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Mme Marie Dethier*, M. Régis Duchateau*, Mme Maya El Hawa*, Mme Sylvie Blairy**
* MSc, ** PhD, Département de psychologie : cognition et comportement, Université de Liège, Boulevard du Rectorat, 3, B-4000 Liège
Correspondance : Marie Dethier. Courriel : marie.dethier@ulg.ac.be
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Emotional response to body and facial feedback in alcohol-dependent patients

Résumé

La réponse émotionnelle à la rétroaction corporelle et faciale chez les patients alcoolo-dépendants
Introduction : l'objectif de cette étude était d'évaluer l'effet combiné de la manipulation de la posture corporelle et de l'expression faciale sur les sentiments subjectifs de patients hommes alcoolo-dépendants (AD), divisés en deux sous-groupes en fonction de la typologie de Cloninger, de manière à accroître la compréhension des difficultés éprouvées par ces patients dans les domaines de la régulation émotionnelle et des relations interpersonnelles. **Méthode :** 20 AD type I, 21 AD type II et 20 participants témoins ont adopté des expressions faciales et des postures corporelles selon des instructions spécifiques et ont maintenu ces positions pendant dix secondes. Les expressions et postures comprenaient les conditions de colère, tristesse et joie, de même qu'une condition neutre (ligne de base). Après chaque manipulation d'expression/posture, les participants évaluaient leur sentiment subjectif (incluant la gaîté, la tristesse et l'irritation). **Résultats :** les trois groupes ont rapporté une augmentation des sentiments subjectifs en concordance avec la manipulation faciale et posturale. Aucune différence n'est apparue entre les patients AD et les sujets témoins, $F(1, 60) = 0{,}01$, $p = 0{,}91$, ni entre les trois groupes, $F(2, 59) = 1{,}03$, $p = 0{,}36$. **Conclusions :** tout comme les sujets témoins, les deux sous-types de patients AD pourraient être répondants à la combinaison de la rétroaction faciale et corporelle et, en conséquence, bénéficier de ses effets régulateurs.

Mots-clés

Alcoolo-dépendance – Réponse émotionnelle – Rétroaction faciale.

Summary

Introduction: the object of this study was to evaluate the combined effect of body postures and facial expressions manipulation on subjective feelings in male alcohol-dependent (AD) divided into two groups according to Cloninger's typology, in order to gain some understanding of their difficulties in the regulation of emotions and in interpersonal relationships. **Method:** 20 type I AD, 21 type II AD and 20 control participants adopted facial expressions and body postures according to specific instructions and maintained these positions for ten seconds. Expressions and postures entailed anger, sadness and happiness as well as a neutral (baseline) condition. After each expression/posture manipulation, participants evaluated their subjective emotional state (including cheerfulness, sadness and irritation). **Results:** the three groups reported heightened subjective feelings in concordance with the facial and posture manipulation with no difference emerging between AD and control participants, $F(1, 60) = 0.01$, $p = 0.91$, or between the three groups, $F(2, 59) = 1.03$, $p = 0.36$. **Conclusions:** similarly to control participants, AD from the two subtypes may be responsive to the combined effect of facial and body feedback and could, subsequently, benefit from its regulative effects.

Key words

Alcohol dependence – Emotional response – Facial feedback.

Alcohol-dependent patients (AD) are known to encounter difficulties in the domains of emotional regulation and emotional communication. These two problems contribute to alcohol consumption and relapse (1, 2). The aim of this study was to investigate body and facial feedback, two processes that have a role in healthy

emotional and interactional regulation. Body and facial feedback designate the fact that emotional experience is affected by cues generated by afferent feedback produced by changes in the muscles involved in body posture and facial expression. In the present study, these processes were investigated in AD divided into two groups according to Cloninger's typology (3): type I AD (AD-I) and type II-AD (AD-II). Table I contains a summary of AD-I and AD-II characteristics. A recent research outlined the pertinence of this classification in studies on emotional issues (4). We will first review emotional and interpersonal issues in AD. We will then define body and facial feedback and describe their role in emotional regulation and interpersonal problems, before setting out the objectives and hypotheses of the study.

Problems of emotional and interpersonal regulation in AD

Emotional regulation

Alcohol drinkers report to use alcohol both to enhance positive affects and to reduce negative feelings (5). A lack of healthy emotional regulatory mechanisms may in part explain why AD needs to turn towards alcohol to regulate emotions. Amongst AD's emotional issues, the important role played by anger in alcohol consumption and relapse has been outlined several times in the scientific literature (6-8). Anxiety and depression are also common among AD. Comorbidity with depression and anxiety is more often found in AD-I whereas comorbidity with personality disorder is more often found in AD-II (9).

AD's difficulty to regulate emotions has been in part studied through the construct of alexithymia. Lane et al. (10) conceptualised alexithymia (or low level of emotional awareness) as a failure to connect the implicit or unconscious processing of affect (i.e., awareness of peripheral manifestations of emotional arousal only through body sensations or a tendency to action) and the explicit or conscious one (i.e., ability to distinguish multiple nuances of emotions). Research suggests an increase incidence of alexithymia in AD; alexithymia being a pejorative factor for maintaining abstinence (e.g., 11, 12). Most studies on that topic used self-report questionnaire. Two recent studies extended those findings and showed that low level of emotional awareness can also be evidenced by an implicit performance task (13, 14). In the levels of emotional awareness task (15), answers to the question "How would you feel?" in response to short written scenes involving two individuals were scored according to the emotional value of the words used by the participant (i.e., non-emotional response vs. awareness of physiological cues vs. undifferentiated emotions vs. differentiated emotions). The authors interpreted their results according to Lane and colleagues' model: AD's low level of emotional awareness suggested impairments in the ability to transform sensorimotor schemes into conceptual representations of emotions. And yet, this ability is necessary to perform in body and facial feedback tasks.

Interpersonal problems

Emotional difficulties are also encountered in AD's interactions with others. The study of emotional contagion to others' emotions is in its infancy in alcohol dependence but preliminary findings suggest that AD present an abnormal reactivity to others' emotions (4, 16). For example, AD-II mimicked more angry facial expressions than controls and AD-I participants whereas these latest tended to avoid mimicking sad facial expressions (4). In addition, AD reported low level of emotional empathy (17, 18). Interestingly, in Maurage et al. (18), this low level of emotional empathy was correlated with alexythimia and heightened interpersonal problems. This last result sup-

Table I: Differences between Type I alcohol-dependant patients (AD-I) and Type II alcohol-dependant patients (AD-II)

Characteristics	Type I alcohol-dependant patients	Type II alcohol-dependant patients
Contributing factors	Genetic and environmental	Primarily genetic
Gender distribution	Affects both men and women	Affects men more often than women
Usual age of onset	After age 25	Before age 25
Common alcohol related problems	Loss of control over drinking; Binge drinking; guilt about drinking; progressive severity of alcohol abuse	Inability to abstain from alcohol; drinking frequently associated with fighting and arrests; severity of alcohol abuse usually not progressive
Characteristics personality traits	High arm avoidance and low novelty seeking; person drinks to relieve anxiety	High novelty seeking; persons drink to induce euphoria

ported the idea that emotional impairments in AD lead to the interpersonal relationships difficulties outlined in the literature (e.g., 19, 20).

Body and facial feedback

The "facial feedback hypothesis" designates the idea that specific features of emotional facial expressions cause equally specific emotional feelings. Despite a generally small to medium effect size – around 12% of explained variance (21) –, research has provided significant support in favour of its existence in healthy individuals (22). Body-posture also influences subjective emotional feelings and its simultaneous combination with the matched emotional facial expression has an additional effect on feelings (23).

Some emotional functions, impaired in AD, have been associated with responsivity to body and facial feedback effects. In particular, people whose subjective emotional experience was influenced by facial feedback were more sensitive to emotional contagion (24) and reported high level of emotional empathy (25). In addition, individuals with psychiatric and neurological disorders were affected differently by their body cues compared to healthy subjects (26-28). These studies may be informative in two points. First, in Dethier et al., adults who had suffered from a severe traumatic brain injury were responsive to happy but not to angry expression/posture manipulations. Anger is also disproportionally affected compared to happiness in emotional facial expression decoding task in those patients (e.g., 29, 30), suggesting that impairments in decoding body and facial configurations of emotion in others may extend to the same configurations in oneself. And yet, alcohol dependence impairs the decoding of emotional facial expressions and body postures in others (review in 31, 32), raising the question of whether this impairment extends also to oneself. Second, in Flack et al., the expressions and postures of sadness were the only ones that help depressed individuals to experience sufficiently distinct feelings, suggesting a relationship between emotional state and responsivity to facial and body feedback.

From a clinical point of view, deliberate manipulation of expressive behaviours of emotion might regulate subjective emotional feelings (e.g., 22, 33). Techniques of adopting or inhibiting emotional behaviours (the most common being relaxation) can be useful in everyday life and in clinical contexts (34). In addition, emotional awareness has been described as an initial step in the regulation of emotion (35). Dyadic interpersonal communication is another process that may rely in part on body and facial feedback (36). Combined with the evidence that people mimic the EFE of others (review in 37), facial feedback provides a mechanism for one person's emotions to influence another's (38). Mutual mimicry and resultant shared emotions may smooth social interactions. Body and facial feedback are thus important for the regulation emotion and to smooth social interactions, two domains where AD encountered difficulties.

The present study

The object of this study was to evaluate the combined effect of body and facial feedback for the emotions of joy, anger and sadness in male AD-I, AD-II and control participants. To simplify analyses, only male AD were included in this study. Because alcohol dependence is known to be related with low level of emotional empathy and low level of emotional awareness, we predicted that AD would be in general less responsive to the combined effect of body and facial feedback than control participants. We also hypothesised that AD would be disproportionally responsive to facial and body cues matching the emotions they encounter difficulties to regulate. More specifically, AD's subjective emotional feelings would be less affected by positive body and facial cues and more affected by negative body and facial cues (specifically anger in AD-II and sadness in AD-I) compared with control participants.

Method

Participants

41 male in-patients diagnosed with alcohol dependence according to the DSM-IV criteria and aged between 28 and 59 years old were recruited at a long-stay post-detoxification treatment centre. All AD were abstinent for at least three weeks prior to participating in the study (M = 38.46 days, SD = 13.88). AD did not receive neuroleptic medications at assessment. AD were excluded from this study if they were dependent on an additional substance or had been diagnosed with a psychosis. AD were classified as AD-I (20 patients) or AD-II (21 patients) according to von Knorring et al.'s criteria (39). More precisely, the patient was classified as AD-II if 1) subjective alcohol problems had started before the age of 25 and 2) the patient presented at least two instances of social

complications such as violence while intoxicated, absence from work, loss of job, legal difficulties (e.g., arrest for intoxicated behaviour, traffic accidents while intoxicated), arguments or difficulties with family or friends because of excessive alcohol abuse. Other patients were classified as AD-I. As shown in table II, the depressive symptomatology level – measured by the Beck Depression Inventory (BDI; 40), evaluative anxiety – measured by the Fear of Negative Evaluation scale (FNE; 41), alcohol dependence – measured by the Severity of Alcohol Dependence Questionnaire (SADQ; 42), or the average level of alcohol consumption did not significantly differed between AD-I and AD-II. However, compared with AD-II, AD-I reported a later first hospitalisation and fewer previous treatments. Pearson's χ^2 analysis indicated that the proportion of participants with a first degree relative suffering from alcoholism was higher in AD-II than in AD-I, $\chi^2(1) = 5.53$, $p = 0.02$.

21 male control participants aged between 25 and 60 years old were recruited from the investigators' acquaintances. They were matched as closely as possible to the demographic characteristics of the AD population with regard to age and education. As shown in table II, the three groups were found to be similar in terms of age, education and evaluative anxiety. AD reported more depression than control participants on the day of testing. Control participants did not have any history of alcohol dependence and were also free of past or present DSM-IV Axis-I psychiatric disorders assessed by the French version of the Mini International Neuropsychiatric Interview (MINI; 43).

Exclusion criteria for all participants included history of developmental or neurological disorders. All participants had sufficient cognitive and motor capacity to understand and comply with instructions and spoke French fluently. All participants gave informed consent, and the human subjects research has been approved by the University of Liège ethical board. These participants were also involved in a related study on emotional communication (44).

Body and facial feedback task

The procedures used in this study were adapted from those developed by Flack et al. (23, 27). Participants were asked to take part in a study on the relationship between the adoption of certain postures, the contraction of certain facial muscles and body sensations. The example of feeling of pain after holding the same position during a certain amount of time was given. This explanation of the purpose of the study was designed to disguise the fact that the experimenters were testing relationships between expressive behaviours and emotional feelings. Participants sat facing a video camera (to allow the experimenter to check afterwards that participants had complied with instructions), while the experimenter was seated behind them and out of their view.

Prior to each manipulation of combinations of expressions and postures, participants were told to relax all of the muscles in their faces and bodies. Once participants indicated that they were relaxed, instructions for a facial expression/posture manipulation were given. Expressions and postures of anger, sadness and happiness were manipulated. A further neutral expression/posture manipulation was used as baseline. The sequence of the four expression/

Table II: Means, standard seviations and comparisons between Type I alcohol-dependents (AD-I), Type II alcohol-dependents (AD-II) and control participants with regard to demographic and control measures

	AD-I (n = 20)	AD-II (n = 21)	Controls (n = 21)	*F*	*p*
Age (in years)	46.20 (7.92)	42.52 (8.22)	45.24 (12.08)	0.81	ns
Years of education since beginning primary school	12.65 (2.62)	12.33 (3.53)	12.90 (2.62)	0.20	ns
BDI[a]	12.10 (9.77)	18.29 (9.98)	5.29 (4.38)	12.51	< 0.001
FNE[b]	6.65 (3.76)	7.71 (5.04)	7.10 (4.21)	0.31	ns
Daily alcohol consumption (glasses)	15.15 (8.61)	18.87 (9.94)	1.26 (1.22)	31.16	< 0.001
Family history of alcoholism[c]	8/20	16/21	1/20		
Previous detoxification stays	2.05 (1.05)	3.86 (3.05)		6.29	< 0.05
Age of first contact hospitalisation	43.80 (5.83)	35.48 (10.25)		10.08	< 0.001
SADQ[d]	28.80 (11.21)	28.52 (9.23)		0.01	ns

Notes: standard deviations are in parentheses; ns = non-significant.

[a] Beck Depression Inventory; [b] Fear of Negative Evaluation scale; [c] the presence of at least one first-degree relative with alcohol dependence was considered as evidence of a positive family history; [d] Severity of Alcohol Dependence Questionnaire.

posture manipulations was counterbalanced between participants. Participants were told to hold their muscles according to the instructions for ten seconds each. Instructions for emotional expressions and postures were adapted from those of Flack et al. (23). A complete description of the instructions can be found in Dethier et al. (28).

After each expression/posture manipulation, subjects were given a body sensations scale to complete. The scale contained 15 seven-point scale items (ranging from "not at all" to "very strongly"); 12 concerned body sensations and other emotional states not relevant for the present study (change in breathing, sensations of cold or shivers, fear/anxiety/distress, burning cheeks, tense or rigid muscles, shaking, perspiration, vertigos, numbness or tingling, muscular pain, and sensation of diffuse heat, revulsion/disgust) and three were emotional items directly relevant to expression/posture manipulations (cheerfulness, sadness or depression, irritation or aggressiveness). So, after adopting each expression/posture, participant answered a series of items, such as "Did you feel any cheerfulness?", on seven-point Likert scale.

A post-experimental interview was used to determine whether or not participants deduced the true purpose of the experiment during the procedure. Participants were asked what they understood the purpose of the experiment to be and if they could think of any other purpose the study might serve. Participants were assigned to one of two guess groups on the basis of their answers to the second question: those who guessed that the experiment examined how expression/posture could affect/produce emotion and those who did not.

Results

Preliminary analyses

Pearson correlational analyses were computed to assess if demographical and control variables had an impact on the body and facial feedback variables. No correlation reached statistical significance between age, education level, depressive symptomatology level, evaluative anxiety on the one hand, and any body and facial feedback computed scores on the other hand, in the combined sample or in the three groups separately. Similarly, concerning AD, duration of abstinence did not have any impact on the dependent variables. Therefore, all subsequent analyses were collapsed across these factors.

Body and facial feedback task

To control for baseline emotional state, difference scores for subjective ratings for each emotional expression/posture were calculated by subtracting ratings from the baseline neutral condition. All the subsequent analyses were conducted with these difference scores.

Global responsivity

We computed a score of global responsivity to body and facial feedback by summating the extent to which the happy, the angry and the sad expression/posture increased feelings of the relevant emotion compared to the neutral expression/posture (e.g., cheerfulness ratings during the happy expression/posture minus cheerfulness ratings during the neutral expression/posture) and ad-ding these together. A score of zero would represent no change in response to any condition. For example, the global responsivity score of a participant with ratings of 3 on the cheerfulness scale, 2 on the irritation scale and 0 on the sadness scale during the neutral expression/posture, and of 6 on the cheerfulness scale during the happy expression/posture, 2 on irritation scale during the angry expression/posture, and 3 on the sadness during the sad expression/posture (increased feelings of the relevant emotion) would be 6 [(6-3) + (2-2) + (3-0)]. No difference emerged between AD and control participants or between the three groups, with $F(1, 60) = 0.01$, $p = 0.91$, $\eta^2 = 0.00$ and $F(2, 59) = 1.03$, $p = 0.36$, $\eta^2 = 0.03$, respectively (AD-I: $M = 2.30$, $SD = 3.40$; AD-II: $M = 4.52$, $SD = 5.09$, Control: $M = 3.29$, $SD = 6.02$).

Responsivity to each expression/posture manipulation

Planned comparisons were then conducted to investigate if participants from each group were affected by each expression/posture manipulation. Because groups did not significantly differed on their global responsivity score and no significant interaction or effect involving the factor group emerged from the analysis of variance, between-group differences were not computed. We compared the rating of the emotional scale matching a given expression/posture manipulation (compared to baseline) with ratings of the same emotional scale across the remaining, non-matching expression/posture manipulations (also compared to baseline). For example, to know if participants were affected by the angry expression/posture manipulation, we compared the rating of irritation during the angry expression/posture manipulation (minus the rating of irritation during the neutral expression/

Table III: Comparisons for Type I alcohol-dependents (AD-I), Type II alcohol-dependents (AD-II) and control participants between the rating of the emotional scale matching a given expression/posture manipulation with ratings of the same emotional scale across the remaining, non-matching expression/posture manipulations (E/P)

		Happy E/P	Angry E/P	Sad E/P	*F*	*p*	η^2
AD-I	Cheerfulness	**-0.15 (2.13)**	-1.65 (2.46)	-1.25 (3.11)	6.97	0.02	0.27
(n = 20)	Sadness	0.05 (0.51)	0.50 (1.54)	**1.00 (1.89)**	3.26	0.09	0.15
	Irritation	0.20 (0.70)	**1.45 (2.14)**	0.35 (1.09)	7.64	0.01	0.29
AD-II	Cheerfulness	**1.19 (2.36)**	-0.33 (2.59)	-0.71 (1.74)	7.70	0.01	0.28
(n = 20)	Sadness	-0.19 (0.60)	0.19 (1.29)	**1.66 (2.27)**	11.82	< 0.01	0.37
	Irritation	0.33 (0.80)	**1.67 (2.56)**	0.90 (1.92)	5.10	0.04	0.20
Controls	Cheerfulness	**0.00 (1.79)**	-0.86 (2.08)	-1.24 (2.12)	11.04	< 0.01	0.36
(n = 20)	Sadness	0.05 (0.80)	1.00 (2.30)	**1.52 (2.73)**	5.49	0.03	0.22
	Irritation	0.00 (0.55)	**1.76 (2.66)**	1.00 (2.17)	6.09	0.02	0.23

Notes: standard deviations are in parentheses; bold types indicate the rating against which the others were compared.

posture) with the ratings of irritation during sad and happy expression/posture manipulations (minus the rating of irritation during the neutral expression/posture). The responsivity to the angry expression/posture manipulation of a participant with ratings of 3 on the irritation scale during the neutral expression/posture, 4 on the irritation scale during the angry expression/posture, 2 on the irritation scale during the sad expression/posture and 0 on the irritation scale during the happy would be 3 {(4-3) - [(2-3) + (0-3)]/2}. As you can seen in table III, AD-I were responsive to happy and angry expression/posture manipulations (sadness showed a non-significant trend) whereas AD-II and control participants were responsive to happy, angry and sad expression/posture manipulations.

Impact of guessing the purpose of the experiment

Seven AD-I, five AD-II and one control participant were assigned to the guess group based on their expressed awareness of the purpose of the experiment. In general, when the 13 participants assigned to the guess group were excluded, the body and facial feedback effect was still significant. Further, each participant was classified in a responsive (global responsivity score superior to 0) vs. non-responsive group (global responsivity score equal or inferior to 0) and results did not show that the guess and the responsive variables were dependent ($\chi^2 = 2.03$, $df = 1$, $p = 0.15$). On the basis of those analyses, we decided not to exclude participants from the guess group from the main analyses. This decision was also supported by the relative small proportion of participants classified in the guess group and the fact that the post-experimental interview sheds light into only some aspects of the experimenter demand effect.

Discussion

The purpose of the present research was to investigate responsivity to the combined effect of body and facial feedback of two groups of AD divided according to Cloninger's typology in comparison with control participants. Similarly to previous research, control participants reported heightened subjective feelings in concordance with the facial and posture manipulation. The effect size of the feedback effect in the control sample was about two times larger than the one reported in the meta-analyses of Matsumoto (21) – i.e., 95% confidence interval of the mean effect size varied from 0.07 to 0.18. This difference may be explained by the heterogeneity of designs and approaches. In particular, in this study, the effects of facial and body feedback were combined, which was shown to increase the effect size of feedback (23).

This study had thus expected effects on control participants. However, contrary to our prediction, both subtypes of our AD participants were also responsive to facial and body feedback effects: AD-I were responsive to happy and angry expression/posture manipulations (sadness showed a non-significant trend) and AD-II to happy, angry and sad expression/posture manipulations, with no difference emerging between AD and control participants concerning global responsiveness. Three different explanations can be put forward to explain the absence of group differences regarding responsivity to body and facial feedback found in the present study.

First, our methodology may not be sensitive enough to show differences between AD and control participants. However, this seems unlikely. In fact, a recent research

used the same methodology and found significant differences between patients with traumatic brain injury and control participants (28). Often raised by critics, the potentially confounding effects of experimenter demand may also account for the absence of significant group difference. The experimenter demand hypothesis is based on the assumption that participants may catch on to the experimenters' purpose, and may then respond to the experimenters' expectations. In this study, each participant was classified in a guess or non-guess group to assess to which extent the experimenter demand accounts for responsivity to body and facial feedback. The number of participants who guessed differed from one group to another (seven AD-I, five AD-II and one control participant). Thus, the possibility remained that responsivity to body and facial feedback was in part due to different mechanisms: the experimenter demand may have a role in AD's responsivity effect but not in control participants' responsivity effect. However, statistical analyses suggest that this is not the case. Furthermore, in general, evidence from previous studies suggests that experimenter demand is not likely to have a role in body and facial feedback effects. Firstly, body and facial feedback effects were still found in studies in which the real purpose of the experiment was extremely well disguised (e.g., 45) or in which participants that reported seeing through the experiment were excluded (46). Secondly, the response to facial feedback has been associated with a number of subsequent emotional responses in previous studies (e.g., recall of emotional events, mimicry; 47, 48). As it is unlikely that participants would respond intentionally to a second emotional measure in accordance with their response to the first, this association does not seem consistent with the effects of experimenter demand. Finally, a number of previous studies have shown that people responsive to facial feedback are less likely to respond to social expectations than others (e.g., 49). In sum, the fact that some participants saw through the experiment introduces a potential confound in the study but different elements suggest that this does not account for the absence of significant difference between groups.

Second, our assumption that AD would be less responsive to body and facial feedback was based on previous research that showed impaired emotional effects in AD. Specifically, our hypothesis was based on the low level of emotional empathy and the low level of emotional awareness described in AD. On the basis of previous research, we proposed that these emotional effects share some processes with the facial and body feedback effect. Nevertheless, it is likely that these shared processes account only for a small proportion of the feedback effect; it is thus possible that alcohol dependence impairs some processes involved in tasks that assessing emotional empathy or emotional awareness, but spares others, including the ones involved in the body and facial feedback task. For example, AD may present some vocabulary issues that account for their low level of emotional awareness, but when those issues are prevented, like in the present study, they may be able to show some connection between body sensations and conscious feelings. Future studies should thus shed light into the common processes between, on the one hand, emotional empathy and emotional awareness, and, on the other hand, body and facial feedback. In addition, the emotional empathy and the emotional awareness deficits of AD have only been described in a few studies (to our knowledge two for each aspect; 13, 14, 17, 18). It is thus important that other studies replicate these preliminary findings.

Third, sampling characteristics could explain in this absence of significant group difference. In fact, the same participants took part on a related study on emotional facial expressions recognition (44). In that study, the AD sample was surprisingly as efficient in the decoding of emotional facial expressions as the control sample. This result stood in contradiction with a consequent previous literature (review in 31). The comparison to this literature suggests that the absence of group difference was due to a particularly efficient AD sample. No potential confound relative to the AD sample (it showed similar characteristics in terms of demographical and alcohol related variables compared with samples of previous studies) or to the task were identified, letting the reason for this surprising result uncertain. In sum, the AD sample from the present research showed an increased capacity to process emotional facial expressions in comparisons with AD from previous studies. Although, no correlation was found between emotional facial expressions decoding skills and responsivity to body and facial feedback in the present research, the possibility that the AD sample presents particularities that account for the results cannot be excluded.

In conclusion, this preliminarily study suggests that, although a potential confound from the experimenter demand persists, either AD, as a group, are responsive to the body and facial feedback effects, either it is only the case for this particular sample. In both cases, this is good news: at least some AD may be responsive to the combined effects of facial and body feedback and could, subsequently, benefit from its regulative effects. Therapeutically, this suggests that relaxation and respiration techniques could be

useful with some AD (see 50, for a study on respiratory feedback). Facial and body manipulation could be one of the technique substitutive to alcohol regarding the regulation of negative emotions. In addition, the preserved connection between body sensations and emotional labels (at least, when presented with a multiple choice procedure) in AD, suggested by this study, could be used to approach AD's difficulty with the processing of their own emotions. To incite AD to pay more attention to their body sensations may help them to develop a better awareness of their emotional feelings. However, it is clear that more studies are needed in this domain. Their objectives must be to replicate those results with different samples and to identify the relationships of facial and body feedback with other impaired emotional processes in AD. ■

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