**Understanding familial liability for emotion regulation difficulties in bipolar disorder.**

*Running title: Emotion regulation difficulties in BD and FDRs*

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**Supplementary material**

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**Supplementary Table 1.** *Means and SD’s of the Difficulties in Emotion Regulation Scale (DERS) for all patients with bipolar disorder compared to first degree relatives and healthy controls*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | BD | | FDR | | HC | |
|  | ***M*** | ***SD*** | ***M*** | ***SD*** | ***M*** | ***SD*** |
| GOALS | 15.67 | 5.54 | 12.48 | 5.25 | 11.6 | 3.59 |
| ACCEPT | 14.44 | 6.35 | 11.15 | 4.19 | 10.7 | 4.29 |
| IMPULSE | 12.71 | 4.95 | 9.22 | 3.35 | 8.6 | 2.16 |
| Awareness\* | 14.26 | 4.56 | 14.46 | 4.45 | 14.03 | 4.38 |
| STRATEGIES | 18.03 | 6.74 | 13.36 | 5.12 | 10.85 | 3.1 |
| CLARITY | 11.06 | 3.91 | 9.76 | 3.27 | 8.85 | 2.74 |
| TOTAL | 86.59 | 25.42 | 70.33 | 19.6 | 64.49 | 14.95 |

Note: BD = bipolar disorder, FDR = first degree relative, HC=healthy control; \* represents estimated marginal means with SD calculated from SE

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**Supplementary Figure 1***. Visual representation of Cohen’s d effect sizes for the full bipolar disorder sample.*

Note: BD = bipolar disorder, FDR = first degree relative, HC=healthy control; Darker colours indicate larger effects. Effect sizes are calculated from the estimated marginal means and standard errors for the Awareness subscale, given age and sex were included as covariates in this analysis.

**Supplementary Table 2***. Demographic and clinical characteristics of the euthymic bipolar disorder sample compared to first-degree relatives and controls.*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Healthy controls  *n=53* | | | First degree relatives  n=42 | | | Bipolar disorder  n=45 | | | Comparisons | |  | Posthoc |
|  | ***Mean*** | ***SD*** | ***n*** | ***M*** | ***SD*** | ***n*** | ***Mean*** | ***SD*** | ***n*** | ***Test statistic***  ***(F/X2)*** |  | ***p*** |  |
| Age (years) | 34.28 | 11.94 |  | 31.93 | 12.38 |  | 37.36 | 11.22 |  | 2.295$ |  | .11 |  |
| Sex (female/male) |  |  | 32/21 |  |  | 28/14 |  |  | 23/22 | 2.22+ |  | .33 |  |
| MADRS | 1.30 | 1.85 |  | 1.95 | 3.09 |  | 4.36 | 2.57 |  | 22.26^ |  | <.001 | BD>FDR&HC |
| YMRS | .77 | 1.19 |  | 1.76 | 1.51 |  | 2.40 | 2.04 |  | 13.43^ |  | <.001 | BD=FDR>HC |
| Subtype (BD I/II) |  |  |  |  |  |  |  |  | 43/2 |  |  |  |  |
| Age of diagnosis |  |  |  |  |  |  | 28.43 | 10.44 |  |  |  |  |  |
| Age of symptom onset |  |  |  |  |  |  | 22.80 | 9.84 |  |  |  |  |  |

MADRS = Montgomery Asberg Depression Rating Scale, YMRS = Young Mania Rating Scale

^Welch; + Chi square, $F

**Supplementary Table 3.** *Means and SD’s of the Difficulties in Emotion Regulation Scale (DERS) for euthymic patients with bipolar disorder, first degree relatives and healthy controls*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | BD | | FDR | | HC | |
|  | ***M*** | ***SD*** | ***M*** | ***SD*** | ***M*** | ***SD*** |
| Goals | 14.7556 | 5.70548 | 12.4762 | 5.25096 | 11.6038 | 3.59133 |
| Accept | 13.7333 | 6.53452 | 11.15 | 4.18514 | 10.6981 | 4.29483 |
| Impulse | 12.7111 | 5.22938 | 9.2195 | 3.35046 | 8.6038 | 2.1603 |
| Awareness\* | 13.979 | 4.41 | 14.416 | 4.39 | 13.952 | 4.35 |
| Strategies | 17.4889 | 6.54225 | 13.3571 | 5.11727 | 10.8491 | 3.10332 |
| Clarity | 10.7111 | 3.9636 | 9.7619 | 3.26705 | 8.8491 | 2.74139 |
| Global | 83.8222 | 26.27848 | 70.3333 | 19. 59905 | 64.4906 | 14.94686 |

Note: BD = bipolar disorder, FDR = first degree relative, HC=healthy control; \* represent estimated marginal means with SD calculated from SE.

**Supplementary Table 4.** *Cohen’s d effect sizes for Difficulties in Emotion Regulation Scale (DERS) comparisons of the euthymic patients with bipolar disorder, first-degree relatives and healthy controls*

|  |  |  |  |
| --- | --- | --- | --- |
| (Sub)Scale | BD vs FDR | BD vs HC | FDR vs HC |
| GOALS | 0.42 | 0.67 | 0.20 |
| ACCEPT | 0.46 | 0.56 | 0.11 |
| IMPULSE | 0.79 | 1.06 | 0.22 |
| AWARENESS\* | 0.10 | 0.01 | 0.11 |
| STRATEGIES | 0.70 | 1.33 | 0.61 |
| CLARITY | 0.26 | 0.55 | 0.31 |
| TOTAL | 0.58 | 0.92 | 0.34 |

Note: BD = bipolar disorder, FDR = first degree relative, HC=healthy control; \* effect sizes are calculated from the estimated marginal means and standard errors for the Awareness subscale, given age and sex were included as covariates in this analysis. FDR-HC effect sizes are the same as those stated in Table 2 in the main text but are repeated here to assist interpretation.



**Supplementary Figure 2***. Visual representation of Cohen’s d effect sizes for the euthymic sample with bipolar disorder.*

Note: FDR = first degree relative, BD = bipolar disorder, HC=healthy control; Darker colours indicate larger effects. Effect sizes are calculated from the estimated marginal means and standard errors for the Awareness subscale, given age and sex were included as covariates in this analysis. FDR-HC effect sizes are the same as those stated in Table 2 in the main text, but are repeated here to assist interpretation



**Supplementary Figure 3.** *Violin plots showing means, standard deviations and probability distributions for the Difficulties in Emotion Regulation Scale (DERS)*.

FDR = first degree relative, BD = bipolar disorder, HC=healthy controls.

Comparisons represented by a blue line are significant at p<.05 (Games-Howell corrected and Bootstrapped). Note that scores on the Awareness subscale were correlated with sex and age in the full sample. Although these were included as covariates in the analysis, for visualisation purposes the means and SDs for this subscale are based on the raw scores not the estimated marginal means in this graph. The theoretical range for the Clarity and Goals subscales is 5-25, for the Awareness, Impulse and Acceptance subscales is 6-30, for the Strategies subscale is 8-40 and for the total score is 36-180.