Chapter 6 - The First Two Years: Cognitive Development
Sensorimotor Intelligence

• Piaget’s term for the way infants think—by using their senses and motor skills—during the first period of cognitive development.

• Begins at birth and ends at about 24 months
Primary Circular Reactions

• The first of three types of feedback loops in sensorimotor intelligence
• Involves the infant’s responses to its body
• Stage 1: *stage of reflexes* (i.e. sucking)
• Stage 2: *stage of first habits* (i.e. grabbing a bottle to suck it)
Secondary Circular Reactions

• The second type of feedback loop
• Involves responses to people and objects
• Stage 3: *making interesting events last*
  – i.e. clapping hands when told to
• Stage 4: *new adaptation and anticipation*
  – i.e. putting mother’s hands together in order to make her start playing patty-cake
Secondary Circular Reactions

• **Object permanence**: the realization that objects (including people) still exist when they can no longer be seen, touched, or heard.
Tertiary Circular Reactions

• The third type of feedback loop
• Active exploration and experimentation
Tertiary Circular Reactions

• Stage 5: *new means through active experimentation*
  – “Little scientist” active and creative exploration using trial and error

• Stage 6: anticipate and solve problems by using *mental combinations*
  – *Deferred Imitation*: when infants copy behavior they noticed hours or days earlier
**TABLE 6.1**

The Six Stages of Sensorimotor Intelligence

For an overview of the stages of sensorimotor thought, it helps to group the six stages into pairs. The first two stages involve the infant’s responses to its own body.

**Primary Circular Reactions**

- **Stage One** (birth to 1 month)
  - *Reflexes*: sucking, grasping, staring, listening

- **Stage Two** (1–4 months)
  - *The first acquired adaptations*: accommodation and coordination of reflexes.
  - *Examples*: sucking a pacifier differently from a nipple; grabbing a bottle to suck it

The next two stages involve the infant’s responses to objects and people.

**Secondary Circular Reactions**

- **Stage Three** (4–8 months)
  - *Making interesting sights last*: responding to people and objects. *Example*: clapping hands when mother says “patty-cake”

- **Stage Four** (8–12 months)
  - *New adaptation and anticipation*: becoming more deliberate and purposeful in responding to people and objects.
  - *Example*: putting mother’s hands together in order to make her start playing patty-cake

The last two stages are the most creative, first with action and then with ideas.

**Tertiary Circular Reactions**

- **Stage Five** (12–18 months)
  - *New means through active experimentation*: experimentation and creativity in the actions of the “little scientist.”
  - *Example*: putting a teddy bear in the toilet and flushing it

- **Stage Six** (18–24 months)
  - *New means through mental combinations*: considering before doing provides the child with new ways of achieving a goal without resorting to trial-and-error experiments.
  - *Example*: before flushing, remembering that the toilet overflowed the last time, and hesitating
Piaget and Modern Research

Habituation

• The process of getting used to an object or event through repeated exposure to it
• Evidence of habituation is loss of interest
• By using habituation and then introducing a new stimulus, we can find more of what babies know and learn
Measuring the Brain

• Brain research shows that babies can think before they can talk

• Techniques Used to Study the Brain:
  – **fMRI**: used to locate neurological responses to stimuli
  – EEG: measures electric activity in cortex
  – ERP (event related potential): notes amplitude and frequency of electrical activity
  – PET: like fMRI but requires injection of dye
Information Processing

Information-processing Theory

• Modeled on computer functioning
• Information-processing theorists believe that a step-by-step description of the mechanisms of thought adds insight to our understanding of cognition at every age.
• Contrast with Piaget’s stages
Affordances

• The environment *affords* opportunities for interactions with what is perceived
Affordances

- The **visual cliff** was designed to provide the illusion of a sudden drop-off between one horizontal surface and another.

- Mothers were able to urge their 6-month-olds to wiggle forward over the “cliff”, but 10-month-olds fearfully refused.
Movement and People

• **Dynamic Perception**: focuses on movement and change
  – Babies work to master the next motor skill

• **People Preference**: an innate attraction to other humans
  – Babies recognize regular caregivers and expect certain affordances from them (i.e. comfort, food, etc.)
Memory

Early Memory

• According to classic developmental theory, infants store no memories in their first year.
• Developmentalists now agree that very young infants can remember if the following conditions are met:
  – Experimental conditions are similar to real life.
  – Motivation is high.
  – Special measures aid memory retrieval.
Reminders and Repetition

• Rovee-Collier found that infants could remember after 2 weeks if they had a reminder session
  – any experience that helps one remember an event, thing or idea

• Repeated reminders (repetition) are better than single reminders
Aspects of Memory

- **Implicit Memory**: remains hidden until a stimulus brings it to mind
  – stored via habits, emotional responses, etc.

- **Explicit Memory**: can be recalled on demand, usually with words
  – consciously learned words, data & concepts
The Universal Sequence

• **Child-directed speech:** the high-pitched, simplified, and repetitive way adults speak to infants (called baby talk or motherese)

• **Babbling:** the extended repetition of certain syllables, such as ba-ba-ba, that begins when babies are between 6 and 9 months old
First Words

• At about 1 year, babies speak a few words.

• Spoken vocabulary increases gradually (about one or two new words a week).

• Holophrase- A single word that is used to express a complete, meaningful thought.
  – All new talkers say names and utter holophrases.
First Words

• **Naming explosion** - A sudden increase in an infant’s vocabulary, especially in the number of nouns, that begins at about 18 months of age.
Cultural Differences

• Some cultures do not value verbal fluency so speak to their children less
  – i.e. Otavalos of Ecuador

• Infants differ in their use of various parts of speech, depending on the language they are learning
  – e.g. more nouns and fewer verbs.
Putting Words Together

- **Grammar** includes all the devices by which words communicate meaning: sequence, prefixes, suffixes, intonation, loudness, verb forms, pronouns, negations, prepositions, and articles.

- Worldwide, people who are not yet 2 years old already use language well.
Theories of Language Learning

Theory One: Infants Need to Be Taught

• B. F. Skinner (1957) noticed that spontaneous babbling is usually reinforced.
• Parents are expert teachers.
• Frequent repetition of words is instructive, especially when linked to daily life.
• Well-taught infants become well-spoken children.
Theories of Language Learning

Theory Two: *Social-pragmatic*

• Infants communicate in every way they can because humans are social beings.

• Early communication focuses on the emotional messages of speech and not the words
Theories of Language Learning

Theory Three: Infants Teach Themselves

- **Language acquisition device (LAD)** - Chomsky’s term for a hypothesized mental structure that enables humans to learn language, including the basic aspects of grammar, vocabulary, and intonation.
Theories of Language Learning

A Hybrid Theory:

• Some aspects of language may be explained by one theory at one age and another theory at another age.

• How language is learned depends on the age of the child as well as on the particular circumstances.