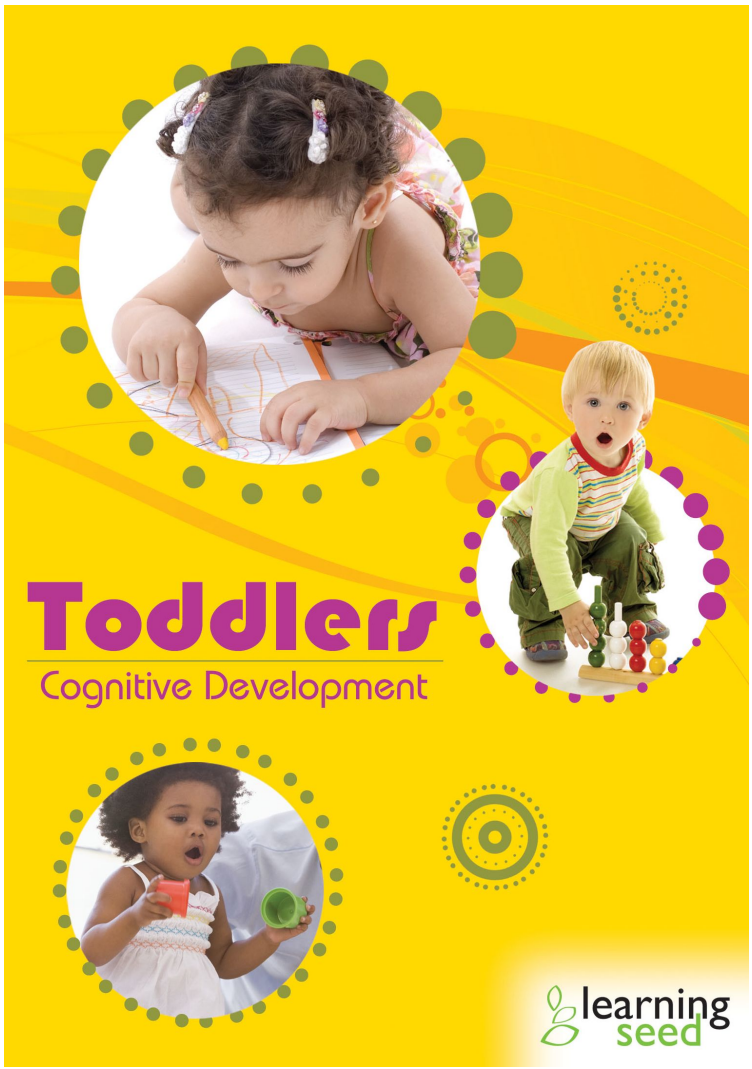

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Toddlers: Cognitive Development

Legal Niceties

The Video

This Teaching Guide

Credits

The Video

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Summary

Viewers learn the attributes of the sensorimotor stage of development, the ways toddlers encode, store, and retrieve information, the process by which memories are formed, the patterns and sequences of language development, the concept of toddler intelligence, and how cognitive development may be affected by developmental differences.

Key points:

- A toddler's brain is constantly creating a complex network of neurons, or brain cells, which connect to each other by dendrites and synapses.
- Repetition creates connection permanence; unused connections are pruned away.
- Piaget's theory places toddlers in the last two substages of the sensorimotor stage of development.
- Toddlers 12 to 18 months are in the tertiary circular reaction substage, where they experiment with trial and error to learn about their world.
- Toddlers 18 months to 24 months are in the beginnings of thought substage which is marked most significantly by symbolic thinking and pretend play.
- A toddler's memory develops rapidly; their information processing includes encoding, storage, and retrieval.
- Most information goes into short-term memory; repetition is key to establishing the neuron connections that create long-term memory.
- Toddlers create implicit memories, which are mainly motor skills like walking or using a spoon, which eventually become second nature.
- Toddlers begin to have explicit memories, such as names of objects or locations, for which their brains need to concentrate.
- Repetition and the development of the hippocampus area of the brain are important in establishing memory.
- Many children say their first word at about 12 months.
- Toddlers' words begin to consistently stand for specific objects, people, and actions.
- At around 18 months, toddlers expand their vocabulary and begin putting two-word sentences together to make observations and communicate with others.
- While it is important to remember that all children develop at different rates, some children may have cognitive developmental differences.

The Toddler Brain

During the first two years of life, the brain grows rapidly, actually tripling in weight. A toddler's day-to-day life also affects brain development, as their brain cells are connect to each other during everything they experience. Neurons are the basic nerve cells in the brain, and these cells communicate with each other thanks to branch-like extension fibers called dendrites. The dendrites receive messages from other neurons through small gaps between them called synapses.

The sights, sounds, textures, and tastes they experience create the new connections in their brains. Connections in the brain become permanent when the experience is repeated. Repetition creating permanence is especially significant in learning language because when children hear the same words or phrases many times, they learn to understand speech and strengthen the language connections in the brain.

Some connections are not reinforced by repetition, and these are eventually pruned away. The act of the brain pruning away experiences that aren't repeated actually strengthens the actively repeated connections.

Activities to aid in creating neuron connections:

- Provide the child with a variety of books and toys.
- Engage in sensory-rich activities that appeal to smell, texture, and taste.
- Hang pictures of familiar objects at the child's eye level while encouraging the child to name them.
- Use repetition in language and activities.

Stages of Development

Jean Piaget is known for his extensive research on child development, specifically in the field of cognitive development and many accepted developmental milestones. Piaget's cognitive theory is based on stages, where each stage builds upon the last. Toddlers fall into the sensorimotor stage, which itself has 6 substages. Toddlers fall into the last two substages: tertiary circular reactions and beginnings of thought.

Piaget placed tertiary circular reaction at about 12 to 18 months of age. During this stage, children move from simply repeating actions that are pleasing to them to conducting mini-experiments and observing their outcomes - learning by trial and error. Children also practice cause and effect by trying out different sounds and actions in order to get attention from their caregivers.

Piaget identified children ages 18 months to 2 years as being in the stage called beginnings of thought. The most significant aspect of this stage is the development of symbolic thought, or the mental representation (internal image) of a past event or object. Symbolic thinking gives children the ability to pretend. Toddler's play often includes pretending to do things. These actions are not mere imitations of behaviors they have just seen; during pretend play toddlers take people and objects from their memories, and use them to recreate actions and situations.

Play is the best way for a child to learn.

Activities that can help foster cognitive development during these two stages:

- Mix two finger paint colors to create a new one to reinforce the concept of cause and effect.
- Play with musical instruments so the child can hear the variation of sound based on how it is played.
- Provide dress up clothes for pretend play, use puppets to act out stories, and create an imaginary store where the toddler can shop using empty boxes. These activities help to encourage symbolic thinking.

Information Processing

Information processing has three steps: encoding, storage, and retrieval.

Encoding is the process by which information is first stored in a form that is usable to memory. There are countless bits of information involved in everything a toddler experiences such as colors, tastes, textures, and noises. A toddler's brain encodes some of the details from all that information.

Storage is the placement of information into memory. There are two types of memory: short term and long term. Most of the information that gets encoded goes into short-term memory. Adults can generally remember 7 bits of information for a short amount of time, but toddlers can only take in about 2 bits of information at a time. These bits of information need to be repeated often in order to be transferred into long-term memory. If an experience created a connection in the brain, that connection can be stored for future use.

Retrieval is the final part of information processing, and it is the process by which material in memory storage is found, brought into awareness, and used. As toddlers get older, their memory retrieval improves. This is in part due to the hippocampus in the brain. At around 12 months old, the hippocampus matures enough to allow children to remember experiences that happened within the time period of about a day. The toddler may even remember events further in the past but they do not have a sense of when those events took place.

Long-term memory can be separated **into implicit and explicit memories**. We are not consciously aware of implicit memories, but they do affect our behavior. These memories include motor skills, habits, and activities that do not require a conscious effort for the brain to recall and execute. Through repetition, activities like walking, climbing, and using a spoon become more subconscious or implicit for a toddler. Explicit memories require conscious cognitive effort to retrieve.

Repetition is key to creating lasting memories, which are a major component of cognitive development. Repeated reading helps toddlers to create neural pathways - when a child knows what is going to happen next in a story it helps them learn the concept of sequencing.

Some other examples of ways to foster the development of a toddler's memory:

- Choose a finger-play song, singing and doing the actions every day.
- Choose a color to go on a hunt for to find objects of that color, repeating the name of color each time the child finds one.

Language Development

Many children begin to use recognizable words around the age of one, and as their language develops, so does their vocabulary. Understanding language comes before the ability to use words. Babies under a year old often understand several words-even before they have a spoken vocabulary of their own. Even by 18 months when toddlers can say an average of 20 words, they actually understand around 200 words.

Children often say their first word between 12 and 14 months of age. Experts debate what constitutes a "first word." Some feel that if the same word is spoken clearly and consistently for any reason, then it's official. Others feel that a word is official when it is a clear and consistent name that is given to a specific object, event, or person.

Once toddlers start to speak words, their vocabulary increases at a quick pace. Between the ages of 12 and 18 months, most children speak in holophrases. **Holophrases** are one-word utterances that stand for a whole phrase, whose meaning depends upon the context in which they are used. The word means something slightly different depending upon the context. Toddlers will also often gesture to express themselves, and can be taught simple signs to communicate if they don't have the words yet.

At around 18 months toddlers begin to use 2-word sentences. With these sentences they begin to express their understanding of relationships and state observations of their world. Toddlers start to speak in regards to possessions, relationships, and requests, also known as **telegraphic speech**. This is speech in which words that are not critical are left out, so they are not grammatically correct.

The best way to foster language development in toddlers is to talk to them, as they learn better if they are spoken to about what they are seeing, touching, and doing. Toddlers get used to this speech pattern and begin asking and answering questions for themselves. When a toddler does talk, showing the child that you are really listening by making eye contact and repeating back what they say is another way to foster development. If the child knows they are speaking to a captive audience, they will be more apt to start conversations or observations. It is important to make reading a daily activity as this also helps with language development. Concepts such as inflection, speech patterns, rhythms, and sequencing can all be enhanced when reading with a toddler.

Developmental Differences

Developmental delays can be caused by genetic or inherited conditions, head injury, illness, or infection. The term delay or difference is used because there are interventions that can lessen or eliminate the delay over time. If the delay continues as the child gets older, their condition may be referred to as If a toddler is not using any words by 15 months and did not babble by their first birthday, this may indicate a developmental delay or possibly a hearing problem. For older toddlers, 19 to 24 months, caregivers may notice a toddler not using word combinations or dropping consonants from words.

Toddlers with intellectual delays may have difficulty with memory, reasoning, language, and other cognitive skills. These children can learn and develop throughout their lives, and may simply just need more time, structure, or guidance to do so.

Ways to help toddlers with developmental delays:

- Stick to predictable routinesaa
- Allow extra time to learn new skills
- Use repetition as practice
- Keep instructions simple
- Provide multi-sensory materials
- Seek out professional support that can provide helpful interventions for the toddler

Review

- If given a stimulating environment with many opportunities to explore, interact, and use language with others, a toddler's cognitive development with thrive.

- Jean Piaget's theory places toddlers in the last two substages of the sensorimotor stage of development which involves learning through trial and error experiments and the ability to pretend and use symbolic thought.

- Toddlers process everything they take in during their experiences in which they encode, store, and retrieve information.

- Toddler language development progresses from the first spoken word to short two-word sentences that toddlers use to request things, show possession, and make observations.

- There are ways and interventions to help encourage and stimulate cognitive development in children with normal development as well as challenging conditions.

Suggested Activities

1. Create activities for toddlers that help to identify their stages of cognitive development (tertiary circular reaction and beginnings of thought) according to Piaget's theory of development. Develop exercises that test their abilities within the characteristics of the stages and identify which activities correspond with which stage.

2. Have students ask their parents when they started to express themselves through language. What was each student's first word and when did they say it? Investigate whether they babbled before they spoke actual words and their vocabulary development after saying their first word. Did it grow rapidly? Did they start to use telegraphic speech? At what age? Have students create a list of activities that will help foster language development in toddlers.

Research Project

Research cognitive developmental delays toddlers may have pertaining to language development. Research the area in which you live for intervention services that can assist with diagnosing, treating, and socializing children that may have challenging cognitive conditions.

Toddlers: Cognitive Development

Fill-In-The-Blank

Fill in the blanks with the correct words from the bank at the bottom of the page.

The basic nerve cells in the brain are _____, and they communicate to other cells through branch-like extensions called _____. Through the extensions, messages can cross a _____, or a gap between another nerve cell. _____ creating _____ is especially significant in not only strong brain cell connections but language development as well. When an experience is not repeated, the brain will _____ away unneeded information. Piaget places toddlers in the _____ stage of cognitive development, specifically the last two _____. _____ is the stage in which toddlers the ages of 12 to 18 months start to create mini experiments and learn cause and effect. _____ is the stage in which toddlers begin to pretend play. Information processing has three steps. In the first step, _____, a toddler will absorb bits and details of an experience. In the _____ step of information processing, a toddler puts information into the _____ memory, but can only hold about 2 bits of information at a time. The last step in information processing, _____, involves pulling learned experiences out of the _____ memory and using them. Toddlers use a lot of _____ memories, which do not take much concentration to perform, and include habits and motor skills. Toddlers typically say their first words around the ages of 12 to 14 months, and soon after begin to speak in _____, or one word utterances that stand for a whole phrase, whose meaning depends on the context its spoken in. Toddlers can also learn to speak through _____ speech which are two word sentences that often express possession, a relationship or a request.

Word Bank:

implicit	permanence	holophrases	sub-stages	synapse
dendrites	prune	telegraphic	sensorimotor	neurons
encoding	short-term	repetition	tertiary circular reactions	
retrieval	storage	long-term	beginnings of thought	

Toddlers: Cognitive Development
Fill-In-The-Blank *Answer Key*

The basic nerve cells in the brain are neurons, and they communicate to other cells through branch-like extensions called dendrites. Through the extensions, messages can cross a synapse, or a gap between another nerve cell. Repetition creating permanence is especially significant in not only strong brain cell connections but language development as well. When an experience is not repeated, the brain will prune away unneeded information. Piaget places toddlers in the sensorimotor stage of cognitive development, specifically the last two substages. Tertiary circular reactions is the stage in which toddlers the ages of 12 to 18 months start to create mini experiments and learn cause and effect. Beginnings of thought is the stage in which toddlers begin to pretend play. Information processing has three steps. In the first step, encoding, a toddler will absorb bits and details of an experience. In the storage step of information processing, a toddler puts information into the short-term memory, but can only hold about 2 bits of information at a time. The last step in information processing, retrieval, involves pulling learned experiences out of the long-term memory and using them. Toddlers use a lot of implicit memories, which do not take much concentration to perform, and include habits and motor skills. Toddlers typically say their first words around the ages of 12 to 14 months, and soon after begin to speak in holophrases, or one word utterances that stand for a whole phrase, whose meaning depends on the context its spoken in. Toddlers can also learn to speak through telegraphic speech which are two word sentences that often express possession, a relationship or a request.

Toddlers: Cognitive Development
Matching

Match the words in the first column to the best available answer in the second column.

_____	He theorized on children's cognitive development	1) "first word"
_____	Toddlers speak in these one word utterances that stand for a whole phrase	2) neurological connections
_____	Toddlers say this around one year of age	3) long-term memory
_____	A toddler's everyday actions create these in the brain	4) Piaget
_____	This triples in weight during the first two years of life	5) hippocampus
_____	This is where a toddler keeps explicit and implicit memories.	6) holophrases
_____	Due to the maturation of this, toddlers can begin to remember things that happened within the last day	7) brain
_____	A toddler can keep about 2 bits of information stored in this at once	8) short-term memory

Toddlers: Cognitive Development
Matching *Answer Key*

Match the words in the first column to the best available answer in the second column.

__4__ He theorized on children's cognitive development

__6__ Toddlers speak in these one word utterances that stand for a whole phrase

__1__ Toddlers say this around one year of age

__2__ A toddler's everyday actions create these in the brain

__7__ This triples in weight during the first two years of life

__3__ This is where a toddler keeps explicit and implicit memories.

__5__ Due to the maturation of this, toddlers can begin to remember things that happened within the last day

__8__ A toddler can keep about 2 bits of information stored in this at once

Glossary

Dendrites	Branch-like extension fibers to help communicate between neurons.
Encoding	The first step in information processing where information is first stored in a form that is usable to memory.
Explicit memories	Memories that require conscious cognitive effort to retrieve.
Holophrases	One-word utterances that stand for a whole phrase, whose meaning depends upon the context in which they are used.
Implicit memories	Memories of which we are not consciously aware but that affect our behavior.
Neuron	Basic nerve cells in the brain.
Retrieval	The process by which material in memory storage is found, brought into awareness, and used.
Storage	The placement of information into memory.
Symbolic thought	A mental representation or internal image of a past event or object.
Synapses	The small gaps between neurons and dendrites that messages cross through.
Telegraphic Speech	Speech in which words that are not critical are left out, and is not grammatically correct.