Dynamics of Affect Modulation in Neurodevelopmental Disorders - DynAMoND

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and DynAMoND Consortium

Background

- Attention deficit/hyperactivity disorder (ADHD), bipolar disorder (BipD) and Borderline Personality Disorder (BPersD) are frequent neurodevelopmental disorders that emerge during childhood or adolescence and have a long-lasting trajectory into adulthood, where they often persist.
- ADHD, BPersD and BipD are characterized by abnormalities in affect regulation starting early in development:
  - BipD is characterized by episodic occurrence of mania or depression, long-lasting mood states with little variation within them.
  - In ADHD and BPersD, patients have difficulties in regulating their immediate emotions (1). This results in short-term mood fluctuations, often triggered by external stimuli, with high frequency and of comparably low amplitude.
- However, this seemingly clear picture is blurred by the fact that both types of affect fluctuations can be found within one patient. Empirical data that distinguishes between these phenomena is lacking.
- **The Modified DynAffect Model (figure 1):**
  - 3 dynamical properties of affect dynamics are capable of explaining individual differences in temporal patterns and trajectories :
    - **Homebase**: attractor of the dynamic system - people having most often good or bad mood
    - **affective variability**: amount of reactivity to external and internal events
    - **attractor strength**: How strong or rigid affective variability is regulated back to the attractor

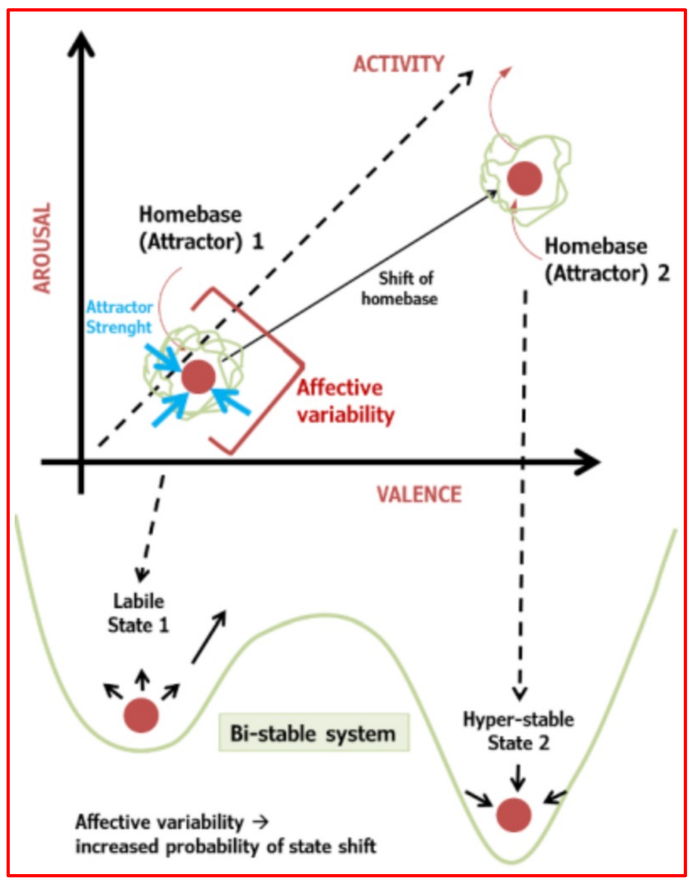

Figure 1. **Modified DynAffect Model** (mod. from 2) on the background of a bistable, double well potential. We propose that ADHD and BPersD are characterized by larger affective variability and lower attractor strength. In depression or mania, the affective homebase (=attractor) itself shifts. The original homebase as well as the shifted homebase (=mood episode) can be interpreted as two separate states in a bi-stable system featuring a double well potential, i.e., the transition between both states requires increased variability to enable the switch to the other "locked" state. In major mood episodes (especially in BipD), variability is lower and attractor strength is higher so that transition probability to the "normal" homebase is low.

Objectives

1) To characterize all components of the *Modified DynAffect Model*, namely *homebases*, *affective variability* and *attractor strength* (shared and specific) in ADHD, BipD and BPersD and healthy controls as control group (figure 3).
2) To investigate the influence of stressor exposure (both macro- and micro-stressors, measured with high granularity) and sleep therein.
3) To examine the contribution of polygenic risk factors for depression, ADHD, BipD, BPersD, Neuroticism, and resilience therein.
4) To carry out these objectives, we will carefully characterize patients clinically, and densely measure affect fluctuations using EMA and established online tools.

Materials and Methods

- **Study design**
  - This is a multicenter study including 5 centers, in Germany, Switzerland, Spain, Italy and Norway.
  - A baseline visit (T1) is followed by a one-year continuous assessment with interim assessments, five measurement bursts and a close out visit after one year (T2; figure 2).
  - In each group, 120 participants are planned (figure 3). Recruitments started in March 2023 and is expected to be completed in 2025.

- **Inclusion criteria**
  - Diagnosis of current and lifetime ADHD along DSM-5 criteria, established using the DIVA-5 interview
  - Diagnosis of BipD of any polarity including euthymia according to DSM-5
  - Diagnosis of BPersD according to DSM-5 using the SCID-5-PD BPersD part
  - Healthy participants without psychiatric illnesses will be included as control group.

- **Exclusion criteria:**
  - Significant neurological and mental disorder, acute suicidal ideation upon inclusion, less than 6 years of regular schooling, current dependency of alcohol or illicit drugs
  - Pregnancy upon inclusion, severe somatic illnesses

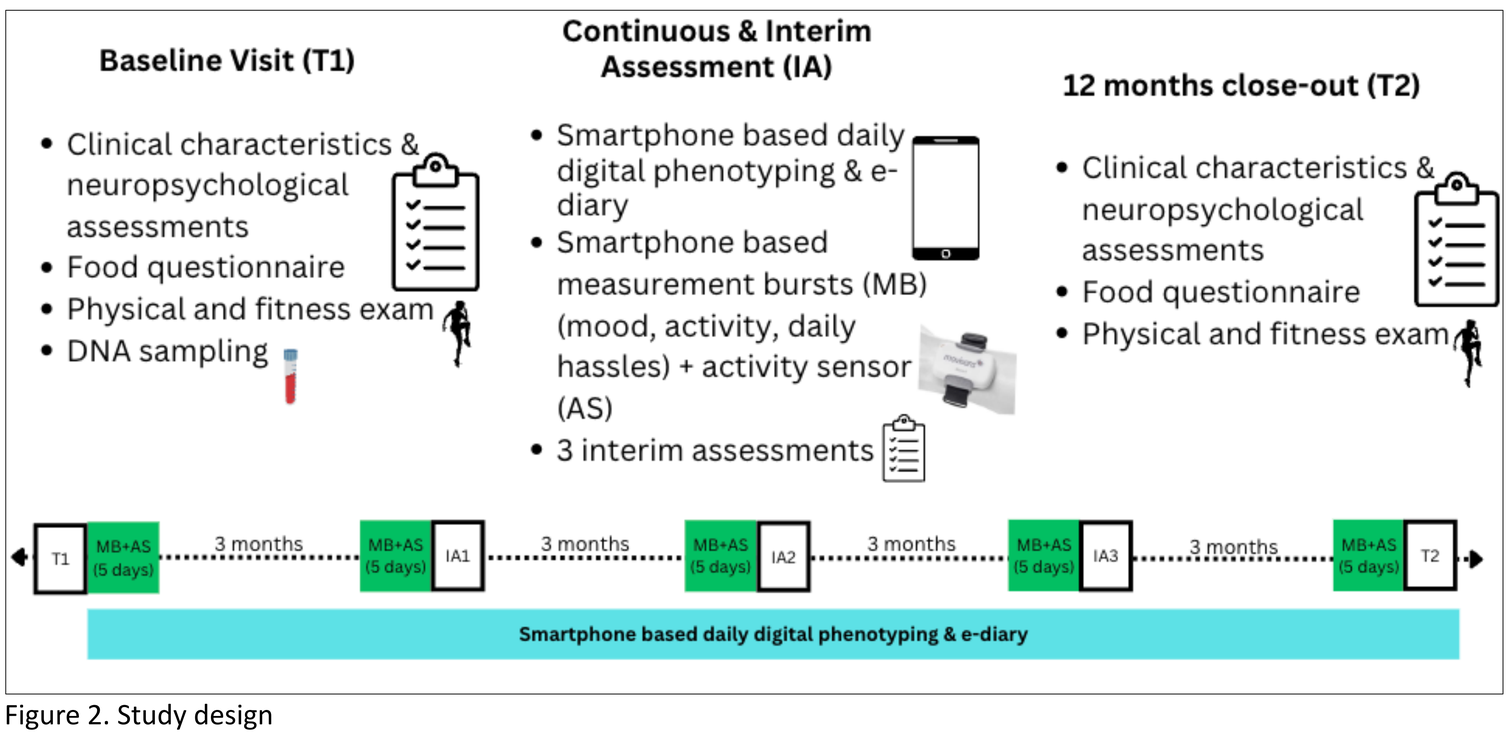

Figure 2. Study design

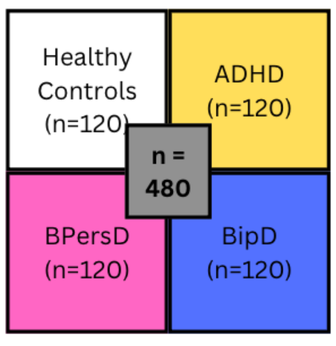

Figure 3. Planned numbers of participants in each group

References & Disclosures

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The presenting author has no conflict of interest to declare.

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