R E V I E W

Recognition of facial expressions by alcoholic patients: a systematic literature review

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Background: Alcohol abuse and dependence can cause a wide variety of cognitive, psycho-motor, and visual-spatial deficits. It is questionable whether this condition is associated with impairments in the recognition of affective and/or emotional information. Such impairments may promote deficits in social cognition and, consequently, in the adaptation and interaction of alcohol abusers with their social environment. The aim of this systematic review was to systematize the literature on alcoholics' recognition of basic facial expressions in terms of the following outcome variables: accuracy, emotional intensity, and latency time.

Methods: A systematic literature search in the PsycINFO, PubMed, and SciELO electronic databases, with no restrictions regarding publication year, was employed as the study methodology.

Results: The findings of some studies indicate that alcoholics have greater impairment in facial expression recognition tasks, while others could not differentiate the clinical group from controls. However, there was a trend toward greater deficits in alcoholics. Alcoholics displayed less accuracy in recognition of sadness and disgust and required greater emotional intensity to judge facial expressions corresponding to fear and anger.

Conclusion: The current study was only able to identify trends in the chosen outcome variables. Future studies that aim to provide more precise evidence for the potential influence of alcohol on social cognition are needed.

Keywords: alcoholism, face, emotional recognition, facial expression, systematic review

Introduction

It is well known that alcoholism can lead, in the long-term, to deficits in neurocognitive functions that involve memory, learning, visual-spatial orientation, psychometricity, and information processing, among other skills.[1,2] In addition, previous authors have highlighted pronounced impairments in the recognition of affective and/or emotional information.

Such impairments promote deficits in social cognition and, consequently, in the adaptation and interaction of alcohol abusers with their social environment.[3–6] These deficits occur because social cognition is one of the key aspects of emotional adaptive functioning. It is also an important nonverbal social skill that conveys messages about individuals' emotional states at the moment of interaction, thus providing clues that aid the interpretation of behaviors.[7]

These deficits, together with the development of interpersonal problems, could become risk factors for the maintenance of an individual's cycle of alcohol abuse and/or dependence. They may induce relapses to drinking and hinder the processes of withdrawal, treatment, and recovery.[8–10]

Given this situation, the majority of studies in the area that have aimed to verify and/or measure the presence of such deficits have employed tasks that involve recognition

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of basic facial expressions, such as anger, disgust, fear, and sadness (negative emotions), and happiness and surprise (positive emotions). These studies have primarily assessed one or more of the following three key variables: accuracy, latency time, and emotional intensity, pointing to some specific changes.

In addition, smaller and more recent studies in this field have monitored brain electrical activity during the performance of cognitive tasks through the use of electro-encephalogram instrumentation. These studies have shown that alcoholics exhibit lower brain activation in regions that mediate visual, auditory, and visual-motor processes and deficits in processing anger.[11–14]

Other studies have investigated the recognition of facial expressions during neuroimaging tests performed via functional magnetic resonance imaging techniques. These studies have indicated, for example, that alcoholics show lower brain activity in the cingulate, orbitofrontal, and insular cortex (regions that mediate emotional processing) during recognition of facial expressions of fear[15] and disgust.[6] In addition, Marinkovic et al[16] showed that alcoholic individuals have lower activation in the right amygdala and hippocampus upon negative and positive stimuli compared with nonalcoholics. These studies suggest that this deficient activation may underlie impaired processing of emotional faces in alcoholic individuals.

Considering the field of knowledge in question and the nonsystematization of findings, the present study consists of a systematic literature review of facial expression recognition by individuals with a history of alcohol abuse and dependence. This aim was achieved by reviewing clinical studies that included accuracy, latency time, and emotional intensity.

Materials and methods

This review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement[17] and followed the instructions in the Cochrane Handbook for Systematic Reviews of Interventions.[18] A systematic search was performed in the PsycINFO, PubMed, and SciELO electronic databases using the following keywords: (alcohol OR alcoholism OR alcoholics) AND (faces OR facial) AND (recognition OR expression OR emotional). The cut-off date for the search was February 6, 2014. The main aspects of the article inclusion and exclusion process are shown in Figure 1. As observed in Figure 1, a total of 1,145 articles were found. Applying the inclusion and exclusion criteria, two

researchers selected 26 articles for analysis in the current review.[3,4,6,7,9–15,19–33]

Results
Context and samples

In general, most of the studies were conducted in Belgium (57.7%, n=15), beginning in the early 2000s (96%). Only one study had a descriptive methodological design,[30] with the remaining studies being of case-control design. The data are presented in Table 1, which also shows the main sociodemographic and clinical characteristics of the samples.

The majority of the clinical subjects were alcohol-abstinent individuals who were undergoing treatment. Of these individuals, 80.8% were inpatients (n=21),[3,4,7,9,11–15,19–26,28,31–33] and 7.7% were outpatients (n=2).[10,29] The samples ranged from eight to 52 subjects (mean 22.9 and median 24), with mean ages between 35.7 and 60.8 years (median 44.7 years) and varying education levels. Prior consumption of alcohol ranged from 12.8 to 39.1 (mean 19) drinks per day. Periods without alcohol consumption generally ranged from 1–8 (median 3) weeks. In two of the studies, this variability was greater, reaching up to 21 years.[19,27]

In terms of the control group, 88.5% of the studies (n=23) selected healthy subjects with no history of alcohol use from the general population. Social drinkers were used as the control group in only two studies, and their alcohol consumption was 3.3–13 drinks per week.[4,7] The control group sample sizes ranged from ten to 47 subjects (mean 23 and median 24), with ages ranging from 33.7 to 45.5 years (median 43.8 years) and variable education levels.

Most studies diagnosed alcohol abuse and/or dependence according to the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; n=25), with the exception of one study that used the DSM-III-R.[9] All subjects abstained from alcohol. Furthermore, only one study utilized the Structured Clinical Interview for DSM-IV Axis I disorder.[32] The controls were primarily healthy subjects from the general population without a prior history of alcohol dependence (n=23). Exclusion criteria for both groups were as follows: presence of comorbidity with any Axis I psychiatric disorder (n=17);[3,4,9–12,14,20,22,25–28,30–33] presence of comorbidity with any Axis II psychiatric disorder (n=1);[33] visual or hearing impairment (n=8);[4,11–14,24–26] epilepsy (n=9);[11–14,24–27,32] health problems in general (n=8);[4,7,12,14,24,25,27,32] intellectual impairment (n=4);[3,9,20,27] Wernicke-Korsakoff syndrome (n=2);[26,27] and use of medications (n=2).[21,32] Five studies did not present their exclusion criteria.[6,15,23,28,29]
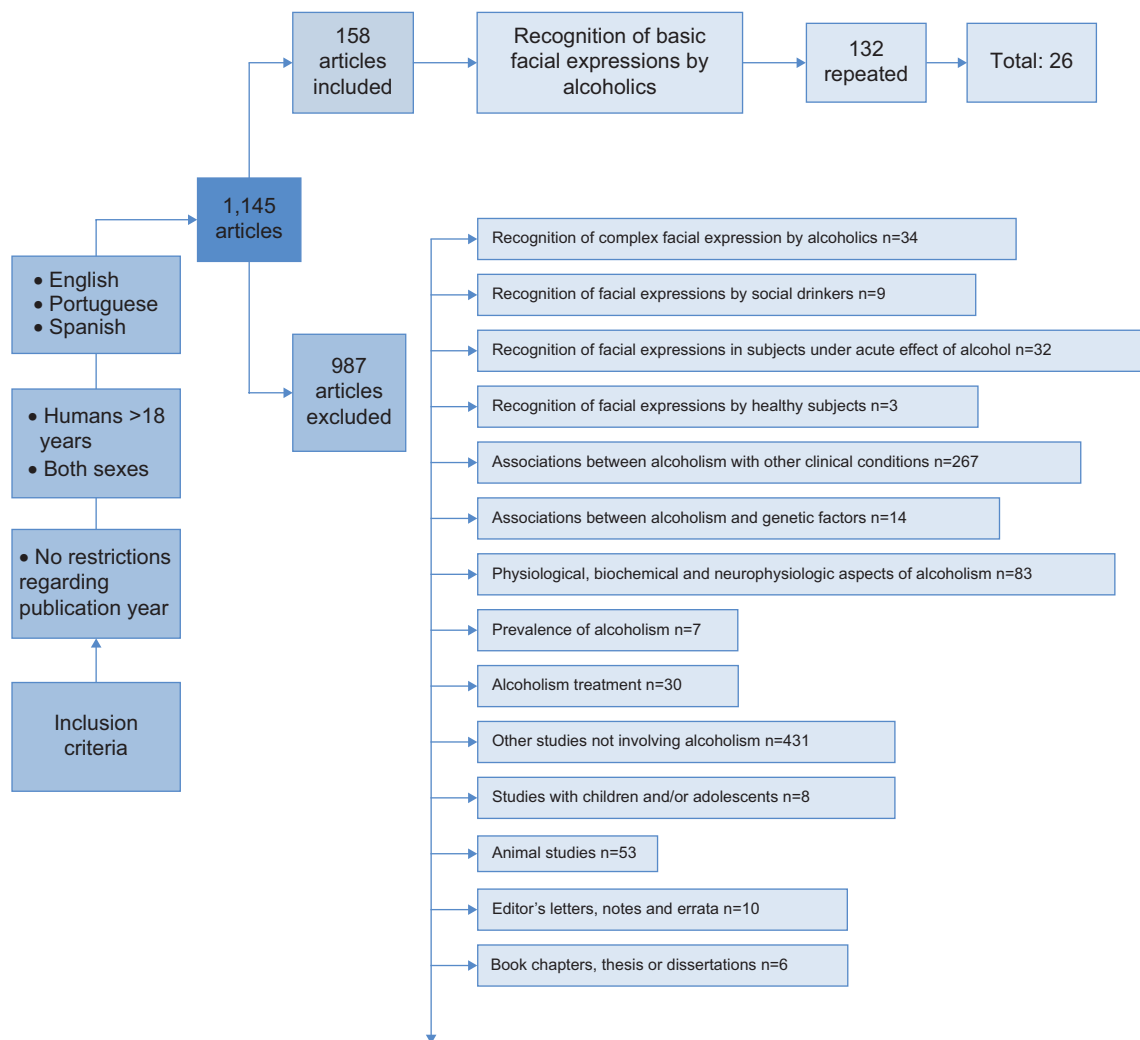
Figure 1 Flowchart of the inclusion and exclusion process.

Facial expression recognition tasks: stimuli and procedures

The main aspects related to types of stimuli and the procedures that the studies used to perform facial expression recognition tasks (FERT) are summarized in Table 2, which shows that the studies used a wide variety of stimuli and procedures. However, this diversity does not seem to have influenced the outcomes, as discussed below.

Outcome variables

The main results according to the outcome variables analyzed in the studies are listed in Table 3. The results concerning accuracy were highly divergent. Of the 23 studies that analyzed accuracy, 17 (73.9%) found at least some difference between the groups, indicating impairment in alcoholic individuals with regard to correctly identifying disgust (26%) and sadness (26%). However, 16 studies found no differences

between the groups, indicating no impairment in alcoholic individuals with regard to identifying emotions, especially anger (43.7%). In addition, ten studies (43.5%) that evaluated accuracy found differing results for the same sample group. Specifically, alcoholics showed greater impairment in recognizing some emotions but not others. The findings were generally contradictory.

Of the eight studies that evaluated the emotional intensity needed for emotion recognition, at least six found a difference in specific emotions. The group of alcoholics required higher intensities for emotion recognition, particularly for fear (50%) and anger (37.5%). However, in seven of these studies this difference was not observed, especially with regard to happiness (75%).

Finally, of the eleven studies that evaluated latency time, five (45.5%) found that alcoholics required more time for emotion recognition. These results were more evident when

Table 1 Sample composition and countries of origin in the analyzed studies

Author	Country	Clinical group			PWC (weeks)	Consumption time (years)	Drinks per day (mean)	REC	Control group			Type
		n	Age, mean (SD) (years)	Education level (years)					n	Age mean (SD) (years)	Education level (years)	
Kornreich et al[3]	Belgium	9 M; 13 F	38.1 (7.7)	2.31	2–3	10.6	18.7	IN	9 M; 13 F	37.2 (9.0)	2.50	HS
Maurage et al[4]	Belgium	9 M; 9 F	50.7 (9.8)	13.39	2	–	14.3	IN	9 M; 9 F	48.0 (10.6)	13.22	SD
O'Daly et al[6]	England	17 M	37.6 (9.6)	–	2	16.3	39.1	–	31 M	40.2 (8.7)	–	HS
Townshend and Duka[7]	England	8 M; 6 F	47.9 (10.3)	–	2	–	15.0	IN	8 M; 6 F	42.1 (9.9)	–	SD
Philippot et al[9]	Belgium	18 M; 7 F	43.0 (6.4)	2.95	3	–	–	IN	18 M; 7 F	43.8 (6.4)	2.91	HS
Frigerio et al[10]	Italy	13 M; 12 F	46.7 (10.1)	12.5	4	–	–	OUT	11 M; 12 F	46.6 (8.8)	–	HS
Maurage et al[11]	Belgium	9 M; 1 F	46.9 (11.3)	13.4	2	–	–	IN	9 M; 1 F	43.9 (9.5)	13.5	HS
Maurage et al[12]	Belgium	10 M; 5 F	46.7 (12.0)	13.46	2	–	15.4	IN	10 M; 5 F	42.1 (14.2)	14.47	HS
Maurage et al[13]	Belgium	7 M; 8 F	49.1 (8.0)	13	2	19.5	16.7	IN	7 M; 8 F	48.1 (7.2)	13.5	HS
Maurage et al[14]	Belgium	7 M; 5 F	41.8 (6.6)	12.67	2.5	9.4	27.3	IN	7 M; 5 F	41.8 (9.1)	12.92	HS
Salloum et al[15]	United States	11 M	35.7 (5.6)	–	4	–	13.6	IN	11 M	36.2 (5.8)	–	HS
Kornreich et al[19]	Belgium	18 M; 7 F	43.0 (6.4)	2.96	2–3	–	–	IN	18 M; 7 F	43.8 (6.4)	2.91	HS
		18 M; 7 F	44.6 (6.7)	2.95	8–486	–	–					
Kornreich et al[20]	Belgium	20 M; 10 F	44.1 (10.7)	12.55	3–4	10–12	12.8	IN	20 M; 10 F	42.1 (11.2)	12.55	HS
Kornreich et al[21]	Belgium	18 M; 12 F	43.9 (9.8)	13.06	3	13.5	19.7	IN	16 M; 14 F	37.1 (10.4)	14.38	HS
Foisy et al[22]	Belgium	16 M; 9 F	46.8 (9.3)	13.04	3	16.8	18.8	IN	16 M; 10 F	44.1 (9.5)	13.48	HS
Foisy et al[23]	Belgium	15 M; 12 F	42.4 (8.1)	12.64	4	13.0	18.0	IN	12 M; 10 F	44.9 (9.3)	14.9	HS
		13 M; 9 F	46.4 (7.9)	13.27	8	13.0	14.7					
Maurage et al[24]	Belgium	17 M; 3 F	44.6 (13.1)	14.35	2–3	15.6	17.9	IN	17 M; 3 F	44.6 (13.1)	14.45	HS
Sprah and Novak[25]	Slovenia	33 M	45.0 (1.6)	11.88	8	13.6	–	IN	36 M	40.4 (11.2)	11.72	HS
Maurage et al[26]	Belgium	14 M; 4 F	47.1 (10.3)	13.17	2	9.6	26.7	IN	14 M; 4 F	47.9 (11.9)	13.78	HS
Fein et al[27]	United States	28 M; 24 F	45.5 (6.8)	15.5	24–1,134	–	–	NET	25 M; 22 F	45.5 (6.8)	16.2	HS
Acharya et al[28]	England	23 M	39.3 (10.8)	–	3	–	–	IN	26 M	33.7 (10.7)	–	HS
Kumar et al[29]	India	30 M	36.8 (5.5)	–	2	–	–	OUT	30 M	34.5 (4.8)	–	HS
Steinmet and Federspiel[30]	Luxembourg	5 M; 3 F	60.8 (8.5)	–	3.1	20.5	–	RZP	NA	NA	NA	NA
Kornreich et al[31]	Belgium	17 M; 8 F	42.1 (9.6)	17.56	3	12.1	16.2	IN	17 M; 8 F	43.5 (9.1)	17.08	HS
Charlet et al[32]	Germany	25 M; 8 F	44.8 (9.8)	15.7	1	11.6	–	IN	25 M; 8 F	46.1 (9.8)	15.8	HS
Carmona-Perera et al[33]	Spain	31 M	52.0 (6.5)	13.7	2	26.5	18.8	IN	34 M	48.7 (10.6)	17.1	HS

Abbreviations: M, male; F, female; SD, standard deviation; PWC, period without consumption; HS, healthy subjects; SD, social drinkers; NA, not applicable; REC, recruitment source; RZP, rural zone population; NET, Internet; IN, hospitalized patients; OUT, outpatients.

Table 2 Main characteristics of stimuli and procedures used for FERT

		Studies (n)	References
FERT stimuli			
Standardized			
Yes	Ekman and Friesen	12	4,6,7,11,12,14,24,25,26,30–32
	Matsumoto and Ekman	9	3,9,15,19–23,28
	Others	3	13,29,33
No		2	10,27
Number of stimuli	Mean 33, median 28		
Evaluated emotions (*)	Happiness	22	3,4,7,9–12,14,15,19–24,26–31,33
	Sadness	19	7,9–11,14,15,19–23,25–31,33
	Fear	16	3,6,7,9,11,14,15,19,25,26,28–33
	Anger	22	3,4,7,9,10,12,13,15,19–26,28–33
	Surprise	8	7,25,28–33
	Disgust	15	7,9,10,13,15,19–23,25,28–30,33
	Neutral	7	6,11,12,14,24,27,29
Actors	Number of actors	Mean 17.1, median 5	
	Ethnicity		
	Caucasian	8	3,4,9,19–23
	Noninformed	18	6,7,10,11–15,24–33
	Sex		
	Both	18	3,6,9,10,12,13,15,19–21,23–25,27–29,31,32
	Male	4	7,11,14,26
	Noninformed	4	4,20,22,33
FERT procedures			
Standardized			
Yes	Hess and Blairy	9	3,4,9,19–23,15
	Others	7	7,10,11,13,28,30,33
No		10	6,12,14,24–27,29,31,32
Means of performing task	Computer	21	3,4,6,9,13–15,19–32
	Slide/card	2	7,10
	Noninformed	3	11,12,33
Task type	Static	12	3,7,15,20–23,26,27,29–31
	Dynamic	5	9,10,13,19,28
	Noninformed	8	4,11,12,14,24,25,32,33
Stimulus presentation	Randomized	22	3,4,6,7,10,11,13,15,19–24,26–33
	Noninformed	4	9,12,14,25
Emotional intensity	30% and 70%	6	3,15,20–23
	100%	3	27,29,31
	Others	4	6,7,14,32
	Noninformed	8	4,11,12,20,25,26,32,33
Response time	Controlled	8	9,22,11,13,14,26,27,32
	No time limit	4	6,30,31,33
	Noninformed	14	3,4,7,10,12,15,19–23,25,28,29
Outcome variables (*)	Accuracy	23	3,4,6,7,9,10,12–15,19–25,27,28,30–33
	Intensity	8	3,7,9,15,19,23,26,31
	Latency time	11	4,11–15,22,24,29,31,32

Note: *Nonexclusive categories.
Abbreviation: FERT, facial expression recognition task.

Table 3 Results according to the outcome variables analyzed

Outcome variables (*)	Emotions	A > C		A < C		A = C	
		Studies (n)	References	Studies (n)	References	Studies (n)	References
Accuracy (N=23)	Happiness	–	–	7	3,4,9,12,19,20,30	7	10,7,15,27,28,31,33
	Sadness	–	–	6	9,10,19,20,28,30	5	7,15,27,31,33
	Fear	–	–	5	6,7,30,31,33	5	3,9,15,19,28
	Anger	–	–	6	3,12,19,20,28,30	7	7,9,10,13,15,31,33
	Surprise	–	–	3	4,28,30	4	7,15,31,33
	Disgust	–	–	6	9,13,19,20,30,33	4	10,7,15,28
	Neutral	–	–	2	12,31	2	6,27
	Total score	–	–	3	21,23,24	4	14,22,25,32
Intensity (N=8)	Happiness	2[a]	3,9	–	–	6[b]	3,7,19,23,26,31
	Sadness	3	9,26,31	–	–	3	19,7,23
	Fear	4	9,7,26,31	–	–	2	3,19
	Anger	3	9,7,23	–	–	1	19
	Surprise	4	9,7,23,26	–	–	3	3,19,31
	Disgust	–	–	–	–	1	7
	Neutral	2	26,31	–	–	–	–
	Total score	–	–	–	–	1	28
Latency time (N=1)	Happiness	2	27,37	1	24	1	15
	Sadness	2	27,29	–	–	1	15
	Fear	–	–	–	–	2	15,29
	Anger	1	13	–	–	2	15,29
	Surprise	2	24,29	–	–	2	15,13
	Disgust	–	–	–	–	1	29
	Neutral	2	27,29	–	–	–	–
	Total score	5	4,11,12,14,22	–	–	1	32

Notes: *Nonexclusive categories; [a]emotion at 30% intensity; [b]emotion at 70% intensity.
Abbreviations: A, alcoholics; C, controls.

the total score of emotions was evaluated. A small number of studies analyzed specific emotions, and the results were contradictory.

All of the results presented were also analyzed while taking into account the different variables associated with the stimuli and procedures used in FERT, ie, the methods chosen for data collection. Despite the great diversity of employed methodologies, none of them seemed to have clearly interfered with the results. In other words, no particular result was associated with any specific stimulus and/or procedure.

The influence of sociodemographic features, particularly the influence of male/female sex on FERT performance, was also evaluated. Of the four studies that analyzed this variable,[9,10,23,27] only the study of Frigerio et al[10] found significant differences. This study indicated that women needed less emotional intensity than men to recognize facial expressions, regardless of whether they had a history of alcoholism.

Only the study by Kornreich et al[19] evaluated the influence of duration of alcohol abstinence on FERT performance. This study found that alcoholics who abstained from alcohol for a longer period of time required a lower intensity to judge the emotion compared with recently detoxified alcoholics; however, there was no improvement in accuracy. In addition, only

the study by Foisy et al[23] evaluated the difference between a group of abstinent subjects undergoing treatment and a group of subjects who discontinued alcohol detoxification due to relapses. This study showed that the latter had lower accuracy, but no difference was observed in the emotional intensity required for recognition.

Discussion

The present study aimed to systematize the literature on recognition of basic facial expressions by alcoholic subjects in terms of the following outcome variables: accuracy, emotional intensity, and latency time. One noteworthy finding is that these studies were conducted recently and were primarily developed by European researchers, with a group of researchers from Belgium being responsible for 57.7% of the studies (n=15).

Homogeneity in the group of researchers who have studied the topic and the significantly diverse methodologies used across studies could have considerably influenced the results. However, despite the great variability of stimuli and procedures in the reviewed studies, a qualitative initial analysis indicated that these variables did not have a direct influence on the studied outcomes. Specifically, different results did not display a direct relationship with any of these variables.

None of the studies included subjects in the clinical groups who were consuming alcohol at the time of measurement. Therefore, future studies in this population are necessary. It is also noteworthy that a small number of subjects were examined in both the clinical groups (8–52) and the control groups (10–47). Thus, the use of larger sample sizes is suggested for future studies.

The prior literature has suggested that respondent characteristics have a direct influence on FERT. Thus, the stimuli that compose FERT and respondent characteristics should be considered separately. Namely, the following variables stand out: male/female sex of the respondent, given that women recognize both positive and negative emotions more accurately and more rapidly than men;[34] age of the respondent, given that adults above the age of 45 years tend to wrongly identify facial stimuli more often than do younger subjects;[35] education level of the respondent, as individuals with lower education levels identify facial expressions of fear and disgust less accurately than individuals with higher education levels;[36] and type of task used, because dynamic tasks have greater ecological validity than do static tasks, given that the former involve movement and are thus more similar to the actual stimuli.[37–39]

Only four studies used an intelligence test to screen the sample, and just one study considered the presence of comorbidity with Axis II personality disorders when assessing exclusion criteria. This observation warrants attention because the literature indicates that the presence of both cognitive deficits and a specific personality disorder can negatively impact FERT performance.[40–45] These variables are particularly important when considering alcoholics, because cognitive deficits may be associated with degeneration of specific brain areas due to chronic and excessive alcohol use.[40,41,46] The same approach is valid for personality disorders, as comorbidity rates (especially with antisocial and borderline personality disorders) are considerable, reaching levels greater than 50%.[43–45]

Some studies indicated alcoholics' greater impairment in FERT, while others did not differentiate between their clinical and control groups. Several studies found differences in accuracy[2,14,20,21,23,24,48] between alcoholics and controls. For sadness[3,9,10,28,30] and disgust,[3,9,13,20,30,33] which are considered negative emotions, there was a slight tendency towards impairment in the group of alcoholics. The same result was observed for emotional intensity, as some studies found that alcoholics were less sensitive in FERT[3,9] and required greater emotional intensity to judge anger[7,9,23] and fear.[7,9,26,31]

The justification given for such positive findings was that the chronic use of alcohol caused changes in the brain structures involved in processing visual-spatial information and the perception of, for example, nonverbal signals,[9,20] especially with regard to negative and/or aversive emotions.[19,28,30] In addition, it has been found that alcoholics show dysfunction in the right cerebral hemisphere, which is responsible for processing negative emotions.[19,47] Thus, some authors support the hypothesis that impairments in social cognition are consequences of deficits in the central nervous system and that they even become a reason for maintaining the vicious cycle of drinking.[2,3,9,13,20]

Unlike the variables of accuracy and emotional intensity, studies have shown greater homogeneity for latency time. Specifically, alcoholics require more time to judge emotions as a whole.[11,30,31,33–35,41] This difference suggests that chronic use of alcohol may impair cognitive functions, such as the speed of processing of emotional information and attention level while performing a task. Thus, alcoholics needed more time to focus on the task and complete it.[4,12,14,27,29] Overall, most justifications for the presence of impairments are related to neurocognitive function.[1,2]

In contrast, the hypothesis used to explain the lack of differences in the three outcome variables (accuracy, intensity, and latency time) between the groups in terms of FERT is associated with the different methodological procedures used. According to Fein et al[27] some paradigms may be more sensitive than others in detecting differences between groups. Studies that used simpler tasks, such as those in which the subject was offered the possibility of classifying emotions as high (70%) or low (30%) intensity or in which the subject answered "yes" or "no" as rapidly as possible after recognizing the emotion displayed,[15,23] found no differences between groups. Conversely, studies that used more complex tasks, such as requesting the subject to classify the intensity of an emotion using a seven-point Likert scale or to choose one of four options of available emotions,[10,19] found differences between groups. Thus, more complex tasks that require more effort from the subjects are able to demonstrate impairment, whereas simpler tasks can level all individuals and thus underestimate the possible deficits.

In addition, other hypotheses underpinning the lack of differences between groups suggest that impairments in the ability to recognize emotions may be independent of alcohol abuse. Such impairments may be associated with other factors, such as primary impairment, which is due to altered emotional intelligence[21] or the genetic history of the individual. Further, this genetic history is capable of potentially

leading to an increased predisposition to the development of abnormalities in the brain regions involved in emotional processing.[9] As an example, in the study reported by Schandler et al[48] preschool children from families with alcoholic individuals exhibited deficits in processing visual-spatial information.

Despite the inconclusive results, it is important to consider the judgment deficits mentioned because they may have a negative impact on the social life of the individual who abuses or is dependent on alcohol. This potential impact becomes even more relevant because the impairments related to social cognition are not restricted to the variables that were analyzed in the current study. It is also known that alcoholics have a tendency to overestimate emotions[7] and show response biases toward negative emotions.[11,12,22,23] Considering this set of impairments, alcoholics are more vulnerable to displaying inappropriate reactions in social situations. Thus, they may experience difficulties in interpersonal relationships and social isolation, and even become involved in fights and/or aggression, which can reduce their quality of life and reinforce their continued alcohol use.[8,20]

Conclusion

The presented data demonstrate divergent results across the relevant studies. Therefore, rather than reaching definite conclusions, only trends can be identified. The current study showed that this line of research is recent and restricted to small groups of researchers who do not use standard methodology. These inconsistencies further complicate direct comparison between studies because, as previously noted, the number of variations between the stimuli and procedures adopted is high. The systematization of a single procedure seems necessary and urgent. Researchers in this area of study should target their efforts in this direction. Most of the studies were performed in European countries, limiting potential generalizations of the findings to other sociocultural contexts. However, context is an important variable in the etiology of alcoholism.[49,50] Attention must be paid to other critical points in the studies, such as: adoption of intellectual screening tests; ascertainment of comorbidity, particularly with personality disorders; the lack of samples arising from different sociocultural contexts; and the lack of samples comprising subjects who are currently consuming alcohol.

Future research can still delineate this field of knowledge, providing more accurate evidence on whether alcoholism influences social cognition. Nevertheless, some of the findings herein regarding the negative effect of alcohol use

on the recognition of emotions have clinical implications. Such implications should be considered in both the treatment of alcoholism and the prevention of relapse, with the aim of minimizing the negative impacts of the distorted interpretation of feelings and/or emotions.[19,27]

Disclosure

The authors report no conflicts of interest in this work.

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