Disrupted regulation of social exclusion in chronic alcoholism: An fMRI study.

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INTRODUCTION

- Chronic alcohol dependence leads to a wide range of cognitive and psychological impairments, among which affective and social interaction alterations seem crucial, from a clinical and maintenance of alcoholism. Brain alterations linked to the emotional deficits have been recently explored, but the cerebral correlates of social interaction disturbances remain unknown.

- Here, we used a validated paradigm inducing a social rejection feeling in order to investigate the cerebral activations associated with disturbed social interactions in alcoholism. On the basis of previous works showing an increased sensitivity to social rejection and a reduced ability to regulate the exclusion feelings in alcoholism, we hypothesize that social rejection will lead to: (1) an increased activation of the anterior cingulate cortex, indexing the negative feelings due to social rejection; (2) a decreased activation of the frontal areas involved in the regulation and inhibition of these feelings.

METHODS

Participants

- 20 male participants (mean age: 46 ± 5.7 years) diagnosed with alcohol dependence according to DSM-IV criteria and recruited during the third week of their detoxification treatment.
- 20 volunteers matched for age, gender and education level.

Stimuli and Task

- fMRI scanning was performed during a virtual ball-tossing game (i.e. “cyberball paradigm”), in which the participant had to knock up with two other players (computer-guided but considered by the participant as being real people).

The experiment consisted in 4 successive experimental conditions:

1. Implicit Exclusion (IE): The participant watches the two other players but is not included in the game (he is told he cannot be included in the game due to technical problems).
2. Inclusion 1 (Incl1): The participant is included in the game and plays with the two other persons.
3. Explicit Exclusion (EE): The participant is excluded from the game as the two virtual players stop throwing him the ball and start playing exclusively together. This is the main experimental condition, leading to social rejection feelings.
4. Inclusion 2 (Incl2): The participant is re-included in the game.

EXCLUSION CONDITIONS

“EE – IE” contrast explores the cerebral correlates of social rejection. Indeed, IE and EE conditions depict an identical visual scene, but in the IE condition the participant is excluded for technical reasons (no rejection feeling), while in the EE condition, the exclusion is due to the other players’ will, leading to a social rejection feeling.

“Incl2 – Incl 1” explores the persistence of the rejection feeling after the end of the actual exclusion. Indeed, Incl 1 and Incl 2 are totally identical (the participant is playing the game), except that the participant as been excluded from the game just before Incl 2.

RESULTS

Behavioural results: post-hoc rejection questionnaires indicated that participants from both groups felt excluded and ignored during the EE condition (t=3.1, p<0.01).

Replication of earlier results. In the control group, EE – IE showed two main left activations: Anterior Cingulate Cortex (ACC, indexing the perception of social rejection and the distress associated with this exclusion feeling) and Medial Frontal Gyrus (MFG, implied in the regulation and reduction of this social rejection feeling).

Between-groups comparison:

CTRL – ALCO for EE – IE, [4, 52, 13] (ACC activation was significantly reduced among alcoholics as compared to controls.)

ALCO – CTRL for Incl2 – Incl 1, [-10, 30, 3] (ACC activation was significantly increased among alcoholics as compared to controls.)

CONCLUSION

(1) During social exclusion, alcoholic participants presented a preserved perception of social rejection (normal ACC activation), but an impaired cognitive regulation / inhibition of the negative feelings associated with this rejection (reduced MFG activation).

(2) Once re-included in the game after the exclusion period, alcoholic participants had a long-lasting persistence of rejection feelings (increased ACC activation), while these feelings rapidly disappear among control participants.

This study is the first to determine the cerebral correlates of the social interaction deficits in alcoholism. It reinforces earlier experimental and clinical observations by showing that alcoholism leads to an impaired control of the frustration and distress due to social rejection, and to a maintenance of these negative feelings when the exclusion has actually come to an end.

REFERENCES