Associations of Irritability and Anhedonia with Event-Related Potentials Measures of Reward Responsivity in Young Adults

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Background

• Irritability and anhedonia are prevalent symptoms of Major Depressive Disorder (MDD).
• Both have been proposed to result from dysfunctional reward processing, but in opposite directions.
  - Irritability: reward responsivity in children.1
  - Anhedonia: striatal reactivity to reward receipt.2
• No research to date has investigated how the presence/severity of both symptoms are linked to reward responsivity in the same sample.
• The Reward Positivity (RewP) is an ERP commonly used as a measure of reward responsivity.3
• We focused on young adulthood because it is a critical period for development of mood disorders.

Aim

• Evaluate the main and interactional effects of irritability and anhedonia on RewP in young adults

Method

• 25 young adults (18 females)
• Age range 18-25 years
• Questionnaires:
  - Brief Irritability Test (BITe)
  - Dimensional Anhedonia Rating Scale (DARS)
  - Depression, Anxiety and Stress Scale (DASS-21)
  - 128 GSN EGI
  - Doors Task1 (Fig. 1)

ERP preprocessing

• 0.3-30Hz bandpass filter.
• Re-referenced to average.
• Baseline correction -200ms.

ERP analyses

• FRN (Feedback Related Negativity) = mean amplitudes 250-350ms post-feedback to Cz.
• RewP = FRN to gain – FRN to loss.

Results

• FRN to gain is higher than to loss, t(40.61) = 4.23, p < .0001 (Fig. 3).
• Irritability, anhedonia, and depression are positively correlated, r = .54 – .63, p < .0001.
• A linear model showed no effect of irritability, anhedonia, or the interaction between irritability and anhedonia on the RewP, F = 0.20, p = .89 (Table 1, Fig. 4 & 5).
• However, the interaction graphs showed a potential interacting effect of irritability and anhedonia (Fig. 6).

Discussion

• First study to simultaneously investigate irritability and anhedonia on RewP.
• Interaction effect between irritability and anhedonia on RewP was NS, which may be due to small N. However, a potential interacting effect suggests:
  - In the high irritability group, greater anhedonia appears linked to higher RewP.
  - In the low irritability group, anhedonia and RewP appear unrelated.
• The failure to consider anhedonia in past studies might explain the absence of findings between RewP and irritability in adulthood. Future studies should take this interaction into account.
• If this pattern holds with an adequate N, it might suggest that irritability, when co-occurring with anhedonia, may have different neural mechanisms than irritability presenting alone.
• Limitations:
  - Sample size is small. Power calculation revealed that N ≥ 65 is required to detect a moderate effect size.
  - Need of clinical sample to fill the higher ends of the irritability and anhedonia spectrums
  - Recruitment still ongoing

References