesis provides evidence for the importance of intersubjectivity both in social play and across wider playful activities through explorations of book sharing in Section 2 and

goal-directed drawing in Section 3. Though much of the literature on intersubjectivity revolves around social pretend play, evidence of how it manifests outside of social pretend play settings, notably during parent-child interactions such as the book sharing activity investigated in Section 2, can inform theories of intersubjectivity in book sharing and other activities (Murray et al., 2022).

Viewing social play through a lens of intersubjectivity, as in this thesis, can support expanding social play research beyond its previous individual focus (Göncü & Gaskins, 2010). Focusing on how factors beyond the individual may influence social play, findings such as those in Section 3 show various social and activity effects on children's intersubjective communication. While social influences are the main focus of the research presented, this general discussion further explores how additional factors beyond the individual, including the play materials, the research setting, and the cultural context, have a role in children's play. All things considered, these are just some of many effects that may play a role in children's developing social play interactions.

In recent years, children's access to play has rapidly changed (Gray, 2011; Howes, 2010), with fathers' engagement in play increasing (Craig et al., 2014) and children's access to play in childcare settings and schools decreasing (Howes, 2010). This shifting environment for children's play means the present studies provide only a glimpse of children's social worlds and suggests that future research should consider social play as occurring widely across different areas and environments in children's lives. To do so, intersubjectivity must be considered as an integral component of social play interactions from infancy through middle childhood.

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Appendix 2.1.1: Interview outline

Introduction

- Tell me about yourself. Are you employed? What's your job?
- Tell me about your family. How many children do you have, and how old are they? Do you live together? Who lives with you?
- In this interview, it might be helpful to focus on the child you took the videos with. If something important comes up based on one of your other children, it's fine for you to mention that too. What is the age of that child? What is the gender of that child?
- Can you tell me about a time in the last couple of weeks that you spent time with your child? What did you do?
- What's your favourite thing to do with your child? What do you enjoy about it?
- What's your least favourite thing to do with your child? When was a time that it went better than expected? How did that feel?
- Which do you think are your child's favourite activities?
- How do you think your child's age influences the activities you like to do together? Are there any activities you're more likely to enjoy when your child is older, or any activities that you used to enjoy when they were younger? What would you have done differently two months ago?

Book sharing

- Now I'll move on to asking a few questions about the book sharing video you took. Do you normally share books with your child, or was that something you just did for the video?
- What makes you more or less likely to share books on different days? Would this have been different before the lockdown?
- How did you feel the book sharing video went?
- Describe what happened. What book did you share? Who picked the book?
- Did you enjoy it? Which part was most enjoyable for you and why?
- Do you think your child enjoyed it? What did your child like most/least? How could you tell? Did that affect your experience?
- Was there anything you didn't like or anything that didn't go as expected? What went differently this time to usual? How did it feel? Was it still fun?

- When you were watching the video back, did you notice any points where you and your child were both experiencing the same emotion? Do you think your child noticed that you were experiencing the same emotion?
- How do you think your child's age influences the activities you like to do together? Are there any activities you're more likely to enjoy when your child is older, or any activities that you used to enjoy when they were younger? What would you have done differently two months ago?
- Is there anything else you noticed or would like to share about the book sharing video?

Play

- Now I'll move on to asking a few questions about the play video you took. Do you normally play with toys with your child, or was that something you just did for the video?
- What makes you more or less likely to play on different days? Would this have been different before the lockdown?
- How did you feel the play video went?
- Describe what happened. What toy did you play with? Who picked the toy?
- Did you enjoy it? Which part was most enjoyable for you and why?
- Do you think your child enjoyed it? What did your child like most/least? How could you tell? Did that affect your experience?
- Was there anything you didn't like or anything that didn't go as expected? What went differently this time to usual? How did it feel? Was it still fun?
- When you were watching the video back, did you notice any points where you and your child were both experiencing the same emotion? Do you think your child noticed that you were experiencing the same emotion?
- Is there anything else you noticed or would like to share about the play video?

Comparing book sharing and play

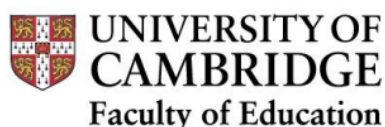
- Were these activities characteristic of things you would normally do with your child? Is there anything you would usually do differently? Would this have been different before lockdown?
- Which of the two activities did you prefer? Why was it more enjoyable for you?
- What was it that made you like the other activity less? What might have made you enjoy it more?

- Which activity do you think your child preferred? Why do you think they liked the other less?
- What might you have done differently to make these activities more enjoyable for yourself or for your child?

Conclusion

- Which questions might you have answered differently before the lockdown? How are things different now?
- Would you like to share anything more about your experiences? Is there anything important that I might have missed?

Appendix 2.2.1: Recruitment poster distributed by email



We're Looking for Dads!

If you're the dad of a **child aged 6-24 months**, you could help us learn more about what it's like to be a dad! We want to know what you like to do with your child – what do you find fun?

What's the project about?

The PEDAL Research Centre at the University of Cambridge is looking for dads to take part in a study on their experiences with their children.

We want to know more about what dads like to do with their children, what they find fun, and what they enjoy most.

What does participation involve?

- ▶ We will interview you for 30-60 minutes over video-chat.
- ▶ Before the interview, we will ask you to take two 5-minute videos and watch them back: one of you playing with your child, and another sharing a book together.
- ▶ We will ask you about which parts of the videos you enjoyed the most.
- ▶ You will receive a £20 voucher to cover your time.

What will we ask?

We will ask you about a few topics that are interesting to us:

- ▶ The activities you enjoy doing the most with your child
- ▶ What you like about playing with your child
- ▶ What you like about sharing books with your child

Why is this important?

Dads are an important part of their children's lives, but a lot of research completely misses them out! Once we've learned more about dads, we can start to create programmes that will help dads who are struggling. This research will be important for making sure that the programmes we develop will be as helpful as possible for dads who need them.

Sign up for more details at this link: bit.ly/PEDALDads, and contact **Emily** at ejg69@cam.ac.uk with any questions.



PEDAL: Centre for Research on Play in Education, Development & Learning
University of Cambridge, Faculty of Education
184 Hills Road, Cambridge, CB2 8PQ

The LEGO Foundation

CAMBRIDGE TRUST

Appendix 3.1.1: Transcription manual

Notation

Table 3.1.8: Transcription notation

Description	Symbol	Example
Vocal laughter	@	
Transcriber's comment	(())	
Uncertain word(s), left empty if indecipherable	()	Speaker A: Does he want to (play)? Speaker B: He doesn't want to ().

Example adapted from Davidson (2010).

Utterances

- Utterances may overlap if speakers speak at the same time.
- The bounds of each utterance should be timestamped to the nearest 0.5 seconds.
- A new utterance begins when one of the following happens: there is a significant change in topic, the speaker changes, or there is a pause of 5 seconds or more.

Further guidance

- Begin transcribing when the researcher leaves the room.
- Pause transcribing if the researcher temporarily re-enters the room.
- End transcribing when the researcher re-enters the room.

Appendix 3.1.2: Connectedness coding manual

Definitions

Connected turn: An utterance is connected if it is topically related to any utterance by the partner within the last 5 seconds. The end of the connected utterance must be within 5 seconds of the beginning of the target utterance.

Successful initiation: An utterance is connected if it is topically related to any utterance by the partner within the following 5 seconds. The end of the target utterance must be within 5 seconds of the beginning of the connected utterance.

The above are not mutually exclusive. An utterance may be both a connected turn and a successful initiation.

Codes

For each utterance transcribed, two codes are assigned. These codes are as follows:

Connected turn

Each utterance is assigned a code of 0 or 1 depending on if it is connected to an utterance made by the partner in the previous 5 seconds.

- A code of 0 indicates that the utterance is not connected to an utterance made by the partner in the previous 5 seconds.
- A code of 1 indicates that the utterance is connected to an utterance made by the partner in the previous 5 seconds. The start of the target utterance and the end of the connected utterance should be no more than 5 seconds apart.

Note: When an utterance is coded as '1' for being a connected turn, the earlier utterance should also have been coded as '1' for being a successful initiation.

Successful initiation

Each utterance is assigned a code of 0 or 1 depending on if it is connected to an utterance made by the partner in the following 5 seconds.

- A code of 0 indicates that the utterance is not connected to an utterance made by the partner in the following 5 seconds.
- A code of 1 indicates that the utterance is connected to an utterance made by the partner in the following 5 seconds. The end of the target utterance and the start of the connected utterance should be no more than 5 seconds apart.

Note: When an utterance is coded as '1' for being a successful initiation, the later utterance can automatically be coded as '1' for being a connected turn.

Further Guidance

In most cases, whether two utterances are connected will be simple to determine. Here are some rules of thumb for the more difficult cases:

- An utterance is not connected if it was clearly not said in response to the partner's utterance (i.e. the topical connection was just a coincidence).
- An utterance is connected if it was clearly said in response to the partner's utterance, even if the exact topical connection is unclear.
- Would Child B have still made their utterance if Child A had not made their utterance? If not, the utterances are connected.
- An utterance can be connected to multiple utterances by the partner.

Appendix 3.2.1: Open-ended pre-registration for Study 3.2

The open-ended pre-registration below was uploaded to the Open Science Framework on 15 June, 2022 (Goodacre, 2022).

Summary

The proposed analysis will compare connected talk during freeplay and a goal-directed drawing activity. We will analyse dyadic connectedness, a property of conversation defined by the frequency of topical links between conversation partners' utterances, across freeplay and a goal-directed drawing activity. By comparing connectedness during freeplay and a goal-directed drawing activity, we aim to draw conclusions around how the contexts of social interactions might be related to connected communication with peers. The data for this research are secondary, based on the observation of dyads during a study of children's play and friendship during the first three years of school in the UK. This research will draw on observations from the third timepoint of the study, when children were observed playing in dyads and completing the goal-directed drawing activity together.

Background

A few studies have found evidence for activity effects on the qualities of social interactions (Booren et al., 2012; Howe & McWilliam, 2001). For example, Booren et al. (2012) found that children engaged in more communication with peers during free choice activities when compared to teacher-led activities. Howe and McWilliam (2001) compared preschool children's communication across four different play contexts, finding that children were most likely to argue during symbolic and construction play and were less likely to argue in individual play and in sand-and-water play. Furthermore, they found that more complex tactics were used in the symbolic and construction play contexts (Howe & McWilliam, 2001). These differences in interaction characteristics across play contexts indicate that certain contexts for interactions may facilitate different quantities and complexities of communication.

With respect to connectedness, some tasks or activities may require or facilitate more connected talk than others. Connectedness in many ways is a symptom of collaboration: to collaborate, children must be able to connect their talk to that of the partner. For this reason, connectedness may occur more in contexts where children are required to work together towards a shared goal. In the goal-directed drawing activity, children will have to discuss their

ideas and build on them to create a final product. In a freeplay scenario, children are free to set their own goals, which may not match up between partners and possibly result in lower levels of connectedness (or, alternatively, goals may not match up because of low levels of connectedness). This would mean that, when compared to a freeplay scenario, a goal-directed activity may facilitate more connected talk as children attempt to reach their goal together.

Much of the connectedness literature has examined its presence in play settings (e.g. Dunn & Cutting, 1999; Slomkowski & Dunn, 1996; Leach et al., 2019). However, a few studies have looked at connectedness in non-play settings: for example, both Brophy and Dunn (2002) and Ensor and Hughes (2008) looked at connectedness between mothers and children during everyday activities and routines. In a non-goal-directed drawing setting framed as social play, Kukkonen and Chang-Kredl (2018) analysed children's ability to establish intersubjectivity and found use of many connectedness strategies, including maintaining the topic of conversation through repetition, building on ideas, and asking for clarification. As far as we are aware no research has assessed the stability of connectedness or compared it across settings. By analysing how connectedness may be similar or different during freeplay and during the goal-directed drawing activity, we aim to draw conclusions around how the contexts of social interactions might be related to children's development and practice of connected communication with their peers.

Research questions

Is there a difference in the rate of dyad's connected talk between freeplay and a goal-directed drawing activity?

This first research question aims to explore differences in dyads' connected talk across two activities: freeplay and a goal-directed drawing activity. We hypothesise that there will be different quantities of connected talk across these two activities ($A \neq B$). Our hypothesis is non-directional because we are not aware of any previous literature investigating the direction of such effects.

Are there interactions between activity context and dyadic variables in our dataset?

Whereas the first research question looks at if there are differences in dyads' connected talk across settings; the second explores which dyads have (or don't have) differences in connected talk across settings. In other words, we will investigate whether there are any interactions between activity context and other variables in the ChiRPP dataset. As this is an open-ended and exploratory research question, we do not present a hypothesis.

Methods

Dataset

This research will use data from the Children's Relationships with Peers through Play (ChiRPP) study (<https://osf.io/3p4q8>), a longitudinal study which explored children's play and friendships during the first three years of school in the UK. The proposed analysis will use observational data from the third timepoint of this study: video observations of dyadic freeplay and drawing. We have selected this timepoint as it includes both a freeplay observation and a goal-directed drawing observation (the latter is not included at earlier timepoints). At the third timepoint, 152 children (mean age 6.79 years) participated in the ChiRPP study.

The ChiRPP data was collected by researchers at the PEDAL Centre, University of Cambridge. Data collection occurred in children's schools. Procedures for the freeplay observations are described in our Registered Report (<https://osf.io/u74zy>). The goal-directed drawing observations took place immediately following the freeplay observations. Dyads were asked to draw the treehouse toyset with which they had played for the freeplay observation. Dyads were provided with limited felt tip pens and only one pad of paper (Ostrov, Woods, Jansen, Casas, & Crick, 2004).

Measured variables

Outcome: The outcome measure in this research is connectedness, which was measured through coding video transcripts for 'connected turns' as specified in our Registered Report (<https://osf.io/u74zy>). We will quantify connectedness at the dyad level (rather than the individual level as we have previously), combining the codes for both members of the dyad into one dyadic connectedness score for each activity. We will convert this score into a rate by dividing by the total number of utterances in the observation, which we will also report separately.

Predictor: For the first research question, the predictor variable is activity. Each dyad was observed taking part in two activities: freeplay and a goal-directed drawing activity. We will input freeplay as [0] and drawing as [1]. For the second, predictor variables will include interaction terms between activity and dyadic characteristics. Dyadic characteristics we may use include but are not limited to dyadic friendship status and dyad sex.

Unit of analysis

The ChiRPP study at the third point included 152 participants. In our previous research with this dataset, we analysed connectedness at the individual level but found that the dyad plays a particularly important role in connectedness. We therefore include the dyad as the unit of analysis in the proposed research.

Statistical models

To answer our first research question, we plan to use a paired-samples t-test to determine if there is a difference between the quantity of connected talk during the freeplay and drawing observations.

To answer our second research question, we plan to use two-way repeated-measures ANOVAs to look for any interactions between dyad characteristics and activity setting.