

In Touch with Reality

Mark Lythgoe explains why touch can help us see more clearly

“Touch functions on many levels of adaptation, first to make survival possible and then to make life meaningful.” T B Brazelton, 1990

In 1972, John Berger pointed out in his wonderful book *Ways of Seeing* that “seeing comes before words”. That’s sight before language. But in terms of your development, touch comes before both. In fact it may well be through the haptic sense that you learn to know and find your place in the world. Before you are born you’re exploring yourself and you’re exploring what’s around you. As early as eight weeks gestation you are able to respond to a gentle touch on the cheek. By 12 weeks you begin sucking your thumb and you even make mouthing and licking movements as you start to explore your environment. At 32 weeks, you are able to decode a rich array of sensory information from the world in the form of temperature, pressure and pain, and touch is the medium for this knowledge. You are perceiving the world through touching it or being touched by it.

In February this year I met Richard Gregory in Bristol and he described to me the remarkable case of a man who was blind from birth and regained his sight after a corneal graft. Following the operation the man could, to Gregory’s surprise, walk down hospital corridors without holding onto walls. Soon after leaving hospital he asked Gregory to take him to the Science Museum, as he very much wanted to see an exhibit of a simple lathe. With the lathe in the glass case he was unable to say anything about the object. But when the case was removed and he was allowed to run his hand over the machine he understood everything about it. “Now that I’ve felt it I can see”, he said. Bizarrely he was effectively “blind” to objects he hadn’t touched: he had to make the connection between the feel and image of the lathe before he could see it. It is impossible for those of us with normal vision to imagine this predicament – to be blind to an object you can see in front of you – yet it suggests that in some way we can see with touch, even that we need touch to see. In other words there’s far more cross-talk between our senses than we might imagine.

I recently interviewed James Wannerton, a synesthete who has a neuronal cross-wiring between two of his senses. The interview was part of a TV programme investigating the nature of Einstein’s genius and its relationship to increased connectivity in the brain. Each time James heard a word he would get a sharp, involuntary taste in his mouth, due to a mixing of his taste and hearing senses. He literally *tasted* the words “Albert Einstein” as I said them to him. “Yoghurt and wafers, Albert Einstein tastes of yoghurt and wafers” he announced. This unusual cross-wiring between brain areas can cause the most peculiar sensations. Imagine mixing touch with vision, which is of course impossible, yet strangely

not as far fetched as you might think. Vilayanur Ramachandran describes the extraordinary case of another blind patient who began to notice that whenever he touched objects or read Braille his mind would conjure up vivid images or flashes of light, and another who experienced a vivid bitter taste in his mouth when shaping hamburger patties with his hands.

It would appear that touch is not always touch, that in fact the organisation of our brain dictates how we experience our sensations. Our brain has different regions that control different functions and as you might expect, it was thought that the visual part of the brain was just for seeing. But this would appear not to be the case. If you are blind from early in life you become very good at detecting small distances between two points (as in Braille) that are very close and it would appear that this new-found “vision” is, in part, due to touch taking over, or reorganising, the visual part of the brain so that you have better touch sensitivity.

Your tactile sense develops prior to others and is not as confined to discrete boundaries. But could it underpin our ability to communicate? Imagine that you are wearing a blindfold and you are holding two shapes, one like a piece of shattered glass with many jagged edges, the other a softly rounded blob. I’m going to give you two nonsense words, “booba” and “kiki”, and I want you to associate each word with a shape. My guess is that you’d partner “booba” with the rounded shape and “kiki” with the jagged shape. If you did, you’d be one of the 98% that would do the same. Along the same lines, we might also say that the taste of lemon is sharp; here we associated shape and taste. Could this simple relationship between representing characteristics of shapes that we’ve touched (or seen) as sounds or words, be the building block for language as a form of communication?

Sensations provide your conscious and subconscious awareness with the internal and external conditions of your body. Your skin feeds you with information on temperature and if you are in danger of damaging your delicate tissue, pain or pressure. Yet you also have a kind of internal “touch”, Sir Charles Bell called this the sixth sense, proprioception: your unconscious interpretation of the sensory feedback derived from muscle, tendons and joints that enables you to keep track of your body in space. You can test this sense by placing your right hand out of sight above your head, then keeping your right hand still, use your left index finger to touch your right thumb. It’s not always easy to make an immediate connection with your thumb. If you did contact your thumb directly then you’ll be glad to hear it’s thanks to proprioception.

This leads me to the strange case of Christina “the disembodied woman”, a patient of neurologist Oliver Sacks who had lost her proprioception, and had great difficulty walking and standing as she would lose her body in space. This may be similar to the feeling you get

if your leg “goes to sleep”. However as Christina’s sense of touch was unaffected, she could overcome this limitation by riding in a convertible car and letting the wind brush against her skin, so that she could find her sense of body image via touch and enjoy the feeling of “embodiment” one again.

Yet touch is much more than just a mechanism by which we sense the world around us. Touch is a two-way process that provides a complex exchange between people: it establishes a relationship or connection and creates an instant dialogue. To start our haptic communication you literally need to be within “arm’s reach”, which is more than just an idiomatic expression, but defines a special spatial relationship. You touch to experience, to acquire knowledge, but when another is involved you also touch to communicate; without thinking you automatically transfer information. We even use the phrase “keep in touch” as a metaphor for speaking in the near future.

Touch as communication can illicit a number of chemical and physical changes in the brain and body, and a lack of physical contact in the early years can lead to abnormal development in brain areas that deal with emotion. Young children or babies who were placed in environments of extreme deprivation of touch, may suffered delayed development of mental and motor skills, a failure to thrive, and in the saddest cases a child could literally perish through lack of contact.

Overall, it is this relationship between touching and knowing that is possibly one of the cornerstones for our human experience and communication. Touch is many things and can be described by science in wondrous and infinite detail, yet it is the likes of Helen Keller who also bring us to a core understanding of our relationship with touch: “My hand is to me what your hearing and sight together are to you ... it is the hand that binds me to the world of men and women”.

Mark Lythgoe is a neurophysiologist at the Institute of Child Health (UCL) where he uses Magnetic Resonance Imaging (MRI) techniques for investigating brain function. www.mlythgoe.com. He wishes to thank Robyn Haselfoot, Andrew Mitchell and Sally Dowsett for their comments and suggestions regarding this article.