PSYC2500 – October 4th
Theories of Cognitive Development

1. **Piaget's Theory**
2. **Other Theories**
3. **Core Domains**

Piaget, a stage theorist:
- has a number of tasks to assess childrens' development at various points
- has been found to be generalized universally to different children
- believes development occurs in a fixed sequence; you have to go through the initial stages to go to the further stages
- at each stage, specific milestones. Each milestone allows you to have a representation of reality that is more accurate.
- Piaget sees children as 'budding scientists'
- a four year old who perceives an event will not perceive it the way a seven-year-old or an adult do

Stages:

The sensormonitor stage (birth to 2 years)
- **Circular reactions**
- infants exploring the world through their actions
- babies repeat, repeat, repeat; know the world through their actions
- there are differnt types of circular actions
- the baby is born with reflexes which allow him to explore the world. The baby will experience pleasure and want to repeat it.
- The babies will be able to repeat events more voluntarily

Secondary circular reactions – repeating an event
- exploring objects; learning about the world

Tertiary circular reactions – acting on different objects
- can repeat actions on objects and generalize to other objects
- beyond the object, but what you can do with that object

Object permanence:
- until 6 months, baby does not have object permanence
- at 12 months, baby has object permanence – there is a representation of the object in the brain

- **Piaget thought up 12 stages**
- the younger the baby, the longer the standard deviation
- but is that an indication of later behaviour?
- For ex: language development – early talkers become early readers? Studies don't show a lot of support.

- **not until 18 months will the baby be able to overcome the 'A, not B' problem** (ex: object is

under blanket A, not B)

Assimilation – the flexibility of the cognitive system to change its representation/schemata

Deferred imitation – you observe, encode and replicate that behaviour at a later period of time

- in order for imitation to occur, babies need to have an imitation

- by 6 weeks of age, babies stop imitating (ex: parent sticking out tongue, baby sticking out tongue)
- by 6 weeks baby have more motor control – nothing to do with imitation per se

Language and symbolic thought:

- language typically occurs, according to Piaget, at 18 months; symbolic thought at 24 months
- schemas: initially action based, then symbolically based
  - schemas develop, but become more symbolic in nature
  - what are the mechanisms of change? Why do babies start changing their behaviours, and what mechanisms can account for it? Piaget says there are 2 mechanisms:
- **assimilation –** mental structures that make you expect certain things to happen – **if you use those mental structures and incorporate everything in the outside world to fit into them, you use assimilation.** One important way to **explain children's errors in thinking.**
- **Accommodation – changing mental structures;** the representation is changed to maintain the existence of the object.

- these 2 mechanisms go hand in hand; sometimes you assimilate, sometimes you accommodate
- they work from the get-go

Equilibrium – you want to be in a state of equilibrium; if what you see does not fit your mental structures you are in a state of equilibrium, so you will accommodate to get back to state of equilibrium. At some point, when you assimilate, you experience some conflict (disequilibrium); strive to create balance (equilibrium)

The Preoperational Stage:

- children now have symbolic thought so they can represent things in their minds
- 'before operations'
- Piaget argues that mathematical reasoning is one way to represent the outside world
- children should be able to use operations like addition and subtraction but with actual categories (ex: pouring liquid into a tall cup versus a stout cup; the taller cup looks like it has more)

Errors in thinking:

ecocentrism – the failure to take the perspective of another; lasts all the way to 7
centration – having to focus on more than one dimension at once

Conservation problems: manipulating the world so that things change shapes, but they don't change in quantity

- ex: conservation of liquids, conservation of numbers

- children truly focus on one dimension; once they focus on that one dimension, their reasoning of the outside world is totally different from our own
- the operations for all the conservation tasks are called **reversability** (reversing the operation

and seeing that the quantities are the same)

Concrete operational stage (7-11) years)

- more able to generalize problem-solving
- **can now use operations (concrete = physically present)**
- **can reason about the outside world, but not in an abstract fashion**
- can't solve hypothetical problems
- ***Formal operational stage*** **(from 12 years)**
  - able to reason abstractly
  - able to think outside of the box
  - with abstract thought comes higher levels of moral reasoning
  - able to make hypotheses
  - exploring the world in trying to understand it better

Vygotsky's Theory

- **information processing**
- **core knowledge theories**

Private Speech:

- our development is closely linked to our social and cultural environment. We are social beings. As social beings, our immediate environment as well as our cultural environment will influence the way we think and see the world.
- Argued as well that we use tools. **Our most precious tool is language.**
- The most precious tool we use to think is language
- he argues that language and thought are pretty much the same
- language initially is an outward manifestation. Before we move to private speech, little kids cannot think out loud.
- Language is a tool; helps guide behaviour.
- With young kids, see the initial use of language – language accompanies and structures that activity.
- Not engaging in social interaction w/language; guiding activity
- **ex: Roxanne from the video who says she's colouring in blue and pink bubbles**
- expressed orally initially and then goes inwards
- ex: disappearance of speech out loud with elementary school kids solving math problems – see lips move, see no behaviour at all

One of the suppositions of Vygotsky's theory of development is that learning can influence development.

- the stage you're in will guide your ability to learn
- Vygotsky says that although he agrees w/Piaget that what we take away from the world we use to construct our representation, he argues that learning what we do w/others (peers or even learned other) will influence cognitive structures and therefore development
- **learning as central to development**
- Vygotsky interested in *how* children learn:
- **2 interrelated constructs:**
- **zone of proximal development (ZPD)**
- **scaffolding**

- there are problems that children can't solve on their own. But if there is a learned other, the

child can then do it. According to Vygotsky, the zone (distance between not being able to solve problem on own and then being able to solve it w/the help of another). Scaffolding = instruction; what level of scaffolding should you give to help the child solve the next set of problems with your help

The zone of proximal development – a mental zone that occurs through interactions. Ex: the child is solving math problems and then reaches a plateau. Learned other has to figure out the level of help to provide such that the child will be able to solve the problems.

The optimal scaffold is different for every child.

For Vygotsky, the analogy is that we are social beings and learn in social environments; for Piaget, we are budding scientists. Now the analogy is that we are information processors, like computers.

Piaget never talked about the working memory or its limits.

We have a sensory short term memory. Initially, we encode information from our senses, but it only lasts a few miliseconds. We have to encode and transfer this information to our working memory in some form of working representation. **We need to keep it active to transfer it to our longterm memory.**

Sensory memory – working memory – longterm memory

- **working memory is limited in how much we hold at once as well as duration.** The information that is in there needs to be reactivated.
- **Longterm memory is limitless; but whether able to retrieve that information is another story**
- **executive functions:** we need the conductor there to be able to remember something. Executive processing allows you to work on information to retrieve it from longterm memory. **Executive processor allows us to retain 'software' –** putting information that belongs together, together.

Mental Hardware: (in textbook)

Sensory memory -> Working memory -> Longterm memory

- the central executive directs and monitors all activity
- longterm memory is permanent; access and retrieval are important
- sensory memory is of a large capacity but very brief

How is memory encoded?

What we know is that, with age, children become more and more adept to using strategies; can use more complex strategies, and are better at using even simple strategies.

Can we teach kids strategies?

Yes. For ex: memory tasks – if you group information together, it's easier to remember them.

- strategies do develop; children become more efficient and complex. And will be able to generalize.

In terms of working memory: the size of working memory is even more limited for children than adults.

- can often not hold more than 2 units of information
- in terms of inhibitory and executive processes: are they very good conductors to the symphony that is learning about the world? Are they able to adapt their strategies / rules they use to inhibit

old rules?

- Prior to age 5, not very good at inhibition (inhibiting something that you have learned well, like a schema, so that you can learn something new.)
- **inhibition is often called self-regulation**
- Vygotsky also argued that one of the functions of language is to self-regulate. With language, able to control own behaviour more appropriately.

Education: want those processes to be automatic so that words can be decoded automatically and then meaning of stories can be interpreted.

- the more automatic your processes, the more resources you have to apply strategies
- can then apply cognitive strategies to understanding complex material if your decoding abilities are very efficient
- is our hardware also becoming more efficient?
- **Speed of processing increases all the way to the teenage years.** 4 and 5 year olds have 1/3 of the speed of that of an adult to cognitively process information.

An information processing framework has allowed us to be more precise than Piaget, Vygotsky, in understanding our limitations in information processing.

Core Knowledge Theories:

- some forms of knowledge so important for survival that learning of these is simplified
- the premise is that we are born with the facility to learn specific aspects of the world that are important for our survival. We are built in such a way that learning about the physical world and the social world will occur fairly quickly because of our hardware.
- **Genetically we inherit a predisposition to process the outside world to help our survival**