

Mara Canen: Psychology

Mentor: Rebecca Brooker -- Psychology

ERN AND THETA DYNAMICS: LINKS WITH ANXIETY RISK IN PRESCHOOLERS

The Error Related Negativity is a neural marker for error monitoring (Botnivick et al., 2001) that has been linked to anxiety risk in children (Torpey, Hajcak, & Klein, 2009) and adults (Olvet & Hajcak, 2008). However, this finding has been inconsistent. For example, more negative ERN amplitudes are related with increased anxiety in children over age 12, but not under age 12 (Meyer et al., 2012). The neural dynamics underlying childhood ERN are also unknown. In this study, we investigate interactions between ERN and the Theta frequency band, which is associated with attentional control (Jensen & Tesche, 2002) as contributors to childhood anxiety risk. We recorded EEG from 59 3.5 year old children ($M=3.56$, $SD=0.35$) during a modified Go-No-Go task. A repeated measures ANOVA and follow-up tests revealed a significant ERN at Fz, FCz, and Cz, but not Pz ($F(3,168)=2.93$, $p=.04$). Theta power was visible for both correct and incorrect trials ($F(4,54)=20.798$, $p<.05$). Parents reported on children's anxious behaviors such as social inhibition and withdrawal and asocial behaviors with peers. Greater Theta power during incorrect trials predicted greater anxiety risk ($B=1.31$, $p<.05$); however, this association was moderated by ERN ($B=.11$, $p=.04$) such that when ERN was small, theta negatively predicted anxious behaviors ($B=1.19$, $p=.04$). Theta and anxious behaviors were unrelated when ERN was large ($B=-.87$, $p>.05$). The current study provides evidence that ERN and theta may jointly contribute to anxiety risk in early childhood.