Supplementary Materials

Missing data analysis took three forms, first we created three dummy variables indicating whether there was data missing for mother, father, or teacher. We tested whether splitting the sample by any of these groups resulted in significant differences between the variables used in the study. For example, we could use the dummy variable to test whether mother ratings of CU traits differed depending on whether father data was present or not. This analysis was carried out using a pair of one-way ANOVAs. There were no significant differences in CU, harsh parenting, warmth, paternal psychopathy, or paternal mental health. However, there were differences in maternal reports of psychopathy, such that maternal primary psychopathy was higher for cases in which either father or teacher data was missing. Likewise, maternal secondary psychopathy and maternal psychopathology was higher for cases in which no father data was available.

Table 1S. Differences between groups given missing data

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Missing Teacher Data | | | Missing Father Data | | |
|  | Data Present:  Mean (SD) | Data Missing:  Mean (SD) | F (*p)* | Data Present:  Mean (SD) | Data Missing:  Mean (SD) | F (*p)* |
| CU traits – Mother | 5.30 (2.17) | 4.83 (2.26) | 2.44 (.120) | 5.29 (2.20) | 4.88 (2.19) | 2.00 (.159) |
| CU traits – Father | 5.31 (2.26) | 5.23 (2.18) | 0.04 (.840) | - | - | - |
| CU traits – Teacher | - | - | - | 5.44 (2.27) | 5.81 (2.52) | 0.96 (.328) |
| **Mother Primary Psychopathy** | **22.63 (5.76)** | **24.51 (6.76)** | **5.21 (.023)** | **22.61 (5.88)** | **24.38 (6.36)** | **4.98 (.026)** |
| Father Primary Psychopathy | 25. 83 (6.63) | 25.46 (6.94) | 0.10 (.752) | - | - | - |
| Mother Secondary Psychopathy | 18.99 (4.37) | 18.96 (4.28) | 0.01 (.959) | **18.66 (4.47)** | **19.91 (3.84)** | **4.80 (.029)** |
| Father Secondary Psychopathy | 25.83 (6.63) | 25.46 (6.94) | 0.33 (.568) | - | - | - |
| Mother Warmth | 22.56 (4.49) | 21.36 (5.20) | 3.46 (.064) | 22.59 (4.56) | 21.39 (4.93) | 3.74 (.054) |
| Father Warmth | 20.19 (5.29) | 20.24 (5.67) | 0.01 (.963) | - | - | - |
| Mother Psychopathology | 33.61 (28.76) | 30.43 (30.10) | 0.64 (.425) | **30.93 (27.87)** | **38.56 (31.72)** | **4.00 (.046)** |
| Father Psychopathology | 28.16 (25.31) | 25.81 (22.68) | 0.29 (.591) | - | - | - |
| Mother Harsh Parenting | -0.001 (0.58) | 0.004 (0.59) | 0.01 (.950) | -0.007 (0.54) | 0.024 (0.67) | 0.17 (.680) |
| Father Harsh Parenting | -0.014 (0.57) | 0.062 (0.63) | 0.56 (.454) | - | - | - |

Second, we analysed whether the parent’s marital status was associated with CU traits. We did this by creating a dummy variable which split CU traits into either high (score of 8 or higher in any rater’s report of CU traits), or low. The cut-off of eight was chosen as it represented a score above the 75th percentile for the sample. The low CU group consisted of 201 individuals, while the high CU group consisted of 102 individuals. This allowed us to use marital status in a chi-square analyses to compare whether differences in household structure were associated with a high severity of CU traits. Marital status was coded into six categories: married, de facto, separated, divorced, single, and other. No significant differences between groups were observed: X2 (5) = 9.75, *p* = .083.

In contrast, a chi-square analysis using fathers’ missing data and marital status was significant X2 (5) = 77.63, *p* < .001, indicating that for most of the cases in which data is present (88.2%) the couple is married. In contrast, missing data is divided into three categories: separated (35.1%), married (29.9%) and divorced (20.8%). It is unclear why a third of fathers’ missing data comes from married couples, as the clinic’s standard procedure is to contact both family members. However, it seems unlikely that fathers’ missing data constitutes a homogenous category which is being ignored in the analyses, rather these results support the notion that there is a diverse range of factors limiting father participation in parenting programs (Tully et al., 2017).

Third, we re-ran the analysis including only those families in which the father was present. However, note that due to the nature of the analyses whenever both father and mother variables were included the models were already constrained by SPSS into those families with both father and mother data. For example, in Table 3 of the study there are four models, following a 2x2 design: DVmothers x IVmothers, DVmothers x IVfathers, DVf athers x IVmothers, DVfathers x IVfathers. Out of these, only the first model changed, as the sample size was reduced from 296 to 220. Results from this model are presented below in Table 2S. This model shows similar relationships to those present in the study above, with standardized beta weights of similar magnitude and direction for factor 2 psychopathy, although these results are not statistically significant. Moreover, note that maternal psychopathy was higher in cases with missing father data, as shown in Table 1S, and that a greater variance in psychopathy scores may have been necessary to discern the effects of factor 1 vs. factor 2. As in our main results, the introduction of warmth to the model in the second block attenuated the relationship between factor 2 scores and CU traits. Finally, the restricted sample was split by gender (boys n = 157, girls n = 62), which revealed that the mother’s factor 2 (but not factor 1) psychopathy was a significant predictor of boys’ CU traits in the first block of the regression, but not the second. This relationship was not replicated for girls.

Table 2S. Mother variables predicting mother-rated CU traits, only including mothers from households with father data.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Mother-Rated CU Traits | | |
|  | Variables | B (Std. Error) | t | *p* |
| 1 | Constant | - | 5.19 | <.001 |
|  | Factor 1 | .10 (.03) | 1.32 | .190 |
|  | *Factor 2* | *.10 (.04)* | *1.24* | *.218* |
| 2 | Constant | - | .82 | .412 |
|  | Factor 1 | .15 (.03) | 1.89 | .061 |
|  | Factor 2 | .01 (.04) | .14 | .893 |
|  | Harsh Parenting | .01 (.03) | .20 | .841 |
|  | **Warmth** | **.26 (.03)** | **3.57** | **<.001** |
|  | Psychopathology | -.02 (.01) | -.29 | .771 |
|  | Age | .03 (.05) | .47 | .641 |

As missing data analyses found no differences in children’s CU traits depending on whether father or teacher data was included, we think it is appropriate to move on with the analyses. Although we found significant differences in maternal scores, both of these groups are included in the analysis, and further investigation into this difference is beyond the scope of the current analysis.