Syntax and Semantics

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How do we learn to communicate?

Babies learn to talk. We have all done it. We were babies. Now we talk. How did it happen?

My theory is that basically we are able to learn because we can feel what we think other people are feeling. Hunger. Anger. Fear. Exhaustion. We map their words and gestures to those feelings to give them meaning. Whatever words our mothers say when they hold us and smile and smother us with kisses, those are good words. They must be. It is the very human-ness we share that gives us the ability to put ourselves in someone else's shoes and guess what's going on. Essentially, we are born with that foundation.

I tell a story about my son, now grown up with a daughter of his own. When he was small he approached me in the kitchen. He had an empty glass. He said: "I want taste." I knew immediately what he wanted based on things that recently happened. He wanted 7up. Why did he call it taste? I think it is because someone asked him "do you want a taste" and then gave him a sip. Oh. That must be "taste." That would be a good word to remember. That is how his vocabulary was growing. Sure he got it wrong, but he was making a guess based on what he thought the other person meant. It was a guess.

Most of the guesses we make turn out to be right. Sometimes they are wrong. Sometimes they are so wrong it is funny. But most of the time they are right or at least close enough.

Another son, maybe about three years old, was standing on a chair at the kitchen table one day. A bug landed on the table. I turned to my son and said, "Don't eat the bug." He looked puzzled and said, "What?" I repeated, "Don't eat the bug." He thought a bit longer, apparently confused, and then repeated back, "What?"

He understood completely the words I had used.

What he did not understand is why I would tell him that. He had no intention of eating the bug. So what I said did not make any sense to him. He decided he must not have heard me correctly. So he asked for clarification.

If a young man at a dance approaches a young woman and says, "You like dance me?" will she understand? Probably she will assume he is not a native speaker of English since the words are a bit awkward. But since they are at a dance, she will probably understand that he meant, "Would you like to dance with me?"

Is she understanding his words or his meaning?

Have you ever heard someone say "oh, you know what I mean?"

Semantics is Meaning

The word **semantics** signifies the meaning of a thing. If I wave a stick at you and appear to be angry, you may take it as a threat. You are looking at the semantics: what did I probably mean. Or if I seem angry with you and make a hand gesture you have never seen before, you may interpret it as an insult. If I seem upset at you but I say, "I love you too," you may take it as sarcasm.

Meaning is very powerful. Somehow just by being human, we seem to get the meaning in lots of situations, even if a language is used that we were not familiar with.

I assert that humans understand by looking for a reasonable interpretation of what they see or hear. I assert that humans overlook the exact words if the meaning seems to be different.

Another case in point. In 1997 I visited a website. On the home page it had a link to some acceptable use rules. I was curious so I followed the link.

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In some legalistic terms it said, "you can visit our website, but you can't download anything." Well, duh. How exactly do you visit a website without downloading anything? Narrowly construed, just by looking at their rules I was already violating their rules. So I decided they must not mean precisely what they say. I had to make my best guess about what they had meant. I ended up assuming they had a different definition of download than me. I went ahead and looked at the rest of their website without feeling any guilt.

Do What I Mean, Not What I Say

Our 12th Article of Faith says, "We believe in being subject to kings, presidents, rulers, and magistrates, in obeying, honoring, and sustaining the law."

In about 1987 I was driving in Massachusetts. The law there said that when an emergency vehicle was approaching, you were supposed to pull over, off the main part of the road. I was stuck in traffic. An ambulance was coming toward me from behind. So I pulled off the road. Actually the ambulance was driving on the edge of the road so my actions probably slowed them down. I was following the written rules as I had seen them in the drivers manual. But the higher law was, "get out of the way." And that is exactly what I did not do. It was stupid of me.

What is "the law" we obey? It is whatever kings, presidents, rulers, or magistrates say it means. To stick with an extremely literal interpretation if it seems to go against the spirit of the law, well, that would not be smart.

Syntax is Wording

Legal contracts are not much fun to read unless you are a lawyer. I have read a number of contracts including some of those "click to accept" licenses on software. The level of precision is annoyingly tedious. Not much fun to read.

Why are they written that way? Because in a court of law if you are arguing about something, it is likely you will have different opinions about what the contract means. At that point we have the judge to tell us what it means. Get it in writing. The point is to protect yourself when the other person does not agree with your position.

Lots of communication is based on common sense. When it is based on exact wording, the going gets tough.

Computers Are Stupid

Well, here's the bottom line. You can write a program. It can be wrong. Still, I can understand it. The tutors can understand it. You can understand it. But the computer cannot understand it.

Why not? Because computers are stupid. They have no common sense. They are forced to give a precise meaning to each word you type. The meaning is not based on what they think you intended. It is based on exactly what you said.

This is the main thing that makes programming difficult. Computers do not understand us the way other humans do. I believe they never will, at least not by the end of this semester.

The whole semester will be consumed in me teaching and you learning how to communicate what is in your mind to a machine that does not understand what you want.

Because despite the fact that computers are stupid, they are also very fast, very reliable, and very cheap (compared to people). They don't call in sick or take vacation. And with some programming skill, many interesting tasks can be broken down into simple steps that computers can perform. For these reasons, even though computers are pretty stupid they are still very popular.

The art of programming is to convert useful activities into simple steps that a computer can perform.

Key Points

Semantics: Humans understand each other based on the most likely semantic interpretation of of the words involved. If the words don't make sense, humans will search for alternate meanings until something does make sense.

Syntax: Computers understand us based on syntactic (grammatic) interpretation of the words involved.

Computers have no idea whether the words make sense or not. Computers are just blindly obedient.

Legal contracts are an example of human communication that must be syntactically correct in case humans decided to disagree on the meaning. But even in the case of contracts, the syntax may be broken. In cases like that, lawyers and judges interpret the contract to tell us what it means.