

### Online Supplement (analyses for the full male + female sample)

As shown in Online Supplement Table 1, groups did not differ on age. As shown in Online Supplement Table 1, and as expected, whereas IQ scores were significantly higher in TDC than ASD, Social Responsiveness Scale (SRS) scores were higher in ASD than TDC.

#### *PAF group differences and associations with age*

A t-test showed a higher PAF in ASD (9.92 Hz) than TDC (9.53 Hz),  $t(343) = 3.26$ ;  $p = 0.001$ . Simple effect analyses of a significant interaction term indicated significant group slope differences,  $F(1,341) = 9.33$ ,  $p = 0.002$ , with a positive relationship between age and PAF in TDC ( $r = 0.47$ ,  $p < 0.001$ ) and a very weakly trending age and PAF relationship in ASD ( $r = 0.12$ ,  $p = 0.09$ ). In TDC, the PAF increased at the rate of 0.17 Hz per year (standard error 0.03 Hz) and thus predicted a PAF of 8.91 Hz in 6-year-old TDC and 9.93 Hz in 12-year-old TDC. In ASD, the PAF increased at a rate of .05 Hz per year (standard error 0.03 Hz) and thus predicted a PAF of 9.73 Hz in 6-year-old children with ASD and 10.33 in 12 year-old children with ASD.

Examination of Online Supplement Figure 1 shows that given an age-related change in PAF in TDC but not ASD, the ASD > TDC PAF finding is most representative of the children between 6- and 10-years-old, with similar PAF values observed between the ages of 10 and 14 years, and with some indication of lower PAF values in ASD than TDC in the children above 14 years. Exploratory analyses examining group differences in the children below or above 10-years of age indicated large group-difference effects in the younger TDC (9.09 Hz) than younger children with ASD (9.79 Hz) ( $t(186) = 4.77$ ,  $p < 0.001$ ; Cohen's  $d = 0.71$ ), and no group differences in the older TDC (10.21 Hz) and ASD (10.04), ( $t(155) = 0.97$ ,  $p > 0.05$ ). Of note, the PAF group differences in younger participants may slightly overestimate the true group-difference effect as in the younger group the children with ASD (8.25-years-old) were slightly but significantly older than the TDC (7.92-years-old),  $t(186) = 2.15$ ,  $p < 0.05$ ).

#### *3.2 Associations between clinical measures and PAF*

Regressions were run with cognitive scores or SRS or ADOS CSS scores as the dependent variable and PAF entered in the first block, group in the second block and the interaction term last. Considering FSIQ, simple effect analyses of a significant interaction term,  $F(1,336) = 4.47$ ,  $p < 0.05$ , showed a marginally significant positive relationship between PAF and FSIQ in ASD ( $p = 0.07$ ) but not TDC ( $p = 0.20$ ). Considering VIQ, simple effect analyses of a significant interaction term,  $F(1, 338) = 4.21$ ,  $p < 0.05$ , showed a very weakly trending negative correlation between PAF and VIQ in TDC

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and no significant associations between PAF and VIQ in ASD ( $p > 0.05$ ). In contrast to the male-only sample, as shown in Online Supplement Figure 2a, PAF and NVIQ analysis revealed no significant interaction ( $p > 0.05$ ). Considering processing speed, and as shown in Online Supplement Figure 3a, simple effect analyses of a significant interaction term,  $F(1,252) = 5.80$ ,  $p < 0.05$ , showed a positive relationship between age and processing speed in TDC ( $p < 0.01$ ) but not ASD ( $p > 0.05$ ).

Separately examining the younger and older groups, significant associations between PAF and FSIQ ( $p < 0.05$ ) and NVIQ ( $p < 0.05$ ) as well as a marginally significant association with VIQ ( $p = 0.07$ ) were observed only in the older TDC (shown in Online Supplement Figure 2b subplots for NVIQ). In contrast, associations between PAF and processing speed were observed only in the younger TDC (shown in Online Supplement Figure 3b subplots for processing speed).

Finally, regarding SRS and ADOS CSS, analyses separately examining each group showed no associations with PAF ( $ps > 0.05$ ).

**Online Supplement Figure Legends**

Online Supplement Figure 1. Scatterplots showing associations between age (x axis) and peak alpha frequency (y axis) for full sample TDC (blue) and ASD (red). \*\*\* $p < 0.001$

Online Supplement Figure 2. (a) Scatterplots showing associations between non-verbal IQ (x axis) and peak alpha frequency (y axis) for full sample TDC (blue) and ASD (red). (b) Non-verbal IQ and peak alpha frequency associations shown for the younger (< 10-years-old; left plot) and older children (>10-years-old; right plot). \* $p < 0.05$

Online Supplement Figure 3. (a) Scatterplots showing associations between processing speed (x axis) and peak alpha frequency (y axis) for full sample TDC (blue) and ASD (red). (b) Processing speed and peak alpha frequency associations shown for the younger (< 10-years-old; left plot) and older children (>10-years-old; right plot). \* $p < 0.05$ , \*\*  $p < 0.01$