

Consciousness: The Webcourse

Lecture 8

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Intersubjectivity: Perceiving conscious states in others

“Intersubjectivity” is the ability to understand subjectivity in others, and to coordinate mutual actions in light of that understanding. It means thinking of others as having a conscious point of view, rather than being like rocks or molecules. For most of us, intersubjectivity has powerful ethical implications. In the history of philosophy Immanuel Kant’s ethical imperative stated, *“Act so that you treat humanity ... as an end and never as a means only.”* One of the ideas that inspires this course is that the study of consciousness, in ourselves and others, is a greatly humanizing process.

The ability to see others as conscious, capable of pain and pleasure, seems to be part of our biological (as well as cultural) inheritance. We are social and intersubjective creatures. Our first real relationship begins immediately after birth. Social bonding is a matter of survival for helpless human infants. These points indicate a biological and genetic role in the development of intersubjective abilities. As we will see, they may also involve certain specialized brain regions.

Some people lack the ability to understand others this way. When it is absent, we can often recognize a missing ingredient. Examples are found in autism in young children, who are delayed in developing “social interaction, language as used in social communication, or symbolic or imaginative play.” (DSM-IV).

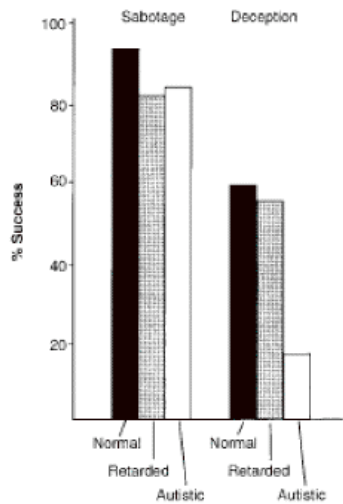


Fig. 2. Deception and sabotage. Children participated in a game where he or she had to prevent a rival (enacted by the experimenter with the aid of puppets) from obtaining a reward, which was kept in a box. In the sabotage condition this could be achieved by locking the box. In the deception condition this could be achieved by claiming (untruthfully) that the box was locked (19).

Children with autism can't engage in deception, though they can understand and engage in sabotage.

What does deception require?

From Frith et al., 1999.

A broader category is Asperger's Syndrome, sometimes considered a milder kind of adult autism. Asperger's Syndrome is marked by "qualitative impairment in social interaction," as manifested by at least two of the following:

- 1 Marked impairments in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body posture, and gestures to regulate social interaction.

(Notice here that language is not the only medium for expressing intersubjectivity...)

- 2 Failure to develop peer relationships appropriate to developmental level.
- 3 A lack of spontaneous seeking to share enjoyment, interest or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest to other people).
- 4 A lack of social or emotional reciprocity.
- 5 Restricted repetitive and stereotyped patterns of behavior, interests and activities ... (The classical example is repetitive hand-flapping in autistic children, but it is also seen in Asperger Syndrome...)
- 6 The disturbance causes clinically significant impairments in social, occupational, or other important areas of functioning" (DSM-IV)

(So this is not just a minor eccentricity. It harms people's lives).

Obviously a lot of people have just one of these features --- very shy or very sensitive people, for example, or people who feel anxious or intimidated. If two or more of the features are present, however, and if they cannot be explained by trauma or situational conditions, Asperger's Syndrome may exist. Autism and Asperger's are often considered to be part of the "autism spectrum." We always need to look at any diagnostic classification skeptically, but most current categories are very well supported by evidence. Asperger's Syndrome seems to really exist.

Humans show many variations on these themes --- some people are sociable, some are shy, some come out of their shell only in certain social settings, some become really sociable when they drink alcohol, and so on. At a much more dysfunctional level, schizophrenics often have difficulty recognizing emotions in other people, and sociopaths --- people who may commit murder with no visible guilt or shame --- can recognize and manipulate the emotions of others, but are apparently incapable of empathy. There is some information suggesting that in childhood, sociopaths may take pleasure in harming animals. So the range of intersubjectivity is huge --- it goes from normal variations in shyness or social interaction, to quite serious conditions that can be harmful.

Humans are "wired" for social interaction.

Andrew Meltzoff and others have documented the ability of newborns only a few hours old to locate the face of caregivers and to *imitate* their facial expressions. (If anybody has a young baby, you might try this – it's harmless and fun. Babies will imitate facial expressions, but you might have to wait a little while for them to respond).

Human beings are "wired" for social interaction.



Very young babies will imitate facial expressions. (Meltzoff & Decety,).

Awareness of the difference between self and other people appears to develop somewhere between 7 and 10 months (Stern, 1985). At this age, infants begin to show separation distress. They are also heavily involved in what Trevarthen (1993) called proto-conversations with their caregiver--- non-verbal behavioral exchanges --- as we see next.

Proto-conversations.

Trevarthen (1993) introduced the term “protoconversation” to designate extended, non-verbal, mutually contingent exchanges between infant and caregiver; proto-conversations depend heavily on the developing right hemisphere of the infant. For example, just consider how normal caregivers interact with babies, long before language becomes part of the process. In a study of newborns (less than 3 days old), “infants are not only capable of responding to a model movement by imitating, but that they also have the capacity to provoke an imitative response, thus sustaining an interaction.” Imitation and initiation are also distinguished by differences in heart rate – acceleration vs. deceleration. People coo to babies, they look into their eyes, tickle them, play “peek a boo” games, hold them, and a lot more. These parenting actions are so widespread across cultures that they probably have some biological basis --- always supported by culture, family, and personal experience, of course.

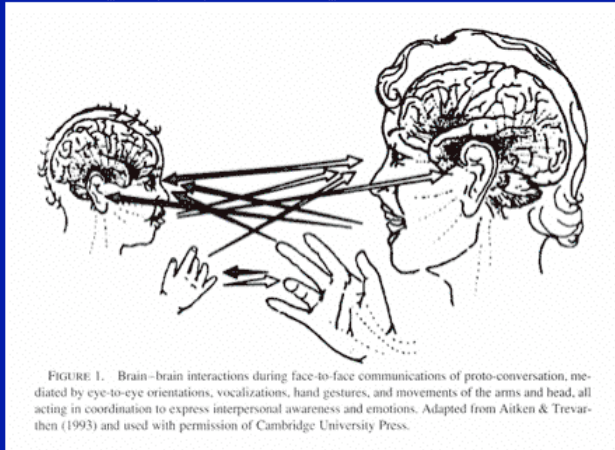
Proto-conversations are the mutual interactive “dances” and “songs” that we engage in quite spontaneously with infants. They also occur between adults, in a variety of different ways, including cellphone conversations, shared laughter, walking in rhythm with others, eye contact interactions, and much more. If you videotape a conversation between two people and slow down the playback, you will see very plainly that they are “dancing” in rhythm with each other.

But maybe it’s infant-caregiver interaction is just conditioned responding, not intersubjectivity? After all, we reward (reinforce) babies for interacting with us. The argument has been made by Corkum and Moore (1995) and others that infant declarative pointing and gaze following is simply a conditioned response. To the contrary, Legerstee et al. (2003) have shown that, while infants can be conditioned to respond to either a person or a doll, the same infants direct their spontaneous pointing, visual checking, and vocalizations to people more often than to dolls.

Many people are surprised to hear that cats and dogs do not follow our gaze when we look up at something outside. Babies do. Some birds, like ravens, do so as well. But most mammals do not engage in “spontaneous gaze-sharing.”

Protoconversations

Trevarthen (1993) introduced the term “protoconversation” to designate extended, non-verbal, mutually contingent exchanges between infant and caregiver; proto-conversations depend heavily on the early developing right hemisphere of the infant.



The Still-Face Effect

The impact and importance of these face-to-face interactions for the infant can be demonstrated using Tronick’s Still Face Paradigm: when mothers fail to respond to overtures by the infant, the infant frowns, looks away, and may cry. First studied in 1978 by Edward Tronick, the Still Face Effect shows the infant’s efforts to engage the non-responsive mother, by smiling and cooing. When the adult continues to display a passive face, briefly smiles to re-engage, then the infant slumps, looks away, and shows signs of distress, including crying and thumbsucking. The Still Face Effect is observed reliably in 2-month olds and up.

Adults may have similar experiences when we are ignored by a friend, or someone whose attention we desire.

The Still-Face Effect



FIGURE 4 A time series of photographs taken from the videotape of the first infant observed in the still-face condition. From "The Infant's Response to Entrapment Between Contradictory Messages in Face-to-Face Interaction" by E. Tronick, H. Als, L. Adamson, S. Wise, & T. B. Brazelton, 1978, *Journal of the American Academy of Child Psychiatry*, 17, p. 9. Reprinted with permission.

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Mirroring and affect attunement

When adults talk to babies, they will often "mirror" their feeling states, laughing when the baby laughs, and pretending to cry when it cries. Adults also spontaneously babble to babies, and engage in a "sing song" speech, in which the intonation (the song) is probably more important than the meaning. All those spontaneous actions are helpful in "tuning in" to the baby's state of mind and emotions. In return, babies also mirror adult emotions.

Psychodynamic researchers have emphasized the extent to which caregivers also help an infant to *regulate* its emotions --- that is, to keep the baby from becoming too upset, or too passive. This is a kind of social homeostasis --- a way in which we act to keep each other within healthy boundaries of behavior. Caregivers soothe upset babies, and encourage them to explore and learn when they are passive. The mother becomes an "external ego" to help the baby cope with the ups and downs of life. The theory suggests that "good enough mothers" --- not perfect ones, which don't exist --- help the baby to learn self-soothing and self-encouragement, so that a young child internalizes the "external ego" of the mother

The mother as the infant's "auxiliary cortex" (Diamond et al., 1963, in Schore, 1997, p. 20): in the nonverbal interactions between infants and caregivers, some have argued that the transaction is between the infant's and mother's right hemispheres. The

right hemisphere of infant is metabolically more active in the first year; it also has a larger prefrontal cortex. The right hemisphere is specialized in the mother for affective exchanges, nonverbal spatial knowledge, and speech intonation, of the kind that we see in proto-conversations. So, infant and mother may be biologically set up to have right hemisphere exchanges. This is also convenient, since most mothers cradle their infants in their left arms, thus sending visual information to the mother's right hemisphere even in a resting state.

The orbital-frontal cortex (OFC) --- that is, the brain region right above our eyes -- has a fundamental role in social and emotional behaviors and self-regulation (Schoore, 1997, p. 29). OFC is the thinking part of the emotional brain. "The essential activity of this psychic system is thus adaptive switching of internal bodily states in response to changes in the external environment that are appraised to be personally meaningful." (Schoore, p. 33)

Mutual gaze and mutual affect attunement are ways in which the caregiver evokes all the self-regulatory, affective, cognitive, and interpersonal abilities of the infant. These abilities, especially in early life, must be utilized in order to develop --- they cannot be neglected. Interestingly, mutual interaction is accompanied by release of endogenous opioids, believed to create a strong sense of warmth and satisfaction in both babies and caregivers.

Sharing attention: Look Mommy!



Babies love to point out objects, and name them for their caretakers. It is one sign of the shared reality two people can create together.

What we are doing in this WebCourse is a more sophisticated version of babies pointing to shared objects. In this case we are not going, “Mommy, airplane!” Rather, we are saying, “Look at our own consciousness!” But it all starts in childhood with the delight in sharing our experiences.

A recent paper by Nagy & Molnar (2004) shows that infants not only recognize and imitate their caregivers’ faces but also initiate various kinds of “declarative” behaviors aimed at engaging and even redirecting adult gaze and attention.

Jealous babies.

Hart (2002, 2004) has shown that young infants become as upset by seeing their mothers holding and talking to another “baby” --- a life-like doll --- as they do when Mom sits with a still face. The jealous response is shown only to other “babies” but *not* when Mom is paying attention to physical objects like books. Jealousy in 6 month olds suggests infants know where Mom is looking --- a shared intersubjective reality.



Baby protesting. What does this baby need to know to make jealousy possible?

When does shared experience emerge?

Shared gaze and joint attention have been taken as hallmarks of emerging intersubjectivity since Jean Piaget's work half a century ago. Brooks and Meltzoff (2002, 2003) have shown that by 12 months of age, infants seem to understand the intentionality of the other, i.e. that "they and other person see the same object and share the same experience." One year olds will follow an adult's gaze more often when the adults' eyes are open than when they are closed. This shared visual line of sight seems to be still developing at age 9 months. Nine month olds do not respond differently if the adult's eyes are open vs. closed--- they follow the direction of the head of the adult.

The argument has been made by Corkum and Moore (1995) that this could simply be a conditioned response. However, Legerstee et al. (2003) have shown that, while infants can be conditioned to respond to either a person or a doll, the same infants direct their spontaneous pointing, visual checking, and vocalizations to people more often than to dolls.





Theory of Mind (TOM)

All of us have theories of each others' minds. In children the capacity to understand other minds is called TOM (Theory of Mind). Baron-Cohen defines it as "knowledge of mental events in others that is used to understand and predict self and others." Four year olds give indications of understanding other minds --- "mentalizing" as Chris Frith calls it. They can recognize and respond to the invisible, internal subjective regularities that account for behaviors of others. The opposite of "mentalizing" is sometimes called "mind-blindness" --- ignoring the fact that one is experiencing another conscious mind.

Disorders of TOM or “mentalizing” occur in people with autistic spectrum disorders

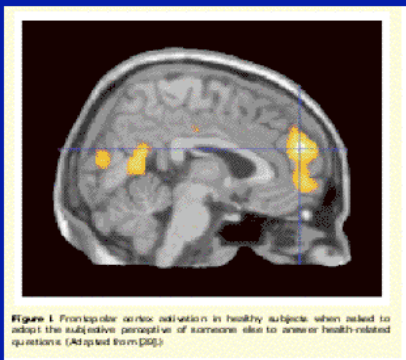
Simon-Baron Cohen calls this “mindblindness.”

Evidence:

- Sally-Ann Deception Task: people with autism have difficulty with this task; can't understand the point of lying or playing hide-an-peek.
- Inability to recognize “cognitive” emotions such as surprise, though happiness and sadness are understood and identified for self and other.
- Perception-based thinking: In appearance -reality tests, people with autism claim that a rock painted to look like an egg is an egg, etc.
- Predicting and explaining others' beliefs: Smarties Test
- Behaviors that indicate a lack of understanding of intentions of others, see Carter story.

Are specific brain regions involved in TOM?

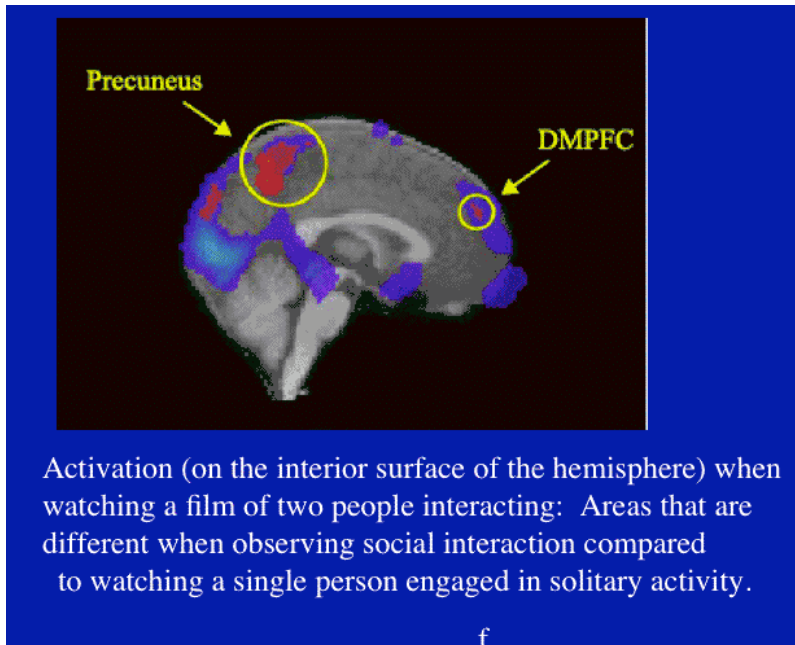
Areas of the brain that are active when someone is asked to adopt the subjective perspective of another in order to make health decisions affecting the other.



Intersubjectivity?

Human homologues of
Macaque mirror neurons.

The above brain image shows activation of the interior surface of the left hemisphere when the subject watches a film of two people interacting. These areas are less active when the subject watches a single person engaged in solitary activity.



Recent research has also shown that when mothers look at photographs of their own children vs. other children there is activation of cortical areas associated with emotional responsiveness (amygdala, insula) as well as TOM functions such as empathy (anterior paracingulate cortex, posterior superior temporal sulcus). (Lebenluft et al., 2004)

The anterior paracingulate gyrus is active when people adopt an “intentional stance” toward an (invisible) other compared to believing that they are interacting with a computer. Gallagher and Frith, 2003

Summary.

Starting shortly after birth, human beings show all kinds of abilities for intersubjective interaction. A large part involves direct face-to-face interactions with the caregiver, a “second person” experience of gaze exchange, “singing” together, and moving in rhythm with the other person. Another part involves pointing to conscious objects in our shared space, the “look, Mommy!” actions that babies enjoy doing. In a way, this WebCourse is a more advanced version of that “Look, Mommy” sharing of our intersubjective world.