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Implicit emotion regulation across the lifespan of patients with bipolar disorder

Alexandra M. Adamis[1*], Caitlin Millet[1], Candice Roquemore Bonner[1], Alexandra A. Corrigan[1], Stephan T. Palm[1], Faith M Gunning[2], Katherine E. Burdick[1]

[1] Mood and Psychosis Research Program, Department of Psychiatry, Brigham and Women's Hospital, Harvard Medical School

[2] Department of Psychiatry, Joan & Sanford I. Weill Medical College of Cornell University, New York

*aadamis@bwh.harvard.edu

BACKGROUND

- Emotion regulation (ER) is the ability to flexibly and dynamically respond to affectively-valenced stimuli in the service of goal-directed behavior.
- ER is intricately linked to a person's well-being and state of mental health.
- Evidence suggests that ER improves across the lifespan. A positivity effect, or a switch from a negative to a positive implicit attentional bias, emerges sometime in mid-to late-life.
- Bipolar disorder (BD) is defined by ER deficits, including an exaggerated, mood-congruent negativity bias.
- Little is known about ER across the lifespan in BD patients.
- *In this study, we explored the hypothesis that a negativity bias will persist across the lifespan for individuals with bipolar disorder, such that they do not experience the normative positivity effect as they age.*

METHODS

- This was a cross-sectional study in 202 affectively stable BD patients and 53 healthy controls (HC) (n=255, 57% female, mean age 43 y).
- Participants were administered the Structured Clinical Interview for DSM-IV to confirm diagnosis of BD, and the Clinical Global Impression of Severity in Bipolar, Young Mania Rating Scale, and Hamilton Rating Scale for Depression to assess affective stability.
- Participants completed the CANTAB Emotion Recognition Task to assess accuracy in recognizing facial emotions in both positive (happiness) and negative (sadness, anger, disgust, and fear) conditions.
- The sample was evaluated across three age cohorts to represent early (20-40 years; n=86); mid- (41-50 years; n=57) and late life (51-65 years; n=72).
- We used a univariate ANOVA to assess positive emotion recognition, and a multivariate ANOVA to assess negative emotion recognition.
- We tested for a main effect of age, a main effect of diagnosis, and an interaction of age and diagnosis.
- Pairwise comparisons were evaluated for significant main effects.
- Each analysis was controlled for sex, race, and depressive symptoms.

RESULTS

Table 1. Sociodemographic and clinical features of sample

Variables	Bipolar Disorder (n=202)	Healthy Controls (n=53)	P value
Age	43.4 (12.2)	37.9 (12.2)	<0.01
Sex (F)	95 (47.0)	30 (56.6)	0.2
Race (W)	98 (48.5)	15 (28.3)	<0.001
Education	14.2 (2.5)	15.5 (1.2)	<0.01
Premorbid IQ	101.7 (14.6)	106.2 (12.6)	0.04

Table 1. Data represented as Mean (SD) or N (%). Premorbid IQ estimated using the Wide Range Achievement Test (WRAT-3). P value calculated using a chi-square test or independent sample Student's T test.

Figure 1. Correct identification of faces on the Emotion Recognition Task (ERT)

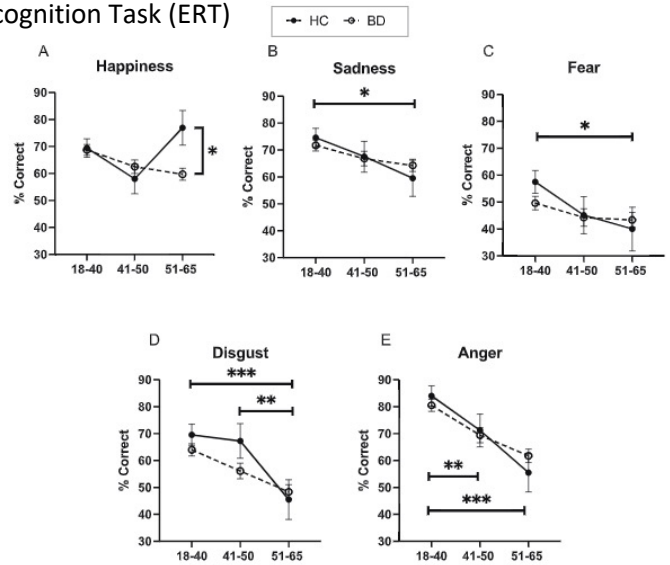

Figure 1. *p<0.05, **p<0.01, ***p<0.001.

RESULTS SUMMARY

- On *negative emotions,* we found a **significant main effect of age** (F (8.486)=4.5, p<.001). Pairwise comparisons (Bonferroni corrected) revealed significantly higher accuracy on the detection of negative emotions in younger cohorts relative to older cohorts.
- On *positive emotion*, we found a **significant interaction effect between diagnosis and age cohort** (F(2)=3.1, p=.04). Pairwise comparisons (Bonferroni corrected) revealed significantly higher accuracy on the detection of happiness in HCs relative to BD subjects in late life.

DISCUSSION & LIMITATIONS

- The developmental trajectory of ER is altered in BD.
- Our results are consistent with a negativity bias in younger adults.
- We replicated the positivity effect in HCs. As healthy individuals age, they assign greater salience to positive stimuli.
- BD patients did not demonstrate the positivity effect.
- Findings are consistent with prior research demonstrating emotional dysregulation in BD.
- Implicit ER may be an important point of intervention for aging BD patients.
- Interventions such as Cognitive Behavioral Therapy (CBT), Interpersonal and Social Rhythm Therapy (ISRT), attentional bias modification (ABM), and repetitive transcranial magnetic stimulation (rTMS) have been effective in treating negative biases in mental illnesses.
- Limitations include the significant age difference of the two groups, the small number of HCs, and the upper age limit of 65 years.

References:

Azriel, O. & Bar-Haim, Y. (2019). Attention bias. *Clinical handbook of fear and anxiety: Maintenance processes and treatment mechanisms.*, 203-218.

Brand, G. J., Goldberg, E. T., Gunawardane, N., Gopin, B. C., Powers, L. R., Malhotra, K. A. & Burdick, E. K. (2012). Emotional bias in unaffected siblings of patients with bipolar I disorder. *Journal of affective disorders* **136**, 1053-1058.

Choi, K. M., Scott, D. T. & Lim, S.-L. (2016). The modulating effects of brain stimulation on emotion regulation and decision-making. *Neuropsychiatric Electrophysiology* **2**.

Miskowiak, K. W., Seeberg, I., Kjaerstad, H. L., Burdick, K. E., Martinez-Aran, A., Bonnin, C., Bowie, C. R., Carvalho, A. F., Gallagher, P., Hasler, G., Lafer, B., López-Jaramillo, C., Sumiyoshi, T., Mcintyre, R. S., Schaffer, A., Porter, R. J., Purdon, S., Torres, I. J., Yatham, L. N., Young, A. H., Kessing, L. V., Van Rheenen, T. E. & Vieta, E. (2019). Affective cognition in bipolar disorder: A systematic review by the ISBD targeting cognition task force. *Bipolar Disorders* **21**, 686-719.

Mogoaşe, C., David, D. & Koster, E. H. W. (2014). Clinical Efficacy of Attentional Bias Modification Procedures: An Updated Meta-Analysis. *Journal of Clinical Psychology* **70**, 1133-1157.

Peckham, A. D., Johnson, S. L. & Gotlib, I. H. (2016). Attentional bias in euthymic bipolar I disorder. *Cognition and Emotion* **30**, 472-487.

Reed, A. E., Chan, L. & Mikels, J. A. (2014). Meta-analysis of the age-related positivity effect: Age differences in preferences for positive over negative information. *Psychology and Aging* **29**, 1-15.

Vaish, A., Grossmann, T. & Woodward, A. (2008). Not all emotions are created equal: the negativity bias in social-emotional development. *Psychological bulletin* **134**, 383-403.