March 8, 2021

Psychology

What's the point?

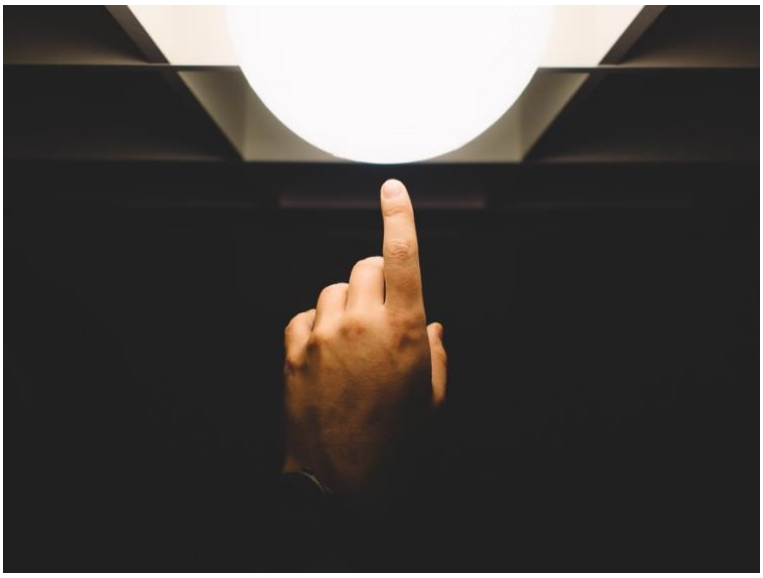
by Cathal O'Madagain[1] | Assistant Professor

doi.org/10.25250/thescbr.brk488

[1]: School of Collective Intelligence, Université Mohammed VI Polytechnique, Ben Guérir, Morocco

This Break was edited by Max Caine, Editor-in-chief - TheScienceBreaker

Perhaps the most familiar gesture in ordinary communication is index-finger pointing. It exists in every culture, and yet we do not know where it originates. In our studies we found evidence that pointing gestures likely emerge from touch.



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Something that humans in every culture produce and understand is the pointing gesture. We begin to point in our first year of life, and we can all easily use pointing gestures to direct the attention of others no matter where in the world we are. Some people have called it a 'linguistic universal', for this reason. Despite the importance of pointing gestures to human development, we have not had any clear idea of where they come from. Why do infants start pointing? Why do they produce the gesture in the same way all over the world? And why does it allow us to coordinate attention? Here we explored the possibility that pointing gestures originate in touch.

First we explored whether pointing gestures are produced as though attempts to touch things. We noticed that when pointing, we often orient our fingers not as if they were 'arrows' directed at the object we are referring to, but as if we were trying to 'virtually touch' those things in the distance – the pad of our index-finger oriented toward the object, and close to touching the object in our line of sight. To test whether this was typical, we had participants point at targets while we filmed them (aged 18 months, 3 years, 6 years, and adults). We placed balls under plastic cups while the participant watched, and then asked them to point at the cup under which a ball was hidden. Taking stills from the videos of the subjects, we drew two lines on these images. First, a line extending along the angle of the participant's finger toward the target, as if the finger were an arrow. Second, a line from the participant's eye

through her finger-tip, and toward the target. This second line tells us what object it looks to the participant as if she were touching, from her point of view. What we found is that the line between a participant's eye and fingertip is a far more reliable predictor of what they are referring to than the line that runs along the 'arrow' of the finger. Pointing gestures, it seems are produced more like attempts to touch things in the distance than like arrows.

Second, we considered that if pointing gestures originate in touch, then when we point at something at an angle, we might rotate our wrist in the same way that we do when we reach out to touch something at an angle. Imagine reaching out to touch the label on a bottle of wine in front of you with the index finger of your right hand. If the label is facing you, your palm will be flat toward the ground. If the bottle is rotated so the label is facing toward your right, you will rotate your wrist clockwise, so the pad of your finger is oriented toward the label; and if the bottle is rotated left, you will rotate your wrist so that the pad of your index finger faces to the right. We played a game with participants in which they had to point at magnets on each side of a box. Sure enough, depending on what side of the box a magnet was placed, participants rotated their wrist just as if they were trying to touch the magnet – even though they were far from the box.

Finally, we considered that if pointing gestures are produced as though they are attempts to touch things, maybe we also interpret them that way. We presented participants with a figure pointing in an ambiguous way: the angle of his finger was always directed toward one object, while his finger-tip was closer to another object, as if he was aiming to touch it. We found that very young children (18 months and 3 years) were far more likely to choose the object the pointer seemed like he was about to touch, although older children and adults were more flexible in their interpretation. The youngest age groups therefore seem to interpret pointing gestures as attempts to touch.

With all results taken together, it seems indeed as though we have found the precursor of pointing. Infants begin, we believe, by exploring objects with their index-fingers. They notice that their parents pay attention to the objects they touch. They discover that they can control their parents' attention by touching things. Then, they aim to 'touch' things in the distance that they want their parents to look at. With this, the pointing gesture is born.