The Growth of Knowledge: Crash Course Psychology #18

Crash Course: Psychology
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Even though you can't see me, you know that I am here talking to you. And I can probably persuade you that this container of water and this container of water have the same amount of water, which they do, even though they don't look like they do.

And you'll see I left my anglerfish behind me. If someone were to move it without my knowing, you'd rightly expect me to look for it first where I originally left it.

...Nnnugh!!

You can figure out all these things because you are far down the path of cognitive development. Your parents will be proud. But there was a time in your life, in all our lives, when simple concepts like these were totally baffling.

Of course, lots of things influence how your mind and its relationship with the world grows over time.

Both our genetics and our environment begin to affect our development long before we're even born, and they continue to influence our learning until the day we die.

And even though we're born with nearly the same number of brain cells we'll ever have, our complete set of brain hardware takes years to solidify as our neural networks grow more complex.

The study of our physical changes, cognitive, social and emotional changes throughout our whole lives - from prenatal to preteen to post-retirement - is called developmental psychology. It's how we grow into who we are.

And it begins with the growth of knowledge itself: the process by which you mature into the anglerfish-tracking water-beaker-estimating peekaboo-master that you are today.

[Intro]

As we age, we tend to follow a sequence of changes in behavior and appearance called maturation. Everyone is affected differently by their personal experience, of course, but we all share inherent genetic growth tendencies.

We roll over before we sit, we sit before stand, and we stand before we walk, and we walk before we break dance. The same thing applies to our cognitive development - how we learn to think, know, remember and communicate. And if you're gonna talk about cognitive development, you gotta start with Jean Piaget, developmental psychologist extraordinaire.

Piaget was from Switzerland where he was kind of a wunderkind and got his PhD in zoology in 1918, began dabbling in Freud psychoanalysis. After graduation, he headed to France to work on a method for testing childrens' aptitudes and abilities. While administering these tests, Piaget began to notice how younger kids kept giving wrong answers to certain questions.

He became fascinated by the fact that children of a certain age consistently made particular mistakes that older kids and adults didn't. Like the younger kids would have a really hard time understanding the idea I just showed you, that this container has the same amount of water in it as in this container. Or that this row of coins has the same number as this row.

While others might have dismissed these as childish mistakes, Piaget theorized that it was because humans go through specific stages of cognitive development and intellectual progression. His main game was asking 'How does knowledge grow?'

He proposed that as we grow and struggle to make sense of our experiences, we create schemas, or mental frameworks that help interpret information.

Schemas are like concepts, ranging from physical things like birds and hats and eye patches to abstract ideas like friendship and betrayal.

And we're constantly striving for cognitive equilibrium, or harmony, between our thought processes and our environments, which are always giving us new things to think about and adjust to.

Piaget proposed that we adapt to new experiences through two processes that are closely related - assimilation and accommodation.

When we assimilate new experiences, we interpret them in terms of our existing schemas. So if a toddler has never seen a deer but has a schema for a horse, she may call the first deer she sees a horsey. She wants to fit it within her understanding.

But with more interactions in the world, our minds expand to accommodate, or adjust to new experiences. So soon enough, that kid realizes that deer aren't just horses, and she adjusts her schema. From there, she'll be able to tell the difference between Bambi and Black Beauty in no time.

But our knowledge base grows in ways that are much more complex than just those two steps, and Piaget knew that. He went on to devise a four-stage theory of cognitive development that described how we learn in different phases of our lives.

He called stage one the sensorimotor stage, which begins at birth and continues on to about age two. This is the time when babies experience the world through their senses and actions. Touching and grabbing and looking and hearing. And putting things in their mouth. From what I can tell, mostly just putting things in their mouth.

Younger babies may get scared around strangers, seem to live only in the present, and have to see something to know it exists. This makes them very easy to trick, if you're into that - I mean if you have any experience with babies, just think about this: toss a blanket over a six-month-old's pacifier and they think it vanished.

They lack object permanence, the awareness that things still exist when they're out of sight. And yet, we develop so quickly that just a month or two later that baby already understands better that objects and people don't disappear just because they're hidden. Object permanence, in Piaget's view, was one of the major achievements of the sensorimotor stage.

The second of Piaget's phases of development is the 'pre-operational stage' and he believed it began around age two, and carried on through age six or seven. The thing about kids of this age is that it's all about them. The pre-operational stage is characterized by 'egocentrism' which drives most of what a child thinks and says.

Kids have a hard time imagining another person's point of view, so much so that when I was a kid, if you asked me if I had a brother, I'd say, 'sure, John', but if you asked me if John had a brother I'd say, 'Nah, I don't think so.'

Egocentrism of course never fully disappears, even in adults who understand how the whole sibling thing works.

The pre-operational stage is also marked by a child's ability to mentally represent objects and events with words and images and

pretend plays in their imagination. They're big into animism now, and believe their favorite bunny, batman or stuffed anglerfish has feelings and opinions and possibly the intent to kiss or kill you when you're asleep - depending on how they're feeling.

Still plenty of kinks to work out.

Piaget suggests that early in this stage, kids don't yet understand the concept of conservation - like how 500 milliliters is the same as 500 milliliters, no matter what container it's in.

They can also struggle with the notion of reversibility. It's hard for them to mentally reverse the process by which a ball of clay smashed flat can be rolled back into a ball. It's a concept that takes some time to understand.

And these challenges both have to do with 'Centration' - a child's tendency to fixate on just one aspect of a problem or object - like the shape of the container or the clay.

But during the second half of stage two, things begin to blossom. Kids start forming their theory of mind or ability to understand other people's feelings, thoughts and perceptions- as well as their own- and also how to predict behavior... like remember when my anglerfish got moved when I wasn't looking? A child at this stage will begin to realize that while she knows that the fish is in a new place, I don't know it was moved, so when I start to look for it, she'll expect me to look where it originally was and not where it was moved to.

These new people skills have all kinds of awesome applications from trying to convince your parents to "PLEASE GIVE ME THAT EXTRA COOKIE I SO DESPERATELY NEED!" to showing empathy, which is better - and offering comfort to others when they seem sad.

Piaget called the third stage of development - beginning around age six or seven and lasting until eleven or twelve - the 'Concrete Operational Stage'. Kids are starting to think logically about concrete events that they've actually experienced. And unlike children in the earlier phase, getting hung up on issues of centration, kids in this stage experience 'decentration', and become able to see beyond just one aspect of an object or problem.

So now, problems with reversibility and conservation just cease to be problems. And the last of Piaget's four stages is the 'Formal Operational Stage' which starts at about twelve and carries us through the rest of our lives. By now, our reasoning is expanding to include more abstract thinking, problem solving and hypothetical questions.

Now Piaget's four-stage model has been criticized for over-simplifying things and for being too rigid in how it classifies certain abilities by age. Today, for example, researchers have detected these phases at earlier ages than Piaget ever did - sometimes way earlier - like some types of object permanence have been observed in three-month-olds.

Psychologists also see development as more of a continuous process rather than a series of stepping stones. But even Piaget understood that his stages weren't as fixed as he made them sound.

And he wasn't the only guy on the block talking about development. For instance, his contemporary, Belorussian psychologist Lev Vygotsky, had some ideas of his own. While Piaget focused on how a kid's mind grows by interacting with his physical environment, Vygotsky emphasized how early development occurs through parental instruction and interaction with social environments.

He believed less in set stages and more in the idea that care-giver adults provide a sort of scaffolding, that helps children climb to higher levels of thinking and learning.

Vygotsky put a lot of emphasis on language as a way of assigning meaning to things, and he also suggested that the ways kids develop might actually vary across cultures.

In the end, there's room for lots of different theories here, but perhaps Piaget's greatest achievement was developing theoretical depth in the concept that kids actually think very differently than adults.

This fact has helped a lot of parents and teachers, and his work spurred a new era of research in the field. While Piaget wasn't the only developmentalist, or even the first, he's definitely one of the most influential, and remains relevant to this day.

As the brain and mind develop in children, so too do their social, emotional, and moral behavior. How a child is raised and cared for can have a profound impact on their personality later in life, which is something we'll look at next week.

This week, though, you learned how we use schemas, assimilation, and accommodation to make sense of the world around us, and about Piaget's four-stage theory of cognitive development, including sensorimotor, pre-operational, concrete operational, and formal operational periods, and about Vygotsky's theory of scaffolding.

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