

Biological-Psychological Interfaces
Journal Club

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Heading:

Thanks to Dr Gingras for asking me to be discussant

Because I'm a computer systems engineer as well as a psychiatrist, it's inevitable that I would look for biological explanations for psychological phenomena. After all, the brain is the organ of the mind, and it must function according to the laws governing biology.

So I'm fascinated by the examples I've come across, and I hope to convey some of my excitement to you.

Let me talk a little about some of the things I found which directed my thinking:

First, who remembers the talk that Klaus Minde gave a few years ago at a McGill Clinical Day held at the Montreal Children's Hospital? He showed a slide which.....

The point for me was that, not only do infants imitate adults as Brothers points out in the article, but imitation may play an important role for adults also. When we imitate somebody, we get that person's attention! Besides the bonding which will occur because we will tend to like a person who imitates us, imitation being the sincerest form of flattery, what possible evolutionary advantage could such a wired-in behaviour have? Any ideas?

Well, of course we learn much of what we know by imitation, for example, tying shoelaces. Maybe we also learn the important components of our personality through imitation. When somebody imitates our behaviours, we get to see in that person what we ourselves are like. I wonder if Heinz Kohut had this in mind when he talked about the "mirroring self-object".

Well, I think that an important function of imitation is the communication of affect. I once read a study in which both ordinary people and professional actors were asked to assume a variety of facial expressions, for example, raise your eyebrows, lower the corners of your mouth, and so on. When questioned about their feelings afterwards, it seemed that adopting a particular facial expression somehow caused the person to feel the emotion associated with that expression.

Put this together with a wired-in tendency to imitate, and we have ... not empathy, not yet. At least, I prefer to refer to this communication of affect as sympathy, that is, the process of identification with another person's feelings. It doesn't require consciousness, and many animals seem quite capable of it. When we add the cognitive process of consciously identifying the other person's feelings through an awareness of our own, we can call it empathy.

When we see a baby's sad or pained expression, we imitate it and experience the same feelings; now our pain acts as the motor to get us to take it away, by taking away the baby's pain. This, obviously, has survival value for the baby, and thus evolution would select for individuals capable of this kind of communication of affect.

You can imagine that many things could go wrong with such a mechanism. When I was researching my article on grief and mourning as healing processes in psychotherapy, I came across an article about physiological responses to hearing babies crying. In general, the hormonal responses were identical for men, women,

and children. There were a group of people who had different hormonal responses, though; adults who had been themselves been abused as children. These same people also reported a different psychological response: the baby's cry made them angry, ready to use violence to make it stop.

Do you think that the abnormal responses to crying as adults was caused by the empathic failures these people experienced as children? Alice Miller, in her book, "For Your Own Good", documents how childhood physical abuse leads to aberrant behaviour later on. It's possible, though, that the faulty communication of affect contributed to getting abused, or maybe the abusive parents and the abused offspring share a common genetic defect. I'll give you an example.

Do you remember in the earlier writings on psychosomatic illnesses, what personality type was associated with peptic ulcers? It was, oral dependent personality. These people could never be satisfied, and the implication was that the illness was somehow caused by having such a personality.

We now know that a genetic tendency toward gastric hyperacidity may be responsible for some cases of duodenal ulcers. Just imagine little Johnny at feeding time; no matter how long he gets the bottle or the breast, he continues to experience discomfort from all the acid in his stomach. Lacking the positive reinforcement that a contented baby provides, his frustrated mother may become a withholding mother, and Johnny is on his way to becoming a person with unmet oral dependency needs. Here, the genetic makeup may be the cause not only of the ulcers in later life, but also indirectly of the person's personality, through their interaction with important others early in life. Could the same thing be true for these people who were abused as children, and as adults have abnormal biological responses to infant cries? These people have more than their share of psychological problems: all the female patients that we treated in the anglophone day hospital during its first eight months gave histories of being physically and/or sexually abused as children.

The other article, "Interhemispheric transfer deficit and alexithymia", is of course about a particular disorder in the communication of affect. I certainly hope that their findings stimulate lots of research into the relationship between the transfer of information between the cerebral hemispheres and the communication of affect, because I think that this may play a role in the genesis of another very important psychiatric illness, schizophrenia.

Since the early 1970's, there have appeared a number of articles describing what appears to be a defect in interhemispheric communication in schizophrenics. On autopsy, one finds an enlarged corpus callosum, with gliotic changes. Neuropsychological studies apparently show impaired interhemispheric transfer of visual and auditory information. Electrophysiological research shows aberrant interhemispheric evoked responses.

Clinically, we know that schizophrenics have a problem with affect. The symptom, flat or blunted affect, may refer to the inability to communicate affect via facial expression, tone of voice, body language, and so on. Schizophrenic adults tend to respond only to the nonverbal component of a mixed message (that is, a message in which the word content differs from the nonverbal communication; for example, saying, "I love you!" in an angry tone of voice) whereas normal adults will pick up on the inconsistency and then go with the nonverbal message.

Can you imagine what life must be like for a person who might have a

congenital defect in the ability to perceive affect or to let others know how they're feeling through nonverbal means? Any interactions with others would soon lead to anxiety, because your communications would be inaccurate. Very soon, this anxiety would lead you to withdraw from others. Not only that, but as in the case of the peptic ulcer oral personality, your parents might also begin to display disordered communications when they interact with you, never mind negative expressed emotion! And the frustrating thing for everybody is that it's impossible to put one's finger on what's wrong, because nonverbal communications are basically unconscious.

What's the primary lesion likely to be? Is it a failure of the wired-in tendency to imitate others? Or is the imitation of nonverbal behaviours itself intact, but this imitation fails to lead to experiencing the emotion oneself? Maybe you will want to do some research into these questions.

For my part, I am interested in exploring one particular aspect of this deviance in affective communication, and that has to do with aprosodia. As Brothers mentioned, aprosodia has been associated with right hemisphere lesions. I suspect that aprosodia is also a component of the flattened affect that we see in not only schizophrenia, but also in Parkinson's disease. Lack of voice inflection is also found in retarded depressions, and perhaps as a side effect of antipsychotic medication.

I propose to use an Artificial Neural Network to perform pattern recognition on samples of speech from these diagnostic groups. If there are differences in the aprosodia between these groups, the Network could be trained to recognize such differences, and then it could be used as an aid in diagnosing new patients.

This is my current research project. I am looking for collaborators, if any of you are interested.

Henry Olders, MD