

# Improving the Conceptual Knowledge of an Infant with Age-Appropriate Picture Books

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## Abstract

The purpose of this study was to improve the conceptual development of an infant through age-appropriate picture books, as well as potentially reveal the effects of such books for developing concepts in children's literature. Study participants used the changing criterion design from single-case research models that consisted of 1 infant and 3 infants between 0–24 months old to ensure the social validity of the study. Age-appropriate informational and fiction picture books were given to the infant observed during the 0–24-month period. The results revealed that the single infant's conceptual knowledge in recipient and expressive language was improved more regularly and systematically compared with age-appropriate picture books under the guidance of parents. These findings provide evidence that infants' conceptual knowledge can be improved through age-appropriate picture books, as well as that both informational and fiction books can be used to effectively expose infants to different concepts. The findings of this study permit the examination of the concept development process in children belonging to different age groups.

**Keywords:** age-appropriate picture books, conceptual knowledge, infants, Türkiye

## 1. Introduction

A “concept” is a category used to group similar objects, people, events, and thoughts (Senemoğlu, 2011). It is also a structure that symbolizes the common features of different phenomena as they are understood in the mind (Merrill, Tennyson, & Posey, 1992). In addition, it includes cognitive images of any kind of design, thought, or fantasy in accordance with different experiences (Türkiye Bilimler Akademisi, 2011), as well as classifications and generalizations of concrete features after abstraction (Bakırcıoğlu, 2012). Hence, we understand and communicate with the outside world through concepts. Therefore, as the process of assigning meaning takes place in cognition, concepts form the basis of cognitive life (Tepebaş & Haktanır, 2013).

A concept not only allows the individual to distinguish a group of entities, events, thoughts, and processes from other groups, but it also helps establish relationships with the other (Senemoğlu, 2011). To learn a concept, it is necessary to know how an object, being, event, or phenomenon is related to or different from the other. More clearly, a concept cannot be learned without understanding such distinctions (Bakırcıoğlu, 2012). Hence, concept learning is basically learning to distinguish. In this type of learning, the individual learns to use the name of a concept for all objects with the appropriate properties. The other meaning is to exclude objects that do not possess that feature (Arı, 2016). Hence, children should be confronted with age-appropriate stimuli that clearly demonstrate the distinctive features of objects from an early period in their process of learning concepts.

A general assumption concerning the basis of linguistic and cognitive development is that it is concept learning. It is worth noting that as concepts are explained in words, children are actively engaged in linguistic and cognitive processes while learning a concept (Merrill, Tennyson, & Posey, 1992). So, children are confronted with four basic cognitive processes—concrete, recognition, classification, and abstract—in accordance with their developmental level. These processes also enable the transition from one level to another in the concept learning process.

Cognitive processes are required to pay attention to the perceptible frame of the object, to distinguish the object from other objects, and to remember the separated object at the same time and scope to learn concepts on a concrete level. Moreover, when the child sees the object in a different environment and situation, the child generalizes that it is the same object at their cognition level. In short, the child can learn the concept by seeing the object purely at the concrete level, but the child can also learn by hearing, touching, smelling, and storing the concept with more

than one perceptual basis at their cognition level. However, at the classification level, the child undergoes the process of remembering their generalization, paying attention to the non-specific properties of at least two instances of a class of the object, and distinguishing each instance from non-instance, generalizing that each instance encountered in a different scope and situation creates the same example, and generalizing that at least two samples belonging to the same class are equivalent. Beyond the abstract level, the child creates illustrative and verbal descriptions of the concept or non-concept, assimilates the presented information, performs inductive and deductive cognitive processes, balances defined properties or rules related to properties, evaluates the tests using samples and non-samples, and analyzes examples and non-examples of the concept in terms of the presence or absence of the specified features of the concept (Senemoğlu, 2011).

Concepts are cognitive tools that enable the individual to think, as well as help us to understand and communicate meaningfully in the physical and social world. An adult or a baby who did not have concepts would be limited to sensory perceptions. Specifically, concepts are essential for thinking. Knowledge of concepts is thus crucial for problem solving and understanding the world (Senemoğlu, 2011). For this reason, children's developmental characteristics should be taken into consideration, in particular, their learning should help establish cause-effect relationships, have simple instructions, be understandable and clear, have applications that vary from simple to difficult and from known to unknown in the process of concept teaching, and recognize that the placement of concepts in children is a slow and difficult process (Şahin, Karaaslan, Çoban, & Ercan, 2011).

### *1.1 Children's Literature and the Conceptual Design Process (0–2 Years)*

Children's literature is the general name given to works covering the period from early childhood to adolescence that enrich their emotional and intellectual world through linguistic and visual messages suitable for their language development and levels of understanding (Sever, 2008). Additionally, children's literature prepares children for life between the pre-school period and adolescence, helps them learn their mother tongue, fosters love of reading and makes it a habit, contributes to their concept knowledge, and develops levels of liking (Çılgin, 2007; Dilidüzgün, 2003, 2004; Gönen & Veziroğlu, 2013; Güleriyüz, 2013; Lukens, Smith, & Coffel, 2013; Lynch-Brown & Tomlinson, 1999; Nas, 2004; Norton & Norton, 2010; Sever, 2013). In this sense, children's literature should take responsibility for their listening, imagining, and thinking, meet their need to know and recognise, understand human life with emotions and thoughts, and provide an aesthetic sense; and also help them feel a sense of accomplishment, socialise, and take part in imaginary and real experiences within a fictional reality.

Children want to know and recognise from their first few months (Bee & Boyd, 2009). Thus, their desire to learn and discover should be fostered (Miller, 2008). Their wish to understand human life should be supported by age-appropriate children's literature that reflects their reality and is prepared by artists. Children's books with this approach can enable them to effectively use their senses, seeing and hearing, in creating meaning. Because concepts are reflected by colours, lines, or words and are at the basis of the meaning creation process, age-appropriate children's literature focuses on stimulating their visual and auditory senses and can contribute to the effective structuring of the conceptual design process of the mind.

Since children's books are the first tools that provide them with age-appropriate books and introduce them to their mother tongue, these should be supported with visuals created with concept knowledge, colour, and lines suitable to the 0–2-year-old period (Sever, 2008). A child can expand his/her language knowledge and meaning universe with these visuals that contribute to conceptual development. The fact that children lack the cognitive ability to understand linguistic symbols at this age (Piaget, 2004) particularly adds to the importance of presenting concepts created with colours and lines in picture books (Striker, 2005). Colour and line establish a concept in the mind before words. In this process, the child interacts with visually created concepts and will gradually structure these designs in his/her mind. As a result, the child will expand his/her meaning world by accumulating concepts (Gander & Gandiner, 2010; Miller, 2008). Later, with the conscious efforts of the mother and father and by providing the child with visual concepts and linguistic names, the child will be able to orally represent concepts in his/her meaning world. Simply put, the child's expanding meaning universe of colours and lines will be expressed by words. Therefore, conceptual and picture books have vital importance in expanding a child's meaning world from 0–2 years.

Constantly developing a child's concept knowledge with age-appropriate picture books enables the child to express his/her emotions and thoughts effectively, develop communication skills, create ideas, talk correctly and with purpose, increase their perception and conception level, and gain sensitivity and aesthetic experience. Introducing literary texts with colours, lines, or words in early the stages of life can include seeing and hearing in the meaning creation process to help develop children's emotional and thought world through interaction and communication with books. Consider the image presented below:



Figure 1. Martılar mavi sever (Ovat & Öğmel, 2010)

Children will look at similar and different parts of an object to generalise and create a concept about that object in their mind (Sever, 2013). In this sense, a child interacting early with the book above could learn, with the help of his/her mother and father, that seagulls can be in the sea, stand on water, fly, be many different colours (black, grey, and white), can open and close their wings, and are called “seagulls”; also, the sea can be different colours, including black and light and dark blue. In this type of interaction between the child and the book, the child will try to join the efforts of his/her mother and father to complete the book and to be a part of the message(s) the author wants to convey. Especially when the mother and father provide cues about the book’s message (e.g., “Why is the sea black?” and “Why can’t seagulls fly when the sea is black?”), the child might form ideas such as that black represents “pollution” and blue represents “cleanness.” Thus, the child can see the similar and different aspects of the sea and seagull and generalize about the concepts “seagull” and “sea” such that “a seagull can fly if the sea is clean” or “a seagull cannot fly if the sea is dirty.” This case shows that children are careful about the object’s perceivable environment and about relating and forming relationships about the different properties of an object in different environments (Senemoğlu, 2011).

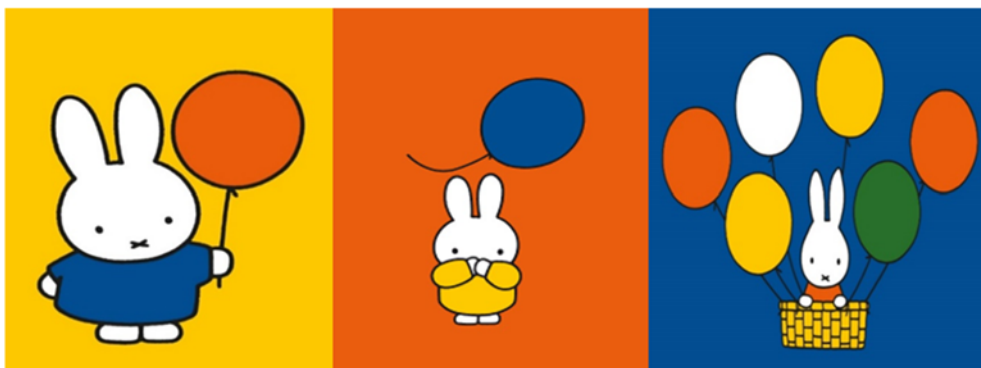


Figure 2. Miffy’s hause (Bruna, 2005)

Concepts are not formed in the mind on their own; they need a stimulus (Sever, 2008, 2013). In this sense, to increase the number of concepts in a child’s mind from an early age, age-appropriate and suitable level books should be provided. Increasing a child’s concept knowledge will enable him/her to express himself/herself and contribute to understanding human life because concepts are the tools of thinking (Senemoğlu, 2011). In this sense, colour and line have an important function in a child at the 0–2 stage when he/she first meets with books and starts to be friends with them. Books for children of this age should be formed with creative narratives and colourful images, as well as try to meet children’s desire to recognize, know, learn, and sense the outside world, with which they do not know how to communicate yet. In particular, children in this age group can develop concepts in memory with visual qualities by looking at the pictures in books. This enables them to be included in the concept design process through seeing and understanding a concept with different qualities. A child that interacts with the book above looks at the “balloon(s)” of different colours; senses the relationship between red, blue, white, yellow, and green balloons, and generalizes the “balloon” concept. Thus, the child feels that, depending on the interaction

with the book, the balloon can be an object that is held, flown, or carried. In short, the child that senses different qualities of the balloon concept can distinguish the balloon from other objects and start to use this concept for all objects with balloon qualities.

The objective of this study was to analyse the conceptual development of a child in the 0-24 month age range through age-appropriate picture books. Many studies have already shown the effects of picture books on the conceptual development (Anderson, 2013; Dilidüzgün, 2004; İpşiroğlu, 1992; Lukens, Smith, & Coffel, 2013; Russell, 2009; Sawyer, 2012; Sever, 2008). Although there are multiple studies examining the effects of play materials, multi-stimulated educational environments, cartoons, project-based training programs, linguistic activities, the Montessori approach, and free reading activities on concept development in the literature, there are few studies on the effects of qualified children's literature on concept development (Angın, 2013; Çelik, 2005; Çıkrıkçı, 1999; Er, 2008; Hayran, 2010; Koçak, 2016; Okur, 2007; Toran & Temel, 2014). Therefore, this study could contribute to the literature by ascertaining the effects of age-appropriate picture books on the concept knowledge development of a child from 0–18 months old.

### *1.2 Purpose of the Study*

The purpose of the study was to improve the conceptual development of an infant through age-appropriate picture books. The hope was not only to reveal the effects of age-appropriate picture books on concept development, but also the conceptual level of the infant during the 0–24 months using such books. So, this research sought to answer the following question:

What is the infant's level of conceptual knowledge of names and verbs in the receptive and expressive language with the use of age-appropriate picture books from 0–6 months; 7–12 months; 13–18 months; and 19–24 months?

## **2. Method**

This single-case research examined the conceptual knowledge of an infant from 0–24 months with the use of age-appropriate picture books. It looked at the effect of the independent variable on the dependent variable (for these variables, see below) by taking repeated measurements from one or several subjects under standard conditions and evaluating each subject in the condition (Tekin, 2000, 2006). In this study, changing criterion design, which is a single-case research design, was applied.

In the changing criterion model, the effects of a series of applications are slowly visible on a behaviour. This model has two main stages: the starting level and application level. In this model, to the complete guessing, validating, and iteration processes, at least three application stages were planned in addition to the starting level. An intermediate criterion was determined for every sub-application stage. To apply the changing criterion model, changes in the dependent variable should be gradual and increase and decrease until the participant is determined to be engaging in the desired behaviour (Tekin-İftar, 2018). For this purpose, in this study, the conceptual knowledge of a child from birth to the 24-month stage was evaluated with age-appropriate picture books.

In this study, since the implementers did not obtain any data to record for the 0–4 week and 1–6-month application process during the infant's interactions with books, both application stages determined with the birth of the infant were selected as starting periods. Thus, the research period was selected as the infant's birth, 0–4-week and 1–6-month application stages, as well as starting levels. Later, the criterion selected for the third application stage (7–12 months) was the number of concepts the infant obtained from instructive books. For the application stages, the determined criterion was 10% of the number of concepts obtained in the previous application stage. However, after the infant obtained the 10% criterion in the application stage, the number of concepts obtained at the end of the application stage was determined to be the main criterion. In this study, 0–4 weeks had 14 sub-application stages, 1–6 months had 38 sub-application stages, 7–12 months had 149 sub-application stages, 13–18 months had 142 sub-application stages, and 19–24 months had 138 sub-application stages.

### *2.1 Participant Characteristics*

The study participant was a girl born by C-section in the 39th week of her term, 10 days prior to the planned delivery date. Researchers included the child since it was possible to observe the effect of concept development with age-appropriate picture books between her birth and 24 months (it was challenging to find a participant for frequent application). In this sense, since the researcher was constantly interacting and communication with the child from her first days, this should have contributed to obtaining quality data. When the related literature was reviewed, the hypothesis that an age-appropriate picture book will develop a child's concept knowledge from an early age was found (Sever, 2008). Since her doctoral thesis, one of the researchers has been bothered by the lack of research that measured this hypothesis in the literature. For these reasons, she selected her own child as the subject of this study. While the researcher was concerned about ethical problems related to using her own child,

she found important examples in the literature to support her approach (Piaget, 1936). Accordingly, the researcher and her husband completed an ethics form and guaranteed not to disclose any information other than the research findings and results. Finally, to determine whether the participant had any medical condition, she was initially examined by a private hospital doctor who reported no visual or auditory problems. As a result, the participant was included in the study process from 0–24 months.

The implementers were the infant's mother and father. The first implementer the father had completed a doctorate in linguistics, which included a thesis on children's literature. The implementers studied appropriate methods for researching children, children's literature, understanding and expressing skills, metacognitive strategies, and drama. The researcher was both the observer and implementer in this process. The second implementer the mother was a graduate student in the education program.

### *2.2 Relationship Between the Environment, Child, and Book*

The application stage of this study was conducted in a house environment that enabled free and comfortable play opportunities for the child. During the 0–24 months, distracting stimuli were removed from the environment when the child interacted with books. The child's interaction with her living environment at home and the books in the first 6 months was different than in later months. In the first 6 months, for example, the child was not sitting on the floor, and she was more dependent on her mother and biological requirements, such as sleeping and drinking milk (Bee & Boyd, 2009), which affected the child's interaction with books and the environment. During this period, the researcher kept the books at a distance the child could see because she could not hold or carry the books. Based on the child's attention, the researcher enabled the child to have visual, auditory, and linguistic interactions with the books. As an example, when the researcher showed the child pictures in the books, names of concepts in the pictures were iterated. In the first 6 months, other stimuli, such as television and phones, were kept outside the application environment when the child interacted with books. During the 6–24-month period, as the child started to sit, crawl, walk, and experience an increase in visual acuity (Miller, 2008), the researcher organized and recorded the child's interactions with books with consideration of all these processes. For instance, when the child could sit on the floor, the researcher put a book in front of the child for interaction or enabled the child to interact by holding the book and turning the pages. As in the first 6 months, distractions such as toys, television, and phones, were removed from the environment.

### *2.3 Selection of Age-Appropriate Picture Books*

Age-appropriate picture books are fiction and instructive books that support vocabulary, language consciousness, sensitivity, and visual perception; meet recognition, knowledge, and learning needs; enable the art education process; and reflect expression opportunities and the beauty of Turkish with rich and appropriate language from an early period (Çer, 2016; Dilidüzgün, 2004; Sever, 2007, 2008). The main objective of instructive books is to transfer information to children and enable them to gain knowledge directly. In these books that are generally supported with visual elements, pictures are primary elements with teaching functions. Accordingly, these books are toy books, cloth books, hardcover books, concept books, ABC books, counting books, and activity books that reflect correct and valid information appropriate for the child's level to meet learning needs such as concept, phenomenon, and scientific knowledge (Bassa, 2013; Sever, 2008; Ural, 2013). Fiction books are picture books created with or without words, in which the child makes sense of the book by taking responsibility for dreaming and thinking. The principal aim of fiction books is to develop children's perception, hearing, and thinking abilities, as well as to give them human sensitivities (Sever, 2008). In this sense, the child's reality, the appropriateness for the child's principles, and expert views were considered while selecting fiction and instructive books for the participant to interact with from 6–24 months. Thus, the researcher prioritised reflected reality by choosing fiction and instructive books after determining the developmental needs of the child for each period: 0–4 weeks, 1–6 months, 6–12 months, 12–18 months, and 18–24 months (Bee & Boyd, 2009; Yavuzer, 2012; Yörükoğlu, 2010).

The researcher included 5 instructional picture books, including toys and cloth for 0–4 weeks; toys, cloth, and thick cardboard for 0–6 months of age, as well as 10 illustrative picture books to hold according to concept and hand structure; ABC books for 7–12 months, concept books, counting books, thick cardboard books, and 20 instructional picture books that could be held in accordance with hand structure; ABC books, concept books, counting books, thick cardboard books, as well as 30 instructional picture books and 30 fiction books for both 13–18 and 19–24 months. In this study, after determining books that reflected the developmental properties of each of the abovementioned periods, to determine the appropriateness of these books for the child, these were evaluated according to the "Appropriateness for Child Principles" *criteria* first developed by Sever (1995) and improved by Çer (2014). These assessments were conducted by the researcher and three experts on children's literature.

In this study, experts only evaluated the properties of 0–4 week, 1–6 month, and 6–12 month instructive books

because, in this process, content presented to children in instructive books was conceptually supported and structured by instructive visual elements. During 12–18 and 18–24 months, field experts evaluated the books for design, content, and educational sense. This assessment was necessary since fiction books were added in addition to age-appropriate picture books starting from the 12th month. In this study, field experts assessed 95 books for appropriateness for children by period. Each expert's assessment was transferred to an electronic environment and analysed with SPSS. The reliability between implementers was calculated using the interclass correlation coefficient. These calculations were conducted separately for 0–4 weeks, as well as 1–6, 7–12, 13–18, and 19–24 months. Intraclass correlation coefficients (reliability between evaluators) for appropriateness for children were .91 for 0–4-week book design, .93 for 1–6-month book design, .90 for 12–18-month book design, .89 for content properties, .88 for educational properties, .86 for 18–24-month book design, .85 for content properties, and .89 for educational properties. According to intraclass correlation values, since calculations between evaluators was considered reliable, it was found that the books for different development periods were appropriate for the child.

#### *2.4 Application Process*

In the changing criterion model, since the researcher could not realise a single application (Tekin-İftar, 2018) in this study, the researcher differentiated the application period for 0–4 weeks, as well as 1–6, 7–12, 13–18, and 19–24 months depending on the infant's development process. In each period of the application process, to ensure the infant spent more time with books, interaction time with books was increased compared to the previous period. Also, the implementers showed visuals to the infant and tried to communicate when visuals in fiction or instructive books were shown to infant. This was to contribute expressive vocabulary to the infant to help develop future recipient language development since it is known that an infant's recipient language skills develop in 0–4 weeks and 1–6 months (Bayhan & Artan, 2004; Bee & Boyd, 2009). Additionally, applications were increased for the infant to touch and know the book, interact with it like a toy, and turn pages in the 0–4-week and 1–6-month periods. When the infant interacted with books, all distracting stimuli, such as toys, phones, and television, were kept outside. In all application processes for this study, a bright and silent environment where the infant could see the books was created. In this study, the application was carried out every two days during 0–4 weeks and 1–6 months, and application was conducted every day in the 6–12, 12–18, and 18–24 months. During application, after the infant's interaction with the books, the implementers recorded with notes what infant said or showed.

##### *2.4.1 Starting Levels and Application Stages*

In the changing criterion model, although it is not mandatory to organise the starting level stage, this stage supports experimental control (Tekin-İftar, 2018). In this study, since application started from the moment the infant was born, the starting level was accepted as the infant's time of birth. However, since there were no verbal data to be recorded during 0–4 weeks and 1–6 months, these periods were accepted as starting periods.

###### *1) 0–4 Week*

Due to the infant's biological needs and sleep requirements, books with pictures were shown once every 2 days for 2–3 minutes, with the pictures being described verbally. From the start, the implementers spoke clearly and simply to the infant when showing visuals in books. This was used for iterating concepts in the books' pictures, as well as to point it and contribute to development of recipient language in the infant. In this period, the implementers enabled the new born to physically touch the book.

###### *2) 1–6 Month*

The infant was shown pictures in 10 instructive age-appropriate picture books for 10–15 minutes every 2 days. The implementers pointed out the visuals in the books to the infant and talked about them. This was done to enable the infant to listen to the talk in terms of receiver language development. Starting from the 1st month, picture books were not always shown in their entirety to the infant in a single session as the infant's interests changed, she cried, got bored, and did not want to look at the pictures. However, by using descriptive phrases to describe the pictures (e.g., "This is an apple, a cat, a brother.") while showing the child the books and motions that defined/described the pictures, the implementers were able to keep the infant interested and supported better understanding of the pictures. Additionally, when books were not completed, they were shown to the infant from the beginning or from where they left off in the previous session. As a result, in this period, all pictures in the picture books were shown to the infant, and this process was repeated in the next 5 months.

###### *3) 7–12 Month*

The infant was shown 20 instructive age-appropriate picture books and 30 fiction books for 25–30 minutes during each session in this stage. When the pictures were being shown to the infant, the implementers said, "Look, this is a bunny; this is a banana; look, this is woof woof" to focus the infant's attention. In this process, pictures in all

the books were shown to the infant in one month, and this was repeated in the next five months. Since 1–6 months was accepted as the starting period, as the infant reached a level at which observers could record expressions in the 11th and 12th months of the 7–12-month application period, and due to consecutive applications, a 10% increase in conceptual knowledge after interacting with the books was determined as the criterion for the next application period.

#### 4) 13–18 Month

The infant was shown 30 instructive age-appropriate picture books and 30 fiction books for 35–40 minutes at a time. In this period, when the infant starts to gain independence, improvements in the infant's linguistic skills were observed (Bayhan & Artan, 2004). In this process, the implementers encouraged the infant's physical interaction with books by identifying the visuals with an index finger and making statements, such as "(Look) this is a fish. What do fish do? (Look) this is a pig. What do pigs do? Or where is the sea, where is the brother? Did infant the cry?," *that* helped the infant to learn the concepts and motions related to the concepts. In this stage, the infant took books on her own, turning the pages to look at the pictures and imitating motions in the pictures that were included in application process. Additionally, the infant's concept knowledge was collected at the end of all applications and 10% was added to the result to determine a new criterion for the following stage. At the conclusion of this application stage, after the infant had met the determined criterion and after recording the concept number obtained from the infant at the end of the process, the final stage began.

#### 5) 19–24 Month

In this phase, the infant was shown 30 instructive age-appropriate picture books and 30 fiction books for 45–50-minute periods. The infant's desire to read alone increased and she started to interact with these books, saying all the names of the pictures in these books. When she had a favourite book, the infant read the book a couple of times on her own as well as with the implementers. In this process, pictures in all the books were shown to the infant in one month, and this was repeated in the last five months. Additionally, in the previous application stage, the infant's concept knowledge was collected at the end of all applications and 10% was added to the result to determine a new criterion for this final application stage. At the end of this application stage, after the infant met the determined criterion, the concept number obtained from the infant at the end of the process was recorded.

### *2.5 Effectiveness and Social Validity*

Social comparison is defined as comparing participants' performance with reference groups' performance that is expected to show desired behaviours at a desired level (Kurt, 2018). In this respect, it is necessary to test the conceptual knowledge that an infant acquired as a result of her interactions with age-appropriate picture books in the first 24 months of life with her peers in the same age group. However, it was impossible for the researcher to have an application area with another infant and conduct the same kind of detailed observation. However, in social comparison studies, it is possible to include a limited number of individuals around the researcher or individual that can show the desired behaviour at the desired level (Kendall & Grove, 1988). Therefore, three families known to the researcher with infants at this age, who introduced their infants to books from birth, were selected for social comparison. After obtaining permission from the families, since there was no standardised measurement tool, an expert prepared a measurement and assessment survey for the families. At the same time, the researcher read 5 instructive books with the infant to measure the conceptual knowledge of babies. The data obtained were used for comparing with the single case research model.

The data obtained in this study were noted by the implementer after each application. More clearly, starting from the moment the infant was born, as a result of interaction with age-appropriate books, pointing out concepts in pictures, trying to say these concepts, and actually saying these concepts were noted as interactions with books. If the infant failed to correctly say the names of the concepts or made different sounds, the implementer noted these concepts as things the infant said. Additionally, the implementer being away from the infant due to the infant's health problems and hospitalisation from 0–2 months, the infant not wanting to look at the books, and other situations prevented daily data collection. Therefore, 0–4 weeks had 11 sub-application stages, 1–6 months had 38 sub-application stages, 7–12 months had 149 sub-application stages, 13–18 months had 142 sub-application stages, and 19–24 months had 138 sub-application stages.

To determine the social validity, babies were selected from three families whom the researcher knew bought books from the moment the infants were born. Also, since the families were close friends of the researcher, the babies were constantly supported with age-appropriate books. Additionally, the families' high socio-economic status, as well as academic or university level education showed they could purchase books and knew the importance of early interaction with books. For all these reasons, after the families were selected, the researcher collected information from the families with babies completing the 0–24 months through a survey, which was developed

based on the suggestions of Anderson & Anderson (1998). When comparing the 3 identified families' infants for 0–4 weeks, 1–6 months, 7–12 months, 13–18 months, and 19–24 months for age-appropriate picture book frequency, the researcher tried to ascertain the number of concepts, ratio of the determined number of concepts, the infant's daily experience, and age-appropriate books for different months.

When the researcher understood it was challenging to determine the number of concepts for each period by applying the survey to the infants' families, they were instead asked to identify what concepts the infant knew how to say or point to during 0–4 weeks, 1–6 months, 7–12 months, 13–18 months, and 19–24 months. The researcher asked families to do this both to identify concept vocabulary in those periods and to exclude concepts acquired by infants from other stimuli. At the end of the survey process, the researcher determined families do not systematically and regularly read books to infants. Lastly, the researcher read 5 instructive and 5 fiction books purchased by the families in month 24 with the infants and recorded the concepts the infants knew how to say or point out to determine their concept knowledge.

### 2.6 Data Analysis

The data obtained about the conceptual knowledge development of an infant from 0–24 months with age-appropriate books and data acquired from 3 other babies were graphically analysed. In the data analysis, a line graph was used to show 0–4 weeks, 1–6 months, 7–12 months, 13–18 months, and 19–24 months of the infant's conceptual knowledge. Additionally, for the study's social validity, the comparative knowledge of 3 infants were plotted on a line graph in comparative format. In all graphs, the number of applications with age-appropriate books is indicated on the horizontal axis, while the number of concepts that the 3 babies knew and could point to are indicated on the vertical axis.

### 3. Results

Results obtained from analysing the effects of age-appropriate picture books on an infant's concept knowledge, as well as that of 3 infants for social comparison, are presented for 0–4 weeks, 1–6 months, 7–12 months, 13–18 months, and 19–24 months. Additionally, the infant's conceptual knowledge was compared with the 10% criterion in all application stages.

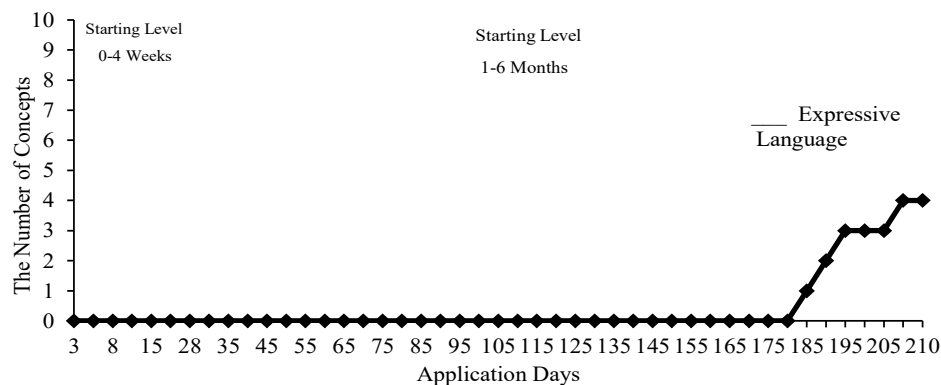


Figure 3. The number of concepts of infant in the 0-4 weeks and 1-6 months

In the 0–4-week process, in the 11 sub-application stages, the implementers showed visuals in the books to the infant, repeated the names, and pointed them out with signs and motions. The implementers moved based on the infant's visual and hearing precision, the pictures in the books were kept close to the infant, and the names of the concepts in the pictures were constantly repeated in the sub-applications. During this period, although age-appropriate books were shown, no pointed or perceived concept was determined due to infant's insufficient biological development. At this stage, while pictures in different books were shown to the infant, it was observed that the infant looked at the picture or limits and borders of the pictures for 3–5 seconds and then turned her attention in other directions.

During 1–6 months, which was determined as the starting period, in the 38 sub-application stages, the implementers showed the visuals in the books to the infant, repeated the names, and pointed them out with signs and motions. In this process, the infant's relationship with books started to differ compared to that in weeks 0–4. In the first 30 sub-applications, the motion, imitation, and voice focused conditioning of the implementers enabled



the infant to begin repetitive babbling behaviour such as “uuuuu” and “aaaaaa.” Additionally, in the 6th month, the infant was directed to the picture to which the implementers repeatedly drew the infant’s attention with motions and by saying the names of the pictures: “woof woof, cat, bear, moon.”

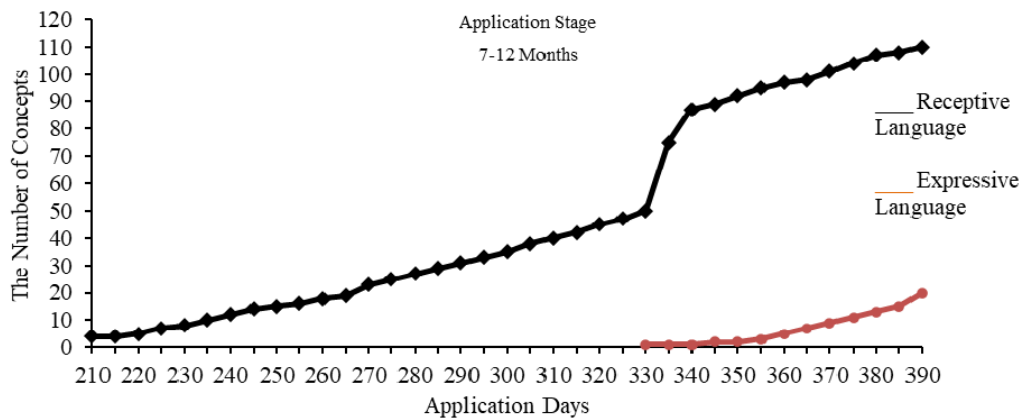


Figure 4. The number of concepts of infant in the 7-12 months

In months 7–12, during the 149 sub-application stages between the implementers and the infant, pictures in 20 instructive books were repeatedly shown, motions were acted, and names were given. In this process, although there were 4 concepts in the receptive language of the infant at the beginning of the 7th month, the number of concepts reached 110 at the end of the 12th month. From the 7–10th months, how the infant was shown pictures in the books changed based on the implementers’ repetitive explanations of the concept names in the pictures. In these months, when the implementers showed the pictures in the books to the infant in every sub-application stage, they turned the page forwards or backwards depending on the infant’s interest, or they enabled the infant to form a relationship with the book on her own. Between the 10th and 11th months, to determine whether the infant was imitating the implementers’ actions related to the pictures, the researcher looked to see if the infant showed or interacted with the pictures through motions, or audio and imitation, such as “Where is vak vak? Is the infant sleeping? What is bear doing?” In this process, the implementers observed that the infant showed the concept in the picture and imitated that concept. According to observations recorded between days 330 and 390, the infant’s expressive language was at 22 concepts.

Table 1. The conceptual knowledge of infant's receptive language in the 7-12 months

Receptive Language												
Nouns												
Family/ Person	Object/ Property	Animal		Emotion	Color	Nature/ Sky	Figure	Vehicle	Number	Fruit/ Vegetable	Place/ Direction	Body/ Organ
abi/ brother	ayakkabı/ shoe	arı/ bee	maymu n/monk ey	eh eh (kötü)/ bağ	beyaz/ white	ağaç/ tree	kare/ square	enn (araba)/ car	bir/ one	çilek/ strawberry	ev/ house	ağız/ mouth
abla/ sister	balon/ balloon	aslan/ lion	mee/ kuzu/ lamb	iyi/ well	kırmızı /red	aydede/ moon	üçgen/ triangle	bisiklet/ bicycle		ekmek/ bread	park/ park	ayak/ foot
amca/ uncle	bardak/ glass	ayı/ bear	möö (inek)/ cow	üzgün/ upset	mavi/ blue	balık/ fish		kamyon/ lorry		elma/ apple		burun/ nose
anne/ mom	boya/ paint	balina/ whale	pisi pisi (kedi)/ cat		sarı/ yellow	bulut/ cloud				havuç/ carrot		diş/ tooth
anneane/ grandmother	kürek/ shovel	domuz/ pig	tavşan/ rabbit		siyah/ black	çiçek/ flower				kabak/ pumpkin		dudak/ lip
baba/ father	masa/ table	fil/ elephant	top/ ball		yeşil/ green	deniz/ sea				muz/ banana		el/ hand
babaanne/ grandmother	salıncak/ swing	havhav /köpek/ dog	vakvak (ördek) /duck			kar/ snow				portakal/ orange		göbek/ belly
dede/ grandfather	su/ water	kaplan/ tiger	zürafa/ girafe			orman/f orest				yumurta/ egg		göz/eye
haya (hala)/ aunt	suluk/ leech	karınca/ ant										kafa/ head
nine/ grandmother	süt/ milk	kelebek/ butterfly										karın/ stomach
yeye (teyze)/aunt	tekerlek/ wheel	kuş/ bird										kulak/ ear saç/hair yanak/ cheek
Verbs												
Action Verbs						State Verbs						
alkışla-/clap			aç-/open			kay-/ski			kalk-/stand up			
çiz-/draw			çevir-/turn			gül-/laugh			otur-/sit down			
öp-/kiss			göster-/show			git-/go			yürü-/walk			
sev-/like			kapat-/close			gel-/came						
tut-/hold			kucakla-/embrace			sarıl-/hug						
ver-/give			salla-/shake			bak-/look						
ye-/eat						üz-/üzül-/trouble						

Note. The concepts are given by Turkish and English (T/E).

As seen in Table 1, the implementers identified concepts related to family/person (11), object/property (11), animal (19), emotion (3), color (6), nature/sky (8), shape (2), vehicle (3), number (1), fruit/vegetable (8), place/direction (2), body/organ (13) for names in the infant's recipient language based on instructional and fiction books in the 7–12 month. It was found that the concept that the infant knows best is related to the names of animals (19). When the verbs of the infant in the recipient language were examined, it was found that there were 13 actions verb such as clap, draw, give, kiss and 10 state verbs such as ski, laugh, go. Moreover, all of the verbs of the infant in the recipient language were found to have positive meaning. In this research, the infant can say only 22 of the 110 concepts in the recipient language depending on the instructional and fiction books.

Table 2. The conceptual knowledge of infant’s effective language in the 7-12 months

Effective Language											
Nouns										Verbs	
Family/ Person	Objec/ Property	Animal	Emotion	Nature/ Sky	Fruit/ Vegetable	Vehicle	Body/Organ	Action Verbs	State Verbs		
abi/brother	boya/ paint	ayı/ bear	eh eh (kötü)/bed	aydede/ moon	muz/ banana	enn (araba)/ car	el/hand	ver- /give	gel- /came		
abla/sister	uçak/ plane	havhav (köpek)/dog								git-/go	
anne/mother		mee (kuzu)/ lamb									
baba/father		möö (inek)/ cow									
hala/aunt		pisi pisi (kedi)/cat									
yeye (teyze)/ aunt		vakvak (ördek) duck									

Note. The concepts are given by Turkish and English (T/E).

As seen in Table 2, the implementers identified concepts related to the family/person (6), object/property (2), animal (6), emotion (1), nature/sky (1), vehicle (1), body (1) in the infant’s expressive language based on instructional and fiction books in the 7–12 month. When the verbs of the infant in the expressive language were examined, it was found that there were 1 action verbs such as give and 2 state verbs such as come and go. Moreover, all of the verbs of the infant in the expressive language were found to have positive meaning.

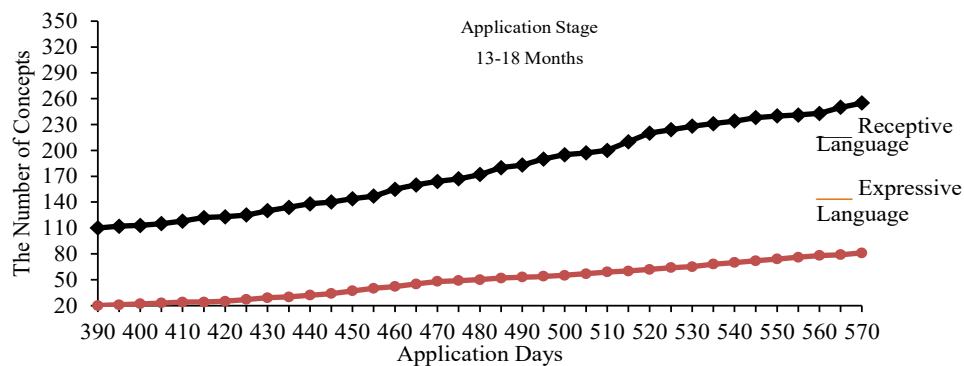


Figure 5. The number of concepts of infant in the 13–18 months

For 13–18 months, both the infant’s recipient and expressive language concept knowledge increased. In particular, the infant had 255 concepts in recipient language and 81 concepts in expressive language during this period after interacting with 30 instructive books and 30 fiction books. When this is compared with the previous period, in months 13–18, the infant defined objects, emotions, behaviours, and actions of characters in instructive and fiction book pictures and added new words to her conceptual vocabulary.

As seen in Table 3, the implementers identified concepts related to family/person (13), object/property (60), animal (21), color (6), nature/sky (9), shape (2), vehicle (3), fruit/vegetable (10), place/direction (4), body/organ (12), opposites (30), clothing (12), emotion (4), plural/particular (4), time (8), vehicle (4), number (5), shape (2) for names in the infant’s recipient language based on instructional and fiction books in the 13–18 month. It was found that the concept that the infant knows best is related to the names of object/property (60). When the verbs of the infant in the recipient language were examined, it was found that there were 24 action verbs such as open, close,

say, read, draw and 22 state verbs such as hungry, play, climb, sleep. However, it was seen that the infant used the negative and positive meanings of the names and verbs in the recipient language.

Table 3. The conceptual knowledge of infant's receptive language in the 13–18 month

Receptive Language									
Nouns									
Family/Person	Object/Property			Animal	Color	Nature/Sky	Fruit/Vegetable/Food	Place/Direction	Body
arkadaş/ friend	baca/ flue	anahtar/ key	ayna/ mirror	balık/ fish	kahverengi/ brown	çam ağacı/ pine tree	bisküvi/ biscuit	bina/ building	baş/ head
bebek/ baby	çatal/ fork	bilye/ ball	cam/ pine	baykuş/ owl	kara/ black	gül/ rose	çay/ tea	oda/ room	boyun/ neck
bonbon/ bonbon	çatı/ roof	boncuk/ bead	çanta/ bag	böcek/ insect	mor/ purple	güneş/ sun	domates/ tomato	okul/ school	dil/ tongue
çocuk/ child	direk/ pole	diş fırçası/ toothbrush	çizgi/ line	çekirge/ grasshopper	pembe/ pink	karanfil/ clove	dondurma/ ice cream	sirk/ circus	diz/ knee
doktor/ doctor	duman/ smoke	dolap/ cabinet	çöp/ rubbish	dinazor/ dinosaur	turkuaz/ turquoise	papatya/ daisy	et/ meat		kaş/ eyebrow
hemşire/ nurse	halı/ carpet	eldiven/ glove	duvar/ wall	kaplumbağa/ turtle	turuncu/ orange	şimşek/ lightning	kahve/ coffee		kirpik/ eyelash
hırsız/ thief	havlu/ towel	gözlük/ glasses	düdük/ whistle	karga/ crow		yağmur/ rain	kek/ cake		kol/ arm
kral/ kral	havuz/ pool	ip/ rope	hediye/ gift	kelebek/ butterfly		yaprak/ sheet	kurabiye/ cookie		parmak/ finger
marketçi/ grocer's	hortum/ hose	kavanoz/ jar	iğne/ needle	kurbağa/ frog		yıldız/ star	limon/ lemon		sırt/ back
öğretmen/ teacher	kapı/ door	kule/ tower	kılıç/ sword	kurt/ wolf			marul/ lettuce		tırnak/ nail
prens/ prince	kaşık/ spoon	kutu/ box	kum/ sand	örümcek/ spider			mısır/ corn		
prenses/ princess	kilit/ lock	lamba/ lamb	macun/ paste	panda/ panda			pasta/ cake		
	kova/ bucket	mum/ candle	merdiven/ stairs	salyangoz/ snail			peynir/ cheese		
	köprü/ bridge	peçete/ napkin	ruj/ lipstick	sinek/ mosquito			simit/ bagel		
	pencere/ window	silgi/ eraser	tabak/ plate	solucan/ worm			üzüm/ grape		
	w								
	pipet/ straw	şemsiye/ umbrella	tablo/ table	tavuk/ chicken			zeytin/ olive		
	resim/ picture	tencere/ pot	tahta/ board	tırtıl/ caterpillar					
	saat/ hour	traktör/ tractor	yara/ bandage	tilki/ fox					
	tarak/ comb	uçurtma/ kite		timsah/ crocodile					
	tava/ pan	yastık/ pillow		yarasa/bat					
	yol/ way			yılan/snake					
	yatak/ bed								
Opposites			Clothing	Emotion	Plural/Particular	Time	Vehicle	Number	Shape
ağır/hafif- heavy/light	düz/eğri-straight/ curve		atlet/ athlete	kızgın/ angry	bazı/ some	akşam/ evening	gemi/ ship	iki/ two	elips/ ellipse
altında/ üstünde- under/ above	hızlı/yavaş- fast/slow		cici (yeni elbise)/ new dress	mutlu/ happy	birlikte/ together	gece/gündüz -night/day	tekne/ boat	üç/ three	dörtgen/ square
aşağı/ yukarı/ up/down	kocaman/azıcık-big/ little		çorap/ socks	sevinçli/ joyful	bütün/ all	hemen/ immediately	tren/ train	dört/ four	

büyük/ küçük- big/small	ön/arka- front/back	elbise/ dress	sıkılmış/ bored	hepsi/ all	önce/sonra- before/after	uçak/ plane	beş/ five
kapalı/açık- close/open	uyanık/uykuda- awake/asleep	etek/ skirt			sabah/ morning	vapur/ steamboat	
sıcak/soğuk- hot/cold	uzun/kısa- long/short	kilot/ pants			şimdi/ now		
temiz/kirli- clean/dirt	var/yok- yes/no	kolye/ necklace					
üzgün/ mutlu- sad/happy	yakın/uzak- close/far	mayo/ swimsuit					
		şapka/hat şort/short terlik/slipp er tişört/t- shirt					
<b>Verbs</b>							
<b>Action Verbs</b>				<b>State Verbs</b>			
aç-/açma-/open	al-/alma-/take			acıık-acıkma-/hungry			bağır-/shut
it-/itme-/push	bitir-/bitirme- /finish			gül-/gülme-/laugh			et-/etme-/make
ittir-/ittirme-/thrust	boya yap-/paint			oyna-/oynama-/play			hopla-/leap
kapat-/kapatma-/close	çek-/çekme-/pull			tırman-/tırmanma-/climb			koş-/koşma-/run
sev-/sevme-/like	çiz-/çizme-/draw			uyu-/uyuma-/sleep			küs-/sulk
söyle-/say	kucakla-/hug			üzül-/üzülme-/worry			otur-/sit
yap-/yapma-/do	oku-/okuma-/read			zıpla-/jump			yürü-/walk

Note. The concepts are given by Turkish and English (T/E).

Table 4. The conceptual knowledge of infant's effective language in the 13–18 months

<b>Effective Language</b>										
<b>Nouns</b>										
Family/ Person	Objec/ Property	Animal	Number	Color	Food	Vehicle	Body	Nature/ Sky	Opposites	
amca/ uncle	anahtar/key	ayna/ mirror	balık/ fish	iki/ two	kara/ black	kek/ cake	gemi/ ship	baş/ head	gül/ rose	aşığı/ yukarı- up/down
bebek/ baby	çizgi/ line	çöp/ rubbish	dinazor/ dinosaur	üç/ three	mor/ purple	limon/ lemon	tekne/ boat	kaş/ eyebrow	güneş/ sun	büyük/ küçük- big/small
çocuk/ child	havlu/ towel	gözlük/ glasses	kaplumbağa/ turtle	dört/four	pembe/ pink	pasta/ cake	tren/ train	parmak/ finger	şimşek/ lightning	hızlı/yavaş- fast/slow
	havuz/ pool	ip/rope	kelebek/ butterfly		turkuaz/ turquoise	simit/ bagel	uçak/ plane	popo/ butt	yağmur/ rain	sıcak/soğuk- hot/cold
	kapı/ door	kum/ sand	kurbağa/ frog		turuncu/ orange			sırt/ back	yaprak/ leaf	temiz/kirli- clean/dirty
	kaşık/ spoon	mum/ candle	panda/ panda						yıldız/ star	
	kova/ bucket	tabak/ plate	tırtıl/ caterpillar							
	resim/ picture	tahta/ board	timsah/ crocodile							
	yatak/ bed									
<b>Verbs</b>										
<b>Action Verbs</b>					<b>State Verbs</b>					
aç-/açma-/open		çek-/pull						otur-/sit down		
ittirme-/push		çiz-/draw						oyna-/play		
kapa-/close		kucakla-/hug						uyu-/sleep		
ol-/be		oku-/read						üzül-/worry		
söyle-/say		sev-/like						zıpla-/jumb		
yap-/do										

Note. The concepts are given by Turkish and English (T/E).

As seen in Table 4, the implementers identified concepts related to family/person (3), object/property (17), animal (8), number (3), color (5), fruit/vegetable/food (4), vehicle (4), body/organ (5), nature/sky (6), opposites (10) for names in the infant’s effective language based on instructional and fiction books in the 13–18 month. It was found that the concept that the infant knows best is related to the names of object/property (17). When the verbs of the infant in the effective language were examined, it was found that there were 12 action verbs such as open, close, say, read, draw and 8 state verbs such as jumb, play, worry, sleep. However, it was seen that the infant used the negative and positive meanings of the names and verbs in the effective language.

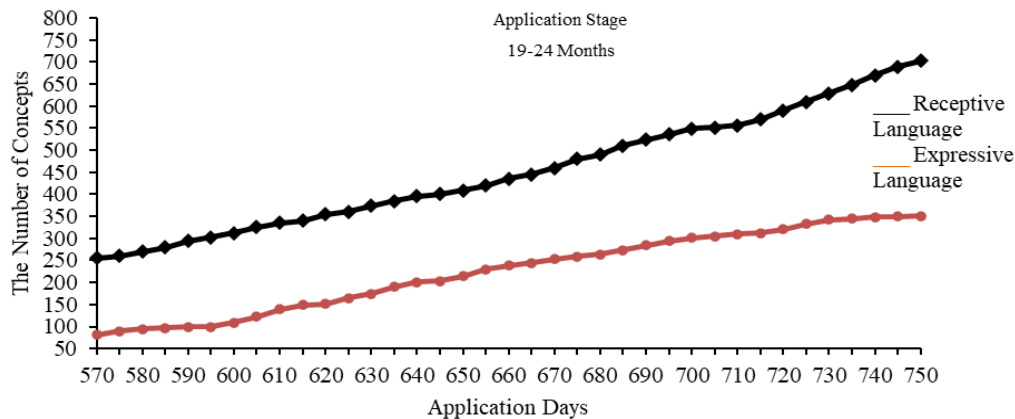


Figure 6. The number of concepts of infant in the 19–24 months

In the 19–24-month process, it was observed that the infant learned the names of pictures in 30 instructive books and 30 fiction books after the implementers’ repetition and generalisation of these names to various situations. After the 138 sub-application stages, it was determined that because of visual reading of instructive and fiction books, the infant’s expressive language increased to 702 concepts and receptive language rose to 352 concepts. When the infant saw a concept in the pictures, the implementers repeated the name of the concept immediately, and the infant either pointed to or said the name of the concept after listening to a related concept (turtle: badada). This shows that the infant learned recipient language visually while learning the concept and then repeated this concept. In this process, it was observed that the infant could immediately understand visuals in book and their symbolic names. When the implementer showed and said the name of a concept in the picture several times, the infant would interact with the related object by saying its name or pointing to it, which enabled him to rapidly develop concept vocabulary.

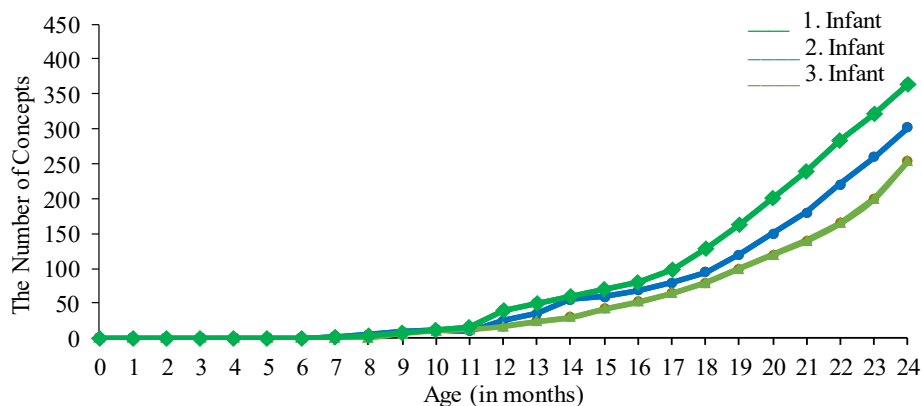


Figure 7. The number of concepts in the 3 infants’ recipient and expressive languages

In this study, based on the survey conducted with families that read age-appropriate picture books to their babies from 0–24 months, the number of concepts in the 3 babies' recipient and expressive languages was determined. Babies' concept number patterns changed independently based on months. It was determined that the concept number in the babies' language rapidly increased after the 11th and 12th months. Based on the obtained data, the number of concepts known by the first infant (green colour) was 40 in the 12th month, 128 in the 18th month, and 364 in the 24th month; the second infant (blue colour) knew 25 in the 12th month, 95 in the 18th month, and 302 in the 24th month; and the third infant (orange colour) knew 17 in the 12th month, 80 in the 18th month, and 254 in the 24th month. In the 12th and 18th months, while the number of concepts in the babies' language were all similar, the number of concepts differed significantly after the 18th and 24th months.

#### 4. Discussion

Children's literature should be included in the concept design process with linguistic and visual elements starting in early childhood. Children trying to perceive life with words they have acquired in this process is a determining variable for books to be age and level appropriate. From the first, developing children's conceptual vocabulary will contribute to their language acquisition and enable them to use their intellectual processes more effectively (Alpöge, 1991; Gürmen, 1997; Sever, 2018). As children complete 2/3 of their intellectual development in the first 5 years, the concept design process from birth to age 2 is extremely important, especially because the learning concepts process starts at birth (Tepebaş & Haktanır, 2013). For this reason, the boundaries of a child's conceptual knowledge should be extended with the information obtained from the visuals in age-appropriate picture books from 0–2 years. Thus, pointing or naming the images from such books will enable the child to develop and construct his/her understanding and expression skills through conceptual accumulation.

In this study, as a result of the interaction with age-appropriate picture books suitable for the infant's level from 0–4 weeks, no concrete data related to the infant's conceptual knowledge could be obtained by the implementers. During this time, the infant used innate schemes or reflexes, such as sucking or staring, she did not having any imitation skill, she lacked the ability to combine information from multiple sense organs, and she was not at the cognitive level to understand objects (Piaget, 2004), which caused the infant to stare at pictures in the books for only 3–5 seconds directed by motion and voice. Since the infant's was not developed enough to understand the concepts in the pictures, her interest in them was emotional and motor based.

From 1–6 months, depending on the 38 sub-application phases, the infant interacted with the books by looking at the pictures in detail; exploring them with her hands, eyes, and mouth; trying to scratch the images with her hands; looking at the images from different directions; and trying to open the books, all of which allowed her to turn to different visuals as she wished. This reveals that the infant's attitude towards visuals is no longer simply sensory, and motor based, as in the previous period, and that as the interaction period with the book increases in months 1–6, she tries to learn and explore the concepts contained in the book more by trial and error. The implementers' transferring of the name and characteristics of an image in the form of classical conditioning through motion, imitation, and sound enabled the infant to form schemes for the relevant image, as well as to point to the relevant image. Creating a high number of experiences with book-oriented stimuli and interactions allowed for the observation of the infant's concept vocabulary development. Starting from the 1st month, the infant had the visual analysis skills to investigate objects in detail, was able to take in different visual and auditory information (Bee & Boyd, 2009), and got used to pictures in books through an adequate number of experiences. This was the first concrete data obtained for the infant's concept vocabulary, proving that it is necessary to introduce age-appropriate books to children from an "early age" (Dilidüzgün, 2004; Sever, 2008). In this sense, starting from the 1st month, the child's parents should ensure he or she interacts regularly and systematically with age-appropriate picture books for the infant's developmental level.

In this study, the infant's receptive language concept number after interaction with instructive books was 110 in months 7–12. In the 11th month, as the infant started to say her first words, the number of expressive language concepts reached 22 by the end of the 12th month. In other words, it has been observed that the number of concepts in receptive and expressive language has increased with the interaction of both implementers and the infant, who gradually began to gain autonomy through different educational books. As expressive concepts in the infant's language increased, concretising by the implementers in terms of signal, motion, and voice (e.g., "What is this? Where is the bird? How did rabbit hop?") enabled the infant to try to say the concepts in expressive language. This shows that the infant can transfer purposeful information from one sense organ to another (Piaget, 2004). It also reveals that the infant should understand before starting to say the words (Yavuzer, 2012). In this respect, the implementers regularly reread books to the infant in the 149 sub-application stages, contributing to the infant's pointing and associating the visuals in the books with their names. As an infant's concept learning is extremely slow from 6–13 months, each concept must be repeated many times (Bee & Boyd, 2009), which reveals the

importance of the conceptual knowledge acquired with age-appropriate picture books for the infant's level. In this study, to determine social validity, the results for the single participants were compared with those of 3 other babies. It was found that there were significant differences between the concept vocabulary of the four children. While there were 132 concepts in receptive and expressive language for the single female participant, the first infant (green colour) had 40 in the 12th month, the second infant (blue colour) had 25 in the 12th month, and the third infant (orange colour) had 17 in the 12th month. This suggests that the interactions between the infant and the book should be carried out regularly and systematically as part of a daily routine.

While the single infant's receptive language concept number was 255, the expressive language concept number reached 81 in months 13–18. As the infant encountered 30 instructive and 30 fiction books in the 142 sub-application stages, this enabled a rapid increase in concept vocabulary. Adding fiction age-appropriate books to the infant's daily life fostered the conceptualising of the actions, emotions, and behaviours of the characters in the books. While the infant's interactions with instructive books was only in the form of naming pictures in previous stages, at this stage the infant recognised characters (protagonist or supporting characters) and fictional environments through speech or motion. In short, the infant's ability to examine the characters' emotions, behaviours in various circumstances, and relationships with other characters and their environments enabled the infant to increase her conceptual vocabulary. Repetition by the implementers in the sub-application stages also contributed to the reinforcement of the acquired concepts. According to data obtained from the social comparison, in terms of receptive and expressive language, the first infant (green colour) knew 128 concepts in the 18th month, the second infant (blue colour) knew 95 in the 18th month, and the third infant (orange colour) knew 80 in the 18th month. As the receptive (255) and expressive (81) number of concepts of the infant regularly interacting with age-appropriate picture books was 336, the infants selected for social comparison did not have more concept vocabulary. This reveals that babies who are acquainted with books at this stage of concept development should engage more regularly with fiction books.

As a result of the regular interactions between the infant and books in the 138 sub-application stages from 19–24 months, the infant had acquired 702 receptive language concepts and 351 expressive language concepts, making the total number of concepts 1053. The 3-fold increase in the infant's vocabulary compared to the previous stage is the result of understanding an event or situation visually, as well as relating or understanding or naming with comparison. In other words, the infant seeing the clues about the changes experienced by the characters in the fictional worlds of age-appropriate picture books; describing the physical characteristics of the characters; understanding their behaviours according to the event, situation, and emotional states; finding reasons for the differences in the visuals and situations depicted in the visuals; and acting and conceptualising events enabled her to increase her vocabulary in these months. Additionally, since this is a period when an infant's language development is analysed according to grammar codes, such as words, phrases, or sentences, and he or she understands that a symbol is different from an object (Piaget, 2004), relationships with books at this stage often involve "looking and expressing." In this study, based on the obtained data from the social comparison, the total number of receptive and expressive language concepts known by the first infant (green colour) was 364 in the 24th month, the second infant (blue colour) knew 302 in the 24th month, and the third infant (orange colour) knew 254 in the 24th month. Although these infants had developed their vocabulary through age-appropriate books, the infant that interacted more frequently with age-appropriate books showed more development.

Babies that lack sufficient perception stimuli will develop slowly (Bee & Boyd, 2009). Additionally, those who do not have the opportunity to look at objects; research them with their hands, eyes, and mouths; and move freely around their environment experience a decline in their perceptual and motor skills (Yavuzer, 2012; Yörükoğlu, 2010). Therefore, stimuli that stimulate the senses and direct the brain to the perception process should be part of children's lives from infancy (Sever, 2018). Here, starting from the first month, it is necessary to ensure that the infant interacts with qualified books that are appropriate to the level that will enable him or her to gain important experiences. To ensure this interaction, the child's mother and father should be conscious of age-appropriate and fiction books and be aware of their responsibility to be a guide to reading books in a visual manner. In other words, an infant's regular interaction with books as visual and linguistic stimuli, with the contribution of the mother and father, will enable him or her to try to associate with the universe of meaning formed by colour, lines, and words. An infant's continuous interaction with books through the parents' help can contribute to the infant learning to interpret objects, characters, events, situations, and emotions. In this respect, it can be said that the experiences created with age-appropriate picture books employed in a social interaction environment with the participation of parents are important in the conceptual development of an infant.

As a result, the infant's receptive and expressive language concepts will be more developed compared to those of children whose parents do not help their infants engage with books regularly and systematically. Thus, it is



necessary to support the concept design process of infants with age-appropriate picture books suitable for their developmental level with the participation of parents. Based on the results of this study, experimental research examining the development of conceptual vocabularies in children from 24–48 months and 49–64 months is recommended.

### **Acknowledgments**

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The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

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### **Data availability statement**

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

### **Data sharing statement**

No additional data are available.

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