Puberty, Brain Structure and Depressive Symptoms in Adolescent Girls

**Introduction**

- Adolescence is an important stage in the transition from childhood to adulthood, associated with an increasing range of problems, including depression (Dahl, Gunnar, 2009).
- One quarter of adolescents will experience major depressive disorder by the end of their teens (Kessler et al. 2001).
- Incidence of depression is same across sex during childhood, but twice as common in girls following puberty.
- There is also significant brain development during adolescence, including structural changes in cortical and subcortical areas that are implicated in emotional reactivity and regulation. These changes have been linked to pubertal development in human and animal research.
- Neurobiological mechanisms are hypothesized to be partly responsible for the association puberty and depressive symptoms in adolescents.
- The aims of this study are to better understand the association between puberty and structural brain development (Aim 1), depression and brain structure (Aim 2), and depression and puberty (Aim 3), during the transition to adolescence.

**Methods**

Recruitment: letters distributed by schools in the greater Eugene/Springfield area, UO Department of Psychology's Developmental Database, DSN lab website, flyers posted around community or at community events/organization.

Demographics: Sample: 130 females >> 62 analyzed
Mean: 11.78
SD: 0.685

Measures: Structural MRI, Pubertal Development Scale (PDS), Center for Epidemiologic Depression Scale – Child (CESD)

**Aim 1: Puberty and Brain Structure**

**Aim 2: Depression and Brain Structure**

**Aim 3: Depression and Puberty**

**Results**

**Discussion**

- **Aim 1:**
  - With increasing pubertal maturation, size of cortical brain structures decreased. The only exception was the pallidum, a subcortical structure, that increased in size.
  - Similar findings when examining pubertal timing relative to same-aged peers.

- **Aim 2:**
  - With increasing depressive symptoms, the size of many cortical structures increased. But the opposite pattern was identified for the insula.
  - Insula is believed to process convergent information to produce emotionally relevant context for sensory experience.

- **Aim 3:**
  - Positive association between puberty and depressive symptoms.
  - A mediation model failed to identify an indirect path between puberty and depression via insula structure.

**Future studies:** Examine role of pubertal hormones on these associations.

**Citations**


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