Running header: EMPATHY IN ALCOHOL DEPENDENCE

Capacity for Cognitive and Emotional Empathy in Alcohol-Dependent Patients

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Abstract

This study assessed two previously unexplored facets of empathy in alcohol-dependent patients (ADs) divided into two groups according to Cloninger's alcoholism typology: the attribution of intentions according to emotional facial expressions (EFEs) and emotional contagion in reaction to EFEs. Twenty-three male Type-I ADs, 21 male Type-II ADs, and 24 male control participants were compared in two computerized tasks. First, participants rated the extent to which an adjective descriptive of personality weighted on interpersonal dimensions (of rejection, aggressiveness, dominance, and affiliation) corresponded with a video of a neutral EFE that changed to an intense EFE. Second, participants evaluated their own emotional states after watching a series of videos that depicted EFEs while their own face was being filmed. The results showed that Type-I ADs attributed more rejection intentions and fewer affiliation intentions to EFEs compared with controls; however, depression might better explain this biased attribution. Furthermore, AD subtypes showed a different pattern of intention attribution according to the emotions that were portrayed and the sex of the stimulus. In addition, angry EFE mimicry was stronger in Type-II ADs than other participants. Finally, ADs expressed fewer positive emotions and more negative emotions than controls when watching EFEs. These findings emphasize the importance of differentiating alcoholism subtypes and contribute to the understanding of AD interpersonal behaviors.

Keywords: alcohol-dependence, alcoholism typology, empathy, emotional facial expressions, social relationship satisfaction

Capacity for Cognitive and Emotional Empathy in Alcohol-Dependent Patients

Empathic tendency and the quality of social relationship are two domains of interpersonal life that are intrinsically related. In their daily functioning, alcohol-dependent patients (ADs) are faced with severe interpersonal problems (Duberstein, Conwell, & Caine, 1993; Marshal, 2003; Nixon, Tivis, & Parsons, 1992) that are a major source of relapse (Marlatt, 1996). Many factors affect interpersonal interactions in ADs including neglecting responsibilities, absence from the home, failing to appear for work, and aggression (e.g., Caetano, Ramisetty-Mikler, & Harris, 2008; Zweben, 1986). According to the model developed by Philippot and colleagues (Philippot, Douilliez, Pham, Foisy, & Kornreich, 2005; Philippot, Kornreich, & Blairy, 2003), impairment in decoding emotional nonverbal cues is also one of those factors. This model postulates that chronic alcohol intoxication leads to impairments to decode nonverbal cues of emotion, which are susceptible to feed interpersonal tensions. Greater tension might in turn result in additional alcohol consumption as a coping strategy. Additional alcohol consumption might lead to a vicious circle because intoxication aggravates interpersonal tensions and depletes already limited nonverbal skills.

Following this model, research over the last decade has turned to the investigation of empathic tendencies in ADs in order to understand their interpersonal difficulties. The present study's originality lies in its assessment of two facets of empathy in ADs: the attribution of others' intentions using their emotional facial expressions (EFEs) and emotional contagion in reaction to EFEs. Moreover, whereas previous empathy studies often have treated alcoholism as a homogenous condition, the current study divided ADs into two groups according to Cloninger's typology (Cloninger, Bohman, & Sigvardsson, 1981). First, we will define empathy, and introduce the different processes involved in this capacity. Next, we will review studies that have assessed empathy deficits in alcoholics. Finally, we will outline the objectives and hypotheses of the current study.

According to Davis (1994), the term *empathy* refers to an individual's reaction to the observed experience of another. Davis's model considers empathy to be a set of constructs. These constructs are related in that they all concern responsiveness to others, but they are also clearly discriminable from each other. Empathy-related outcomes and the processes that lead to them are classified as either cognitive or emotional. The present study focused on one cognitive outcome (attributional judgment) and one emotional outcome (parallel emotional contagion).

Cognitive empathy concerns the attributional judgments offered by observers regarding a target's behavior and interpersonal accuracy (i.e., the successful estimation of other's people thoughts and feelings; Davis, 1994). From this perspective, decoding EFEs is of central importance. Darwin (1872) was the first to state that EFEs not only convey information about an expresser's affective state but also about his or her interpersonal intentions. Current emotion theorists agree that EFEs can serve social predictive functions (e.g., Fridlund, 1994, 1997). Several studies with healthy participants have shown that EFE decoding may be associated with the inference of specific interpersonal intentions (Hess, Adams, & Kleck, 2005; Hess, Blairy, & Kleck, 2000; Knutson, 1996). For example, the perception of happy EFEs is associated with attributions of high dominance and high affiliation; the perception of anger and disgust EFEs is associated with attributions of high dominance and low affiliation (Knutson, 1996).

Emotional empathy is the emotional reaction an observer experiences in response to the observed experiences of a target (Davis, 1994). These emotional reactions may be parallel or reactive. One process that leads to parallel emotional contagion is mimicry. In 1907, Lipps proposed that mimicry mediates emotional empathy. His theoretical model postulates that witnessing the emotional behaviors of an interaction partner (e.g., EFEs and postures) leads the observer to imitate these behaviors, which then induce (via a feedback process) a

corresponding emotional state in the observer. In fact, previous research reports that individuals tend to mimic EFEs and report emotional states that match the EFEs to which they have been exposed (e.g., Blairy, Herrera, & Hess, 1999; Dimberg, Thunberg, & Elmehed, 2000; Hatfield, Cacioppo, & Rapson, 1992; Hess & Blairy, 2001; McIntosh, 2006; Sonnby-Borgstrom, Jonsson, & Svensson, 2008).

To date, research into the capacity for empathy in alcoholism has focused on the investigation of cognitive empathy, and more specifically on the capacity of ADs to decode EFEs (see Uekermann & Daum, 2008, for a review). Studies have shown that ADs demonstrate deficits in labeling EFEs. Moreover, they overestimate the emotional intensity of EFEs compared with healthy participants (Foisy et al., 2007; Foisy et al., 2005; Kornreich, Blairy, Philippot, Dan, et al., 2001; Kornreich, Blairy, Philippot, Hess, et al., 2001; Kornreich et al., 2003; Philippot et al., 1999). The more severe these alterations, the more ADs reported interpersonal problems (Kornreich et al., 2002). However, the variation in this impairment across emotions is not clear. Although alcoholism seems to be associated with an overestimation of anger in EFEs (Frigerio, Burt, Montagne, Murray, & Perrett, 2002; Maurage et al., 2009; Phillippot et al., 1999), previous studies have found heterogeneous results with regard to differential impairments across other emotions.

To our knowledge, only three studies have explored other aspects of empathy in alcoholism. First, Matyassy, Kelemen, Sarkozi, Janka, and Keri (2006) showed that the recognition of complex mental states is preserved in ADs who have been abstinent for at least 6 months. Second, in a pilot study on the intention attribution, 20 ADs and 20 healthy participants attributed the intentions of dominance and affiliation to faces that portrayed joy, anger, or sadness (Dethier, Volkova, Neumann, & Blairy, 2010). The results revealed that ADs differed from healthy individuals in their intention attributions of dominance but not in those of affiliation. These results suggest that ADs express fewer dominance attribution

nuances compared with healthy participants. Finally, the level of empathy as evaluated by the Empathy Quotient (Baron-Cohen & Wheelwright, 2004), a self-report questionnaire that assesses empathy using a holistic approach, was significantly lower in ADs than controls (Martinotti, Di Nicola, Tedeschi, Cundari, & Janiri, 2009).

The Present Study

The objectives of the present study were twofold. First, we wanted to extend the research on empathy in alcoholics to additional aspects of cognitive (i.e., the capacity to infer interpersonal intentions) and emotional empathy (i.e., emotional contagion from EFEs and mimicry). Second, we wanted to test certain hypotheses with reference to ADs divided into groups by the Cloninger subtypes of alcoholism.

To attain our first objective, we investigated the capacity of ADs to infer interpersonal intentions of aggressiveness, rejection, dominance, and affiliation from EFEs in social situations[1]. These interpersonal intentions are particularly pertinent for ADs in terms of their reported interpersonal and emotional difficulties. ADs are impulsive, aggressive towards themselves and others, and violent (Bjork, Hommer, Grant, & Danube, 2004; Duberstein, et al., 1993; Evans, 1980; Marshal, 2003). Clinical studies suggest that ADs have a tendency to overestimate the anger and threat expressed by others, even if no anger or threat is in fact expressed (Bartek, Lindeman, & Hawks, 1999; Karno & Longabaugh, 2004). Furthermore, we assessed the emotional response of the observer to the emotional state of another person. More specifically, we examined the modulation of the affective state and of the facial reactions of ADs according to the EFEs displayed by other people.

To attain our second objective, we distinguished ADs using the Cloninger subtypes of alcoholism (Cloninger, 1987; Cloninger, et al., 1981), something that has never been undertaken in empathic studies of ADs before. Cloninger used genetic epidemiological data to support a personality model that identified two subtypes of alcoholism. Type-I ADs (AD-Is)

are characterized by late-onset alcoholism (i.e., after 25 years of age) and the strong influence of environmental factors. Men and women are affected equally by this subtype. AD-Is tend to self-medicate with alcohol. Conversely, Type-II ADs (AD-IIs) are characterized by an onset of alcoholism before 25 years of age. These ADs consistently present a high familial risk of alcoholism. This subtype affects men who are unable to abstain and often drink heavily for pleasure rather than to self-medicate. Furthermore, AD-IIs exhibit persistent alcohol-related antisocial behaviors and are characterized by impulsivity, extraversion, sensation seeking, and aggressiveness (e.g., Bjork, et al., 2004; Hallman, von Knorring, & Oreland, 1996; Modestin & Wurmle, 1997; L. von Knorring, von Knorring, Smigan, Lindberg, & et al., 1987). According to Cloninger's personality profile, AD-IIs are higher in novelty seeking but lower in harm avoidance and reward dependence compared with AD-Is. Comorbid depression and anxiety are more often found in AD-Is; while comorbid personality disorders are found in AD-IIs (Driessen, Veltrup, Wetterling, John, & Dilling, 1998). Efforts to discriminate Cloninger's subtypes have led to the introduction of several classification schemes. This study uses von Knorring, Bohman, von Knorring, and Oreland's (1985) criteria. Pombo and Lesch (2009) recently concluded that classification models that emphasize the number of social consequences as well as age of onset (as von Knorring et al. do) show significantly better classification concordance than models that do not. To simplify analyses, we included only males in this study. Male and female ADs suffer from different interpersonal problems (Mueller, Degen, Petitjean, Wiesbeck, & Walter, 2009). Thus, gender differences in empathy capacities are probable. Because the Type I/Type II ratio in female ADs is significantly different from that in male ADs (A. L. von Knorring, et al., 1985), gender comparisons were not investigated.

With regard to ADs' affective and interpersonal difficulties, the following hypotheses were tested: (1) We expect that ADs, particularly AD-IIs, would attribute more intentions of

rejection, dominance, and aggressiveness to other people on the basis of their EFEs compared with controls. Personal history partially creates an interpretative lens through which judgments of others' EFEs are made (Halberstadt, Dennis, & Hess, 2011). AD-IIs primarily mature in rejecting environments. For example, several studies have indicated that there is a relationship between the lack of appropriate attachments to parents or schools and the development of alcohol-dependence in AD-IIs (McNally, Palfai, Levine, & Moore, 2003; Patock-Peckham & Morgan-Lopez, 2010; Sher, Walitzer, Wood, & Brent, 1991; Windle & Davies, 1999). (2) We hypothesize that the process of conditioning to cognitive schemas of rejection would be implicated in the attribution of interpersonal intentions of rejection in all ADs but particularly AD-IIs. (3) A negative nonverbal behavior should translate this negative attitude in interactions with others. We predict that ADs would express fewer positive emotions and more negative emotions in reaction to EFEs compared with controls. (4) Moreover, we predict that intention attribution nuances with regard to the emotion displayed by EFEs would differ between groups. AD-Is, who frequently show a flat affect, should express fewer nuances than healthy participants. In contrast, AD-IIs should express more nuances than healthy participants. (5) With regard to emotional empathy, we predict that ADs' modulation of their affective states following exposure to EFEs would differ from that of healthy people according to the ADs' Cloninger subtype of alcoholism. Specifically, we predict that emotional contagion (i.e., subjective reports and mimicry) would be higher in AD-IIs but lower in AD-Is compared with healthy participants. These hypotheses are based on the fact that, as their reason for drinking demonstrates (i.e., AD-Is use alcohol to reduce tension, and AD-IIs use alcohol to enhance sensation), in their interpersonal and affective life, AD-IIs are looking for sensations and AD-Is are trying to avoid negative emotions. We hypothesize that exposure to EFEs would reproduce this approach-avoidance process

regarding emotions. (6) Finally, we predict that cognitive and emotional aspects of empathy would be related to the quality of interpersonal relationships.

Method

Participants

Forty-four male in-patients diagnosed with alcohol dependence according to the DSM-IV criteria were recruited at Belgian hospitals. All ADs were abstinent for at least three weeks prior to participating in the study. ADs did not receive psychotropic medications at assessment. ADs were excluded from this study if they were dependent on an additional substance or had been diagnosed with a psychosis. ADs were classified as AD-I (23 patients) or AD-II (21 patients) according to von Knorring et al.'s (1985) criteria.

Twenty-four male controls were recruited from the investigators' acquaintances. Controls were matched with AD-Is by age (± 5 years) and level of education. They were also free of all DSM-IV Axis-I psychiatric disorders assessed by the French version of the Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1997). Control participants had not been hospitalized for psychiatric reasons. All participants were Caucasian and spoke French fluently.

The Beck Depression Inventory (BDI; Beck, 1996) and a French version of the Fear of Negative Evaluation scale (FNE; Douilliez, Baeyens, & Philippot, 2008) were used to control for the possible effect of depression and evaluative anxiety in the empathy measures. The Benton Facial Recognition Test (BFRT; Benton, Hamsher, Varney, & Spreen, 1983) assessed the ability of participants to correctly process the identity attributes of emotionally neutral faces. Variables were recorded for ADs, including problematic drinking onset, the number of previous in-patient detoxification stays, average daily alcohol consumption, and family history of alcoholism. The presence of at least one first-degree relative with alcohol dependence was considered as evidence of a positive family history. The Severity of Alcohol

Dependence Questionnaire (SADQ; Stockwell, Hodgson, Edwards, Taylor, & Rankin, 1979) evaluated the severity of alcohol dependence in ADs. Written informed consent was obtained from participants following a complete description of the study. The University of Liège ethical board approved this research project.

Tasks and Questionnaires

Interpersonal Intention Task

Stimuli. We constructed a series of video clips depicting EFEs (see Figure 1 for an example of sadness). Specifically, we selected the anger, disgust, sadness, contempt, and joy EFEs of two male and two female Caucasian actors from a series of standardized stimuli (JACFEE; Matsumoto & Ekman, 1988). Morphing software (Morph 4.0, Abrosoft FantaMorph) used the neutral (0% emotional intensity) and "full-blown" EFE (100% emotional intensity) to create 20 continuums (5 emotions x 2 sex of stimulus x 2 actors). This process led to the creation of 100 color images that represented the transition from neutral to full-blown EFE. The video clips incrementally increased the degree of expression in 1% steps. The final video clips were constructed from the first 70 morphing images (i.e., 0% to 70% emotional intensity); each clip lasted 0.97 s.

Insert Figure 1 about here

Dependent variable. Participants assessed the precision with which a personality description matched the person that they viewed in the video clip using a 7-point scale that ranged from -3 (not at all*)* to 3 (very intensely). Participants were asked to imagine meeting and speaking with this person on the street. They evaluated the suitability of the match for all 20 EFEs using 8 personality descriptions (aggressive, gentle, authoritarian, weak, sociable, distant, hostile, and friendly). To decrease the time of the experiment, half of the participants

evaluated the first four adjectives using Actor 1 (e.g., aggressive, gentle, authoritarian, and wimpy with anger female Actor 1) and the second four adjectives using Actor 2 (e.g., sociable, distant, hostile, and friendly with anger female Actor 2); the other half of the participants did the reverse. Thus, each participant viewed 80 video clips followed by a unique adjective (5 emotions x 2 sex of stimulus x 8 adjectives). The experiment was divided into two sessions of 40 video clips each.

The eight adjectives were selected from the Liste d'Adjectifs Bipolaire en Echelle de Likert (L.A.B.E.L.; Gendre, Capel, & Monod, 2002). Each adjective was weighted between -1 and 1 on dimensions of aggressiveness, rejection, dominance, and affiliation (see Table 1). For each of the 10 EFEs, a score was computed for the four dimensions. These scores corresponded to the sum, for each adjective, of the products of the participant's evaluation (between -3 and 3) by the adjective weight. The adjective weights were computed using the functional method developed by Gendre and collaborators (Gendre, Capel, Rossé, & Cappello, 2007).[2]

Insert Table 1 about here

After three practice tests, the 40 EFEs were presented in a random order on an HP Compaq 6710b notebook PC. EFEs were followed by an adjective that stayed on the screen until participants made their evaluations. Participants had the time they wanted to make an evaluation but were not allowed to see the EFE a second time. The experimenter did not look at the participant during the task.

Emotional Contagion Task

Stimuli. The same video clips as those constructed for the interpersonal intention task were used for the emotional contagion task except that they contained the 100 morphed

images (0% to 100% emotional intensity) and each lasted 1.39 s. Five series (anger, disgust, contempt, sadness, and joy) of four video clips (two male actors and two female actors for each emotion) were shown to the participants consecutively. After each 5.54-s series, participants evaluated their emotional states. A fixation cross that was visible for 3 s before the first video clip of each series appeared in the middle of the screen and caught participants' attention. These emotional series were presented in a random order on an HP Compaq 6710b Notebook PC.

Dependent variables. Participants viewed the EFEs and assessed their own feelings using a 7-point scale that ranged from -3 (I felt very negative emotions) to 3 (I felt very positive emotions). After one practice test in which participants saw video clips of faces depicting surprise, the experimenter left the room. Participants assessed their own emotions in a neutral condition before they viewed the video clips.

A webcam (WB-5400 Megapixel USB2 Webcam Live) placed on the top of the laptop computer filmed participants' faces during the task. We selected five video segments from the full video of the participant constructed in relationship to the emotional series. Each segment began 0.5 s before the first actor appeared on screen and lasted until 0.5 s after the fourth actor disappeared from the screen. The entire segment lasted 6.5 s. Four judges (two males and two females) familiar with the different EFE configurations assessed the expressivity of the participants in order to evaluate mimicry. These judges evaluated the facial expressions in each video segment (five per participant) on two 5-point scales of expressivity and arousal, respectively. If the expressivity scale was not null, the judges evaluated expressivity on six additional 5-point scales (anger, contempt, disgust, joy, surprise, and sadness). The intraclass correlation for the expressivity ratings was .89 as scored by the four judges. The videos of one AD-I and two AD-II participants could not be used due to poor video quality.

Young Schemas

Participants completed the French version of the Young Schema Questionnaire Short Form II (YSQ-SII; Young, 1994). This measure contains 75 items that evaluate 15 dysfunctional schemas. Of these schemas, five are associated with the domain of rejection. The present study focused on these schemas. The emotional deprivation schema includes the expectation that others will not adequately meet one's desire for a normal degree of emotional support. The mistrust/abuse schema includes the expectation that others will hurt, abuse, humiliate, cheat, lie, manipulate, or take advantage. The social isolation schema includes the feeling that one is isolated from the rest of the world, different from other people, not part of any community, or some combination therein. The defectiveness/shame schema includes the feeling that one is defective, bad, unwanted, inferior, or invalid in important respects. Finally, the abandonment/instability schema concerns the perceived instability or unreliability of social support and connection. High internal reliability has been previously demonstrated with AD and control groups (Roper, Dickson, Tinwell, Booth, & McGuire, 2010). In the present study, acceptable internal reliabilities (all αs > .80) were found for all three groups.

Interpersonal Relationship Quality

We created a self-evaluation questionnaire to assess the interpersonal relationship quality. The first portion of the questionnaire examines the relationship with the person closest to the participant, and the second portion of the questionnaire evaluates relationships with people in general.[3] In addition to providing general information regarding the "closest person", the former assessment investigates relationship emotions, the quality of emotional communication, support received and provided, as well as the pleasantness of the relationship. The latter assessment evaluates social relationship emotions, the quality of emotional communication, and the ability to establish social relationships. High internal reliabilities were revealed across all three groups for both portions of the questionnaire (all αs > .90), and

acceptable internal reliabilities were shown across all three groups for each subscale (all αs > .80).

Procedure

Participants were seen twice in one week. The interpersonal intention and emotional contagion tasks were not administered on the same day. The different tasks were counterbalanced across participants.

Statistical Analyses

All statistical analyses were conducted using STATISTICA version 10 for Windows (StatSoft, 2011). Repeated-measures ANOVAs compared the three groups with regard to control, demographic, empathy, and interpersonal relationship measures as well as the YSQ-SII. Only the main effect of group and the interaction effect that includes group are presented. In the case of a significant interaction or a main effect that included group, supplementary repeated-measures ANOVAs compared groups to each other. Post-hoc contrast analyses were computed when the results revealed a significant interaction that included group in a supplementary ANOVA comparing one group to another. In a second time, correlational analyses relevant to our hypotheses were conducted.

Results

Control Measures

As shown in Table 2, the three groups were found to be similar in terms of age, education, and BFRT score. For the three significant group effects (BDI, FNE, and average daily alcohol consumption), analyses were computed to compare one group to another. As expected, both AD groups scored higher on depression and evaluative anxiety, and they had higher levels of daily alcohol consumption than controls. No significant difference emerged between AD-Is and AD-IIs with regard to depression or average level of alcohol consumption; however, AD-IIs reported higher levels of evaluative anxiety compared with

AD-Is, $F(1, 42) = 7.46$, $p < .01$, $\eta^2 = .15$. Pearson's chi-squared analysis indicated that the proportion of participants with a first degree relative suffering from alcoholism was higher in ADs than controls, $\chi^2(1) = 11.47$, $p < .001$, but this proportion did not differ between AD-Is and AD-IIs. As expected, compared with AD-IIs, AD-Is reported starting problematic drinking later, fewer previous treatments, and lower levels of alcohol dependence (as measured by the SADQ).

Of all these significant differences, the levels of depression and evaluative anxiety might have influenced the empathy results. In fact, several studies have shown that affective states affect judgment (e.g., Hale, 1998; Joormann & Gotlib, 2006; Niedenthal, Halberstadt, Margolin, & Innes-Ker, 2000; Raes, Hermans, & Williams, 2006). The impact of the alcohol-related measures (i.e., problematic drinking onset, number of previous treatments, and level of alcohol dependence) was not examined because these measures were confounded with other factors concerning the alcoholic subtype concept; thus, this effect was difficult to isolate. Specifically, these differences between AD-Is and AD-IIs for those measures refer to intrinsic population characteristics. Correlational analyses for each group revealed evidence for 40 significant correlations between the BDI score and the intention attribution dependent variables. Of these relationships, 8 were significant for AD-Is, 13 for AD-IIs, and 7 for controls. This proportion (28/120) is significantly higher than chance. As a consequence, complementary analyses including the BDI score as a covariate were performed on the intention attribution dependent variables. Correlational analyses did not find evidence of an association between the FNE score and the empathy dependent variables (intention attribution and emotional contagion) or between the BDI score and the emotional contagion dependent variables.

Insert Table 2 about here

Interpersonal Intention Task

Intention attribution according to emotion and sex of stimulus

To test the hypotheses that ADs (particularly AD-IIs) attribute more intentions of rejection, dominance, and aggressiveness to other people based on their EFEs than controls, a 5 x 2 x 4 x 3 ANOVA, with emotion, sex of stimulus, and intention as within-participant factors and group (AD-Is, AD-IIs, and controls) as the between-participant factor, was conducted on the attribution of interpersonal intentions. An intention x group interaction emerged and was qualified by a sex of stimulus x intention x group interaction as well as an emotion x intention x group interaction. No other interactions involving the factor group emerged. Furthermore, because the BDI score was correlated with the intention attribution dependent variables, analyses of covariances (ANCOVAs) using the BDI score as a covariate were performed. The results from these ANOVAs and ANCOVAs for the three significant interactions are presented below.

Intention x group interaction. This interaction emerged from the ANOVA, $F(6, 195) = 2.53$, $p = .02$, $\eta^2 = .07$. Between-group analyses showed that this interaction was only significant with regard to AD-Is compared with controls, $F(3, 135) = 4.96$, $p < .01$, $\eta^2 = .10$. Post-hoc analyses revealed that AD-Is attributed more intentions of rejection and fewer intentions of affiliation compared with controls, $F(1, 45) = 6.01$, $p = .02$ and $F(1, 45) = 5.73$, $p = .02$, respectively. However, when the BDI score was included in the model as a covariate, the intention x group interaction was no longer significant.

Sex of stimulus x intention x group interaction. This interaction emerged from the ANOVA, $F(6, 195) = 5.48$, $p < .001$, $\eta^2 = .14$. A between-group ANOVA indicated that this interaction was significant with regard to AD-IIs compared with AD-Is, $F(3, 126) = 8.27$, $p < .001$, $\eta^2 = .16$, and AD-IIs compared with controls, $F(3, 129) = 7.75$, $p < .01$, $\eta^2 = .15$. These

interactions remained significant when the BDI score was entered as a covariate. Figure 2 compares AD-Is, AD-IIs, and controls with regard to their attributions of aggressiveness, rejection, dominance, and affiliation for male and female stimuli. As shown in Figure 2, AD-IIs presented a different pattern of intention attribution with regard to sex of stimulus compared with the other groups. In fact, post-hoc analyses revealed that AD-IIs attributed more intentions of rejection, $F(1, 65) = 18.23$, $p < .001$, and fewer intentions of affiliation, $F(1, 65) = 22.52$, $p < .001$, to male EFEs compared with female EFEs, whereas AD-Is and controls did not.

Insert Figure 2 about here

Emotion x intention x group interaction. This interaction emerged from the ANOVA, $F(24, 780) = 2.03$, $p < .01$, $\eta^2 = .06$. Between-group ANOVAs indicated that this interaction was significant when comparing AD-IIs with AD-Is, $F(12, 504) = 3.92$, $p < .001$, $\eta^2 = .09$, and AD-IIs with controls, $F(12, 516) = 1.88$, $p = .04$, $\eta^2 = .04$. As Table 3 shows, AD-Is attributed more intentions of aggressiveness, rejection, dominance, and fewer intentions of affiliation in EFEs of contempt, and more intentions of aggressiveness, rejection, and dominance in EFEs of sadness compared to AD-IIs. AD-IIs tended to attribute more intentions of rejection in EFEs of anger and more intentions of aggressiveness and dominance in EFEs of disgust compared with controls. The inclusion of the BDI score as a covariate in between-group and post-hoc analyses did not affect the results (i.e., they remained either significant or marginally significant).

Insert Table 3 about here

Nuance in intention attribution

To test the hypotheses that AD-Is express fewer nuances and AD-IIs more nuances than controls with regard to intention attributions of facial emotions, we computed the sum of the absolute differences between the most attributed and the least attributed intentions for each emotion. Overall, AD-IIs (M = 63.49, SD = 23.20) were more nuanced than AD-Is (M = 46.12, SD= 24.31), $t(42) = -2.42$, $p = .02$, whereas controls were situated between the AD groups (M = 52.26, SD = 26.36), $t(43) = 1.51$, $p = ns$ and $t(45) = -.83$, $p = ns$, respectively.

Emotional Contagion Task

Expressiveness

To test the hypotheses that ADs express less positive emotions and more negative emotions than controls, a 5 x 8 x 3 ANOVA with stimulus and scale as the within-participant factors and group as the between-participant factor was conducted on the expressiveness score. The results revealed a significant scale x group interaction, $F(14, 434) = 2.68$, $p < .001$, $\eta^2 = .08$. No other significant effect involving the factor group emerged. Between-group analyses indicated that this interaction was significant with regard to AD-Is compared with controls, $F(7, 308) = 3.74$, $p < .001$, $\eta^2 = .08$, and AD-IIs compared with controls, $F(7, 287) = 3.45$, $p < .01$, $\eta^2 = .08$. Because the analyses did not reveal significant differences between AD-Is and AD-IIs, post-hoc analyses compared all ADs to controls. As observed in Table 4, these analyses indicated that ADs expressed less joy, surprise, and arousal but more sadness and contempt than controls.

Insert Table 4 about here

Subjective feelings

Contrary to our hypotheses of higher and lower levels of emotional contagion in AD-IIs and AD-Is compared with controls, respectively, the results regarding subjective feelings did not reveal any significant group effects.

Mimicry

Stimuli were considered to be mimicked when the amount of expressivity of one emotion when facing stimuli of this specific emotion was larger than the amount of expressivity of the same emotion but when facing other stimuli. To reduce the number of comparisons, we computed five 5 x 3 ANOVAs for the expressiveness scores of anger, joy, sadness, disgust, and contempt with expressivity of the specific emotion as the within-participant factor (e.g., the amount of anger expressed when viewing anger, joy, sadness, disgust, and contempt EFEs) and group as the between-participant factor. Only the anger model was significant among the five emotional expressivity x group interactions. Post-hoc analyses indicated that AD-IIs mimicked anger EFEs, $F(1, 62) = 8.94$, $p < .01$. In accord with our hypothesis of a higher level of emotional contagion in AD-IIs compared with controls and AD-Is, AD-IIs mimicked anger EFEs more strongly than AD-Is and controls, $F(1, 62) = 4.72$, $p = .03$ and $F(1, 62) = 6.54$, $p = .01$, respectively.

Young Schemas

Our hypotheses stated that AD-IIs would score higher than AD-Is (who would score higher than controls) on schemas relevant for the attribution of rejection. As Table 5 shows, group comparisons revealed significant effects for the five schemas relevant to this variable. Between-group analyses revealed that AD-IIs scored higher than controls with regard to the five schemas. AD-Is scored higher than controls with regard to the dysfunctional schemas of emotional deprivation and defectiveness/shame. AD-IIs presented more schemas of social isolation and abandonment/instability than AD-Is.

Insert Table 5 about here

Interpersonal Relationship Quality

We hypothesized that ADs would report lower interpersonal relationship qualities compared with controls. However, group comparisons did not reveal significant effects for either the quality of the interpersonal relationship with one's closest person or with people in general. The absence of a difference in the former portion of the questionnaire is probably due to the person chosen (i.e., spouse, friend, or family member). In fact, all control participants chose a sentimental partner, whereas only 39% of AD-Is and 67% of AD-IIs reported having a sentimental relationship.

Correlational tests

Pearson's correlations were conducted on the scores of AD-Is, AD-IIs, and controls separately. The Bonferroni correction corrected for inflated Type-I error rates. Contrary to our hypothesis, no significant correlation emerged between the quality of interpersonal relationships and the empathy dependent variables (i.e., intention attribution and mimicry) in any group. Furthermore, no significant correlation emerged between the schemas relevant for the attribution of rejection, which was also contrary to our prediction for ADs, especially AD-IIs.

Discussion

This study was the first to assess two facets of empathy in two groups of ADs divided according to Cloninger's typology in order to gain insight into their interpersonal problems. This study is also the first to find abnormal emotional expressivity in ADs. Specifically, both AD groups expressed less joy, surprise, and arousal but more sadness and contempt than controls in the emotional contagion task. This lack of perceivable enthusiasm might be a key element that contributes to difficulties in social relationships, such as those in developing

close relationships, breakdowns in intimate relationships, and loneliness (Blanchard & Panzarella, 1998; Brozgold et al., 1998; Feldman, Philippot, & Custrini, 1991; Schachner, Shaver, & Mikulincer, 2005). This inadequate interpersonal behavior seems to be characteristic of all ADs regardless of their subtype. However, our results showed that other impaired interpersonal and empathic behaviors are specific to certain AD subtypes. In fact, many of the results can be interpreted with regard to the emotional and interpersonal functioning of specific AD subtypes.

The results regarding AD-IIs reflect their impulsivity and difficulties with managing anger. First, AD-IIs presented a highly nuanced general pattern of intention attribution as a function of emotion compared with controls and especially compared with AD-Is. This finding was in agreement with our hypothesis. This group difference in terms of nuance is an interesting finding because it mirrors the personality traits and drinking habits of the subtype. This highly nuanced pattern might reflect the impulsivity and the high novelty-seeking personality trait of AD-IIs (Bjork, et al., 2004; Cloninger, Sigvardsson, & Bohman, 1996). Second, AD-IIs mimicked more of the anger stimuli than the other groups. This result is in accord with our hypothesis of enhanced reactivity in AD-IIs but was found only for the emotion of anger. Thus, enhanced reactivity might be present for emotions that AD-IIs are particularly predisposed to feel. In fact, AD-II anger mimicry is concordant with their high level of comorbidity with antisocial personality disorder (Driessen, et al., 1998). Furthermore, past studies have shown a preponderance of anger in ADs and have documented the significance of this emotion in relationship to alcohol consumption and relapse (Bartek, et al., 1999; Pekala, Kumar, Maurer, Elliott-Carter, & Moon, 2009; Tivis, Parsons, & Nixon, 1998; Witkiewitz & Villarroel, 2009). However, these studies did not distinguish ADs according to their subtype.

In the real world, AD-IIs' highly nuanced pattern of intention attribution suggests that these individuals attribute interpersonal intentions in impulsive and Manichean ways. This "all or nothing" evaluation of others' intentions may lead to relationship conflicts in case of the inference of either extremely negative or extremely positive intentions. In fact, disappointment is likely to follow extremely positive first impressions. Conversely, this result suggests that AD-IIs have difficulty with tempering their initial judgments of others when confronted with negative facial expressions. In this case, their intention attributions are probably more negative than the actual intent of their interaction partner. As a result, AD-IIs may experience and express exacerbated angry feelings. Our results, which show a preponderance of anger mimicry in AD-IIs, also support the hypothesis of an exacerbated expression of anger when these individuals are confronted with threatening EFEs. In sum, the highly nuanced pattern of intention attribution combined with enhanced anger mimicry may cause a vicious circle. These behaviors might lead to increased feelings of anger not only in AD-IIs but also in their interaction partners. This effect thereby increases the number of negative facial expressions that AD-IIs confront. The anger of AD-IIs might then reinforce expression and mimicry of anger and the attribution of extreme negative intentions to others, thereby increasing interpersonal conflicts. Our study found that AD-IIs reported more schemas of social isolation and abandonment/instability compared with both AD-Is and controls. This result is also concordant with this model: Because AD-IIs are likely to view numerous negative facial expressions, which are interpreted even more negatively, it stands to reason that they may feel isolated and abandoned. The lack of appropriate attachment described in AD-IIs also plays a role in dysfunctional schemas (McNally, et al., 2003; Patock-Peckham & Morgan-Lopez, 2010; Sher, et al., 1991; Windle & Davies, 1999).

Interpersonal conflicts and the difficulty with managing anger have important clinical implications; in fact, these problems precipitate relapse (Bartek, et al., 1999; Karno &

Longabaugh, 2004; Marlatt, 1996; Witkiewitz & Villarroel, 2009). Thus, our results outline the necessity of anger management techniques as well as the development and maintenance of meaningful and secure interpersonal relationships that constitute important components of therapy (Reilly, Clark, Shopshire, Lewis, & Sorensen, 1994).

Interestingly, AD-IIs evaluated female EFEs differently than male EFEs; specifically, they perceived women as highly affiliative and non-rejecting compared with men. This positive bias towards female stimuli might be related to participants' interpersonal functioning with women and particularly with their wives. In fact, different studies demonstrate that AD-IIs have more marital problems than AD-Is (e.g., marital instability, relationship distress, hostile behaviours, male-to-female physical violence, blame, and lack of trust; Epstein, McCrady, & Hirsch, 1997; Fals-Stewart, Leonard, & Birchler, 2005; Floyd, Cranford, Daugherty, Fitzgerald, & Zucker, 2006; Ichiyama, Zucker, Fitzgerald, & Bingham, 1996; Murphy, O'Farrell, Fals-Stewart, & Feehan, 2001). This apparent contradiction between positive intentions attribution toward women and marital problems may reflect a benevolent sexist attitude. Benevolent sexism is a positive attitude toward women that portrays them as warm but less competent than men. Men with this point of view idealize women and believe that they should be placed on a pedestal, but only if they conform to the traditional roles that men assign them and do not challenge male authority (Glick, Diebold, Bailey-Werner, & Zhu, 1997). The contrast between what women should be and what they truly are may lead to disappointment, arguments, aggression, and violence.

Our results are also consistent with the emotional problems presented by AD-Is; specifically with the high comorbidity with depression in this population (Driessen, et al., 1998; Gilman & Abraham, 2001; Lynskey, 1998). As opposed to AD-IIs and in concordance with our hypothesis, AD-Is showed intention attributions with emotions lacking in nuance that can be viewed as reflecting the absence of energy and the low reactivity described in

people who experience depression. This flat evaluation of others' intentions might also lead to poor social relationships. AD-Is may be perceived as shallow and insipid. These unattractive personality traits may progress to social isolation.

Another potential source of interpersonal problems is illustrated by the fact that AD-Is attributed more intentions of rejection and fewer intentions of affiliation to EFEs compared with controls. Negative judgments of others' intentions may also result in social isolation. The results suggest that these biased intention attributions are perhaps better explained by the presence of a depressive state. The fact that high attributions of rejection and low attributions of affiliation are associated with a high level of depression is not surprising considering the mood-congruent bias found in judgment studies of depressed and healthy individuals (e.g., Hale, 1998; Joormann & Gotlib, 2006; Mandal & Bhattacharya, 1985; Niedenthal, et al., 2000; Raes, et al., 2006; Schiffenbauer, 1974). Depressed individuals are characterized by social withdrawal; thus, they experience few affiliation intentions and many rejection intentions. They will then attribute preferably these intentions to others.

These findings suggest that depression has important implications for the interpersonal functioning of AD-Is. Thus, an important component of therapy is evaluating depression and its impact on judging others' intentions (either through a negative bias in intention attribution or a low-nuanced pattern of intention attribution). Treating depressive symptoms may be a key element of therapy.

Numerous differences between the empathy behaviors of AD-Is and AD-IIs emerged in this study. Our results with regard to intention attribution based on emotion highlight the pertinence of the distinction in typology. In fact, two patterns of results emerged according to the type of emotion. On one hand, AD-IIs tended to evaluate facial expressions of anger and disgust as more aggressive, rejecting, and dominant compared with the other groups (although this difference was non-significant). On the other hand, AD-Is evaluated facial expressions of

sadness and contempt as overaggressive, over-rejecting, over-dominant, and under-affiliative compared with AD-IIs. Although the nature of our task (i.e;, intention attributions) and the distinguishing alcoholic subtypes make our results difficult to compare with previous studies, they are nevertheless in line with those that find problems in the EFE decoding of ADs (Uekermann & Daum, 2008). Furthermore, our results suggest that ADs not only make mistakes when recognizing EFEs but they also anticipate in a biased way the relationship with the person in front of them. The categories of emotions that have not been well recognized in previous EFE decoding studies are inconsistent. The distinction between AD subtypes might reduce this inconsistency.

Contrary to our hypothesis, a significant relationship between the interpersonal intention attributions of rejection and the presence of dysfunctional cognitive schemas related to rejection did not emerge. One possible explanation for this null result is that participants did not feel as if they were the targets of the emotional expression in the interpersonal intention task. In other words, the interactions may not have been sufficiently emotional to activate dysfunctional schemas. The low ecological validity of the interpersonal intention task might explain the absence of an association as well as the small effect sizes of the results from the interpersonal intention task. Moreover, the questionnaire on the quality of interpersonal relationships did not show a significant relationship with any of the empathy dependent variables or a significant between-group difference. This questionnaire did not control for social desirability, which is a problem for ADs (Rychtarik, Tarnowski, & Lawrence, 1989). Because social desirability interference was inevitable in a self-report questionnaire, focusing on the subjective distress that results from social relationships rather than the perceived quality of the relationship itself might have been more reliable. This evaluation also would have been more directly related to the participant's experience. To remedy these problems, future studies should use the Inventory of Interpersonal Problems (IIP; Horowitz, Rosenberg,

Baer, Ureño, & Villaseñor, 1988). The IIP assesses self-perceived distress in interpersonal relationships with scales arranged in a circumflex model in which affiliation and dominance are the primary axes.

Our study has several limitations that should be mentioned. First, as discussed above, the intention attribution task and the questionnaire on interpersonal relationship quality present some limitations. We believe that the absence of a significant group difference on the subjective feelings measure was also due to problems with the present measure. In fact, the impact of social desirability and the difficulty of precise introspection are two major problems that could be remedied with a physiological measure of emotional contagion in future studies. Second, only the caricatural emotion of anger had the potential to lead to perceivable between-group differences with regard to mimicry. Subtle mimicry might not be detected in a judgment study (Cacioppo, Petty, Losch, & Kim, 1986). Nevertheless, a judgment study is ecologically valid because it represents what ADs might perceive in real life and provides insight into aspects of mimicry that could affect social relationships. Third, our participants were matched based on level of education and not socioeconomic status. Furthermore, the sample was homogenous with regard to gender and ethnicity, which limits the generalizability of the results. Finally, the intention attribution and emotional contagion measures were not recorded during the same task, which prevented an investigation of the associations between the different biases and deficits.

In conclusion, this study is the first to investigate ADs' intention attributions and emotional contagion with regard to EFEs and to distinguish, through the investigation of empathy, ADs according to Cloninger's subtypes. Our findings may be important in understanding the interpersonal behaviors of ADs including their aggression, which presents a problem not only for ADs but also for their caregivers, family, and society. In fact, ADs' interpersonal problems are a major cause of relapse (Marlatt, 1996). As suggested previously

(Foisy, et al., 2007), EFE decoding training might be useful for ADs. Group therapeutic programs that target EFE-recognition remediation and, more generally, social cognition, have been developed for psychiatric and neurological clinical conditions (Bornhofen & McDonald, 2008a, 2008b; Combs et al., 2007; Frommann, Streit, & Wolwer, 2003; Golan & Baron-Cohen, 2006; McDonald et al., 2008; Russell, Chu, & Phillips, 2006). In summary, patients gradually learn to identify EFEs. They also learn to anticipate intentions, desires, and behavioral reactions from EFEs. These treatments improve EFE recognition and the capacity to make social inferences. Based on what has been accomplished in other clinical populations, programs that account for the specificity of empathy deficits in ADs (i.e., targeting interpersonal inference, anger management, and emotional expressivity) might reinforce the interpersonal skills that are effective for alcohol-dependent individuals (Eriksen, Bjornstad, & Gotestam, 1986; Miller, Andrews, Wilbourne, & Bennett, 1998).

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Footnotes

[1]Aggressiveness is an action tendency activated in anger that mobilizes resources to hurt, destroy, or overcome the obstacles to goals pursued by the individual and his or her psychological or physical integrity. Rejection is an action tendency present in disgust and can remove, suppress, and negate protective objects. Dominance is characterized by an affirmation toward others that functions to keep general control and is clearly present in pride and arrogance. Affiliation is a positive approach action tendency that denotes attention orientation toward the object as well as behavioral attitudes of approach, distance reduction, and object exploration. Affiliation is present in desire, affection, tenderness, and curious exploration.

[2]The weights correspond to the correlations between the adjective signatures and the dimension signatures. The signature of an item (adjectives or dimensions) or its characteristic vector is its coordinates in the multifactorial space of the personality-description domain, which is delimited by 6 scales (maturity, extraversion, masculinity, conformism, tension, rationality). These scales are considered to be essential for describing and to structuring this domain. The LABEL furnished the signatures for the eight adjectives as well as for the dimension of aggressiveness (Gendre et al., 2002). To compute the signatures for the dimensions of dominance, affiliation, and rejection, we asked four experts to choose 5 adjectives from the 261 that constituted the LABEL to best represent each dimension. The mean of the signature of the 20 adjectives was then calculated in a way as to compute the signature.

[3]This questionnaire is available from the authors.

Table 1

Adjective Weights for the Dimensions of Aggressiveness, Rejection, Dominance, and Affiliation

Adjective	Aggressiveness	Rejection	Dominance	Affiliation
Aggressive	1	0.53	0.67	-0.18
Gentle	-0.81	-0.74	-0.82	0.63
Authoritarian	0.83	0.55	0.81	-0.39
Weak	-0.51	-0.02	-0.74	0.02
Sociable	0.07	-0.64	0.06	0.86
Distant	0.19	0.84	0.08	-0.87
Hostile	0.60	0.75	0.49	-0.41
Friendly	-0.28	-0.86	-0.40	0.97

Table 2

Means, Standard Deviations, and Comparisons between AD-Is, AD-IIs, and Control Participants with Regard to Demographic and Control Measures

	AD-Is (n = 23)	AD-IIs (n = 21)	Controls (n = 24)	*F*	*p*
Age (in years)	46.57 (7.29)	42.95 (7.18)	43.54 (10.18)	.30	ns
Years of education since beginning primary school	12.17 (3.30)	11.14 (2.17)	12.71 (2.99)	1.69	ns
BDI[a]	19.39 (10.06)	20.95 (11.15)	3.67 (4.94)	26.12	< .001
FNE[b]	13.96 (7.27)	19.76 (6.77)	11.79 (8.37)	6.59	< .01
BFRT[c]	45.48 (3.10)	45.40 (4.87)	46.83 (3.56)	1.00	ns
Daily alcohol consumption (glasses)	18.19 (12.56)	23.44 (14.01)	1.46 (1.38)	19.46	< .001
Previous detoxification stays	2.43 (1.88)	6.05 (5.08)		-3.18	< .01
Problematic drinking onset age	36.13 (7.05)	18.81 (4.41)		9.66	< .001
Family history of alcoholism	11/23	13/21	3/24		
SADQ[d]	26.52 (9.42)	33.05 (11.71)		-2.04	< .05

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

[a]Beck Depression Inventory; [b]Fear of Negative Evaluation scale; [c]Benton Facial Recognition Test; [d]Severity of Alcohol Dependence Questionnaire.

Table 3

Means, Standard Deviations, and Comparisons between AD-Is, AD-IIs, and Control Participants with Regard to the Attribution of Interpersonal Intentions for each Emotion

Emotion	Intention	AD-Is (n = 23)	AD-IIs (n = 21)	Controls (n = 24)	AD-Is vs. AD-IIs		AD-IIs vs. Controls	
					F	*p*	*F*	*p*
Anger	Aggressiveness	3.64 (3.76)	5.64 (4.87)	3.53 (5.03)	2.09	ns	2.36	ns
	Rejection	4.04 (4.04)	6.28 (4.36)	3.91 (5.32)	2.57	ns	2.94	< .10
	Dominance	4.04 (3.60)	6.09 (4.72)	4.14 (4.60)	2.45	ns	2.27	ns
	Affiliation	-4.08 (3.76)	-6.17 (3.70)	-4.10 (4.89)	2.74	ns	2.75	ns
Disgust	Aggressiveness	3.81 (4.05)	5.66 (4.19)	3.30 (4.69)	2.01	ns	3.31	< .10
	Rejection	5.63 (4.31)	6.85 (4.73)	4.75 (4.76)	0.77	ns	2.33	ns
	Dominance	4.14 (3.75)	5.92 (3.94)	3.92 (4.21)	2.19	ns	2.82	< .10
	Affiliation	-5.93 (3.83)	-6.70 (4.34)	-5.25 (3.97)	0.40	ns	1.44	ns
Contempt	Aggressiveness	-2.65 (4.62)	-5.65 (3.39)	-4.49 (4.07)	5.98	< .05	0.91	ns
	Rejection	-3.36 (4.82)	-7.06 (4.08)	-5.53 (3.70)	8.40	< .01	1.46	ns
	Dominance	-2.28 (4.24)	-4.75 (3.00)	-3.90 (3.71)	4.86	< .05	0.58	ns

	Affiliation	3.07 (4.19)	6.24 (3.81)	4.94 (3.07)	8.02	< .01	1.38	ns
Sadness	Aggressiveness	-2.71 (3.49)	-5.39 (2.88)	-4.08 (2.92)	8.10	< .01	1.96	ns
	Rejection	-0.71 (3.10)	-2.96 (2.82)	-2.61 (2.82)	6.50	< .05	0.16	ns
	Dominance	-2.26 (3.44)	-4.66 (3.19)	-3.37 (3.14)	5.96	< .05	1.75	ns
	Affiliation	-0.39 (2.90)	1.15 (2.86)	1.29 (3.16)	2.92	< .10	0.02	ns
Joy	Aggressiveness	-4.99 (3.74)	-6.63 (3.18)	-5.57 (3.19)	2.59	ns	1.11	ns
	Rejection	-6.40 (4.47)	-8.38 (3.81)	-7.61 (3.95)	2.56	ns	0.39	ns
	Dominance	-4.22 (3.01)	-5.79 (3.11)	-5.00 (2.77)	3.09	< .10	0.79	ns
	Affiliation	5.75 (3.89)	7.57 (3.78)	7.24 (3.48)	2.62	ns	0.77	ns

Notes. Standard deviations are in parentheses; ns = non-significant; AD-Is were not compared with controls because the emotion x intention x group interaction was not significant.

Table 4

Means, Standard Deviations, and Comparisons between ADs and Control Participants on the Expressiveness Scales

Scale	ADs (n = 44)	Controls (n = 24)	*F*	*p*
Expressiveness	4.27 (2.37)	4.61 (3.67)	0.66	ns
Joy	0.61 (1.13)	2.22 (3.21)	8.52	< .01
Sadness	0.72 (1.04)	0.13 (0.42)	7.06	< .01
Anger	0.71 (1.69)	0.06 (0.13)	3.50	< .10
Disgust	0.41 (0.74)	0.21 (0.32)	1.55	ns
Surprise	0.48 (0.92)	1.27 (1.74)	5.74	< .05
Contempt	0.69 (0.84)	0.32 (0.40)	4.05	< .05
Arousal	8.91 (2.78)	10.68 (3.28)	5.31	< .05

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

Table 5

Means, Standard Deviations, and Comparisons between AD-Is, AD-IIs, and Control Participants on the Schemas Associated with Rejection from the YSQ-SII

	Control means (n = 24)	AD-I means (n = 23)	AD-II means (n = 21)	*F*	*p*
Emotional Deprivation	0.13 (0.34)	0.65 (0.98)	1.10 (1.67)	4.34	< .05
Mistrust/Abuse	0.17 (0.64)	0.61 (0.89)	0.90 (1.22)	3.59	< .05
Social Isolation	0.29 (0.86)	0.61 (1.08)	1.48 (1.60)	5.75	< .01
Defectiveness/Shame	0.00 (0.00)	0.35 (0.78)	0.95 (1.53)	5.56	< .01
Abandonment/Instability	0.33 (1.17)	0.61 (0.89)	1.38 (1.40)	4.80	< .05

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

Figure Captions

Figure 1: An example of a video clip used in the interpersonal intention task. The video clips depict the continuum between a neutral facial expression and an emotional facial expression of 70% of emotional intensity.

Figure 2: The intention attribution means for AD-Is (n = 23), AD-IIs (n = 21), and controls (n = 24) as a function of intention and sex of stimulus.

Figure 1

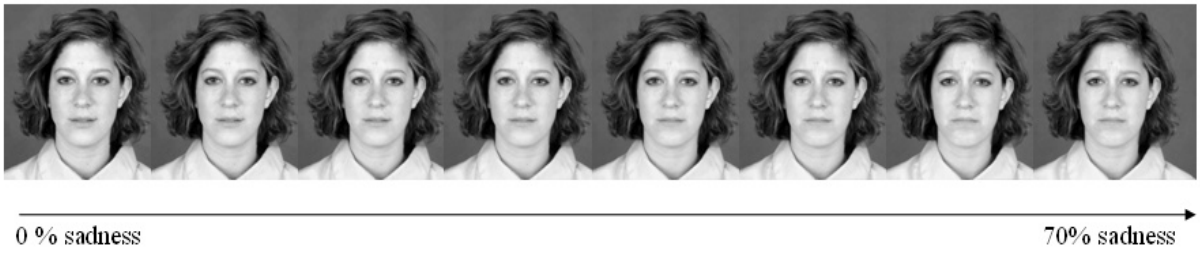
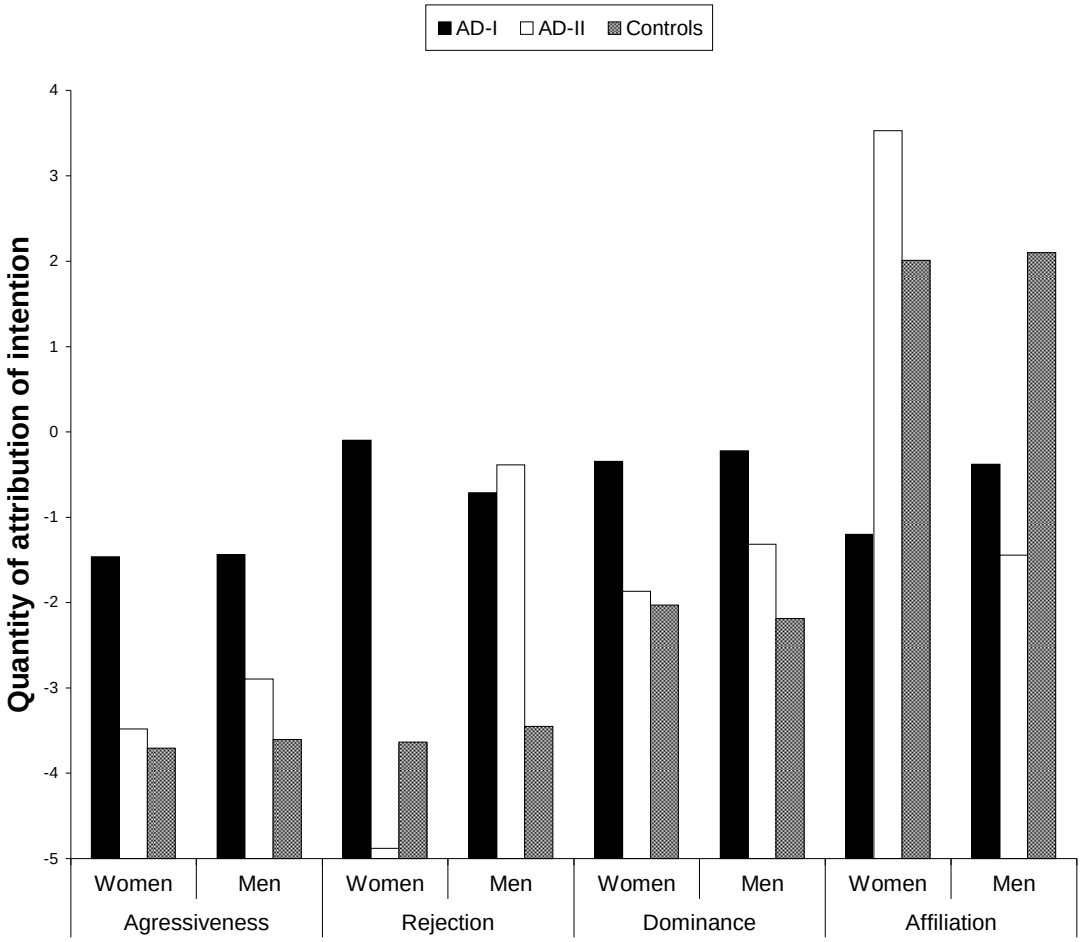


Figure 2


AD-I
AD-II
Controls
Quantity of attribution of intention
4
3
2
1
0
-1
-2
-3
-4
-5
Women
Men
Women
Men
Women
Men
Women
Men
Agressiveness
Rejection
Dominance
Affiliation