ADHD & co-occurring internalising problems: exploring mechanisms

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Background

- ADHD commonly associated with internalising problems
  - ~25% anxiety disorder
  - ~30% experience depressive episode before age 30
- Understanding nature of the links important for informing interventions
  - Directionality? E.g., Murray et al. (2020)
  - Which symptoms? E.g., Speyer et al. (2021)
  - Mediating mechanisms? E.g., Antony, Pihlajamaki et al. (2022)
  - Implications? E.g., Murray et al. (2018)
Mediating mechanisms?

- Which factors link ADHD symptoms & internalising problems?
- Many mediators of small to moderate effect (e.g., Murray et al. in prep)
- But also some key ones
Emotion dysregulation (ED) as a key mediator

- **ED**: ‘Expression/experience of emotion excessive relative to social norms, developmental stage, context’
- Common in ADHD (~25-45%)
- Also associated with internalising problems
- Possible mediator?
- Key limitations of previous work:
  - Lack of *longitudinal* studies
  - Lack of studies of emotion dysregulation as it manifests in the course of daily life in ‘*ecological context*’
Longitudinal evidence:

Antony, Pihlajamaki et al. (2022) JCPP:
- ALT-SR model fit to Millennium Cohort Study ages 3, 5, 7 (n=9,619)
  - Significant indirect effect (b=0.04; 95% CI = 0.03 -0.06)
  - No significant direct effect (full mediation)
  - Highly similar in male vs female sub-sample
Ecological context evidence

N= 255 convenience sample from z-proso (e.g., Murray et al. 2022):
• 4x a day for 2 weeks on own smartphones
• Measures of context, provocations, substance use, stress, negative affect, aggression
Linked to ADHD and internalising symptoms from main cohort
# Derived measures of ED*

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Levels</strong></td>
<td>Negative emotion levels</td>
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<td>Mean negative emotion levels</td>
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<td><strong>Variability</strong></td>
<td>Emotional lability</td>
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<td>Variation in negative emotion levels</td>
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<td><strong>Inertia</strong></td>
<td>Emotional inertia</td>
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<td>Autoregressive effects of emotions over time</td>
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<td><strong>Coupling</strong></td>
<td>Emotional reactivity</td>
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<td>Strength of relations between event and emotional reaction</td>
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<td>Behavioural reactivity</td>
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<td>Strength of relations between event/emotion and behavioural reaction</td>
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</tbody>
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*using dynamic structural equation modelling (DSEM) e.g. [Zhu et al., (2023)]
Example findings

- Speyer et al. (2023) JADD:
  - Higher ADHD:
    - Higher levels of daily life stress
    - Higher levels of daily life negative affect*
    - Stronger persistence of stress over time*
    - Stronger links between stress and later negative affect
  - *mediated links with internalising problems
Implications

• There are likely to **wide range of mediators**
• **Emotion regulation & stress regulation** are key targets for preventing development of secondary internalising problems
• More research needed on development/adaptation of therapeutic approaches suited for ADHD