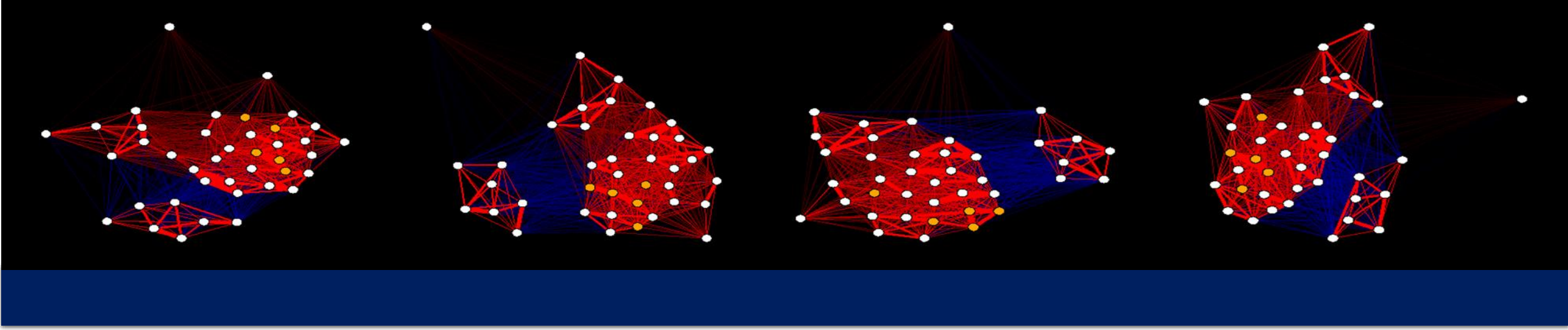

# *Decades-to-Minutes (D2M): Overview of key findings & future plans*

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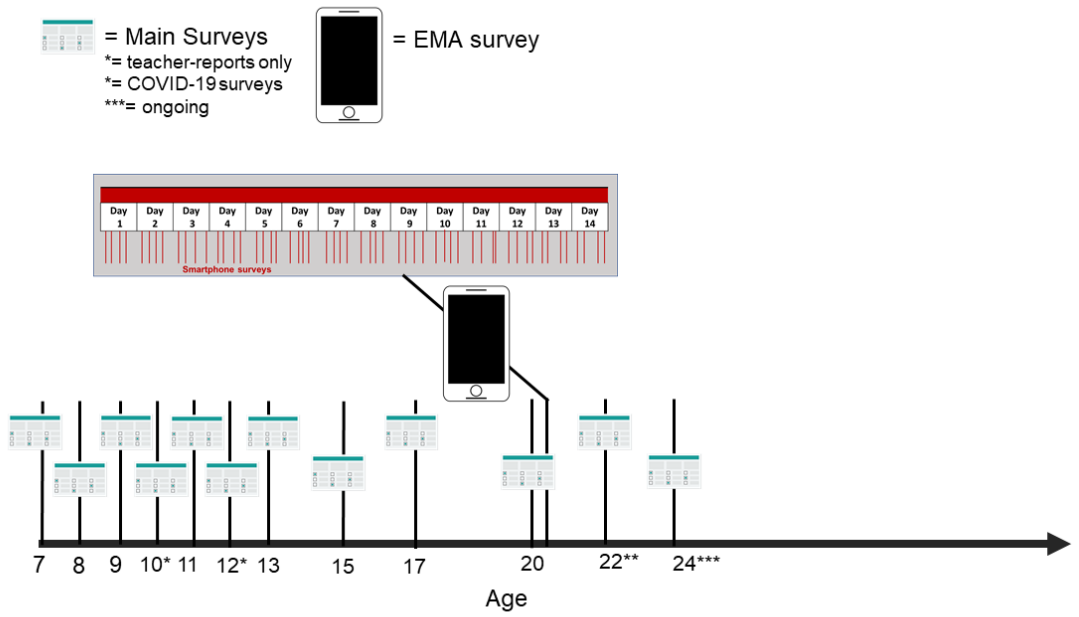
# Rationale for D2M

- Development unfolds over multiple timescales… from milliseconds to decades
  - Daily life experiences coalesce into long term developmental changes
  - Long-term developmental histories impact daily life thoughts, feelings, behaviours, experiences
- But most studies address only one timescale
- D2M was motivated by a need to bridge the gap between ‘in-the-moment’ experiences and long-term development

*‘There are multiple clocks that time us’*
*Featherman and Petersen (1986)*

# Study design for D2M wave 1

- Ecological momentary assessment (EMA) collects near *real-time* data on experiences *in the flow of daily life*
  - Thoughts
  - Feelings
  - Behaviour
  - Events
- In wave 8 (age 20) of z-proso:
  - Embedded a burst of ecological momentary assessment (EMA)
  - 4x a day for 2 weeks on participant smartphones
  - GPS co-ordinates recorded
- Link the long-term developmental data from main data collection waves to the EMA data at age 20



# Participants in D2M wave 1

- N= 255 convenience sub-sample from z-proso
- Compared with main z-proso cohort:
  - More females (62% vs 49%)
  - Slightly higher SES ($p$<.001)
  - Slightly lower aggression ($p$ = .004), higher stress ($p$=.006).
  - No difference on ADHD symptoms, internalising problems, alcohol use, cannabis use.

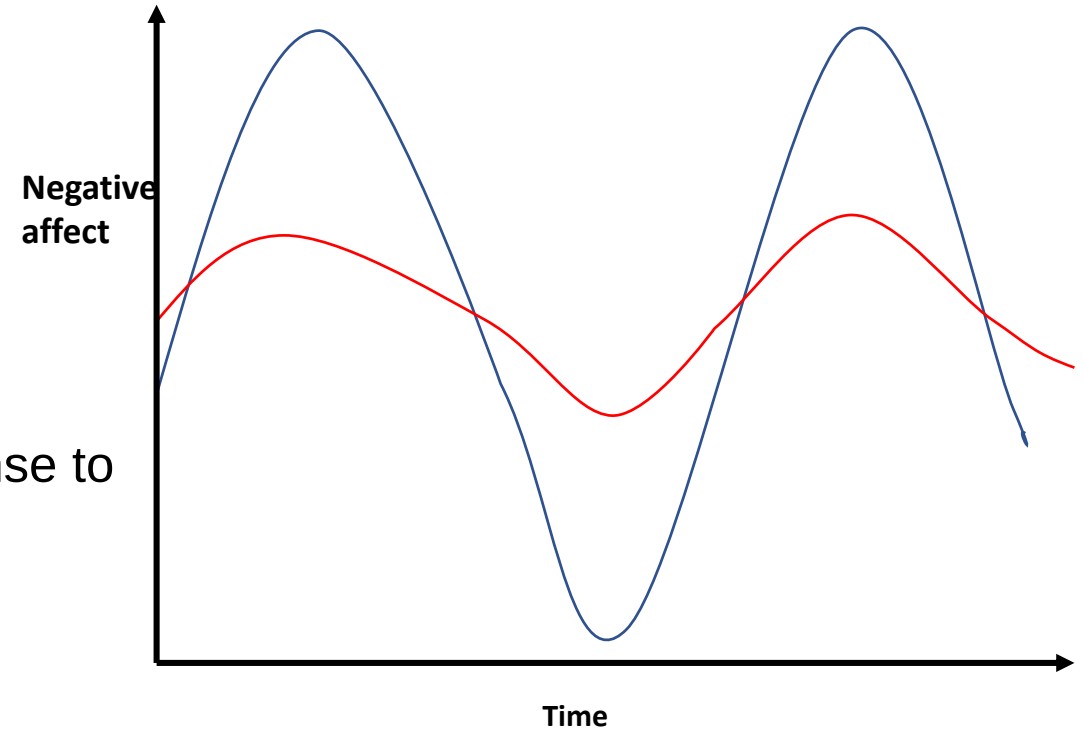
# Measures in D2M wave 1

- Measures
  - Context (current activity and company)
  - Provocations
  - Substance use (cannabis, alcohol)
  - Stress (adapted version of perceived stress scale)
  - Affect (PANAS-X negative affect scale)
  - Aggression-ES-A

| **Please indicate your level of agreement with the following statements. In the last 30 minutes…** | | | | |
|---|---|---|---|---|
| | *Strongly Agree* | *Agree* | *Disagree* | *Strongly Disagree* |
| *I lost my temper.* | ○ | ○ | ○ | ○ |
| *I deliberately insulted someone.* | ○ | ○ | ○ | ○ |
| *I shouted at someone.* | ○ | ○ | ○ | ○ |
| *I encouraged others to think badly of a person I didn't like.* | ○ | ○ | ○ | ○ |

# D2M Analyses

- Machine learning
  - E.g. can we predict momentary acts of aggression?
- Dynamic SEM (DSEM)
  - Derive individual-level indices of daily life functioning e.g.,
    - Negative emotion levels
    - Emotional reactivity
    - Emotional lability
    - Behavioural reactivity (aggression in response to provocation)
    - Etc…
  - Link these to main survey data e.g., depression symptoms, aggression levels

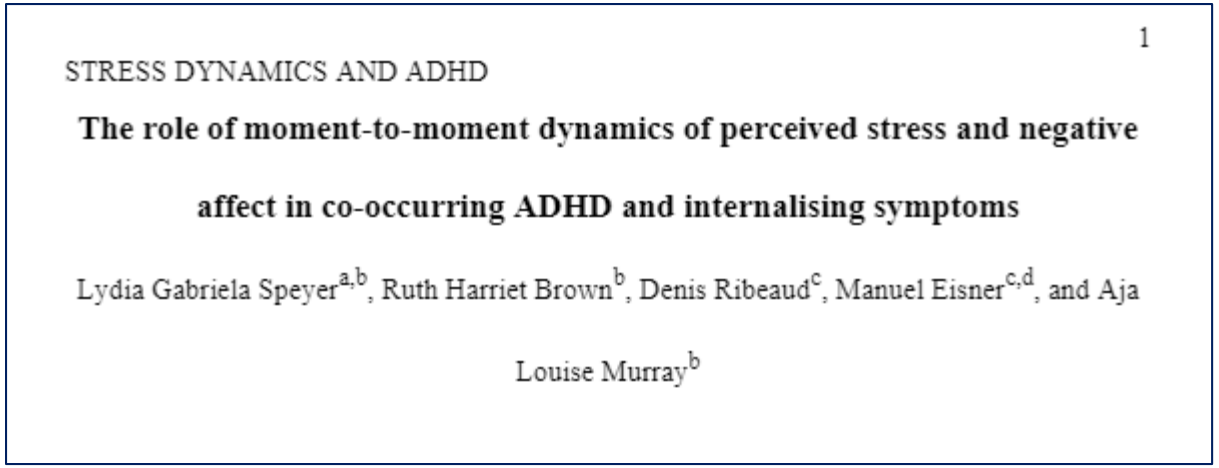


# Two main strands to D2M papers

- Methodological:
  - Multi-timeframe methodology
  - Aggression measure development + validation
  - Stress measure validation
  - Predicting participation
  - Predicting compliance
    - prompt-wise
    - overall
- Mental health & aggression:
  - ADHD and co-occurring issues
    - Internalising problems
    - Aggression
    - Substance use
  - Teacher relationships & emotion regulation
  - Predicting  momentary aggression with machine learning

# Example findings: ADHD & co-occurring issues

- Anxiety & depression commonly co-occur with ADHD symptoms
- Proposed inter-linked mechanisms include:
  - Increased stress levels  (e.g., more dependent life events)
  - Poorer emotion regulation (e.g., higher reactivity to stressors, greater lability)
- Little research on ‘daily life’ stress & emotion processes associated with ADHD symptoms



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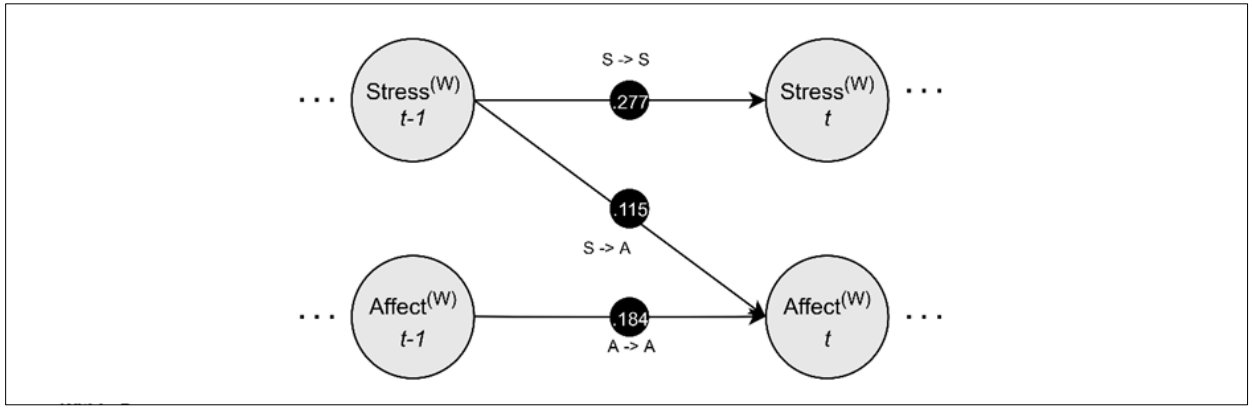
STRESS DYNAMICS AND ADHD

**The role of moment-to-moment dynamics of perceived stress and negative affect in co-occurring ADHD and internalising symptoms**

Lydia Gabriela Speyer[a,b], Ruth Harriet Brown[b], Denis Ribeaud[c], Manuel Eisner[c,d], and Aja Louise Murray[b]

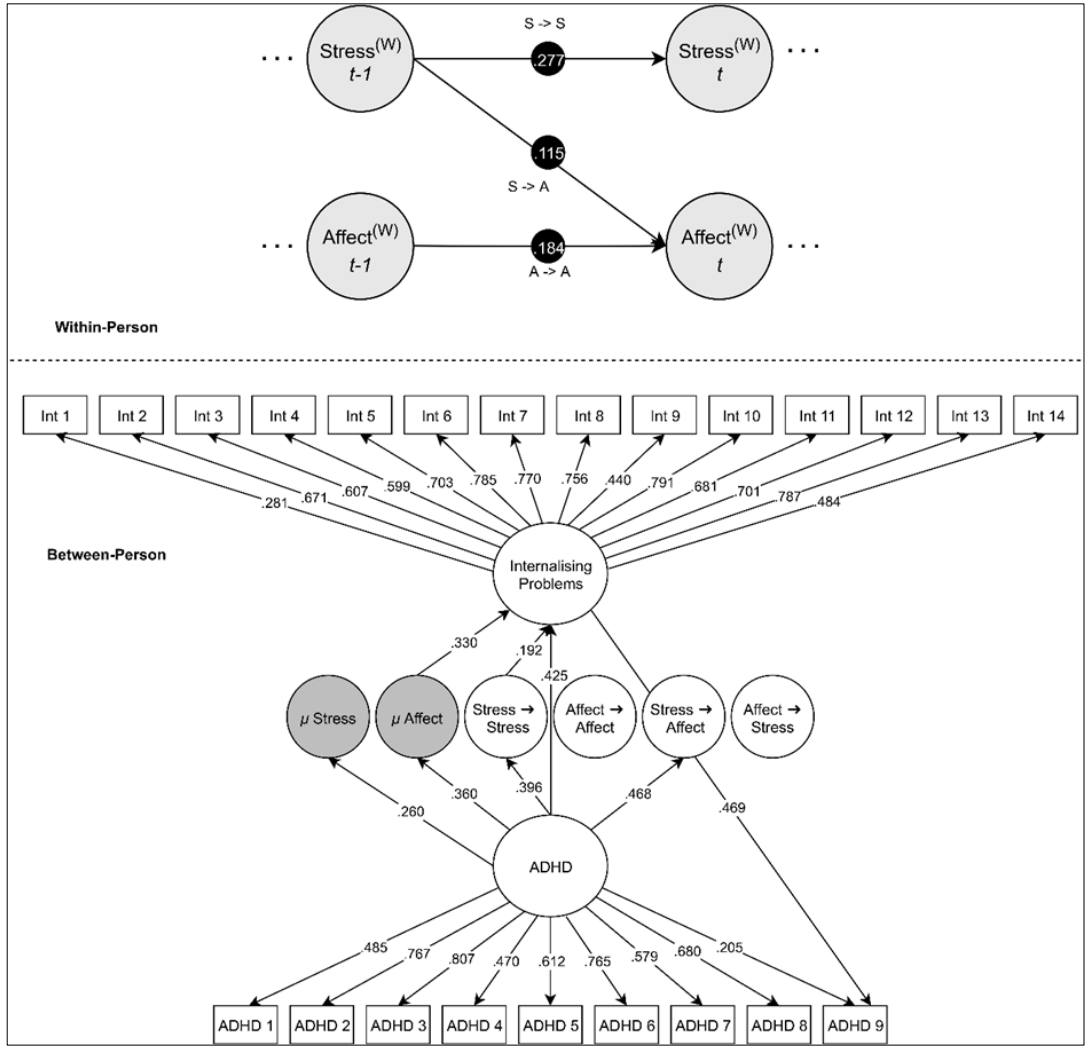
*Pre-print at: [https://psyarxiv.com/d5u38](https://psyarxiv.com/d5u38)*
*Published version in JADD*

# Analysis



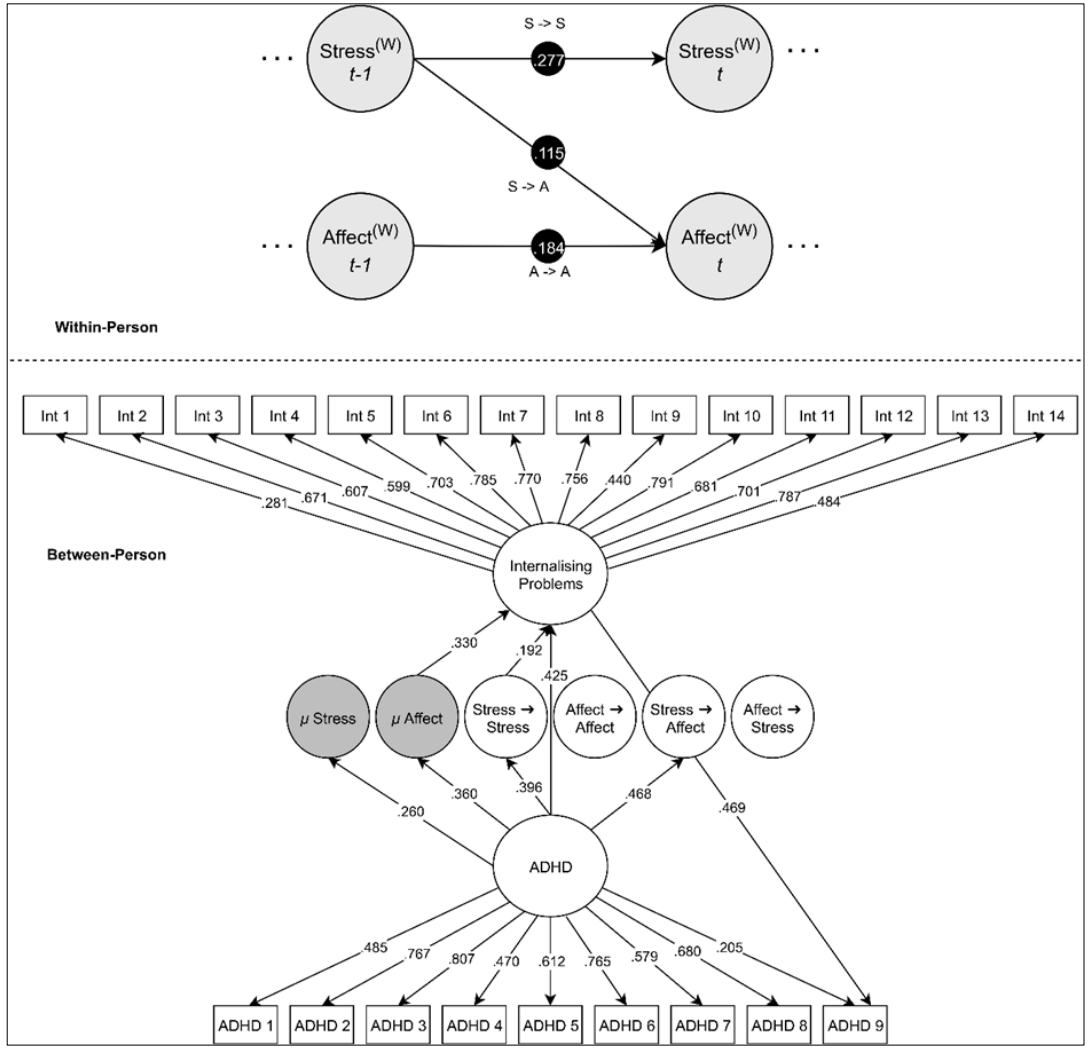

- Using DSEM, for each participant derived measures of:
  - Stress **levels**
  - Negative affect **levels**
  - Strength of **links** between stress and subsequent negative affect
  - Strength of **links** between negative affect and subsequent stress
  - **Persistence** of stress
  - **Persistence** of negative affect

# Results



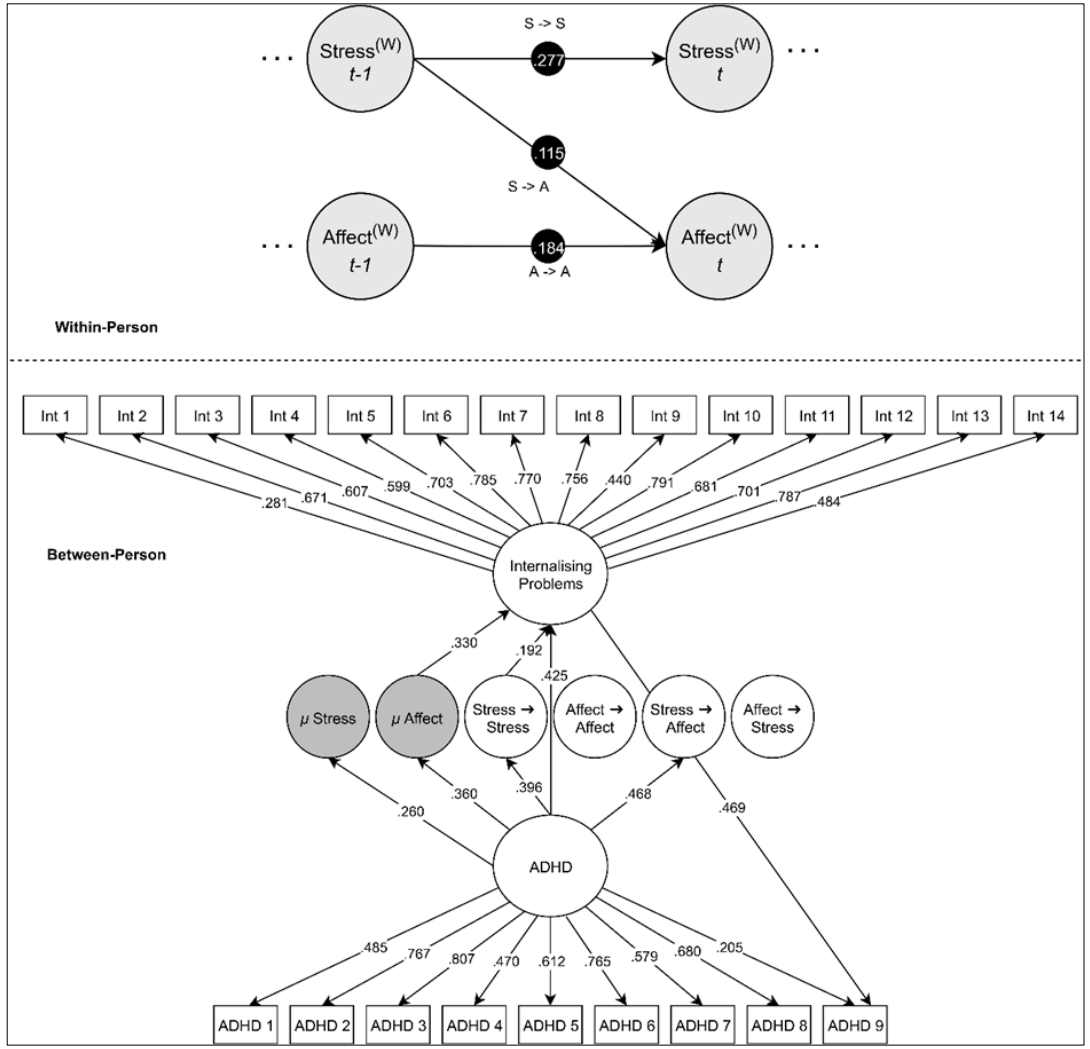

- Those with higher ADHD symptoms had:
  - Higher levels of daily life stress
  - Higher levels of daily life negative affect
  - Stronger persistence of stress over time
  - Stronger links between stress and later negative affect

# Results




- Those with higher internalising problem symptoms had:
  - Higher levels of daily life negative affect
  - Stronger persistence of stress over time
  - Higher levels of ADHD symptoms

# Results



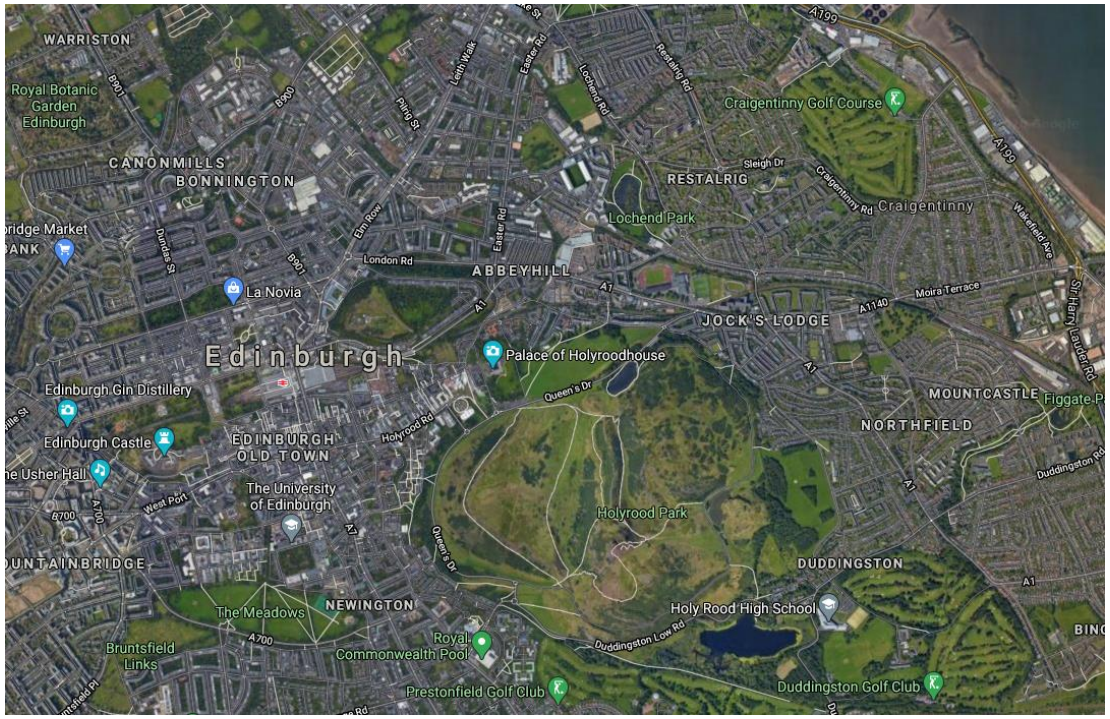

- Two daily life emotion processes linked ADHD symptoms and internalising problems
  - Higher daily life negative affect levels
  - Higher stress persistence

# Implications

- Together w/ other findings from D2M, suggest that levels of ADHD symptoms associated w/ more difficulties in daily life:
  - stress management
  - emotion regulation
  - negative mood
  - aggression
- Some of these may be associated with development of commonly co-occurring issues in ADHD

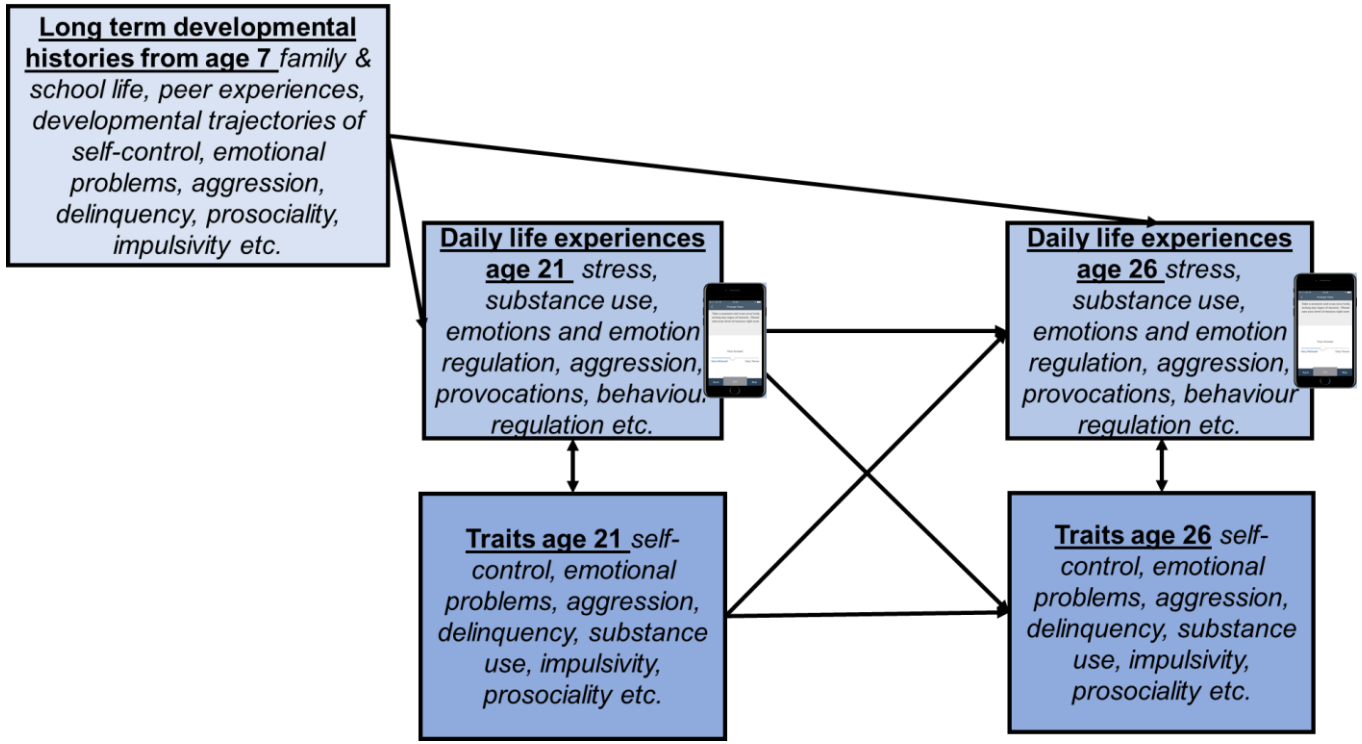
# Future (in prep) papers

- Place-based influences on mental health
  - Link EMA survey measures to greenspace using GPS
- Daily life emotion regulation processes transdiagnostic factors in mental health
  - Negative affect, lability, reactivity links to anxiety, depression, psychosis, externalising problems etc.
- Victimisation experiences in childhood/adolescence & links to daily life emotion & stress regulation in adulthood



# D2M wave 2

- Further wave of main survey + 2nd Wave of D2M




**Funded by Leverhulme Trust**

# Future RQs that can be answered

- Explore *reciprocal links* between **daily life experiences & long-term development** in context of developmental histories from age 7
  - *How do daily life experiences coalesce into long-term changes in mental health?*
    - *E.g., Does cumulative daily life stress lead to increases in anxiety and depression over time?*
  - *How do long-term changes in traits impact on daily life behaviour?*
    - *E.g., Do gains in self-control over development translate into better daily life emotion and behaviour regulation, lower aggression, lower substance use etc.?*

# Real-world implications

- **Emotion regulation** is a key target for intervention in ADHD to prevent development of co-occurring issues

- **Digital interventions** are popular in mental health; however, compliance is a major problem
  - D2M identified momentary & individual characteristics that can be leveraged to improve engagement

# For more info on D2M…

- Check out our OSF project with materials, code, and pre-prints of publications:

https://osf.io/5bhp9/

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