**Supplementary Methods and Results**

***Associations Between Irritability- and Anxiety- Related Symptoms and Age***

To evaluate the potential association between each of the irritability- or anxiety- related EMA items and age, a series of models specified each EMA item as the outcome variable at Level-1 and age as the predictor at Level-2 was conducted. Continuous variables at both levels were standardized:

 Level-1 (prompt level): EMA item ratingij= β0j + *r*ij

Level-2 (participant level): β0j = γ00 + γ01(age) + u0j

At Level-1, EMA item ratingij denotes the rating for participant j at prompt i, β0j represents the within-person mean rating, and rij denotes the within-person random effect. At Level-2, γ00 denotes the average rating in the sample, γ01 denotes the between-person association of age with the mean rating, and u0j denotes the between-person random effect. Supplementary Table 2 presents full results of these models. Across all models, age did not significantly predict mean rating of the EMA items.

***Within-Prompt Associations Between Irritability and Anxiety Symptoms***

 A series of analyses examined the within-prompt associations between irritability and anxiety symptoms across groups. At Level-1, each EMA anxiety item was entered as a person-centered, continuous predictor to test whether and how within-person fluctuations in that anxiety symptom predicted fluctuations in the irritability symptom. Analyses were constrained such that symptoms assessed since the previous prompt were tested together (e.g., anxious affect and temper outburst), momentary symptoms were tested together (e.g., momentary anxiety and momentary irritability), and no association was tested twice. At Level-2, diagnostic group was again entered as a categorical predictor:

Level-1 (prompt level): EMA irritability item ratingij= β0j + β1j(EMA anxiety item rating) + *r*ij

 Level-2 (participant level): β0j = γ00 + γ01(DMDD) + γ02(ADHD) + γ03(ANX) + u0j

 Level-2 (participant level): β1j = γ10 + γ11(DMDD) + γ12(ADHD) + γ13(ANX) + u1j

Denotations parallel those for within-irritability associations above. FDR-corrected p-values were calculated separately for group means and comparisons.

 Supplementary Table 6 presents full results for irritability-anxiety associations across groups. In general, significant irritability-anxiety associations within prompts were restricted to the DMDD and ADHD groups. Specifically, fluctuations in anxious affect significantly predicted frustration for both the DMDD and ADHD groups. Further, fluctuations in momentary anxiety significantly predicted momentary anger in the DMDD group, and endorsement of anxious avoidance significantly predicted irritable mood in the ADHD group. However, there were no significant group differences in within-prompts associations between irritability and anxiety (i.e., no difference in slopes across groups).

**Supplementary Table 1**

***Psychiatric Comorbidities by Clinical Group***

|  |  |  |  |
| --- | --- | --- | --- |
| % (*N*)  | **DMDD** (*n* = 26) | **ADHD\***(*n* = 27) | **ANX**(*n* = 28) |
| ***Diagnosis*** |  |  |  |
| Lifetime MDE  | 4.00% (1) |  3.70% (1) |  3.57% (1) |
| Dysthymia | 0.00% (0) | 0.00% (0) | 0.00% (0) |
| Adjustment Disorder | 0.00% (0) | 0.00% (0) | 0.00% (0) |
| Panic Disorder | 0.00% (0) | 0.00% (0) | 3.57% (1) |
| Separation Anxiety |  12.00% (3) |  14.81% (4) |  32.14% (9) |
| Specific Phobia |  16.00% (4) |  7.41% (2) |  17.86% (5) |
| Social Phobia | 23.08 % (6) |  11.11% (3) |  50.00% (14) |
| Agoraphobia | 0.00% (0) | 0.00% (0) | 3.57% (1) |
| GAD | 46.15% (12) | 14.81% (4) |  92.86% (26) |
| ADHD | 76.92% (20) | 100% (28) | 3.57% (1) |
| Conduct Disorder | 0.00% (0) | 3.70% (1) | 0.00% (0) |
| ODD† | --- |  29.62% (8) | 0.00% (0) |
| DMDD | 100% (26) | 0.00% (0) | 0.00% (0) |

*Note.* Abbreviations: ADHD = Attention Deficit Hyperactivity Disorder; ANX = Anxiety Disorder; MDE = Major Depressive Episode; GAD = Generalized Anxiety Disorder; ODD = Oppositional Defiant Disorder. \*One ADHD participant had a partial KSADS-PL, thus % of secondary diagnosis in this group represents the ratio within the 27 participants with full data. †Based on DSM-5 guidelines, the DMDD diagnosis supersedes an ODD diagnosis.

**Supplementary Table 2**

***Associations Between EMA Item Mean Ratings and Age***

|  |
| --- |
|  **Age** |
| ***Temper Outburst*** |  |
|  Coeff. (SE) | -0.38 (0.19) |
|  *t* | -1.93 |
|  *p*-value | .057 |
| ***Irritable Mood*** |  |
|  Coeff. (SE) | 0.09 (0.07) |
|  *t* | 1.34 |
|  *p*-value | .184 |
| ***Frustration*** |  |
|  Coeff. (SE) | 0.05 (0.06) |
|  *t* | 0.91 |
|  *p*-value | .364 |
| ***Momentary Anger*** |  |
|  Coeff. (SE) | -0.04 (0.05) |
|  *t* | -0.84 |
|  *p*-value | .404 |
| ***Anxious Affect*** |  |
|  Coeff. (SE) | 0.11 (0.07) |
|  *t* | 1.52 |
|  *p*-value | .130 |
| ***Anxious Avoidance*** |  |
|  Coeff. (SE) | 0.32 (0.21) |
|  *t* | 1.52 |
|  *p*-value | .130 |
| ***Momentary Anxiety*** |  |
|  Coeff. (SE) | -0.03 (0.05) |
|  *t* | -0.58 |
|  *p*-value | .564 |

**Supplementary Table 3**

***Convergent Validity of EMA-Assessed Anxiety Symptoms***

|  |  |  |  |
| --- | --- | --- | --- |
|  | **SCARED****Youth-Report****3-Month****Total Score** | **SCARED****Parent-Report****3-Month****Total Score** | **PARS****1-Week****Total Score** |
| ***Anxious Affect*** |  |  |  |
|  Coeff. (SE) | 0.39 (0.07) | 0.26 (0.06) | 0.30 (0.07) |
|  *t* | 5.63 | 4.21 | 4.44 |
|  FDR-corrected *p*-value | .009 | .005 | .003 |
| ***Anxious Avoidance*** |  |  |  |
|  Coeff. (SE) | 0.83 (0.17) | 0.65 (0.21) | 0.94 (0.21) |
|  *t* | 4.83 | 3.11 | 4.45 |
|  FDR-corrected *p*-value | .002 | .002 | .002 |
| ***Momentary Anxiety*** |  |  |  |
|  Coeff. (SE) | 0.35 (0.08) | 0.20 (0.06) | 0.18 (0.06) |
|  *t* | 4.44 | 3.17 | 3.22 |
|  FDR-corrected *p*-value | .002 | .002 | .002 |

*Note.* Abbreviations: FDR = False Discovery Rate; PARS = Pediatric Anxiety Rating Scale; SCARED = Screen for Child Anxiety Related Emotional Disorders; SE = Standard Error. Results reflect models in which all continuous variables were standardized. One participant (ADHD) was missing the SCARED youth-report, two participants (HV) were missing the SCARED parent-report, and four participants (two HV, two ADHD) were missing the PARS.

**Supplementary Table 4**

***Associations Between EMA-Assessed Irritability and Anxiety and Frustration Ratings During SST***

|  |  |  |  |
| --- | --- | --- | --- |
|  | Coeff. (SE) | *t* | FDR-corrected *p*-value |
| ***Temper Outburst*** | 0.70 (0.20) | 3.46 | .007 |
| ***Irritable Mood*** | 0.29 (0.08) | 3.62 | .004 |
| ***Frustration*** | 0.28 (0.08) | 3.75 | .002 |
| ***Momentary Anger*** | 0.24 (0.07) | 3.37 | .002 |
| ***Anxious Affect*** | 0.23 (0.09) | 2.57 | .012 |
| ***Anxious Avoidance*** | 0.72 (0.25) | 2.79 | .010 |
| ***Momentary Anxiety*** | 0.23 (0.09) | 2.66 | .012 |

*Note.* Abbreviations: FDR = False Discovery Rate; SE = Standard Error; SST = Stop Signal Task. Results reflect models in which all continuous variables were standardized. Models included subset of participants who completed the task (*N* = 79; DMDD *n* = 16; ADHD *n* = 23; ANX *n* = 15; HV *n* = 25).

**Supplementary Table 5**

***Anxiety Symptom Levels Across Diagnostic Groups***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **DMDD**γ00 (SE) | **ADHD**γ00 (SE) | **ANX**γ00 (SE) | **HV**γ00 (SE) | **Significant Group Comparisons**(FDR-corrected *p*-values) |
| Anxious Affect | 1.40 (0.10) | 1.17 (0.08) | 1.60 (0.12) | 1.08 (0.02) | ANX > ADHD (.005), HV (.030);DMDD > HV (.004) |
| Anxious Avoidance† | 4.93% (1.99%) | 0.91% (0.52%) | 6.28% (1.78%) | 0.83% (0.47%) | ANX > ADHD (.005), HV (.006);DMDD > ADHD (.044), HV (.043) |
| Momentary Anxiety | 1.36 (0.09) | 1.19 (0.09) | 1.32 (0.06) | 1.11 (0.03) | ANX > HV (.006); DMDD > HV (.017) |

*Note.* Abbreviations: ADHD = Attention Deficit Hyperactivity Disorder; ANX = Anxiety Disorder; DMDD = Disruptive Mood Dysregulation Disorder; FDR = False Discovery Rate; HV = Healthy Volunteer; SE = Standard Error. All group means for all variables were significantly greater than 0 (all corrected ps < .05). †For illustration purposes only, γ00 (SE) reflects MLM in which categorical outcome variable was run as continuous, thus representing the estimated % of prompts on which the item was endorsed; group comparisons were computed using logistic MLM.

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**Supplementary Table 6**

***Within-Prompt Associations Between Irritability and Anxiety Symptoms***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **DMDD**γ00 (SE) | **ADHD**γ00 (SE) | **ANX**γ00 (SE) | **HV**γ00 (SE) | **Significant Group Means**(FDR-corrected *p*-values) |
| ***Anxious Affect Predictor*** |  |  |  |  |  |
| Temper Outburst | 0.25 (0.23) | 0.61 (0.49)  | 0.39 (0.40) | 0.59 (0.35) | *none* |
| Irritable Mood | -0.00 (0.05)  | 0.17 (0.08)  | 0.04 (0.04) | 0.13 (0.08) | *none* |
| Frustration | 0.31 (0.08) | 0.26 (0.10)  | 0.16 (0.07) | 0.43 (0.19) | DMDD (.012); ADHD (.042) |
| ***Anxious Avoidance Predictor†*** |  |  |  |  |  |
| Irritable Mood | 0.31 (0.24)  | 1.06 (0.37) | 0.26 (0.20) | 1.81 (0.89) | ADHD (.032) |
| Frustration | 0.27 (0.18)  | 0.65 (0.31) | 0.10 (0.23) | 1.55 (0.64) | *none* |
| ***Momentary Anxiety Predictor*** |  |  |  |  |  |
| Momentary Anger | 0.31 (0.09) | 0.25 (0.13) | 0.01 (0.07) | 0.13 (0.09) | DMDD (.024) |

*Note.* Abbreviations: ADHD = Attention Deficit Hyperactivity Disorder; ANX = Anxiety Disorder; DMDD = Disruptive Mood Dysregulation Disorder; FDR = False Discovery Rate; HV = Healthy Volunteer; SE = Standard Error. There were no significant group comparisons. †MLMs in which anxious avoidance predicted temper outburst did not converge.