When Social Inclusion Is Not Enough: Implicit Expectations of Extreme Inclusion in Borderline Personality Disorder

5 AUTHORS, INCLUDING:

Chiara De Panfilis
Università degli studi di Parma
60 PUBLICATIONS **319** CITATIONS

SEE PROFILE

Paolo Riva
Università degli Studi di Milano-Bicocca
31 PUBLICATIONS **139** CITATIONS

SEE PROFILE

Emanuele Preti
Università degli Studi di Milano-Bicocca
15 PUBLICATIONS **65** CITATIONS

SEE PROFILE

AUTHORS' DRAFT
ACCEPTED FOR PUBLICATION IN *PERSONALITY DISORDERS, THEORY RESEARCH AND TREATMENT* ON 5/5/2015

When social inclusion is not enough:
Implicit expectations of extreme inclusion in Borderline Personality Disorder

Chiara De Panfilis,[1,3] Paolo Riva,[2] Emanuele Preti,[2,3] Chiara Cabrino,[1] Carlo Marchesi[1]

[1] Department of Neuroscience, Unit of Psychiatry, University of Parma, Italy
[2] Department of Psychology, University of Milano-Bicocca, Italy
[3] Personality Disorders Lab, Italy

Correspondence to:
Chiara De Panfilis, M.D.
Università degli Studi di Parma
Dipartimento di Neuroscienze, Unità di Psichiatria
c/o Ospedale Maggiore, pad. 21 Braga
viale A. Gramsci 14, 43126 Parma, Italy
tel +390521033594
fax+390521347047
e-mail: chiara.depanfilis@unipr.it

Abstract

Increasing evidence suggests that individuals with Borderline Personality Disorder (BPD) might feel rejected even when socially included by others. A psychological mechanism accounting for this response bias could be that, objective social inclusion violates BPD patients' underlying implicit needs of "extreme" inclusion. Thus, this study investigated whether, during interpersonal exchanges, BPD patients report more rejection-related negative emotions and less feelings of social connection than controls, unless they are faced with conditions of extreme social inclusion.

Sixty-one BPD patients and sixty-one healthy controls completed a modified *Cyberball* paradigm. They were randomly assigned to a condition of ostracism, social inclusion or over-inclusion (a proxy for extreme social inclusion). They then rated their emotional states and feelings of social connection both immediately and 20 minutes after the game.

BPD patients reported greater levels of negative emotions than controls in both the ostracism and the inclusion conditions, but not when over-included. Further, only for BPD participants was over-inclusion associated with experiencing less negative emotions than the ostracism condition. Yet, BPD patients reported lower feelings of social connection than controls in any experimental situation.

Thus, in BPD, a laboratory condition of "over-inclusion" is associated with a reduction of negative emotions to levels comparable to those of control participants, but not with similar degrees of social connection. These results suggest that for BPD patients even "including contexts" activate feelings of rejection. Their implicit expectations of idealized interpersonal inclusion may nullify the opportunity of experiencing "real" social connection and explain their distorted subjective experiences of rejection.

Key words: borderline personality disorder; *Cyberball*; social exclusion; over-inclusion; idealized expectations of inclusion.

The tendency to readily perceive and overreact to interpersonal rejection is a defining feature of Borderline Personality Disorder (BPD) (American Psychiatric Association, 2013; Gunderson, 2008; Kernberg, 1984). However, research has yet to clarify whether this rejection sensitivity bias in BPD refers to emotional over-reactivity to actual experiences of rejection and/or results from a distorted perception of any social context as rejecting.

Depending on the methods employed, previous studies generally found evidence for both these hypotheses. Among individuals with BPD or high BPD features, events denoting interpersonal rejection or hostility have been associated with increased negative affects (Berenson et al., 2011; Chapman et al., 2014; Sadikaj et al., 2010) and maladaptive coping strategies (Dixon-Gordon et al., 2011). On the other hand, even when faced with cooperative social exchanges, BPD patients show a distorted view of the others as untrustworthy (King-Casas et al., 2008) and react with less positive emotions to perception of warmth in others (Sadikaj et al., 2010), in keeping with clinical perspectives that borderline patients show a hostile, paranoid world view (Kernberg, 1984). However, the diversity of the interpersonal experimental protocols and of the emotional outcomes adopted across studies prevents from drawing firm conclusions from these research findings (Lawrence et al., 2011).

Cyberball is an ecologically valid experimental paradigm that can be adopted to evaluate emotional reactions to both social inclusion and exclusion (Williams et al., 2000). In a classic *Cyberball* game, participants are told that the investigators are interested in the effects of mental visualization on a subsequent task, and that a good way to warm up is to engage in a mental visualization exercise (*Cyberball*). Thus, they are asked to exchange ball throws with two other players ostensibly on-line, who in reality are computer-controlled confederates. This cover story preserves the ecological validity of the experiment and the psychological consequences of unexpected ostracism. Then, the participant is either included, receiving the ball about a third of the time throughout, or ostracized/excluded, receiving the

ball once at the beginning from each computer controlled player and then never again. Extensive research in healthy individuals demonstrated that being ostracized in *Cyberball* causes them to report higher levels of painful feelings and negative emotions immediately after the game (Hartgerink et al., 2014). This strong, automatic, and immediate painful response to ostracism can serve to orient the individual's attention to the ostracism episode for further appraisal (reflexive stage: "detect first, ask questions later"; Williams, 2009). In fact, ostracized participants recover from the ostracism-induced negative emotions to the level of those who were in the inclusion condition within a few minutes (reflective stage). At this point, the appraisal can tell the individual whether the episode is meaningful or not and helps to regulate his/her immediate emotional responses (Williams, 2009).

Yet, studies employing the classic *Cyberball* paradigm among BPD populations report mixed results. Studies that only focused on the exclusion condition reported that BPD patients show lower levels of satisfaction regarding the need for interpersonal acceptance and belonging, but no greater overall negative affect than controls, both at the reflexive and at the reflective stage (Dixon Gordon et al., 2013; Lawrence et al., 2011). Other studies highlight that individuals with BPD, as opposed to controls, exhibit overall higher negative emotions immediately after the game independent of the inclusion and exclusion situations, and even before starting the game (Renneberg et al., 2012; Staebler et al., 2011). Finally, after the inclusion situation patients with BPD report having received the ball less often than controls, suggesting that they show a negative bias for perceived social participation (Staebler et al., 2011).

Taken together, these findings challenge the idea that BPD patients simply exhibit an emotional over-reactivity to actual exclusion. Rather, during social exchanges, patients with BPD seem to react as if they were excluded regardless of objectively including or excluding contexts, thus calling for further inquiry into the underlying mechanisms at work.

A potential way of addressing this issue is by considering the framework of expectancy violation in understanding individuals' responses to social exclusion. Among healthy controls, neural reactions to social exclusion involve an expectancy violation mechanism. When approaching social exchanges, people expect others to follow the "unwritten rule": to include them in a social interaction. The violation of this expectation activates brain areas signaling alarm, conflict, and threats to acceptance (Bolling et al., 2011; Somerville et al., 2006). Consequently, healthy individuals are affected by social exclusion because this condition violates their implicit, underlying expectations of being included by others. This raises the hypothesis that people with BPD react as if they were ostracized even in inclusion scenarios because fair, reciprocal interpersonal exchanges violate their implicit, underlying expectations for extreme social inclusion. In other words, patients with BPD could internally long for a condition of extreme interpersonal inclusion; this could account for their tendency to experience high negative emotions and to feel disconnected from others even when objectively/fairly included in reality.

Therefore, the present study aimed to evaluate this hypothesis using a modified *Cyberball* paradigm with three conditions: ostracism, inclusion, and over-inclusion (i.e., a proxy for a situation of extreme inclusion). We expected that individuals with BPD would experience more painful feelings (i.e., stronger rejection-related negative emotions) and lower degrees of social connection (i.e., less feelings of social closeness) than controls following both the ostracism and the classic inclusion situations. Conversely, in the over-inclusion condition we hypothesized that individuals with BPD would report levels of negative emotions and feelings of social closeness comparable to controls.

METHOD

Sample

5

This study involved 61 patients with BPD and 61 sex and age matched healthy controls (HC) (age range: 18-65 years). BPD participants were recruited among outpatients receiving treatment at an Italian community-based Department of Mental Health. Patients were referred from treating psychiatrists and were included in the study if the BPD diagnosis was confirmed with the Structured Clinical Interview for Axis II Disorders (SCID-II; First et al., 1997; Mazzi et al., 2003). HC were recruited through advertisements in meeting places in the local community that were publicized by the researchers in order to gather a sex and age matched control group. For the clinical group, exclusion criteria were a diagnosis of schizophrenia, other psychotic disorders, active bipolar disorder and substance dependence at the Structured Clinical Interview for DSM-IV-TR Axis I Disorders (SCID-I/P) (First et al, 2002). For the control group, exclusion criteria were endorsing more than 4 BPD positive items at the SCID-II screening questionnaire and scoring higher than the clinical cut-off at the Global Severity Index (GSI) of the Symptom Checklist-90-revised (SCL-90-R) (Derogatis, 1994; Prunas et al., 2012).

Procedure

Baseline assessment

All subjects were asked to participate in an investigation on "mental visualization and individual differences" and gave written informed consent to the study. They then completed a general demographic questionnaire asking about their age, gender, educational level, work, and marital status.

For the clinical group, DSM-IV Axis I and Axis II disorders were evaluated by the SCID-I/P and the SCID-II, two diagnostic interviews that are considered the gold standard for, respectively, clinical disorders and personality disorders and show excellent inter-rater reliability (Lobbestael, Leurgans & Arntz, 2011). Two senior-level residents in psychiatry with extensive training in both measures administered the interviews. Inter-rater reliability on

the SCID-II was evaluated prior to the study's start, using independent ratings on four conjoint interviews from the two raters (mean intraclass correlation coefficient for BPD criterion count=.94; Cohen's κ for a BPD diagnosis=1). For both the SCID-I/P and the SCID-II interviews, during the enrolment time period the raters regularly discussed the scored protocols with senior psychiatrists to prevent drift over time.

Control participants' BPD features and current psychopathology symptoms were evaluated with, respectively, the BPD-subscale of the SCID-II questionnaire and the GSI of the SCL-90-R. The SCID-II questionnaire is a screener that precedes the full SCID-II semi-structured interview. The BPD subscale consists of 15 questions, covering DSM-IV BPD criteria, which ask participants to answer "Yes" or "No" statements with regard to the presence or absence of BPD symptoms. The SCID-II screener BPD subscale has high internal validity (α=.86) as well as a medium correlation between self-rating and ratings by friends (r=.49) and good construct validity (Piedmont et al., 2003). The GSI refers to the mean rating across all items of SCL 90-R and measures the level of overall psychological distress; a T-score ≥63 suggests that the individual is a clinical case (Derogatis, 1994). The internal consistency of GSI in this sample was α=.93.

Following the diagnostic screening, in a separate appointment all participants completed a measure of their current emotional state (the Rejection-related Emotions Scale, RES; Buckley et al., 2004; see description below) and then participated in a modified *Cyberball* experiment.

<u>*Modified Cyberball experiment*</u>

To test the key hypothesis of the study, we adopted a modified version of the classic *Cyberball* paradigm that adds an "over-inclusion" condition to the two classic conditions of the game of ostracism and inclusion (see Leitner et al., 2014; Kawamoto et al., 2012; Van Beest & Williams, 2006; Wesselmann & Williams, 2013; Williams et al., 2000). In the

current study, when over-included the actual participant received the ball about 45% of the total launches, that is, more times than what would be expected in a fair game, in which each player should receive the ball about 33% of times. Specifically, in our over-inclusion condition the two computer-generated players exchanged only two passes between the two of them at the beginning of the game, and then never again. Then, they keep throwing the ball to the actual participant for the rest of the game. In this way, our 45% rate of over-inclusion represents the exact counterpart of the ostracism condition, where the participant usually receives two ball tosses at the beginning of the game, and then never again. This expedient is necessary to convey the impression to the participant that all players in the game can pass the ball to the others, that is, that the conditions of ostracism and over-inclusion are not just due to technical problems with the computer. Participants were randomly assigned to the ostracism (N=42, 34.4%; 20 patients, 22 HC), inclusion (N=42, 34.4%; 21 patients, 21 controls), or over-inclusion (N=38, 31.1%; 20 patients, 18 controls) *Cyberball* conditions.

After completing the task, as a manipulation check, participants rated the percentage of throws (0%–100%) they received during the game. They were then asked to report how excluded ("*I felt excluded*") and ignored ("*I felt ignored*") they felt during the *Cyberball* game. Responses were rated on 10-point scales (ranging from 1=*not at all* to 10=*very much*). The two items were combined in an overall index of feelings of being excluded and ignored (r=.962, p<.001). Higher scores indicate greater feelings of ostracism.

Subjective responses to the modified Cyberball experiment

Rejection-related Emotions were assessed with the RES (Buckley et al., 2004). The scale includes 24 items assessing six clusters of emotions: anger, anxiety, sadness, hurt, rejection, and happiness. Items are rated on a 10-point scale (ranging from 1=*not at all* to 10=*very much*) and are averaged to create an overall index of negative emotions (after reversing happiness scores). Higher scores indicate more rejection-related negative emotions.

Participants completed the RES three times: at baseline (t0: prior to *Cyberball*; Cronbach's α=.88); immediately after the game (t1: reflexive stage; α=.87), and 20 minutes after completing the experiment (t2: reflective stage; α=.88). At t0 and at t2 questions related to how the respondent felt "*right now*", while at t1 all questions related to how she/he felt "*during the Cyberball game*".

Feelings of social connection were assessed with the Inclusion of Other in the Self scale (IOS; Aron et al, 1992), a single-item, pictorial measure of the psychological overlap between the self and the other. Higher scores indicate a higher degree of social connection. Participants completed this scale twice (t1 and t2). At t1 they were asked to indicate how close they felt with the two other players based on how they felt "*during the Cyberball game*"; at t2, they reported on their degree of social closeness based on how they were feeling "*right now*".

Debriefing

After completion of the experiment, all study participants received detailed information about the study and its purposes, and had the opportunity to have their data deleted should they wish so. Subjects were not reimbursed for study participation. The Local Ethical Authority approved the study protocol.

Statistical analyses

The clinical and control groups were compared in terms of gender distribution, educational level (% with high school degree or less *vs* college/university degree or more), work status (% unemployed) and marital status (% currently involved in a relationship) using χ^2 with Fisher's exact test. Age differences were evaluated using Student's t test for independent samples. Descriptive statistics were performed to detail DSM-IV Axis I/II rates and GAF score in the clinical sample as well as GSI score and number of BPD positive items at the SCID-II screener in the control group.

To test whether the *Cyberball* experimental manipulation was successful, a 2 (Group: BDP vs. HC) X 3 (Experimental Conditions: ostracism vs. inclusion vs. over-inclusion) factorial MANOVA was performed with the post-*Cyberball* (t1) ratings of percentages of ball tosses received and feelings of being excluded/ignored as dependent variables.

Finally, two mixed-model repeated measures ANOVA were conducted, respectively with RES and IOS scores as the dependent variables, to examine how rejection-related emotions and feelings of social connection were influenced by the clinical status, experimental situation, and time [RES: 2 (Group) X 3 (Condition) X 3 (Time: t0, pre-Cyberball; t1, reflexive stage; t2, reflective stage); IOS: 2 (Group) X 3 (Condition) X 2 (Time: t1 and t2)]. For all the models examined, multivariate tests were performed when the assumption of sphericity was violated (Mauchly's test). Simple effects analyses with Bonferroni's correction for multiple comparisons were used to evaluate significant main and interaction effects.

RESULTS

Sample characteristics

BPD and HC did not differ in terms of age (40.2±11 y.o. *vs* 37.6±12; t_{120}=1.2, *p*=.20) nor gender distribution (respectively, 47 females, 77% *vs* 43 females, 70.5%; χ^2_1=.68, *p*=.30). BPD patients were more likely than controls to be unemployed (28.8% vs 5%; χ^2_1=10.7, *p*=.001) and less likely to have a college/university level of education (14.8% vs 42.6%; χ^2_1=11.6, *p*=.001) and to be currently involved in a relationship (28% vs 44%; χ^2_1=8.6, *p*=.006). Rates of DSM-IV Axis I/II comorbidity in the clinical sample are reported in *Table 1*. Patients' current score on the Global Assessment of Functioning scale was 54.9±7.8. For the control group, the mean number of positive items on the BPD section of the SCID-II screener was 1.49±1.3, and the mean GSI score was .36±.3.

[TABLE 1 HERE]

Manipulation check

There was a significant effect of the experimental Condition at t1 on participants' ratings of percentage of throws received ($F_{2,115}$=129.5, p<.001, $\eta^2_{partial}$=.69) and feelings of being ignored and excluded ($F_{2,115}$=38.1, p<.001, $\eta^2_{partial}$=.4). Percentage of throws differed as expected across all of the three experimental conditions (over-inclusion 47.1±17.1, > inclusion 30.9±10.4, > ostracism 4.5±4.8; p<.001), while combined ratings of feelings ignored and excluded were higher in the ostracism condition (5.8±3.5) as compared to both the inclusion (2.1±2.2) and over-inclusion (1.4±1) situations (p<.001) but did not differ between the inclusion and the over-inclusion conditions (p=.50). This indicates that the *Cyberball* manipulation was successful in conveying different degrees of inclusionary status, from over-inclusion to inclusion to ostracism. There was no significant effect of Group (respectively, $F_{1,115}$=.1, p=.71, $\eta^2_{partial}$=.001 and $F_{1,115}$=1, p=.31, $\eta^2_{partial}$=.009,) or Group by Condition interaction (respectively, $F_{2,115}$=.09, $\eta^2_{partial}$=.002, p=.91 and $F_{2,115}$=.9 p=.39, $\eta^2_{partial}$=.02). This indicates that both HC and BPD participants were equally cognitively aware of their inclusionary status during the game as a function of the experimental condition.

Rejection-related Emotions

For RES total score we found a significant main effect of Time, Condition and the Time by Condition interaction, indicating that in both groups the pattern of change over time differed across the ostracism ($F_{2,107}$=9.5, p<.001, $\eta^2_{partial}$=.15), inclusion ($F_{2,107}$=6.8, p=.002, $\eta^2_{partial}$=.11), and over-inclusion ($F_{2,107}$=12.7, p<.001, $\eta^2_{partial}$=.18) conditions. As expected, for ostracized participants negative emotions increased from t0 to t1 (p=.03) and then decreased from t1 to t2 (p<.001), while for those who were included and over-included negative emotions decreased from t0 to t1 (p=.02; p<.001) and did not vary from t1 to t2 (p=1) (*Table 2*).

[TABLE 2 HERE]

However, there was also a significant main effect of Group, which was qualified by significant Group by Condition and Group by Time interactions (*Table 2*). The Group by Condition interaction indicates that the difference in negative emotions between BPDs and HC varied across the three diverse experimental conditions (effect of Group within the Group X Condition interaction): BPDs reported higher levels of negative emotions than HC in both the ostracism ($F_{1,108}$=19.8, *p*<.001, $\eta^2_{partial}$=.15) and inclusion ($F_{1,108}$=14.9, *p*<.001, $\eta^2_{partial}$=.12) situations, but not in the over-inclusion condition ($F_{1,108=}$.93, *p*=.28, $\eta^2_{partial}$=.01) (*Table 2*; *Figure 1, Panel A*). In addition, the emotional reactions to the three diverse experimental situations varied between the two groups (effect of Condition within the Group X Condition interaction: HC: F=3.58, *p*=.03, $\eta^2_{partial}$=.06; BPDs: F=12.66, *p*<.001, $\eta^2_{partial}$=.19). Whilst among HC significant differences in overall RES scores were found only between the ostracism and the inclusion conditions (*p*=.03), BPDs reported lower RES scores in the over-inclusion condition as compared to ostracism (*p*<.001). Exploratory analyses were conducted to evaluate the individual types of emotions contributing to these effects. The Group by Condition interaction was significant only for feelings of anxiety ($F_{2,106}$=3.36, *p*=.04, $\eta^2_{partial}$=.06) (*Figure 1, Panel B*). Although BPD patients experienced greater anxiety than HC both when they were ostracized (*p*<.001) and included (*p*=.01), they reported anxiety levels similar to HC in the over-inclusion condition (*p*=.52). Further, only BPDs reported lower feelings of anxiety in the over-inclusion condition than when ostracized (*p*<.001). Crucially, these results suggest that for BPD patients only an experience of over-inclusion might be associated with levels of negative emotions - specifically, feelings of anxiety - comparable to those of healthy participants. In addition, only for BPDs is over-inclusion associated with lower levels of negative emotions than the ostracism condition.

[FIGURE 1 HERE]

Finally, the Group by Time interaction indicates that negative emotions developed differently over time in BPD patients ($F_{2,107}=3.93$, $p=.02$, $\eta^2_{partial}=.07$) and HC ($F_{2,107}=11.6$, $p<.001$, $\eta^2_{partial}=.18$), regardless of the experimental conditions. Exploratory analyses preformed on the diverse types of individual emotions showed that this interaction effect was driven by a diverse development over time −in the two groups− of sad and happy feelings (respectively, $F_{2,212}=3.3$, $p=.04$, $\eta^2_{partial}=.03$; $F_{2,107}=4.5$, $p=.01$, $\eta^2_{partial}=.08$). As can be seen in *Figure 2, Panel A*, sadness decreased right after the *Cyberball* experience in BPDs, but increased thereafter ($F_{2,105}=3.1$, $p=.05$, $\eta^2_{partial}=.06$), while did not vary over time among HC ($F_{2,105}=.8$, $p=.45$, $\eta^2_{partial}=.01$) (effect of Time within the Group X Time interaction). Thus, while BPDs reported more feelings of sadness than controls both at t0 ($F_{1,106}=28.6$, $p<.001$, $\eta^2_{partial}=.21$) and at t2 ($F_{1,106}=15.2$, $p<.001$, $\eta^2_{partial}=.12$), this between groups difference disappeared immediately after the experiment ($F_{1,106}=3.3$, $p=.07$, $\eta^2_{partial}=.03$) (effect of Group within the Group X Time interaction). Similarly, the variation of, happiness over time showed a different pattern in BPDs and HC (respectively, $F_{2,107}=18.1$, $p<.001$, $\eta^2_{partial}=.25$; $F_{2,107}=39.7$, $p<.001$, $\eta^2_{partial}=.43$). While happy feelings increased right after the game for both BPD patients ($p<.001$) and HC ($p<.001$), from t1 to t2 HC experienced a further increase in happiness ($p=.003$) but BPD patients did not ($p=1$) (effect of Time within the Group X Time interaction) (*Figure 2, Panel B*). These results indicate that the simple experience of participating in a social exchange game can decrease sadness and increase happy feelings in BPD, but only in the short run.

Feelings of social connection

For IOS scores, results showed a significant effect of Time, Condition, and the Time by Condition interaction, indicating that in both groups feelings of social connection developed differently over time across the three experimental conditions. As expected, IOS scores increased from t1 to t2 following the ostracism condition ($F_{1,116}=31$, $p<.001$,

13

$\eta^2_{partial}$=.21) but did not change following the inclusion and over-inclusion conditions (respectively, $F_{1,116}$=.93, $\eta^2_{partial}$=.01, p=.34; $F_{1,116}$=.22, $\eta^2_{partial}$=.00, p=.64) (*Table 2*).

However, there was also a strong main effect of Group, with no significant Group by Time or Group by Condition interactions (*Table 2*), indicating that, overall, BPDs reported less feelings of social connection than HC across the three experimental conditions and the two evaluation times. Thus, BPD patients' perceptions of social connection are always inferior to those of the control participants, irrespectively of their specific inclusionary status.

DISCUSSION

This study used a laboratory paradigm to induce a condition of over-inclusion, in addition to the classic conditions of ostracism and inclusion, to evaluate the hypothesis that BPD patients would report higher levels of rejection-related emotions and lower feelings of social connection than controls both when excluded and when fairly included, but not when faced with a condition of extreme social inclusion.

The results partially supported this hypothesis. Specifically, two main findings emerged.

Firstly, BPD patients exhibited higher levels of negative emotions and lower feelings of social connection than controls, not only when ostracized, but also in the inclusion condition. Thus, BPD patients express significant distress even when fairly included by others.

Secondly, BPD patients reported levels of negative emotions (and specifically anxiety) comparable to those of controls only when over-included. This suggests that their heightened painful feelings during both rejecting and reciprocally including interpersonal exchanges can be decreased only when their interaction partners demonstrate an "over-including" attitude toward them, at the expenses of fair play. This could indicate that individuals with BPD have

a higher threshold for perceiving social inclusion. However, contrary to the study hypothesis, over-included BPD patients still felt more socially disconnected than over-included controls. Thus, for BPD patients even a condition of extreme interpersonal inclusion is unlikely to make them perceive a degree of social closeness comparable to controls.

Overall, this pattern of results indicates that borderline patients are not simply hypersensitive to actual rejection: in BPD rejection-related emotions and feelings of social disconnection can be activated even in objectively including situations. These findings are in keeping with previous reports that individuals with BPD, as compared to controls, experience heightened negative emotions in any social scenario (Renneberg et al., 2012), feel excluded even when objectively included (Staebler et al., 2011), and respond with less positive emotions to others' agreeable behavior (Sadikaj et al., 2010). These data suggest that borderline patients are biased to react as if they were rejected even following objective interpersonal inclusion, which is similar to what was previously found among individuals with high rejection sensitivity and low self-esteem (Buckley et al., 2004; Leary & Guadagno, 2011). Thus, from the perspective of interpersonal self-regulation BPD patients are unable to benefit from mutually rewarding interpersonal exchanges to regulate their emotions and feelings of social closeness.

To our knowledge, this is the first investigation applying a modified *Cyberball* paradigm with an over-inclusion condition to elucidate such response bias in BPD. The increased emotional distress experienced by borderline patients, as compared with non-clinical controls, during both ostracism and fair inclusion was diminished only by a laboratory condition of extreme inclusion. In addition, only for BPDs being over-included resulted in lower negative emotions than the ostracism condition. This supports the study hypothesis that BPD patients have different social expectations than controls. Prior research in non-clinical subjects showed that over-inclusion does not give rise to a corresponding greater increase in

positive emotions than simple inclusion, possibly because it violates individuals' expectations for fair levels of inclusion (Kawamoto et al., 2012; van Beest & Williams, 2006; Williams, 2000). In line with this, in our HC sample significant differences in emotional reactions were detected only between the ostracism and inclusion condition. Conversely, BPD patients seemed to perceive over-inclusion as "the norm"− i.e., as the situation that was associated with lower painful feelings than ostracism, and that made them report levels of negative emotions comparable to non-clinical subjects. This suggests that, under such circumstances, they felt that their implicit expectations of inclusion were more satisfied in the over-inclusion than in the fair inclusion situation. Consistent with object relations theory (Kernberg et al., 1984), this response pattern may indicate that "normal" interpersonal inclusion does not sufficiently fulfil the patient's unconscious idealized need for interpersonal belonging. According to this view, BPD patients often show polarized, distorted representations of self (as abandoned/rejected) and others (as malevolent/excluding). This overt paranoid stance, though, results from the projection of one's own negative affect into the others, which serves to defend corresponding split-off idealized internal representations of the self as perfectly nurtured, and of the others as perfectly caring. This attempt to protect such idealized hope to belong ultimately prevents BPD patients from experiencing actual social connection in real life. In other words, individuals with BPD find it hard −and painful− to acknowledge their connection with others during ordinary interpersonal exchanges, as this would mean relinquishing their unconscious hope of a "perfect" relationship (Yeomans et al., 2015; Clarkin & De Panfilis, 2013). Accordingly, the results of this study suggest that BPD patients react with greater painful emotions than controls to fair inclusion because such condition violates their implicit expectations of extreme inclusion. These findings may also help clarify some aspects of BPD interpersonal dysfunctions. Borderline patients typically develop the feeling that others mistreat them. Thus, they desperately search for someone who can

eventually compensate them for the care they feel is missing. When this happens, they might evoke rescuing and "over-accepting" attitudes in their partners, whom they at first idealize as "saviors" (Gunderson, 2008, p. 27). The decrease in negative emotions that was associated, in this study, with the over-inclusion condition might reflect BPD patients' affective over-involvement in such types of interpersonal exchanges. However, these exclusive and intense relationships soon fail because of the patient's unrealistically high expectations of having their needs met. Then, this further validates patients' perception of mistreatment and abandonment (Gunderson, 2008). Consistently, in this study, BPD patients felt more socially disconnected than controls even when over-included. This could indicate that even high levels of actual social inclusion do not perfectly match BPD individuals' implicit idealized expectations of interpersonal inclusion. In turn, this may contribute to perpetuate the vicious cycle of unsustainable and short-lived relationships that characterizes BPD "disturbed relatedness".

An additional finding of this study is that, regardless of the experimental situation, sadness decreased and happiness increased in BPD immediately after *Cyberball*. Renneberg and colleagues (2012) also reported that, unlike controls, BPD patients' sadness decreased immediately after the game, suggesting that social participation may reduce sad feelings in BPD. Yet, our study shows that this "beneficial" effect of the *Cyberball* game on increasing happiness and decreasing sadness among individuals for BPD does not last long, as it vanishes a few minutes after the game is over, at which point borderline patients return to exhibiting higher sadness levels than controls, and do not experience a further increase in happiness as controls do. Importantly, in both studies borderline patients reported more feelings of sadness (and greater overall negative emotions) than controls did even before the game started. One can speculate that for BPD patients this short-term increase in positive affect signifies their satisfaction at participating in a social interaction, even if virtual. This

could possibly reflect their inner need and hope to belong and to be involved in interpersonal exchanges, which they perceive as unmet in ordinary life but are temporarily fulfilled during the game. Though they then become dissatisfied again, shortly after the *Cyberball* experience. Thus, this change in negative emotions level according to the temporal stage of social participation deserves further inquiry.

Limitations of this study include the use of a community control group screened via self-report questionnaires only, and the lack of a clinical control group. Since all BPD patients in this sample were receiving some kind of psycho-pharmacotherapy, the potential confounding effect of medications on task performance could not be controlled for. Further, this study employed only self-report measures of social connection and emotional states, and did not investigate behavioral reactions (e.g., aggression, withdrawal, ingratiation) to the three *Cyberball* conditions. Importantly, the study's conclusions, that BPD patients' rejection-related emotions and feelings of social disconnection results from the violation of implicit expectations of extreme social inclusion, are based only on participants' subjective responses to the modified *Cyberball* experiment. While our over-inclusion manipulation can be regarded as a first attempt to address this issue, these results need replication before concluding that an expectancy violation mechanism fully accounts for the observed pattern of results. For instance, BPD patients might be hyper-vigilant toward minor cues of rejection, and therefore might be pleasantly surprised –and thus report lesser negative affects– in "unambiguous" conditions of inclusion. Thus, future studies should test the proposed hypothesis using different manipulations or measures of subjects' expectancies and desires for interpersonal acceptance. Finally, while this study recruited one of the largest samples of BPD patients among *Cyberball* studies, the limited number of subjects per cell might have impeded the detection of small effect sizes as being significant. Future studies with higher statistical power could probe other expected effects as significant.

In conclusion, the results of this study support the view that BPD patients' interactions with others are organized around an underlying need of extreme, idealized interpersonal inclusion. This makes them experience real inclusion conditions as painful and rejecting. If confirmed, these findings can help explain why supportive and validating treatments are of limited value in BPD: the violation of the internal implicit expectations of idealized inclusion would prevail over actual situations of interpersonal connection. Rather, borderline patients could benefit from interventions (i.e., Yeomans et al., 2015) addressing their systematic and defensive distortion of neutral and benign interpersonal exchanges into subjective experiences of rejection.

References

Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of Other in the Self Scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology, 63*, 596-612.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Publishing.

Berenson, K.R., Downey, G., Rafaeli, E., Coifman, K.G., Leventahal Paquin, N. (2011). The rejection-rage contingency in borderline personality disorder. *Journal of Abnormal Psychology, 120*, 681-690..

Bolling, D. Z., Pitskel, N. B., Deen, B., Crowley, M. J., McPartland, J. C., Mayes, L. C., Pelphrey, K. A. (2011). Dissociable brain mechanisms for processing social exclusion and rule violation. *Neuroimage, 54*, 2462-2471.

Buckley, K. E., Winkel, R. E., & Leary, M. R. (2004). Reactions to acceptance and rejection: Effects of level and sequence of relational evaluation. *Journal of Experimental Social Psychology, 40*, 14-28.

Chapman AL, Walters, K.N., & Dixon Gordon, K.L. (2014). Emotional reactivity to social rejection and negative evaluation among persons with borderline personality features. *Journal of Personality Disorders, 28*, 720-733.

Clarkin, J. F., & De Panfilis, C. (2013). Developing conceptualization of Borderline Personality Disorder. *The Journal of Nervous and Mental Disease, 201*, 88-93.

Derogatis, L.R. (1994). *Symptom Checklist-90-R: Administration, scoring, and procedures manual* (3rd ed.). Minneapolis, MN: National Computer Systems.

Dixon-Gordon, K.L., Chapman, A.L., Lovasz, N., Walters, K. (2011). Too upset to think: the interplay of borderline personality features, negative emotions, and social problem solving in the laboratory. *Personality Disorders: Theory, Research, and Treatment, 2*, 243-260.

Dixon-Gordon, K.L., Gratz, K.L., breetz, A., Tull, M. (2013). A laboratory based examination of responses to social rejection in borderline personality disorder: the mediating role of emotion dysregulation. *Journal of Personality Disorder, 27*, 157-171.

First, M. B., Spitzer, R. L., Gibbon, M., Williams, J. B. W. (2002). *Structured Clinical Interview for DSM-IV-TR Axis-I Disorders, Research version, Patient Edition (SCID-*

I/P-RV). New York: Biometrics Research Department, New York State Psychiatric Institute, November 2002 Revision; Web Site http://www.scid4.org (Italian translation by Perrone R).

First, M. B., Spitzer, R. L., Gibbon, M., Williams, J.B.W. (1997). *Structured Clinical Interview for DSM-IV Personality Disorders, (SCID-II).* Washington, DC: American Psychiatric Press Inc.

Gunderson, J. G. (2008). Borderline Personality Disorder, 2nd Edition: A Clinical Guide. American Psychiatric Publishing.

Hartgerink, C. H. J., van Beest, I., Wicherts, J. M., & Williams, K. D. (2014). Ordinal effects of ostracism: A meta-analysis of Cyberball studies. Unpublished Manuscript. Tilburg University. Retrieved from https://osf.io/ht25n/

Kawamoto, T., Onoda, K., Nakashima, K. I., Nittono, H., Yamaguchi, S., & Ura, M. (2012). Is dorsal anterior cingulate cortex activation in response to social exclusion due to expectancy violation? An fMRI study. *Frontiers in Evolutionary Neuroscience, 4*, 1-10.

Kernberg, O. F. (1984). *Severe personality disorders.* New Haven: Yale University Press.

King-Casas, B., Sharp, C., Lomax-Bream, L., Lohrenz, T., Fonagy, P., Montague, P.R. (2008). The rupture and repair of cooperation in borderline personality disorder. *Science, 321*, 806-809.

Lawrence, K.A., Chanen, A.M., & Allen J.S. (2011). The effect of ostracism upon mood in youth with borderline personality disorder. *Journal of Personality Disorders, 25*, 702-714.

Leary, M. R., & Guadagno, J. The sociometer, self-esteem and the regulation of interpersonal. In Vohs, K. D., & Baumeister, R. F. (Eds) *Handbook of Self-regulation* (2nd edition, Chapter 18). New York, NY: Guilford Press, 2011.

Leitner, J. B., Hehman, E., Deegan, M. P., & Jones, J. M. (2014). Adaptive Disengagement Buffers Self-Esteem From Negative Social Feedback. *Personality and Social Psychology Bulletin*, doi: 0146167214549319.

Lobbestael, J., Leurgans, M., & Arntz, A. (2011). Inter-Rater reliability of the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) and Axis II Disorders (SCID-II). *Clinical Psychology and Psychotherapy, 18*, 75-79.

Mazzi, F., Morosini, P., De Girolamo, G., Guaraldi, G. P. (2003). *SCID-II - Structured Clinical Interview for DSM-IV Axis II Personality Disorders, Italian Version.* Firenze: Organizzazioni Speciali.

Piedmont, R.L., Sherman, M.F., Sherman, N.C., & Williams, J. E. G. (2003). A first look at the Structured Clinical Interview for DSM-IV Personality Disorders Screening Questionnaire: More than just a screener. *Measurement & Evaluation in Counseling & Development, 36*, 150-160.

Prunas, A., Sarno, I., Preti, E., Madeddu, F., Perugini, M. (2011). Psychometric properties of the Italian version of the SCL-90-R: A study on a large community sample. *European Psychiatry, 27*, 591-597.doi:10.1016/j.eurpsy.2010.12.006.

Renneberg B, Herm K, Hahn A, Staebler K, Lammers CH, Roepke S. (2011) Perception of social participation in borderline personality disorder. *Clinical Psychology Psychotherapy, 19*, 473-480.

Sadikaj, G., Russel, J.J., Moskowitz, D.S., Paris, J. (2010). Affect dysregulation in individuals with borderline personality disorder: persistence and interpersonal triggers. *Journal of Personality Assessment, 92,* 490-500.

Somerville, L.H., Heatherton, T.F., & Kelley, W.M. (2006). Anterior cingulated cortex responds differentially to expectancy violation and social rejection. *Nature Neuroscience 9,* 1007-1008.

Staebler, K., Renneberg, B., Stopsack, M., Fiedler, P., Weiler, M., Roepke, S. (2011). Facial emotional expression in reaction to social exclusion in borderline personality disorder. *Psychological Medicine, 41,* 1929-38.

Van Beest, I., & Williams, K. D. (2006). When inclusion costs and ostracism pays, ostracism still hurts. *Journal of Personality and Social Psychology, 91*, 918.

Wesselmann, E. D., & Williams, K. D. (2013). A Commentary on "Cyberball: A Reasonable Paradigm for Studying Ostracism in Developmental Science?". *International Journal of Developmental Science, 7*, 57-63.

Williams, K. D., Cheung, C. K., & Choi, W. (2000). Cyberostracism: effects of being ignored over the internet. *Journal of Personality and Social Psychology, 79,* 748-762.

Williams, K.S., Yeager, D.S., Cheung, C.K.T., & Choi, W. (2012). Cyberball*Cyberball* (version 4.0) [Software]. Available from https://cyberball*Cyberball*.wikispaces.com.

Yeomans, F. E., Clarkin, J. F., & Kernberg, O. F. (2015). *Transference-Focused Psychotherapy for Borderline Personality Disorder. A clinical guide.* Washington, DC: American Psychiatric Publishing.

Table 1. DSM-IV Axis I and II comorbidity in the BPD sample.

	Frequency (N)	%
Any Comorbid Axis I Disorder	37	60.7
Mood Disorders	22	36
Eating Disorders	11	18
Anxiety Disorders	3	4.9
Adjustment Disorder	2	3.3
Any Comorbid Axis II Disorder	27	44.3
Passive-Aggressive	10	16.4
Histrionic	6	9.8
Depressive	6	9.8
Narcissistic	5	8.2
Avoidant	3	4.9
Dependent	3	4.9
Obsessive-Compulsive	3	4.9
Not otherwise specified	6	9.8

Table 2. Effect of time, experimental condition, group status and their interactions on emotional states and feelings of social connection.

	Ostracism		Inclusion		Over-inclusion		Time	Condition	Group	Interactions
	BPD	HC	BPD	HC	BPD	HC				
RES scores							$F_{2,107}=12.35*$ $\eta^2_{partial}=.19$ $p<.001$	$F_{2,108}=13.2$ $\eta^2_{partial}=.20$ $p<.001$	$F_{1,108}=28.8$ $\eta^2_{partial}=.21$ $p<.001$	TimeXCondition $F_{4,216}=7.5$ $\eta^2_{partial}=.12,$ $p<.001$
t0	4.5±1	3.1±.4	4.1±1	3.2±.9	3.8±1.1	3.7±1.8				GroupXCondition $F_{2,108}=3.0$ $\eta^2_{partial}=.05,$ $p=.05$
t1	4.8±1.9	4±1.7	3.3±1	2.2±.7	2.6±.9	2.5±.6				TimeXGroup $F_{2,107}=3.5$ $\eta^2_{partial}=.06,$ $p=.03$
t2	4.6±1.9	2.9±1.1	3.5±1.5	2.2±.6	2.9±.9	2.3±.3				
IOS scores							$F_{1,116}=5.4,$ $\eta^2_{partial}=.04,$ $p=.02$	$F_{2,116}=16.7$ $\eta^2_{partial}=.22,$ $p<.001$	$F_{1,116}=10.8$ $\eta^2_{partial}=.08,$ $p<.001$	TimeXCondition $F_{2,116}=13.1$ $\eta^2_{partial}=.18,$ $p<.001$
t1	1.8±1.3	1.9±1.3	3.3±2	4.4±1.7	3.6±2.1	5.3±1.2				GroupXCondition $F_{2,116}=2.7$ $\eta^2_{partial}=.04,$ $p=.07$
t2	3.1±2	3.1±1.8	3.1±2	4.2±1.5	3.6±1.9	5.1±.9				TimeXGroup $F_{1,116}=0.4$ $\eta^2_{partial}=.00,$ $p=.62$

Note: BPD=patients with borderline personality disorder; HC=healthy controls. RES: total score on the Rejection related Emotions Scale. IOS: total score on the Inclusion of the Other in the Self Scale. t0=Baseline (Pre-*Cyberball*); t1=reflexive stage (immediately after *Cyberball*); t2=reflective stage (20 minutes after *Cyberball*). *Mauchly's test indicated that the assumption of sphericity had been violated for the main effect of time, $\chi^2 (2)=16.1$, $p<.001$, therefore multivariate test are reported.
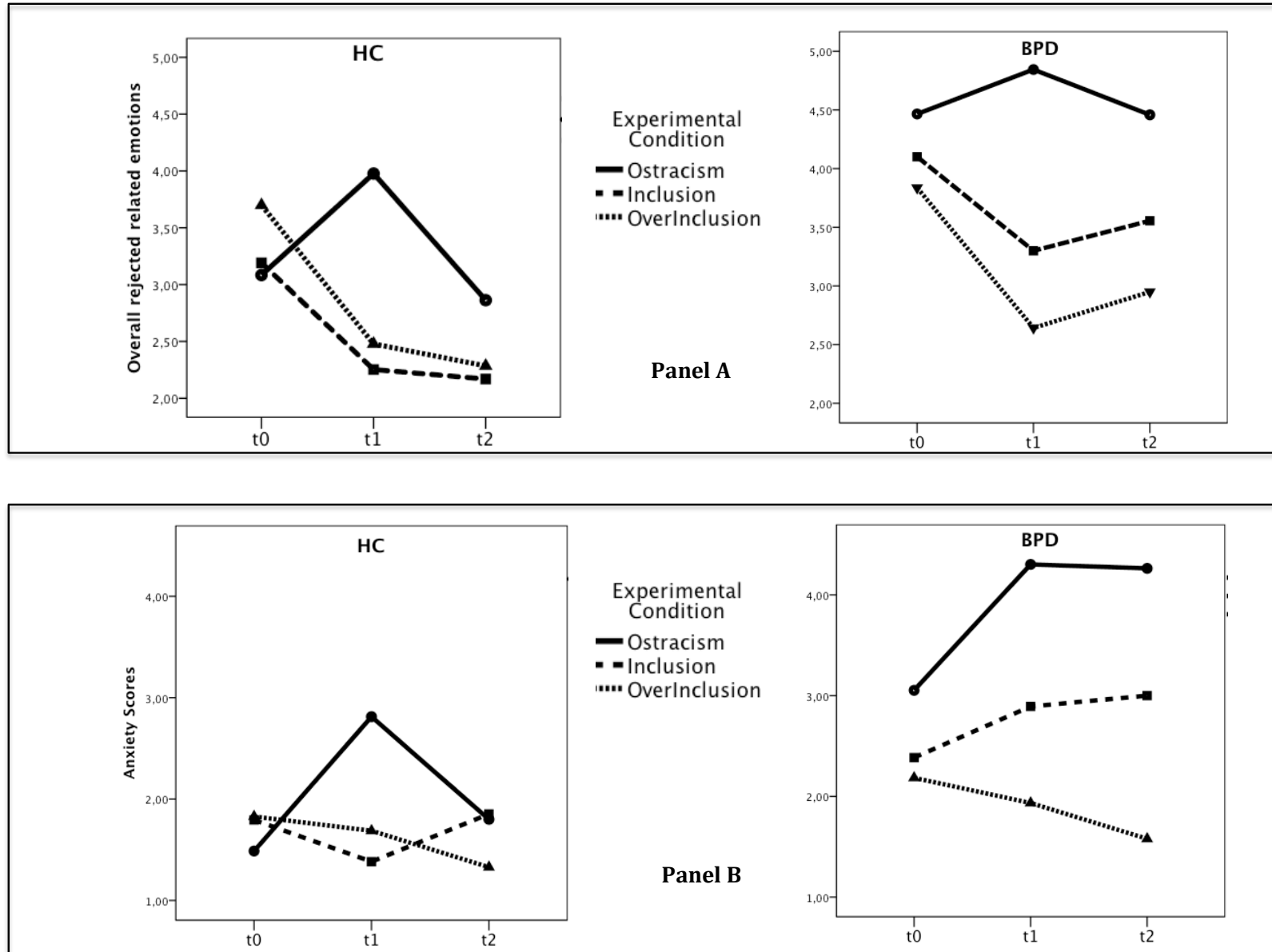
Figure 1. Ratings of Overall Rejection-related Negative Emotions (Panel A) and Anxiety (Panel B) in BPD and control participants across experimental conditions and over time.
BPD=patients with borderline personality disorder; HC=healthy controls.
t0=Baseline (Pre-Cyberball); t1=reflexive stage (immediately after Cyberball); t2=reflective stage (20 minutes after Cyberball)
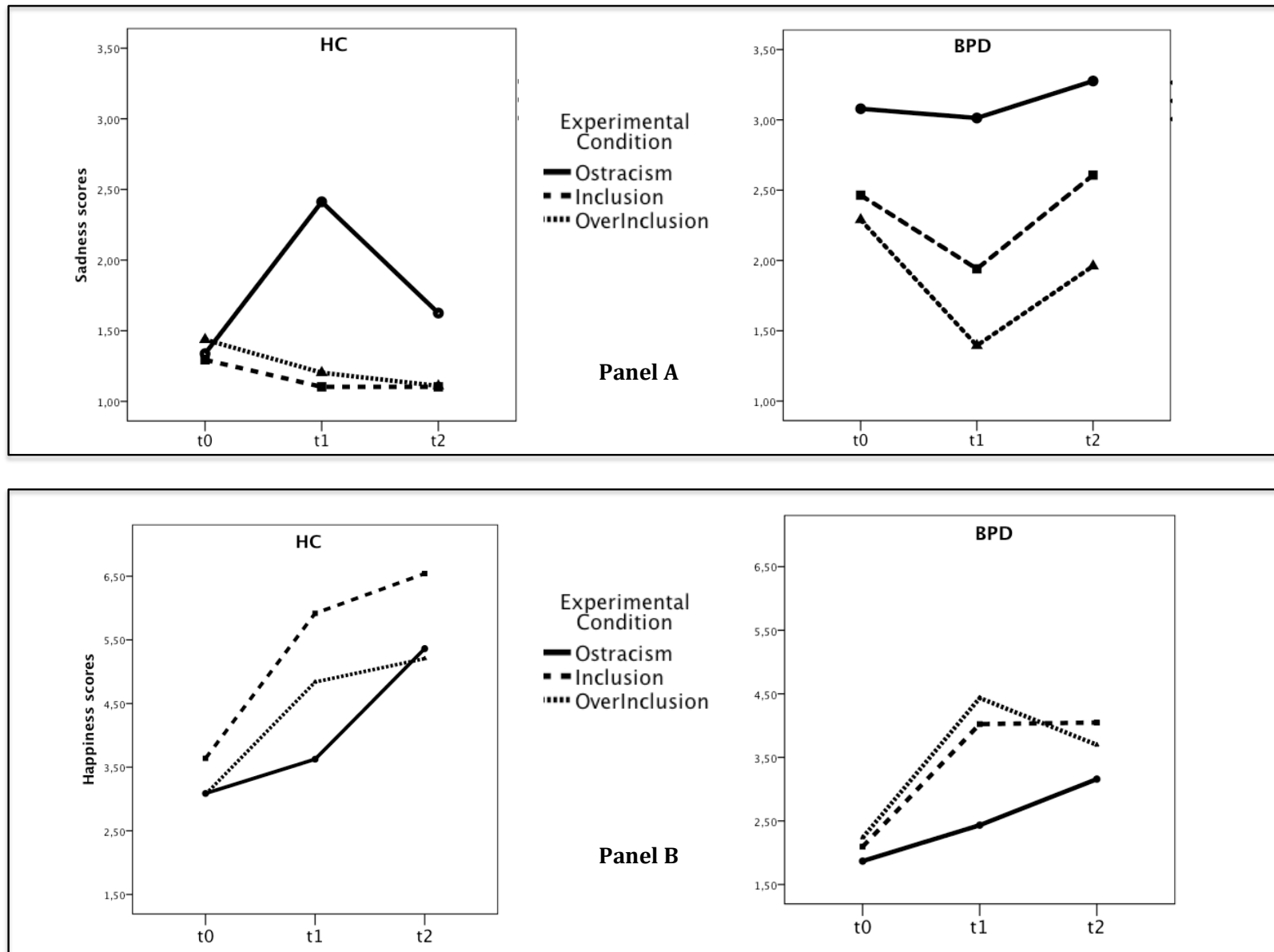
Figure 2. Ratings of Sadness (Panel A) and Happiness (Panel B) in BPD and HC across experimental conditions and time.
BPD=patients with borderline personality disorder; HC=healthy controls.
t0=baseline (Pre-Cyberball); t1=reflexive stage (immediately after Cyberball); t2=reflective stage (20 minutes after Cyberball)

27