Full length article

From objects to artefacts to props: The role of objects in infant-toddlers' play and imagination in Conceptual PlayWorlds in family settings

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ABSTRACT

Imagination is considered a highly desired mental function in the 21st century, yet little is known about the emergence of play and imagination in infancy and toddlerhood. This paper reports an educational experiment of *We Are Going on a Bear Hunt* Conceptual PlayWorlds (CPW) in family settings to explore this under-researched area. Eighteen families with infant-toddlers (18 children 4 to 24 months old, mean age of 10 months) were recruited, with nine families each in the March 2021 and July 2021 rounds. We gathered around 29 h of digitally recorded data through Zoom sessions, 5.5 h of video data collected by families, and 11.5 h of pre and post CPW interviews with families. The data show that with support from adults, infants and toddlers develop their play and imagination, which is reflected through the evolving object-meaning relations regarding how their play and imagination are mediated by material objects and the corresponding roles of objects in play and imagination. Three types of roles of objects in infant-toddlers' play and imagination are reported. It is argued that the roles of objects in play offer new conceptual tools supporting adults in better understanding and supporting infant-toddlers' development of play and imagination.

1. Introduction

In the ongoing global economic competition, more nations realise the power of imaginative, creative and innovative minds (Renzulli et al., 2022). As a result, the development of imagination, especially for young children, is attracting increasing research attention. A multitude of studies on child development have identified the links between the development of imagination and play with other critical developmental domains, such as literacy development, cognitive development, and social-emotional development, to name just a few (Bodrova & Leong, 2005; Tsortanidou et al., 2022). Imagination can be a contested concept, with some researchers

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defining imagination as a skill that can be trained and practised (Kind, 2022), and others regard it as a thinking process for generating novel ideas (Craft, 2014). In this paper, we follow the cultural-historical conception of imagination as a higher mental function (Vygotsky, 1998). All higher mental functions are mediated by signs, and their development follows the general genetic laws of cultural development. This implies that they must first appear on the social plane through interactions and collaborations before appearing on the individual plane (Vygotsky, 1997).

Fragkiadaki et al. (2021) present empirical evidence of infants' and toddlers' ability to engage in collective imagining while playing with adults, which refers to infants' and toddlers' awareness, engagement and contribution to imaginary situations with the support of more capable adults. They argue that engagement in collective imagining is both the source and outcome of infants' and toddlers' development of imagination. Their study contributes an important piece of new understanding to the under-researched area of infant-toddler's development of imagination on the social plane by filling the gap in Vygotsky's (1966, 1998) existing theory of imagination in which he has only focused on the development of imagination for those above three years old. Unlike infants and toddlers whose imagination exists on the social plane during collective imagining in play with adults (Fragkiadaki et al., 2021), preschoolers are able to engage in imagination in their play alone or with their peers, in which they create imaginary scenarios and change the meanings of objects, actions, and roles (Fleer, 2011, 2019; Vygotsky, 1966, 1998), and older school children and adolescents are able to imagine alone "*utilising abstract concepts*" and their imagination completely "*breaks the connection with real objects*" (Vygotsky, 1998, p. 161).

As a higher mental function that takes place within a person's mind, we cannot observe imagination directly. Yet, since imagination of young children is manifested in the form of their play in which they create imaginary scenarios (Vygotsky, 1966, 1998), we can study the development of imagination in young children through the study of their play. Imagination takes a long development process in a person's life span: an infant-toddler's imagination looks different from a preschooler's imagination, and a preschooler's imagination varies significantly from an adolescent's imagination (Vygotsky, 1998). The essence of these differences lies in the evolving object-meaning relations: 1) infants and toddlers are not able to engage in imagination alone due to their inability to diverge meanings from objects, and their actions are constrained by immediately seen concrete objects, which is defined as object-above-meaning relations (Vygotsky, 1966). For example, let us reuse Vygotsky's (1966) example of a stick to illustrate this. When a stick is seen as a stick and a child explores its properties by mouthing it, throwing it, or feeling it, to name a few actions that the child might engage in, the child is constrained by the innate moving force of the immediately seen stick. Infants and toddlers need support from adults to give new meaning to the stick and learn new play actions; 2) preschoolers are able to severe meaning from objects; they can give new meanings to objects, and their actions are mediated by the meaning of imaginary scenarios rather than the meaning of immediately seen concrete objects, which is defined as meaning-above-object relations, and the child is less constrained by the immediate situation. However, to some extent, they still rely on the support of concrete objects as external pivots for holding the new meanings they try to work with (Fleer, 2011; Vygotsky, 1966). For example, a stick is used as a pivot or placeholder for holding the meaning of a horse, and it turns into a prop in their play (Vygotsky, 1966); 3) older school children and adolescents' imagination breaks the connection with real objects, and they imagine based upon meaning (Vygotsky, 1998).

In this study, the different object-meaning relations in young children's play are conceptualised as different roles of objects in play. Fleer (2021) argues that it is essential to develop further understanding of the under-researched area of the roles of objects in children's play and imagination, as well as their corresponding object-meaning relations. Yonzon et al. (2022) enrich the empirical understanding of the role of props in play for developing toddlers' imagination in an Australian educational setting. Those toddlers were 1.9 to 2.1 years old. What is still unknown is how children younger than 1.9 years old gradually develop their ability to work with meanings rather than immediately seen objects, in other words, their ability to sever meanings from objects and use objects as pivots to hold new meanings. To fill this gap, this paper presents a study that aims to explore the development of roles of objects in infant-toddlers' play and imagination with the support of more capable adults and their corresponding object-meaning relations by focusing on the following two research questions:

- What's the role of objects in infant-toddlers' collective imagining and play?
- How does the role of objects in play change alongside the evolving object-meaning relations in infant-toddler's collective imagining and play with the support from the adult?

This paper starts with a theoretical discussion of the cultural-historical conception of object-meaning relations in imagination and their corresponding roles of objects, followed by an explanation of the methodological framework alongside the study design. The research findings are reported under three headings to illustrate the three different types of roles of objects in infant-toddler's collective imagining and play, which are then culminated with a theorisation of these three types of roles of objects in infant-toddler's play and imagination in terms of their different meaning-object relations. We argue that this new understanding of the evolving object-meaning relations provides us with new insights into the emergence of collective imagination in infancy and toddlerhood and thus advances the cultural-historical theory of the development of imagination.

2. Concrete objects, artefacts, and props

This study conceptualises imagination as a higher mental function (Vygotsky, 1998, 2004). All higher mental functions are mediated by signs (psychological tools) (Miller, 2011; Vygotsky, 1997, 1999). A person's development of the use of signs, which leads to their formation of higher mental functions, is internalised from their practical and material activities in which material objects mediate their practical actions as tools or artefacts (Kozulin, 1984; Miller, 2011; Galperin et al., 2023). In an attempt to study the emergence and development of imagination in infancy and toddlerhood, this study explores the role of material objects and their

changing meaning in infant-toddlers' play. Based upon existing cultural-historical theories of roles of material objects and their meanings in children's play, three types of roles of material objects are conceptualised in this study:

(1) Concrete objects: Very young infants' play actions around objects are constrained by the *concrete objects* in the natural visual field, and they tend to engage in sensory exploration actions such as mouthing, throwing, hitting and kicking the object (Vygotsky, 1966, 1999). According to Vygotsky (1966), when children are constrained by concrete objects' innate meanings or motivating forces, there is an **object-above-meaning relation**. In other words, object-above-meaning relations can be reflected through young children's sensory exploration play actions.

(2) Artefacts (cultural objects): Cultural-historical theory conceptualises the central neoformation for infants in their first year of life as the development of cultural actions around cultural objects with support from adults (Pellegrini, 2019; Solovieva & Quintanar, 2021; Vygotsky, 1998). *Artefacts* hold cultural meanings, rules, values, norms and practices (Cole, 1996; Kozulin et al., 2003; Tudge & Odero-Wanga, 2009; Hennig & Kirova, 2012; Yonzon et al., 2022). Although still constrained by their physical properties, '*artefacts are simultaneously ideal (conceptual) and material*' (Cole, 1996, p. 117). **Artefacts**, as discussed above, are simultaneously ideal and material. They unify the material objects with their cultural meanings. Thus, it is argued that there is an **object-equal-meaning relation**, and the child's play actions are mediated towards the culturally meaningful and appropriate actions around the objects. Take work tools as an example of artefacts. Elkonin (2005) argues that in history, when work tools were simple for young children to manipulate, they learnt culturally meaningful actions to use those work tools in actual labour activities alongside their families and were able to participate in adult work and activities at an early age. Children's motive to engage in imaginary or role play comes from their desire to be part of the adult community (Elkonin, 2005). As a result, there was no need or motivation for children to use imagination or engage in role play during this historical era (Elkonin, 2005), for they can stay in the object-equal-meaning relation when they use those work tools. It is argued that object-equal-meaning relation is evident in young children's culturally meaningful actions around cultural tools.

(3) Props: As history develops, labour and life activities and their corresponding work tools and artefacts become too complex for young children to use, so scale-down work tools that no longer have their original basic functions but only have a superficial similarity of appearance to adult work tools, and symbolic toys, are made for children to recreate adult labour activities and areas of life which they are not included but aspire to be part of (Elkonin, 2005). For example, "*a scaled-down rifle becomes only a nonworking model of a rifle- it does not really shoot but can be used only to represent shooting*" (Elkonin, 2005, p. 84). For another example, bear hunt activities might be too dangerous for young children and teddy bears are created to allow children to recreate adult bear hunt activities. A child's play with scaled-down tools and symbolic toys involves elements of a play situation, for the situation is arbitrary, and the actions he performs around the scaled-down tools might only be a representation of the real action for using a real tool. For instance, a child who uses a scaled-down rifle does not really shoot a real bear but represents shooting a real bear. One important technique in this sort of play described is '*the substitution of one object for another and performance of arbitrary actions using these objects*' (Elkonin, 2005, p. 87). This object substitution involves using one object as the placeholder for the meaning of another object, and according to Vygotsky (1966), the objects that serve as pivots or place-holders for new meanings can be called props. In the case of scaled-down tools and symbolic toys, the cultural meaning of the object immediately seen is closely linked with the meaning of the object it represents, for example, a toy truck as the placeholder for holding the meaning of a real truck or a toy teddy bear as a pivot for the meaning of a real bear. However, props can also serve as pivots or placeholders for new meanings not directly linked with the concrete object or immediate situations; for example, a stick becomes a horse (Vygotsky, 1966). There is a **meaning-above-object relation** in props, for the child's play actions are mediated by the new meaning given to the props rather than the innate meaning of the **props** themselves (Vygotsky, 1966). The meaning-above-object relation is evident when children's actions are guided by the meaning of the imaginary scenarios rather than the concrete object itself.

It is essential to point out that young children's development of evolving object-meaning relations and their corresponding object roles in play and imagination requires support from more capable others (Kozulin et al., 2003; Vygotsky, 1999). This point could be perfectly reflected in the following quote:

"*…even at the earliest stages of the child's development, the factor that moves his activity from one level to another is neither repetition nor discovery. The source of development of activity lies in the social environment of the child … the child enters into relations with the situation not directly, but through another person.*"

Vygotsky (1999, p. 20)

Adults support infant-toddlers in developing new understandings of concrete objects and provide guidance regarding how concrete objects could be used in more culturally meaningful and later symbolic manners (Yonzon et al., 2022; Kozulin et al., 2003). When adults provide new meanings to objects and imaginary scenarios, they lend their more advanced capability of using words as signs to young children, thus lifting them to their Zone of Proximal Development (Eun, 2017). Vygotsky (1999) argues that the moment children use signs to master themselves and the situation, "*a radically new organisation of behaviour arises, as well as new relations to the environment*" (p. 14).
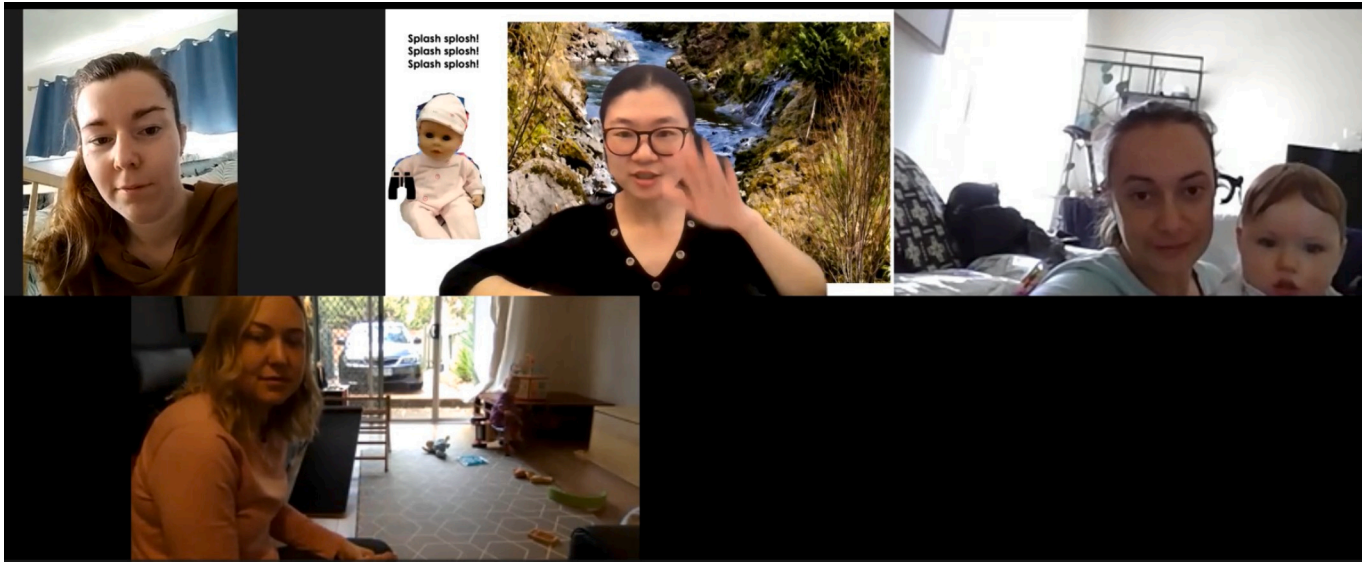
Fig. 1. Patting actions for representing walking and a virtual background with a river image.
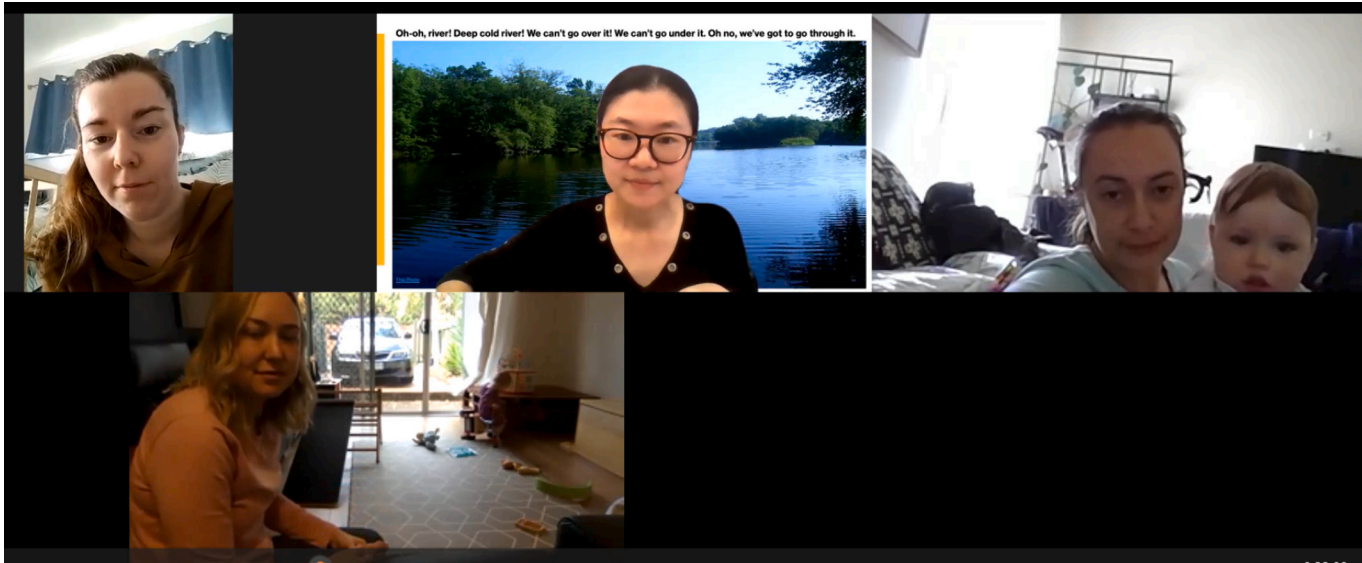
Fig. 2. Virtual zoom background with another river image.

3. Methodological framework

This study follows Hedegaard's dialectical-interactive approach, a 'qualitative methodology of field research' (Hedegaard, 2008a, p. 17), which aims to research conditions for development by studying children's participation in activities in concrete social situations (Hedegaard, 2008b). In order to generate rich data for answering relevant research questions, this study applies research methods of 'educational experiment' (Hedegaard, 2008b), 'interaction-based digital video observation' (Fleer, 2008), and 'interviews' (Hviid, 2008) from the dialectical-interactive approach. In an educational experiment, purposefully planned interventions are systematically introduced into everyday practices, which helps to generate rich and meaningful data that might provide us with new insights into the relations between theoretical concepts we try to explore (Hedegaard, 2008c). In this study, the educational experiment was realised by introducing a theoretically justified Conceptual PlayWorld (CPW) pedagogical model (Fleer, 2019) into families with infants and toddlers to generate rich data related to play and imagination. The storybook chosen for this study is *We Are Going on A Bear Hunt* by Michael Rosen (2016). With the support of the CPW pedagogical model, families design and implement CPW sessions with their infants and toddlers in family settings.

3.1. Participants

Eighteen families with infants and toddlers from diverse cultural heritage (4 to 24 months, mean age of 10 months old) from Melbourne, Victoria, participated remotely in the study. Most of the infants and toddlers were the first child in their family except for five families who had older children, and four of those older children occasionally joined in the CPW storytelling sessions.

3.2. Data collection procedure

The eighteen families were recruited through the process of expression of interests via PlayGroup Victoria in two separate but identical research rounds, respectively, in March and July 2021. There were nine families in each round, who were further divided into three smaller groups depending upon their availability. Smaller groups were believed to support discussions among families in the CPW sessions. For each small group, ten CPW Zoom sessions were conducted, in which the researcher told the bear hunt story digitally for infant-toddlers, introduced CPW characteristics, shared video clips of CPW implementation collected by families, and led further discussions among parents. The ten CPW sessions were conducted over five weeks, with two sessions each week. Two interviews were conducted with each family before and after the CPW intervention (except for one family who could not participate in the post-CPW interview due to new situations in her family. However, this did not impact the research findings reported in this paper, thanks to the availability of multiple data sources and extensive data from various families). Families were encouraged to implement CPW at home with ideas they came up with or ideas obtained from the researcher and other families between Zoom sessions. They recorded and shared video data of their implementation. Email communications and field notes helped to contextualise the video recordings collected. A total of 29 h of CPW Zoom sessions, 5.5 h of digital video data collected by families at their homes, and 11.5 h of pre and post CPW interviews with families, were gathered.

The ten Zoom sessions loosely follow the following routines:

- Greeting rituals (1–2 min)
- Digital storytelling (5–7 min): The researcher tells the *We Are Going on a Bear Hunt* story. For example, when telling the part of the story where we go through the river, the researcher pats her hands on the table one after another and says 'splash splosh splash splosh' to pretend walking through the river, and the patting actions are used to hold the meaning of walking through the river (see Fig. 1). The virtual zoom backgrounds with different river images are used to support the creation of a virtual imaginary situation (see Figs. 1 & 2).
- Mini workshops (15 to 25 min): explaining CPW characteristics, sharing video clips of play ideas implemented by families, and small group discussions regarding families' experiences and challenges of implementing CPW at home.
- Goodbye rituals (1–2 min).

3.2.1. Imaginary play practices: five characteristics of the CPW pedagogical model

There are five characteristics in the Conceptual PlayWorld pedagogical model (Fleer, 2019, 2021): 1) selecting a storybook with an engaging narrative characterised by dramatic moments. 2) Designing and creating imaginary spaces. 3) Intentionally plan entry into and exit out of the imaginary scenario; for example, putting on a pair of self-made binoculars can signal to enter into the imaginary bear hunt, and putting the binoculars away can signal to exit the imaginary play. 4) Planning problem scenarios that need to be solved. 5) Plan adults' roles and pedagogical positioning in the interactions.

3.3. Data analysis

Hedegaard's three layers of analysis have guided the data analysis in this study: commonsense interpretation, situated practice interpretation, and thematic interpretation (Hedegaard, 2008d). During the analysis, the researcher will jump back and forth between those three layers of analysis instead of following a linear process in an orderly manner (Hedegaard, 2008d). A commonsense interpretation is the first attempt to comment on what is meaningful in the observation based on the researcher's understanding of

interactions in the activity settings (Hedegaard, 2008d). The three types of roles of objects in play and imagination conceptualised in the theoretical framework provided a beginning point for identifying interesting patterns in the commonsense interpretation. When infant-toddlers engage in sensory play with concrete objects in the absence of imaginary scenarios provided by adults, for example, playing with the moving wheels of a truck and seeing the truck as something that has moving parts instead of seeing it as a truck, we label the data as 'concrete objects'; when infant-toddlers use objects with culturally appropriate actions with adults' support, for example, learning to push the truck without being in an imaginary scenario, we label the data as 'artefacts'; and when infant-toddlers use objects in a series of culturally appropriate actions guided by the meaning of the imaginary scenario provided by the adults, we label the data as 'props'.

During situated practice interpretation, the researcher identifies themes among dominating motives, interaction patterns, and problems identified in commonsense interpretation across several activity settings (Hedegaard, 2008d). During this process, the researcher not only read the commonsense interpretation to identify relevant themes but also re-read detailed video logs or re-watch related video clips to deepen the commonsense and situated practice interpretations further. Four themes that guide the situated practice interpretation are stated as follows in Hedegaard (2008d, p. 55):

> "*(1) The intentional orientation of the researched persons; (2) The ways interaction occurs between the participants (interaction patterns); (3) The conflicts between different person's intentions and projects in the activity; (4) The competence and motives that the researched persons demonstrate during their interactions.*"

During this second level of interpretation, children's and adults' intentional orientation, motives, and interactional patterns in the data pieces selected for answering the research questions are examined; for example, when an infant-toddler demonstrates a motive to engage in sensory play, correspondingly, the adult tends to show a motive in providing object, space, time, and support for child's sensorimotor exploration, or the other way around. We also observe places where conflicts between their intentions arise. At the third level of thematic interpretation, the roles of objects and their corresponding object-meaning relations discussed in the theoretical framework are used to answer the research questions.

4. Findings

Vignettes selected from two families present the different roles of objects in infants' and toddlers' play under three headings: objects as concrete objects in play, objects as artefacts in play, and objects as props in play.

4.1. Theme One: objects as concrete objects in play

This section presents two data pieces from two children, whose pseudonyms are Ryan (a boy) and Sydney (a girl), respectively 10 and 13 months upon entering the CPW intervention. These two particular data pieces are selected because we will present related data from the same families under other themes to showcase qualitative changes in object-meaning relations of the object for mediating the child's actions over time.

4.1.1. Vignette 4.1.1. A truck as an object with moving wheels for sensory exploration
In the Pre-Conceptual-PlayWorld interview with Sally, Ryan's mother, on 20th March 2021:

The researcher asks: "So, would you like to share some interesting examples of your observation of Ryan?"
Sally says: "One thing I think is quite funny about him is he likes cars. For example, he was never the type of kid that would roll the car on the ground, like he would always take the car upside down, and he preferred to play with the individual wheels. I always thought that was interesting…"

In this interview clip, it seems that before the implementation of the Conceptual PlayWorld, the toy car does not hold the cultural meaning of a tool for transporting things or people for Ryan. Instead, it is a concrete object with a moving part that innately motivates his rolling and spinning actions of the wheels. Ryan's actions are constrained by the moving parts of the truck, and the truck is more of a device to mediate his manipulation of a material object rather than a culturally meaningful object. This implies an object-above-meaning relation, and the truck functions as a concrete object in Ryan's exploration (Vygotsky, 1966).

4.1.2. Vignette 4.1.2. A sensory bag as a sensory bag
After the CPW Zoom storytelling sessions 1 and 2, families are encouraged to create imaginary spaces for the *We Are Going on A Bear Hunt* story. On 31st March 2021, Jane, Sydney's mother, shared the following video clip of them playing with a blue sensory bag that she created using a sealed plastic bag with water in blue colour and miniature river creatures such as mini toy fish and shells to represent the river space in the story. Before presenting the following vignette, it is also important to point out that the imaginary scenario of going through the river has been created for Sydney many times in other settings. For example, in the Zoom storytelling sessions, pictures of real-life rivers are used to support Sydney in engaging in the imagination, and the researcher who tells the story also uses the patting actions to represent walking through the river (see methodology framework section). In addition, there are other 'walking through the river' imaginary play episodes in the family. For example, in another video shared by the family, the mother creates the river imaginary play by using a container filled with real water to represent the river, and also in another video, the mother

and father together take Sydney to the swimming pool and pretend it is the river, and they experiment with Sydney the sinking and floating of a few of Sydney's toys.

Jane and Sydney sit on the floor with a blue sensory bag containing some blue liquid and tiny water animals. Jane says, "Look, Sydney, the splishy-splashy water", and she gently pats the sensory bag to make the sound with both hands but one after another repeatedly. She asks, "Do you want to feel it? Cold, isn't it?" Sydney picks up the sensory bag and starts to mouth it. Jane asks, "Does that feel cold? Does that feel cold in your mouth? What's inside?" Jane shows the tiny toy fish in the sensory bag and says, "It's fish inside." Sydney again tries to taste the sensory bag with her mouth and looks at Jane. Then she feels the sensory bag with her hands, pats the sensory bag with both of her hands just like what Jane did before, and looks at Jane with a smile. Jane returns her with a smile and says, "Splish-Splash". Then Jane gets the sensory bag, gently bangs it on the floor, and says, "Splish-splash". Sydney gets it back and starts to mouth it again. Jane says, "Does that feel nice and cold on your teeth and gums?". Sydney continues to mouth the bag and squeeze it with her hands, and she also makes some sounds that seem to indicate her excitement for another 30 s before walking away.

In this vignette, Jane starts the interaction by introducing the sensory bag as a symbol for the imaginary river space in the story, and she does this by saying, "Look, Sydney, the splishy-splashy water". Yet, Sydney's dominating motive is to explore the sensory bag through her senses. For example, her play actions are mainly "mouthing it", "tasting it", "feeling the sensory bag with her hands", and "patting the sensory bag with both of her hands". Jane supports Sydney's motive for sensory exploration by saying, "Do you want to feel it? Cold, isn't it", "Does it feel cold in your mouth?", "What's inside?" and "Does that feel nice and cold on your teeth and gums?". She also introduces the idea of using the sensory bag to represent the river by making the 'splishy-splashy' sound by patting both her hands on the sensory bag. When Sydney makes the same patting action on the sensory bag, Jane says, "Splish-splash", which provides meaning to Sydney's action and transforms that sensory exploring action into an imaginary action of going through the river (The similar symbolic 'walking' action is also repeatedly used during the CPW storytelling sessions by the researcher). We could see that in this vignette, Sydney's initial actions are still dominantly motivated by the innate moving forces of the sensory bags and constrained by the sensory bag. For her, at this stage, the object is above the meaning for mediating her actions. Yet, with the support of her mother, who starts to give the meaning of walking through the river to the action of patting the sensory bag with both of her hands one after another repeatedly, the sensory bag starts to hold the meaning of the imaginary river. When the meaning of walking is given to the patting action, Sydney's patting action is no longer sensory in nature; instead, it is mediated by the meaning of the scenario with the mother's support on the social plane. Similar to the pointing example Vygotsky (1997) provides, the reaching out movement of the child is initially meaningless, yet when the adult gives it meaning, it gradually gains the cultural meaning of directing. It is argued that with the support of adults, Sydney will gradually understand how to give new meanings to her actions and thus engage in the collective imagination. In this process, Sydney is lifted by her more capable mother to the meaning-above-object relations in the imaginary situation. The mediating role of a capable adult who provides meaning to an infant's play actions supports the transition from the object-above-meaning relation to the meaning-above-object relation and thus promotes infants' emergence of the collective imagination.

4.2. Theme Two: objects as artefacts in play

The following data piece is selected to present this theme because we can see how Ryan's actions around the truck have changed with Sally's support. Another piece of data, in which Ryan more competently uses the truck as a transportation tool in a meaningful imaginary scenario, will be presented under theme three to build a fuller picture of Ryan's development of imagination and play.

4.2.1. Vignette 4.2. Learning culturally meaningful actions for playing with the toy truck

Sally and Ryan are sitting on their bedroom floor. They have been playing a blue ball rolling back-and-forth game for a few minutes. When Sally notices Ryan's no longer interested in playing with the blue ball, she suggests the idea of playing with the truck near them.

Sally says, "Oh, what about the truck?". She points to the blue ball and the truck and asks, "Can you put the ball into the yellow truck?". Ryan sits still for a few seconds as if he is thinking. Sally repeats the question and the pointing action. After sitting still for another two to three seconds, Ryan picks up the ball and puts it into the yellow truck. Then he lifts the dump body, and the blue ball slides onto the floor. Sally gives Ryan a happy and surprised facial expression and says, "What about Monty (one of their teddy bears)? Can you put Monty into the truck?". Ryan drags the truck towards himself and tries to lift the truck's dump body again. Then he puts the ball back into the truck and slides it down the dump body part twice. Sally says, "And now, you can probably use the yellow truck to go on a bear hunt because I think you can go over the oozy mud there. What do you think? Go look for another teddy bear friend for our bear team?". While Sally says this, she reorders the three toy bears in front of her, and Ryan looks at and listens to her. Ryan returns to his truck and the blue ball when she stops talking. Sally looks at him and asks, "Do we take the blue ball with us? What do you think?". While Sally says this, Ryan continues to focus on exploring the dump truck, and he tries to lift the dump body again, and when he lets go of his hand, the dump body part falls back down. He does the same thing again and then pauses and looks at Sally. Sally asks, "What about the yellow ball? Can you put the yellow ball into the yellow truck?" Sally continues to ask, "Do you think it can fit?". Ryan crawls towards the blue ball and picks it up with one of his hands. Sally says, "Or do you want to try the blue ball again?" Ryan attempts to put the blue ball back into the dump truck again.

Similar interactions around putting the ball into the truck continue for one to two minutes. Then Ryan turns the truck upside down and tries to lift it with multiple attempts, but the truck falls off each time because it is too heavy. Even if he adjusts the positions where his hand holds onto the truck, it still does not work. Sally suggests, "Why don't you pull it towards you?" (Sally gestures to indicate the direction of 'towards oneself'). Then Ryan holds onto one side of the dump body, pulls the truck towards himself, and successfully gets the truck with its bottom on the floor. Sally comments, "That's the right side up." They continue to flip the truck upside down and then

back up to the right side. When the truck is the right side up again, Ryan pulls and pushes the truck back and forth by holding onto the front edge of the dump body part, yet the back-and-forth movement of the truck is slight due to the constraint of the length of his arm (see Fig. 3).

Sally says, "You want me to reverse this to make it easier?". She turns the dump body part of the truck to face Ryan, which allows Ryan to grab onto the back edge of the dump body part and pull and push the truck back and forth with a much bigger movement (see Fig. 4).

Compared with Sally's observations before the CPW intervention, the toy truck seems to offer more affordances for Ryan's actions. In the vignette, it is evident that Sally has the motive to teach Ryan about culturally meaningful actions with the toy truck. For example, she says things like, 'Can you put the ball (or Monty) into the yellow truck?', 'pull it towards you', and 'That's the right side up'. Ryan has the motive to explore and practice culturally meaningful actions related to the toy truck, for example, "putting the blue ball into the truck" and dumping things from the truck by "lifting the dump body and the blue ball slides down onto the floor", "flipping the truck to make it sit on its wheels", "moving the truck on its wheels". The increased affordance of the truck indicates the development of Ryan's motor skills and his understanding of the truck as a cultural object, a tool for transporting things. With his mother's support, the truck gradually transforms from a concrete object with moving parts for sensory exploration into an artefact (cultural object), in which the cultural meaning of the truck as a transportation tool cannot be separated from the concrete object of the truck. The meaning of the truck and the object of the truck is equally important. In other words, the artefact holds the dialectical unity of the object and its cultural meaning (Cole, 1996). The infants' actions are not merely stimulated by the object itself. Instead, the actions are also motivated by the cultural conventions of actions around the object, and the child acquires new culturally meaningful actions around the object through the support of a more capable adult. But, we could see that the play actions are still constrained by the affordances of the concrete object. The role of the toy truck is unique in this vignette. It is not treated as a mere sensory object, yet it is not yet an object for holding new meaning in an imaginary situation. Although Sally suggests the idea of driving the truck through the muddy area for a bear hunt, the imaginary scenario has not been enacted yet. Hence, we cannot call it a prop in play yet. When an object serves as a prop, the meaning of the imaginary scenario and the new meaning of the object will guide children's play actions (Vygotsky, 1966). This vignette shows us that social interactions support infants in developing cultural meanings of objects and acquiring cultural actions around cultural objects, thus enabling concrete objects to turn into artefacts in play. Moreover, infant-toddlers' play actions change when concrete objects start to hold cultural meanings and turn into artefacts for them. Those actions are mediated by the cultural meanings of artefacts, thus representing meaning-equal-object relations; Cole (1996) argues that although its physical property still constrains it, an artefact is simultaneously ideal and material.

4.3. Theme Three: objects as props in play

The following two pieces of data are selected because they show the development of Ryan's and Sydney's ability to engage in imaginary scenarios with support from more capable adults. Objects play the role of props and serve as pivots for holding new meanings for the imaginary scenario.

Fig. 3. Grabbing onto the front edge of the dump body.

Fig. 4. Grabbing onto the back edge of the dump body.

4.3.1. Vignette 4.3.1. Driving the truck over the mud with Monty to find a teddy bear friend

On 26th April 2021, Sally and Ryan are in their kitchen area, which has a wooden floor. Sally stands not far away from Ryan to record this video. Ryan sits on the floor with the yellow truck beside him, and Monty, his teddy bear, is in the truck. The truck is on a

Fig. 5. Ryan driving the truck to find another bear friend with Monty.

small black furry mat (representing the muddy area). Sally says, "You want to take Monty over the thick oozy mud to find the teddy bear friend? " Ryan tries to drag the truck off the black furry mat yet gets stuck there. Ryan makes a sound, "Heh…" Sally says, "Yeah". Ryan tries again, and this time, he drags the yellow truck off the black furry mat. He drags the truck around to adjust the direction of the truck, and he moves the truck around the wooden floor (see Fig. 5). Sally says, "Come on, let's find the bear". Ryan looks at Sally, and he pauses for two to three seconds. Sally says, "Let's go and find another teddy bear friend." Ryan pushes the truck with one of his hands holding to one side of the dump body part and the other hand and knees supporting his body. He pushes the truck in this way from the kitchen room to the other room adjacent to the kitchen. While pushing, Ryan intentionally adjusts the direction of the truck towards where he wants to go. Sally says, "Look, Ryan, there is a teddy bear. Oh, Look!" (She points to the teddy bear which is on the bottom shelf of the changing table) "There's another teddy bear. Can you see the teddy? You wanna grab the teddy? Hello teddy? What's your name?" Sally gently shakes the bear and pretends to say, "My name's Rudy". Sally pretends to be Ryan and says, "Hi Rudy, nice to meet you." Then she pretends to be Rudy and says, "Hi, nice to meet you too. Hello, Ryan! How are you? Can I have a ride in the truck with Monty?" Ryan looks at Rudy. Then he smiles and crawls towards Rudy, and he laughs 'ah ha' and makes a sound that seems to indicate his excitement.

Vignette 4.3.1 showcases Sally's motive to engage Ryan in an imaginary scenario of going on a journey to find another teddy bear friend with Monty, which provides rich meaning to Ryan's actions. In this imaginary scenario, Ryan's action of pushing the truck takes on the meaning of 'driving the truck', and Monty and Rudy have been animated in the play. It is also evident that with Ryan's enhanced capability to manipulate the truck in a culturally meaningful manner, the imaginary situation is enacted, and the truck becomes a meaningful transportation tool in the imaginary scenario, enabling him to take Monty with him on the imaginary journey. Ryan's pushing the truck from the kitchen to the other room where Rudy is located indicates Ryan's understanding of the imaginary scenario about finding Rudy and his motive of engaging in the collective imagining with the support of his mother. With Sally's support, his play actions around the truck are guided by the meaning of the imaginary scenario. In other words, the meaning is above the object, and the toy truck holds the meaning of a real truck in the imaginary scenario. Ryan becomes the truck driver with the support of the imaginary scenario and verbal support from his mother.

Vadeboncoeur and Göncü (2019) argue that an important law of imagination is that it builds from materials provided by previous experiences. It is argued that Ryan's ability to engage in imaginary driving experience is also supported by his previous real-life experiences of sitting in a car or seeing a truck. The evidence of his relevant real-life experience can be found in the post-CPW interview, and Sally reflects:

> "*Yeah, it's just like everyday things that we do, like pushing him into the car. You can relate it back to any of the STEM concepts. So, it's just like, 'you know, we travel, and, like, this is how a car works', and then trying to relate it back to his toy car, so that like when we get back into the room from driving in the car to GymbaROO, or wherever we go. It's like, 'Oh, you know, that's a real car, and this is your little car'.*"

4.3.2. Vignette 4.3.2. The sensory bags serve as props to hold the meaning of grass, river and muddy areas

On 1st April, in the living room, Jane sets up the mobile to record the video while Sydney is on the other end of the living room, babbling to herself. Jane says, "Hey, Sydney, do you wanna go on a bear hunt? Do you want to put the binoculars on?" (The binoculars indicate the entry into the bear hunt imaginary play for them). Sydney walks closer towards Jane and waits for Jane to put the binoculars on for her. Jane asks, "Are you ready to go on the bear hunt?" Jane sings, "We are going on a bear hunt; we are going to catch a big one." Sydney comes closer to Jane with a smiling face, and she tries to bounce her body to the song's rhythm. Jane continues to sing, "I'm not scared. It's a beautiful day. Oh no, it's grass, long wavy grass!" Jane brings a sensory bag with some grass inside it and lays

Fig. 6. Sydney stepping into the imaginary river.

it on the floor. Jane makes a gesture to indicate 'over the grass'. While Jane is singing, Sydney listens and watches what she is doing. When Jane continues to sing, "We can't go over it." Sydney comes closer to the grass bag, squats down and picks it up, and Jane puts her hand under the grassy bag and sings, "We can't go under it. Oh, we have to go through it." Jane supports Sydney in putting the grassy bag down, and Jane makes the "Swishy, swishy…" sound. Sydney lifts her arms and then brings her hands together, which ends up as a clapping.

Then Jane changes the grassy sensory bag with a blue liquid sensory bag (The same one we see in Vignette 4.1.1), and she continues to sing the song related to going through the river, "Oh, no! It's a river! A cold, deep river! We can't go over it! We can't go under it (when she sings this, she lifts the bag with one of her hands and then has the other hand under the bag). We have to go through it! Splish, splash, splish, splash". Sydney has been watching and listening attentively during this time. Jane asks, "Can you try?" Sydney steps on the blue sensory bag as if walking in the river (see Fig. 6). Jane comments, "You splish-splash with your feet in the cold, deep river?" And then Sydney walks off the river.

When the lyric related to the river space finishes, Jane swaps the blue sensory bag with a sensory bag that contains some mud, and she continues to sing the song, "I'm not scared. It's a beautiful day. Oh, no, mud, thick, Ozzy mud!" She lays the mud sensory bag on the floor, and Sydney comes closer and sits on it. "We can't go over it". When Jane sings, "We can't go under it", Sydney picks up the sensory bag. Jane sings, "Oh no, we have to go through it." She helps Sydney put the mud bag back onto the floor. Sydney bounces her body while still sitting on the mud sensory bag as if she was crawling through the oozy mud area (see Fig. 7). And Jane asks, "Can you feel that thick, oozy mud?" Sydney touches the sensory bag, stands up and makes a sound that indicates her excitement. Then she turns around her body, sits on top of the sensory bag again, and looks at Jane with a smile. She sits on the sensory bag and moves her bottom to feel the sensory bag, and Jane says, "Good job! Yeah".

Vignette 4.3.2 illustrates that with the support of the adult who provides an imaginary situation using the narrative of *We Are Going on a Bear Hunt*, the sensory bags are no longer just sensory bags. They now hold new meanings for the grassy, river, and muddy areas. In this case, the sensory bags play the role of props in the imaginary play. Sydney's different play actions around the different imaginary spaces indicate her developing understanding of the imaginary scenarios as well as her motive of engaging in the collective imagining with her mother, for example, her lifting her hands and clapping her hands as if she is excited walking through the grassy area, her stepping onto the blue sensory bag as if she walks through the river, her sitting on the mud sensory bag as if she sits in and crawls through the muddy area. Her actions arise from the meaning of the imaginary situations rather than the innate motivating forces from the sensory bags. Otherwise, we would expect similar sensory exploration actions around those different sensory bags. According to Vygotsky (1966), when the child's play actions are mediated by the imaginary scenario rather than the immediately seen concrete object, it indicates a meaning-above-object relation. Those sensory bags now become props, serving as pivots that hold new meanings

Fig. 7. Sydney going through the muddy area.

for different imaginary spaces with the mother's support.

5. Discussions

The study reported in this paper has focused on the roles of objects in play and imagination for infants and toddlers, and these roles change alongside the evolving object-meaning relations. The findings suggest that collective imagining in a Conceptual PlayWorld supports the changing roles of objects from concrete objects to artefacts (or cultural objects) to props, resulting from the support of adults who lend their more advanced capability of play and imagination and thus lift children a head taller up to their zone of proximal development (Eun, 2017; Vygotsky, 1999). In this section, we discuss the findings under two themes: the role of adults in supporting infant-toddler's development of imagination and play and three types of roles of objects in infant-toddler's play.

5.1. The role of adults in infant-toddlers' development of play and imagination

This study demonstrates the essential role of adults in promoting the emergence and development of play and imagination. This aligns with findings from previous research that involvement and support from adults in young children's play help to enhance the maturity and complexity of their play and imagination (Bodrova, 2008; Haight et al., 1999). First, in social interaction, adults help children to appropriate the cultural meaning of objects and turn the concrete object into an artefact in play. For example, in vignette 4.2, Ryan acquires culturally meaningful actions for using the toy truck. Second, adults co-construct imaginary scenarios with children and give new meaning to objects or children's actions. For example, in vignette 4.3.1, Sally provides the imaginary scenario in the form of a narrative for Ryan to go on a journey look for a bear friend, giving rich meaning to Ryan's actions. In vignette 4.3.2, Sydney comes and steps on the blue sensory bag. Jane comments, "You splish-splash with your feet in the cold, deep river?". This corresponds with Lindqvist's (1996) argument that adults support children in enhancing their play engagement and development by modelling more advanced forms of play within social interactions in co-constructed imaginary situations.

5.2. Three types of roles of material objects in infant-toddlers' play and imagination

5.2.1. Objects as concrete objects

This study shows that infant-toddlers' natural forms of engagement with material objects tend to be sensorimotor explorations. During this type of play, children are constrained by the immediately visible field, and their actions aim to explore and manipulate the concrete object. For example, it is evident that in vignettes 3.1.1 and 3.1.2, the objects, such as the toy truck or the sensory bag, serve as manipulative devices. Jane and Sydney engage in actions motivated by the objects' innate motivating forces rather than the cultural meaning of objects or the meaning of imaginary scenarios. The object is above meaning in mediating the child's play actions. This corresponds with Vygotsky's (1966) argument that the play actions of very young children are motivated by the innate motivating forces of the object (Vygotsky, 1966). Other studies (e.g. Belsky & Most, 1981; Pellegrini, 2019) on infant-toddler's object play also suggest that this form of sensorimotor exploration activity is the predominant activity of the youngest children, and they precede other forms of play.

5.2.2. Objects as artefacts (cultural tools or objects)

This study demonstrates that when infants and toddlers start to appropriate the cultural meanings of objects and develop culturally meaningful actions to use the objects as cultural tools with support from the adult. This aligns with previous studies that argue that developing cultural actions around cultural objects is part of the central line of development for infants (Pellegrini, 2019; Solovieva & Quintanar, 2021). In this case, the child's play actions are simultaneously mediated by the object and its cultural meaning. For example, in vignette 4.2, with the support of his mum, Ryan acquires more culturally meaningful actions related to using the toy truck as a transportation tool; for instance, he starts to learn how to put things into the truck, how to offload the truck by lifting the dump body and push the truck on its wheel. His play actions in this vignette fundamentally differ from his exploration action of spinning the individual wheels, which his mum reports before the CPW intervention. His play actions around the toy truck in vignette 4.2 have become more culturally meaningful, but he is not trying to use the truck in imaginary scenarios yet. Therefore, although his play actions are mediated by the cultural objects and their associated cultural meanings, conventions and practices, there is still a lack of imaginary situations. But the learning of culturally meaningful actions and practices associated with the artefacts is important for setting the stages for infants and toddlers later to enact the functions of artefacts as tools or cultural objects in imaginary situations, which is showcased in vignette 4.3.1 in which Ryan starts to pretend to drive the truck in which he transports Monty with him in an imaginary situation in which he and Monty are going to find their bear friend Rudy.

5.2.3. Objects as props

This study also implies that with the support of an adult, infants and toddlers are capable of using objects as props, which serve as pivots for holding new meanings in play. For example, in vignette 4.3.1, Ryan alone might yet to develop the ability to use the toy truck as the pivot to hold the meaning of a real truck and give his pushing actions the imaginary meaning of driving; yet when his mother gives the meaning of 'driving' to his pushing actions in the imaginary situation of finding bear friend, Ryan is lifted by his mother ahead taller and is enabled to do so. In this situation, the toy truck serves as the pivot to hold the meaning of a real truck, and Ryan's pushing actions turn into the imaginary 'driving the truck' action, and Ryan takes up the role of a truck driver. Similarly, in vignette 4.3.2, the sensory bags with grass, mud and blue liquid become the placeholder for the imaginary spaces of long wavy grass, muddy area and the

river supported by the narrative of *We Are Going on a Bear Hunt* song. The emergence of the ability to use props is recognised as significant in young children's psychological development of play, for the ability to use props indicates children's ability to sever meaning from their objects and use objects as placeholders for new meanings, which is regarded as the essence of imagination for young children (Vadeboncoeur & Göncü, 2019; Vygotsky, 1966). When objects are used as props in collective imagining, children's play actions are mediated by the meaning of the imaginary situation or the new meaning given to the prop rather than the concrete object itself. Thus, it indicates a meaning-above-object relation in mediating a child's play actions (Vygotsky, 1966).

Hence, the results of this study also show that infants and toddlers are capable of engaging in collective imagining, which is supported by Fragkiadaki et al. (2021). But it contradicts Vygotsky's (1966) original theorisation that there is no imagination in infants and toddlers. One potential reason for this contradiction might be that Vygotsky's original theorisation was based on data from everyday observations of infant-toddler play in natural settings and laboratory-based experiments. In those natural settings and laboratory-based experiments, there might be no motivating developmental conditions in infants' and toddlers' social situations to support engagement in collective imagination and play. In contrast, this study and Fragkiadaki et al. (2021) apply the methodology of educational experiments, which intentionally create developmental conditions that support the development of play and imagination for young children. In addition, it is likely that when Vygotsky claims 'there is no imagination in infants and toddlers', he means infants and toddlers cannot sever the innate motivating forces from concrete objects on their own. This is because if Vygotsky believes there is no collective imagining in infants and toddlers, then he contradicts himself in regard to the general genetic laws of social origins for cultural development.

This study also suggests different levels of complexity in the props used by infants and toddlers. This is supported by Yonzon et al. (2022), who also observes that as toddlers' imaginations develop, the props transition from concrete ones towards more abstract ones. For example, the toy truck in vignette 4.3.1 contains some superficial characteristics of a real truck. Monty could be seated in the dump body part of the truck. Yet, it does not have some of the most basic functions of a real truck. Ryan could not sit in the toy truck and drive it like a real truck. So here, the toy truck is a scaled-down tool without its original function of transporting a person from one place to another (Elkonin, 2005). Elkonin (2005) argues that children are motivated to use their imagination when they use this type of scaled-down tools because imagination is needed for imaginary problem-solving, for they no longer have the basic functions of real tools. In vignette 4.3.1, it is evident that the toy truck becomes a transportation tool for Ryan, and this transporting function of the truck is used to solve an imaginary problem in which he needs to take Monty with him to look for another teddy bear friend. The child has to give new meaning to his pushing actions, which now become driving actions, and his role has changed from a little boy into a driver. The toy truck serves as the pivot to hold the meaning of a real truck, thus becoming a prop in the play. This prop is quite concrete, for we still know it is a truck when taken out from an imaginary situation. In comparison, the props used by Sydney in vignette 4.3.2 are more abstract. Unlike a toy truck, when these sensory bags are taken out from imaginary situations, they will return to sensory bags.

The three roles of objects in play and imagination for infants and toddlers, alongside their respective object-meaning relations as well as corresponding children and adults' motives in interaction, are summarised in Table 1.

It is important to note that these different object-meaning relations and roles of objects in play are not presented as stages of play development and imagination for young children. Instead, they are considered developmental trajectories. The different object-meaning relations appear in the same child during different situations, so the role of objects in play is considered dynamic.

6. Conclusion

The findings of this study show that with support from adults, infants and toddlers develop their play and imagination, which is reflected through the changing object-meaning relations regarding how their play and imagination are mediated by material objects and their corresponding roles of objects in play and imagination. This paper makes unique contributions to understanding the under-researched area of infant-toddlers' development of play and imagination for two reasons. First, the conceptualisation of artefacts as a new role of objects in play, which indicates a dialectical unity of object and meaning, provides families and practitioners with a new conceptual tool to understand the importance of supporting infants and toddlers to appropriate cultural meanings of an object which support their development of play and imagination. Second, little existing literature provides theoretical and empirical understandings of the play and imagination of infants and toddlers under one and two years old in family settings. This present study fills part of this gap by focusing on research participants under one and two years old. This study presents rich empirical data showing infant-toddlers' capabilities for engaging in collective imagining with adults' support. It fills the gap in the literature related to infant-toddlers' play and imagination in family settings. However, this paper challenges Vygotsky's (1966) claim that there is no imagination for infants and toddlers. It is argued that this contradiction in findings arises from the different nature of data obtained through different study designs. Vygotsky made his claim based on observations from natural and laboratory-based settings where collective imagining was not a practice tradition. As a result, no imagination was observed in infants and toddlers in the data Vygotsky had access to due to the absence of motivating conditions for infants' and toddlers' development of imagination of play.

In contrast, this study and Fragkiadaki et al. (2021) adopt educational experiment study designs that intentionally create motivating conditions for infant-toddlers' development of play and imagination to generate relevant data. The new findings of infant-toddlers' capability to engage in collective imagining and adults' role in supporting infant-toddlers' collective imagination enrich our understanding of infant-toddlers' play and imagination. Those findings urge families and practitioners to actively take the initiative to create motivating conditions for infant-toddler's play and imagination development. In addition, those findings also encourage further study of infant-toddlers' play and imagination through educational experiment study design. Due to the focus of this paper on the roles of objects in play and their corresponding object-meaning relations in mediating children's play actions, this paper did not systematically present pedagogical strategies adults could apply to support this development, and it could be a focus for another research

Table 1
Three roles of objects in play and imagination.

Object-meaning relation	Child's motive	Adult's motive	The role of objects in play
Object-above-meaning	Sensorimotor-exploration motive	Provide object, space, time, and support for the child's sensory exploration	Concrete objects
Meaning-equal-object	Developing human forms of using cultural tools (artefacts)	Teaching human forms of using cultural tools (artefacts)	Artefacts
Meaning-above-object	Engaging in the collective imaginary scenarios	Providing help to co-construct imaginary scenarios	Props

paper.

Submission declaration and verification

This work has not been published previously. It is not under consideration for publication elsewhere, and its publication is approved by tacitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the Copyright-holder.

CRediT authorship contribution statement

Suxiang Yu: Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Marilyn Fleer:** Writing – review & editing, Supervision. **Prabhat Rai:** Writing – review & editing, Supervision.

Declaration of competing interest

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