Making its annual appearance at the Brain Fair, the Developmental Brain Imaging Lab (DBIL) joined other local scientists and educators to share knowledge of the brain with visitors of the Oregon Museum of Science and Technology (OMSI). DBIL answered questions about the use of magnetic resonance imaging (MRI) to study the human brain, invited others to participate in fun activities, and discussed its research at the lab. We also recruited for our ongoing studies to help more individuals with interests in brain research get more involved.

Thank you for reading our most recent newsletter! Through this annual medium we hope to share our recently published research, updates about DBIL in the community, and new direction for projects and recruitment.

To learn more about our current research and paid participation opportunities, contact us!

Phone: (503) 494-0641
Fax: (503) 418-8416
Email: dbil@ohsu.edu
www.ohsu.edu/dbil

Like us on Facebook! fb.com/ohsudbil
Sensation seeking (SS), a trait leading individuals to seek out novel and intense sensations and experiences, increases during adolescence. This transitional period in development is characteristic of increased risk taking, often reflected by elevated alcohol and drug experimentation, unsafe sexual activity, and reckless driving. We examined brain activity during reward processing in high and low sensation seekers and found significant group differences in the insula and prefrontal cortex, regions associated with emotion, inhibition, and higher order functioning – characteristics noted to be underdeveloped in adolescence. We found that the high SS group showed decreased brain response to a lack of reward in the insula and prefrontal cortex, suggesting a decreased sensitivity to reward absence. This may indicate that high SS youth have a reduced ability to assess the consequences of their decisions or reduced emotional arousal to lack of reward. As our findings parallel those of adults; brain response to rewards may be less dependent on age, and more on individual personality traits such as SS. These results suggest a need for continued research, which could ultimately lead to preventative strategies aimed at reducing risky behaviors among adolescents.

**Does testosterone drive the sex differences in spatial working memory?**

Adolescence is a critical period for the neurological development of many executive function including spatial working memory. Spatial working memory (SWM) is the ability to store information about the world around you for a limited amount of time. There has been some early research on the differences between boys and girls in the areas of visual-spatial skills suggesting testosterone plays a role in the development of SWM. A random sample of adolescent boys and girls were given a SWM task during an fMRI (functional magnetic resonance imaging) scan. We examined areas of the brain that were implicated in SWM and we discovered that there were differences in BOLD (blood oxygen level-dependent) activation in those regions between boys and girls. However, there was no link between BOLD activation during working memory tasks and the resurgence of testosterone in boys during adolescence. There was also no statistically significant difference between boys and girls on performance of SWM task. We speculated that chromosomal and environmental factors might be responsible for the differences in BOLD activation in certain areas of the brain implicated in SWM between boys and girls. It is also possible that other sex hormones may be responsible for the development of SWM.

**RECENT PUBLICATIONS**

How do high and low sensation seeking adolescents differ in the brain?
