Taking the Mind

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out of the War

Knowing how the Colombian armed conflict affects the emotions and brain functioning of ex-combatants is fundamental to strengthen their reintegration and reincorporation processes into civilian life. Two research projects, within the framework of a broad project, make such a characterization and use it to design an intervention strategy to support reincor- poration and peace.

Illustration: Tobías Arboleda.

After more than half a century of armed conflict in Colombia, the country is entering a post-conflict process that seeks reconciliation and peacebuilding.

At this juncture, it is important to recognize the consequences of prolonged exposure to the armed conflict for ex-combatants and victims to use this knowledge to create strategies that facilitate peacebuilding.

Therefore, Universidad de Antioquia's Mental Health Research Group (Gisame) and Embedded Systems and Computational Intelligence Research Group (Sistemic) in collaboration with national and international universities, have addressed the effects of the Colombian armed conflict on people in the process of reintegration and victims. They have taken different approaches: psychology, mental health and assessment of brain functioning.

Putting Yourself in the Place of Others

The key to putting ourselves in the place of others is empathy, which is the ability that allows people to recognize their own and others' emotions. Thanks to this, we can have a better interaction in a social context. However, war and the constant threat it poses make many people lose the ability to adequately recognize these emotions.

It is a psychological survival strategy that has negative consequences when people return to civilian life.

Let us think of J.J.[1], a former combatant who joined the Reincorporation Program. He is the son of a coffee-growing family. His brother was recruited by an illegal armed group, and his parents were killed by armed actors who accused them of being "collaborators" of another armed group that dominated the region. J.J. joined the armed group in search of his brother and, for years, he performed various tasks until he became a combatant and joined the sieges. During those years, the war, deprivation and violence he suffered and caused would modify his way of perceiving emotions and even make him doubt his ability to put himself in the place of others, that is, to be empathetic.

To know what happens in the brains and minds of people who have had to live stories like J. J.'s, we evaluated the level of empathy in a group of Colombian ex-combatants in the first phase of the study. This evaluation was performed through psychological tests and questionnaires. It allowed us to establish three different profiles among the ex-combatants who participated in the research:

- The first profile has low performance in the four dimensions evaluated, which translates into low levels of empathy at a general level.

[1]Names changed to protect the participant.

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- The second profile shows a greater ability to understand discomfort in others, but with difficulties in expressing anxiety or discomfort in the face of adverse situations experienced by others.
- The third profile shows adequate levels in three of the four dimensions of empathy, which implies that the person has the capacity to put themselves in someone else's place. This does not imply, however, that they take actions to help.

This part of the study revealed that most ex-combatants like J. J. have the empathic resources necessary to relate to others. They are similar to those observed in people without combat experience.

Electrodes and Emotions

Emotion processing facilitates the recognition of our own feelings. This processing is closely related to empathy. In a war context, people may modify their ability to recognize emotions in order to adapt.

EThey may also modify their appraisal of stimuli, which is the ability to differentiate between negative or threatening stimuli and positive stimuli.

That is precisely what happened to J.J. after years immersed in the war. He was no longer the boy who picked coffee on his parents' farm. The weight of the war was not only in the weapons and equipment he carried on his shoulders; it was also on his mind and body marked by hunger, violence and the experience of war. Unbeknownst to him —it would only be known years later in the context of scientific research— his brain learned to recognize threatening faces, sounds and voices sooner because his survival depended on it. These alterations were evaluated in Colombian ex-combatants and, at the same time, in a group of people without combat experience to make a control comparison. During this process, participants had to indicate whether a face or word presented to them, such as the examples in Figure 1, was positive, neutral or negative.

During the development of this task, we recorded the electrical activity of the participants' brains through electrodes placed on their scalps. Techniques for

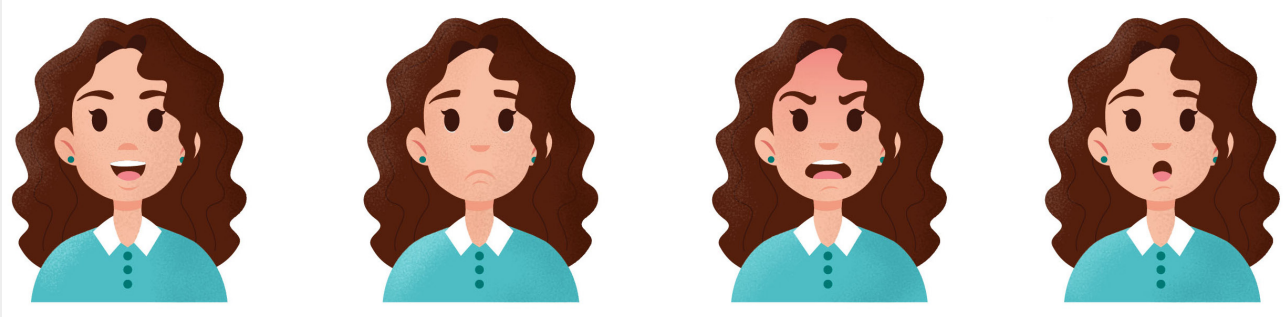

Figure 1. Examples of facial expressions.
Image: Authors / Carolina Gomes.

analyzing the recording of brain electrical activity allow us to identify variations in the brain's response at a given moment, for example, when observing a happy face. In this way, it is possible to establish how certain areas of the brain are activated and connected during the development of specific cognitive processes.

In addition, several questionnaires were implemented to evaluate aspects of cognition and social behavior, including the attribution of mental states to others, social skills and empathy.

After analyzing the data on brain functioning and comparing them with the profiles and information provided by the participants, we identified that exposure to an armed conflict can modify emotional recognition. Thus, people exposed to war situations performed better in identifying relevant social cues and showed greater neural activity in emotional face recognition tasks.

Furthermore, in brain connectivity analyses, we found a similar pattern for ex-combatants and for people with no combat experience. Brain connectivity tells us how electrical impulses pass from one brain region to another while doing a task (Figure 2). Despite the similar patterns, there was a significant difference between the groups in the way they recognized positive stimuli. This could indicate that, in a war context, positive stimuli, such as smiles or friendly calls, are less relevant than negative stimuli, such as threatening faces. This may be because recognizing negative stimuli and threats

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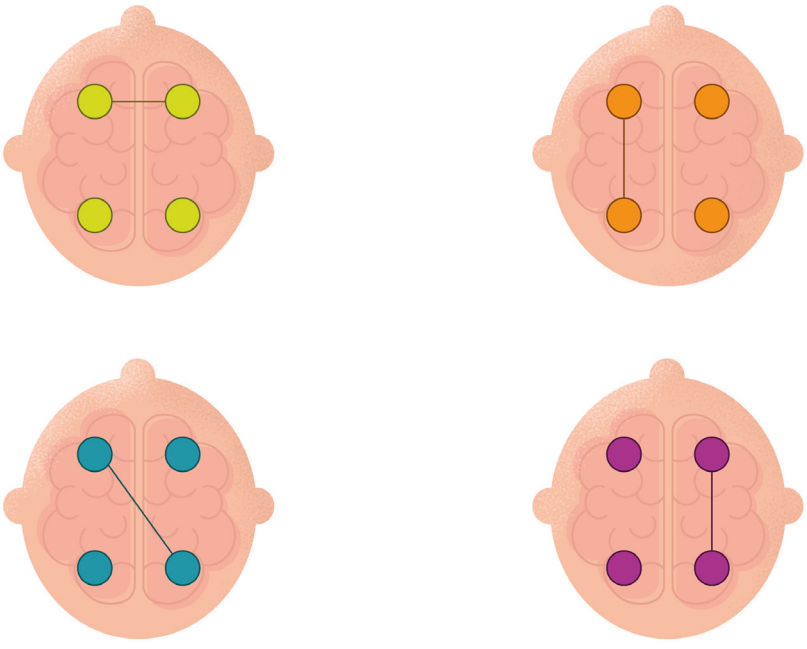


Figure 2. Example of functional brain connectivity based on brain electrical activity. Image: Authors / Carolina Gomes.

is fundamental for survival in contexts of armed conflicts.

These findings are key to a scientific study of the consequences of the armed conflict for those who have experienced it firsthand. For this reason, the Gisame and Sistemic research groups decided to move on to the next phase: to apply this scientific evidence to strengthen the processes of reintegration and reincorporation into civilian life, as well as the reconstruction of the social fabric of communities through supporting strategies and interventions.

Psychological Strategies to Promote Reincorporation and Peace

According to data obtained by the Agency for Reincorporation and Normalization (ARN), there are more than 70,000 demobilized combatants in Colombia, of whom about 50,000 have participated in a reintegration or reincorporation program offered by the national government. In these programs, ex-combatants often have difficulties adapting to everyday life. This has sometimes led them to drop out of re-integration programs and has increased the likelihood that they will re-offend.

J.J. experienced these difficulties firsthand when, after falling in love with María, a fellow member of the armed group who had also been recruited at a young age and glimpsing the desire to have a family and stability, he decided to flee the war and seek reintegration with her.

After arriving at a brigade and announcing their intention to demobilize, they began the process. After many interviews, processes and paperwork, they were given the green light to become independent and start on their reintegration route to return to society. Since then, they have attended classes to get their primary and secondary school diplomas, lived in a suburb of Medellín and looked for ways to earn an honest living. They get along well with their neighbors, although sometimes they are afraid people will find out they are demobilized soldiers and that this will lead to problems. Above all, however, there are ghosts from the war that still make it difficult for them to manage their emotions and live them fully.

Thanks to cases such as J.J.'s and María's, which we studied during our research, we learned about the psychological characteristics associated with the armed conflict, such as empathy profiles, social skills and electrical activity. It was then that we saw it was essential to implement strategies to encourage the return of ex-combatants to civilian life.des sociales y teoría de la mente (figura 3).

Intervenciones de este tipo son claves para mejorar los procesos de reincorporación a la vida civil, pues buscan mejorar la capacidad de los excombatientes para enfrentar las dificultades de la vida diaria y afrontar positivamente los retos sociales.

Trained participants also showed different brain activity in response to positive images, specifically in the band of gamma, which is related to the degree of perception of a stimulus.

Therefore, we decided to design a psychological intervention based on evidence. It is called "Socio-Cognitive Training" (SCT), and its purpose is to train participants in basic emotion recognition, social skills and theory of mind (Figure 3).

Interventions of this type are key to improving the processes of reincorporation into civilian life, as they seek to improve the ability of ex-combatants to face the difficulties of daily life and deal with social challenges in a positive way.

It was right on the reintegration route that we met J.J. and María, who came to Universidad de Antioquia to participate in the project. We explained to them what the evaluation process and the electroencephalographic recording involved. In the beginning, they had many questions, which were gradually answered by the evaluators. Then, the questions turned into curiosity, and they became interested in the whole process. Months later, they were invited to participate in the psychological training, but only J.J. greed, since María had just had her baby and had no one to take care of him at home.

Training in recognizing and responding to emotions

The socio-cognitive training was conducted with a group of Colombian ex-combatants. Psychological evaluations and computerized emotional recognition tasks, such as those described above, were conducted before and after the training. They were synchronized with the

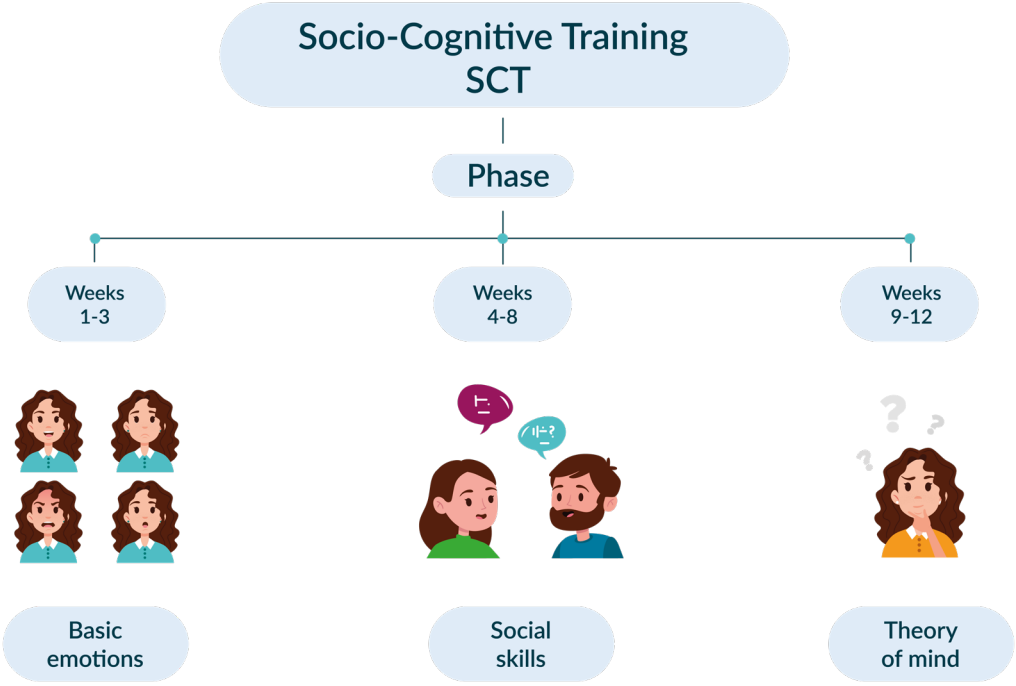


Figure 3. Description of the phases of the Socio-Cognitive Training. Image: Authors / Carolina Gomes.

electroencephalographic recording obtained through the electrodes on the scalp. The results were compared with those of people who did not receive the training.

The study participants performed two computerized tasks. The first one required them to categorize faces and words as positive, negative or neutral. In this task, the ex-combatants who received the training performed better in recognizing neutral faces, that is, those ambiguous stimuli that do not express a specific emotion such as happiness or sadness.

The other computerized task required the participants to rate a series of images as positive, negative or neutral. This task was also synchronized with electroencephalography. The data obtained in the encephalography were analyzed to assess how different brain areas are connected during the performance of an activity.

Brains andBrain Waves

Here, it is important to explain that the functioning of the brain generates electromagnetic waves, like those of the radio, but at very low power. They are classified according to their frequency in five bands: delta (0.1-3.99 Hz), theta (4-7.99 Hz), alpha (8-13.99 Hz), Beta (14-30 Hz), and gamma (30-60 Hz). Each frequency band is associated with a particular brain activity.

This interaction between the different parts of the brain can be observed in the frequency bands of the waves.

When analyzing the bands in the assessment, we found that the ex-combatants who received the socio-cognitive training had different brain activity when looking at negative images. This activity was evident specifically in the delta band, which is related to concentration. Increased activity in this band indicates increased attention when perceiving emotionally charged stimuli. Trained participants also showed different brain activity in response to positive images, specifically in the band of gamma, which is related to the degree of perception of a stimulus. From this, we could infer that trained participants are more aware that they are perceiving an emotionally charged image.

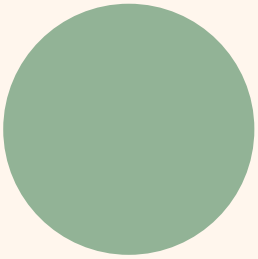
This suggests that socio-cognitive training has a positive impact on ex-combatants and can reduce aggressive behavior since it improves the recognition of ambiguous stimuli and favors the re-organization of brain functioning. Thus, SCT helps to focus attention and increases the level of perception. Ex-combatants learned that, by identifying their emotions better, they can have news-strategies to relate to other people.

J.J.'s experience motivates us even more, as we see how he understood many things about his emotions and the emotions of others. He has "stopped getting worked up" about some of the things that happen with his classmates and coworkers, and he has been able to better understand Maria's anger, which was strange

Interventions of this type are key to improving the processes of reincorporation into civilian life, as they seek to improve the ability of ex-combatants to face the difficulties of daily life and deal with social challenges in a positive way.

and irritating to him before. That's why he wants her and his son to also learn about emotions to avoid quarrels and senseless arguments.

With such promising results and much work ahead of us, the Gisame and Sistemic research groups continue to study the factors that influence the cognition, emotional processing and mental health of the population exposed to the armed conflict. Based on this knowledge, we will continue to develop interventions and strategies to strengthen the social competencies of former combatants such as J. J., who feels increasingly confident in his ability to relate constructively to a new social environment. In this way, we seek to take advantage of science to help rebuild the social fabric and contribute to the construction of peace in Colombia. X



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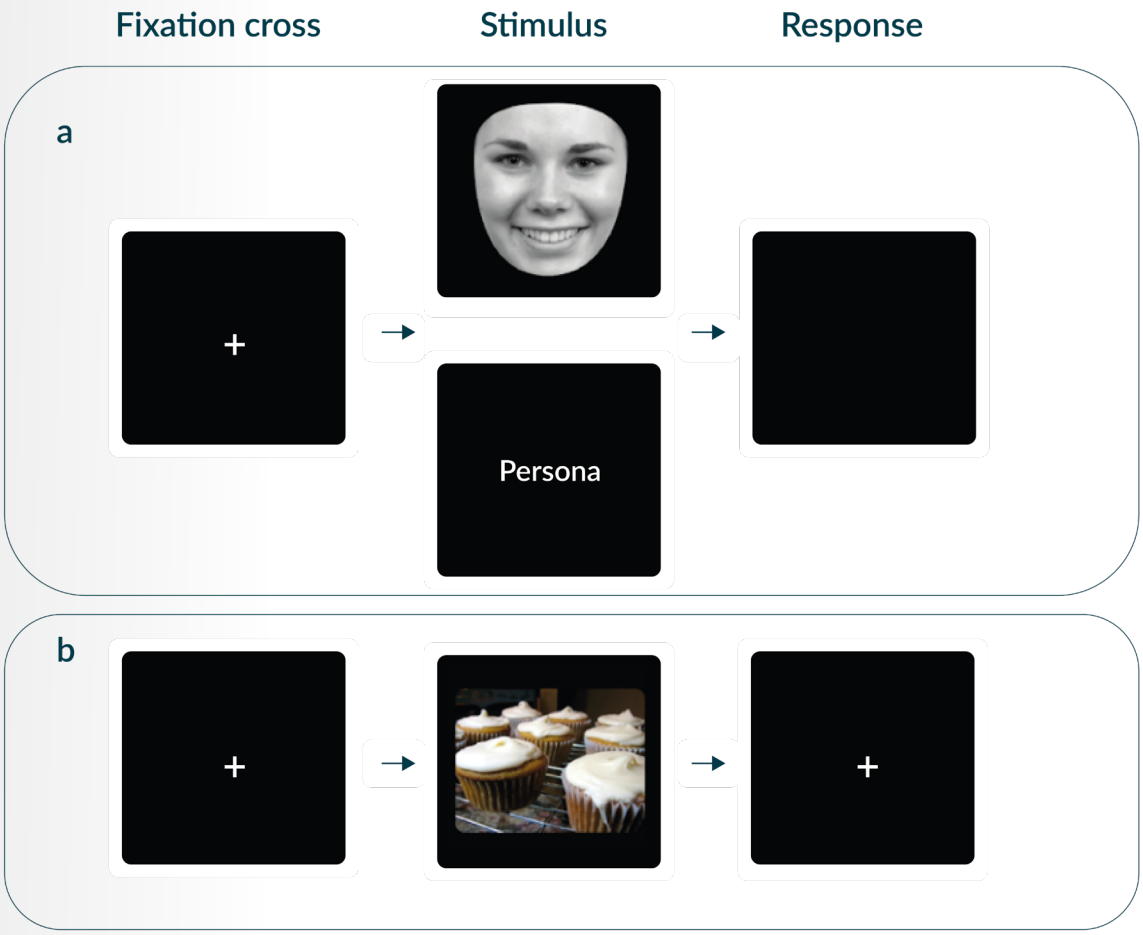

Figure 4. Sequence of computerized tasks used, (a) Emotional Recognition Task (b) Contextual valence Recognition Task. Authors.