

## Sample- Research Proposal

### Background

Our capacity to recognize emotions and empathize with others is often thought of as something we learn in childhood, but research has shown that there is a relationship between facial mimicry (*unconscious copying of another's facial expression*), emotion recognition and self report empathy scores. Brain imaging studies suggest that mimicry, emotion recognition and empathy have a shared neural basis. These findings mean that instead of emotion recognition and empathy being simply a learned trait they may in fact have a biological basis. In addition, the regions of the brain that are shown to underlie emotion recognition and empathy also align with areas of the brain that are influenced by hormones both prenatal (before birth) (Goldstein et al., 2001) and circulating (current hormones). A recent study even showed that increasing circulating testosterone, decreases facial mimicry in females (Hermans et al., 2006), which indicates that females and more specifically females with lower testosterone may have better facial mimicry and thus better emotion recognition and empathy than males and females with higher testosterone levels.

**Objective:** The objective of this research is to examine the relationships between prenatal testosterone exposure (measured by the 2D:4D ratio) and facial mimicry, emotion recognition, and self-reported empathy in females between the ages of 18-25 years.

**Method:** *Step 1:* measure the 2<sup>nd</sup> and 4<sup>th</sup> digit (finger) on each hand of the participants to get the 2D:4D ratio. *Step 2:* we will induce facial mimicry by having participants passively watch videos of the six primary emotions (happiness, anger, fear, surprise, disgust, sadness). *Step 3:* we will have participants watch the videos and identify the emotion they are viewing. While the participants are doing both step 2 & 3 they will be recorded by a hidden camera. *Step 4:* video is reviewed so that each participants facial expressions can be analyzed to determine their level of mimicry.

**Expected results:** I hypothesize that participants who have higher prenatal testosterone will have poorer facial mimicry and emotion recognition compared to those who have lower prenatal testosterone.

**Impact:** By understanding the role that prenatal sex hormones, specifically testosterone, have on the development of emotion processing, we can gain a better understanding of how individual differences in emotion processing arise. Through understanding individual differences in emotion processing we will be better able to understand complex neurological conditions like autism.