Our brains synchronise during a conversation

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Credit: Francisco Farias Jr/public domain

The rhythms of brainwaves between two people having a conversation

begin to synchronize, concludes a study published in *Scientific Reports*, led by the Basque research centre BCBL. According to scientists, this interbrain synchrony may be a key factor in understanding language and interpersonal communication.

Until now, most traditional research had suggested the hypothesis that the brain "synchronises" according to what is heard, and correspondingly adjusts its rhythms to auditory stimuli.

Now, experts from this Donostia-based research centre have gone a step further and simultaneously analysed the complex neuronal activity of two strangers who hold a dialogue for the first time.

The team, led by Alejandro Pérez, Manuel Carreiras and Jon Andoni Duñabeitia, has confirmed by recording cerebral electrical activity that the neuronal activity of two people involved in an act of communication synchronises in order to allow for a connection between both subjects.

"It involves interbrain communion that goes beyond language itself and may constitute a key factor in interpersonal relations and the understanding of language," says Jon Andoni Duñabeitia.

Thus, the rhythms of the brainwaves corresponding to the speaker and the listener adjust according to the physical properties of the sound of the verbal messages expressed in a conversation. This creates a connection between the two brains, which begin to work together towards a common goal: communication.

"The brains of the two people are brought together thanks to language, and communication creates links between people that go far beyond what we can perceive from the outside," added the researcher from the Basque research centre. "We can find out if two people are having a conversation solely by analysing their brain waves."

What is neural synchrony?

For the purposes of the study, the BCBL researchers used 15 dyads of people of the same sex, complete strangers to each other, separated by a folding screen. This ensured that the connection generated was truly thanks to the communication established.

Following a script, the dyads held a general conversation and took turns playing the roles of speaker and listener.

Through electroencephalography (EEG), a noninvasive procedure that analyses electrical activity in the brain, the scientists measured the movement of their brainwaves simultaneously and confirmed that their oscillations took place at the same time.

"To be able to know if two people are talking between themselves, and even what they are talking about, based solely on their brain activity is something truly marvellous. Now we can explore new applications that are highly useful in special communicative contexts, such as the case of people who have difficulty with communication," Duñabeitia said.

In the future, the understanding of this interaction could contribute to the fields of psychology, sociology, psychiatry and education, using the neural images within an ecological or real-world context.

"Demonstrating the existence of neural synchrony between two people involved in a conversation is only the first step," said Alejandro Pérez. "There are many unanswered questions and challenges left to resolve."

Pérez further maintains that the practical potential of the study is enormous. "Problems with communication occur every day. We are planning to get the most out of this discovery of interbrain synchronisation with the goal of improving communication," he

concluded.

The next step for the researchers will be applying the same technique to study whether the brains of two people "synchronise" in the same way when the conversation takes place in their non-native language.

More information: Alejandro Pérez et al. Brain-to-brain entrainment: EEG interbrain synchronization while speaking and listening, *Scientific Reports* (2017). DOI: 10.1038/s41598-017-04464-4

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