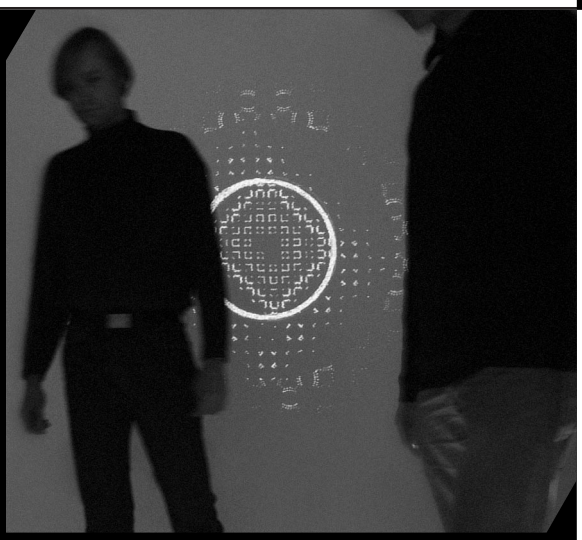
2d



> Ada knowledge: Interaction

As we are able to take in and process information and learn from experience, we can react accordingly to changes in our environment. At the end of this chain, there is hence always an "answer."

This chapter contains:

- Information about how people and Ada exchange with the environment
- Illustration of the activated brain regions with the auditory word
- Recommendations for instruction
- Worksheet

A: Factual information

Body language, communication and play as opportunities for interaction

Interaction means that we take in and process information from our surroundings and use this to deduce a corresponding reaction, with which we in turn influence the surrounding environment.

Our "answer" to the information we receive and process might be: We run toward something, run away or do not move, we whisper or scream, we turn red with anger or embarrassment, we laugh or cry. The individual reactions to an environmental change can be highly varied and even contradictory. Since humans are social creatures, many of our reactions emerge from the interaction with one or more persons.

Communication

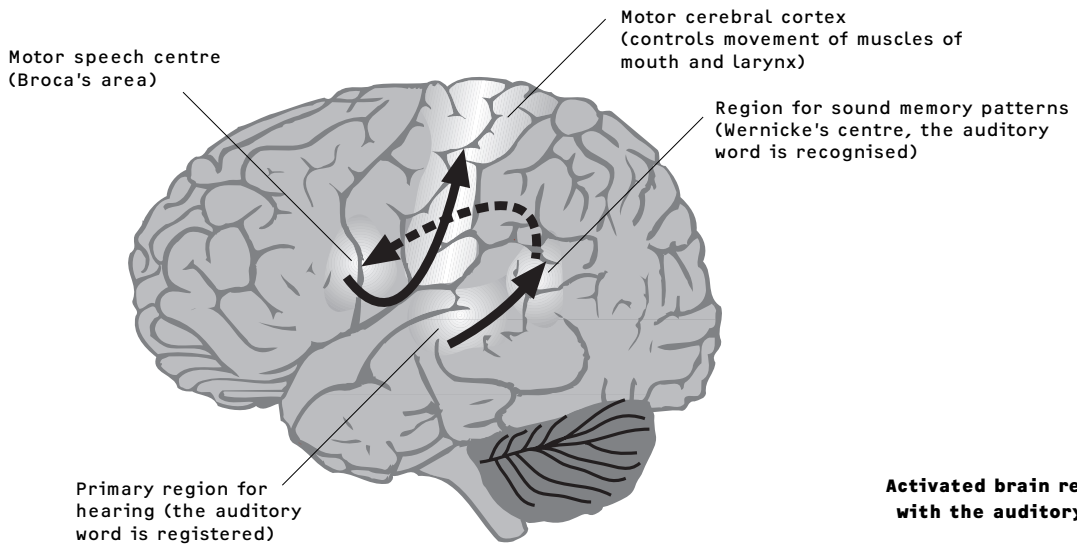
One form of interaction between people is communication. There are two different ways that people can exchange information: verbally via language and non-verbally via facial expressions, gestures, etc. In both cases, we send out signals that the person opposite receives and interprets. Thus, we are in principle engaged in continuous communication: not only when we talk to others through language but also when we express things without being conscious of it. For instance, the skin can "tell" others how we are feeling: when we go pale from fright or red from anger.

How does Ada communicate?

Ada does not express herself through language. She communicates to her surroundings through sounds, light signs and projections on the walls. By illuminating a floor plate, for example, she can let a visitor know she is aware of his presence. She can invite him to follow her light signals. If the visitor reacts to this, he arouses Ada's interest and she tries to intensify the "contact" by following his path with a spotlight and directing her artificial eyes toward him and projecting these images on the wall. The use of the skin as an expressive communications organ is something we know from the animal kingdom, such as with the octopus or chameleon.

Ada can also express herself through music. The music is produced by a so-called Roboser. The Roboser composes and generates its music based on the data that Ada receives from the environment (sensory input), and the internal state associated with it. It is hence a direct expression of Ada's state at a particular moment.

Light and music not only reflect the state Ada is in at a given moment, such as sleeping, waking up, investigating the environment and playing with visitors, but also allow her to communicate her moods. Ada is thus able to show that she is surprised by something, happy or sad, or feels disturbed.



Activated brain regions with the auditory word

Playing

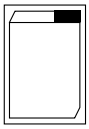
Humans especially like to play during their childhood. Playing gives them an opportunity to practise skills. Yet play is also a social behaviour through which humans relate to one another. There are countless theoretical approaches as to why humans play. At any rate, playing is a typical behaviour of animals and humans.

Ada's play behaviour

Ada's play behaviour best demonstrates the fact that Ada does not function according to a set programmed schema, but reacts in a goal-oriented and situationally dependent way. Ada tries to get the visitors to play and manoeuvre them into the correct "position" for the game. She accomplishes this by making use of her various light signals as well as corresponding sounds. In so doing, she has to learn which type of signals lead to success and which do not.

She knows various games: a game involving movement (similar to "catch"), a game of strategy and a game using music. If visitors fail to react to one game, then she abandons it and tries again later.

B: Recommendations for instruction



Sheets with border can be copied and distributed to students.

Explanations of **Worksheet 2d.5**

The worksheet deals with protocols, which constitute an important foundation for the interaction between people and machines. Student answers will differ according to the knowledge they bring to the exercise and their age. For informatics instruction, the worksheet may also be integrated in a corresponding lecture about protocols, Internet, networks and the like.

Answers

1a) *Sample answers:*
German-speaking Switzerland: The call recipient picks up the receiver and answers by saying their name, while the person calling greets the call recipient and then says their own name.
Italian-speaking Switzerland: The call recipient picks up the receiver and says "Pronto!" – to which the person calling then says their name.

1b) *During the telephone conversation, they are able to learn and use reason to draw conclusions from the circumstances of the unfamiliar situation.*

2. *The computer has to check whether it is connected with the printer; the protocol thus has to contain a call-in. It then needs to convey to the printer what it is supposed to do with the text document. Plus it should include references regarding the beginning and length of the document. The printer also has to know when the text document begins. An end must be indicated so that the printer can check whether it has received everything. If this check is successful, it can report to the computer that the transmission was successfully completed. If not, it has to notify the computer that an error has occurred.*

3. *Computers and people interact in different ways. In receiving information, people are more flexible (fault tolerance). By contrast, the computer expresses itself more precisely but depends on exact parameters with the intake of information.*

These problems lead to the following: There needs to be a reconciliation of the two sets of requirements. Let's say a person would like to speak with a computer. Yet to do so, his language has to be adjusted to conform precisely to the rules of the computer. As soon as a person makes a mistake, the computer is no longer able to understand him. Up to now, people have had to adopt a relatively strong approximation of the computer's mode of communication (e.g. via keyboard and screen) in order to interact with the computer. This can cause humans to experience difficulties, however, since they are not used to this type of communication.

Bibliographic information

•Watzlawick, Paul u.a.: **Menschliche Kommunikation. Formen, Störungen, Paradoxien.** Bern, Stuttgart, Toronto 1993.

Protocols

A protocol is a directive according to which communication proceeds. The term originally comes from diplomatic relations, while today it is of major significance in the field of informatics.

"When two people are having a conversation over the telephone, apart from having a functioning line, they also need to understand the language of the person opposite. In other words: The electrical impulses that are converted into sound via a speaker in the telephone receiver have to be recognised as that which the person on the other end of the line has said. Naturally, it comes quite easy for us because we use a generally valid vocabulary and a common grammar." (•Precht, Manfred et.al.: **EDV Grundwissen.** Munich 1993. p. 53)

The communication between computers functions on a similar principle. Protocols establish which computer sends what and when, which computer receives it, what it is supposed to start doing with it and how it needs to react to the transmission.

1a) What different protocols do you know for telephone communications between two people?

1b) How is it that two people who speak the same language but are not familiar with each other's protocol are nevertheless able to talk on the phone?

2. Conventional computers do not have an ability to learn that is comparable to humans. In addition, they do not know anything about the content of what they are communicating and hence cannot review it for accuracy. What might a protocol look like for a computer's communication with a printer? Which measures need to be taken to avoid errors for the communication to be successful and to end up with a printout of the text document?

3. Knowing about the communication abilities and requirements of humans and computers, what are the consequences for the interaction between a person and a computer?