Comparing Correlations Between Groups and Caregiver Roles

According to family systems theory (e.g. Whitchurch and Constantine, 1993), families comprise interdependent subsystems, and the stress and emotions experienced in one subsystem (e.g. partner relationship) influence behaviors and feelings in other family subsystems (i.e. parent–child relationship) (Stroud *et al.*, 2011). This means that parental stress, psychological adjustment and relationship satisfaction not only affect the behavior and feelings of the parents but also those of the offspring. This mechanism is called a spillover effect, and it explains why children's physical, emotional, cognitive and social functioning are strongly influenced by how their parents function (Nelson *et al.*, 2009).

In line with this theory, we assumed that parental stress would be associated with the parents' psychological adjustment and partner relationship satisfaction. Therefore, we also assessed whether these associations between parental stress and psychological adjustment and partner relationship satisfaction varied across the three family types and across caregiver roles.

Materials and Methods

Analysis Plan

The SEMs were fitted using R statistical software (version 3.3.3) with the *lavaan* package (version 0.6-1; Rosseel, 2012). In each analysis, a likelihood ratio test (LRT) statistic was used, calculated as −2 times the natural log of the difference in likelihoods of the data under a less constrained versus a more constrained model. Under the assumption of multivariate normality, the LRT statistic is asymptotically distributed as a χ^2 random variable with *df* equal to the number of additional constraints in the more constrained model (i.e. how many fewer parameters are estimated). To account for non-normality in some of the variables, the Yuan–Bentler scaled χ^2 statistic was used to compute robust LRTs. To account for small-sample bias (Nevitt and Hancock, 2004), χ^2 was multiplied by a correction factor $k = 1 − (2p + 5)/[6(N − 1)]$, where $P = 8$ variables and $N = 140$ observations (i.e. $k = 0.975$). Any χ^2 reported below (and in the main text) is the scaled, *k*-corrected statistic that is robust with respect to both non-normality and small sample size.

To test whether the correlations between parental stress and scores on each of the other three outcome measures (anxiety, depression and relationship satisfaction) varied among the three family types, an SEM was fitted in which each of the eight variables was used as a single indicator of a latent construct, by constraining their variances to zero and freely estimating their factor loadings (which represented the *SD*s). This model was also saturated, but because the variances of the latent constructs were fixed to one, the estimated covariances among the variables were standardized (i.e. correlations). Thus, the null

hypotheses regarding the group equivalence of correlations could be tested by constraining estimated correlations to be equal across groups. The saturated model estimated six separate correlations between parental stress and each outcome (i.e. for each of the two caregivers in each of the three groups), whereas the constrained model estimated only two correlations between parental stress and each outcome (one for the primary caregivers and another for the secondary caregivers in all groups); thus, these tests had 6−2 = 4 *df*. We controlled for the family-wise Type I error rate by testing each of the three correlations using a Bonferroni-corrected $\alpha = 0.05/3 = 0.0167$ as the criterion for statistical significance.

We also tested the equality of these correlations across caregiver roles. For these analyses, the saturated model estimated six separate correlations between parental stress and each outcome (i.e. for each of the two caregivers in each of the three groups), whereas the more constrained model estimated only three correlations between parental stress and each outcome (the same for both caregivers, separately within each family type); thus, these tests had 6−3 = 3 *df*. We controlled for the family-wise Type I error rate by testing each of the three correlations using a Bonferroni-corrected $\alpha = 0.05/3 = 0.0167$ as the criterion for statistical significance.

If any omnibus test was significant, three pairwise post hoc tests were conducted by constraining only a pair of groups means or covariances to equality at a time. Note also that means and correlations among outcomes were allowed to differ between caregiver roles, but equality constraints were imposed separately within each caregiver role. Thus, we implicitly controlled for any differences between caregiver roles (or, when testing caregiver roles, we implicitly controlled for family type).

Results

Table II in the original article shows the correlations among parental stress, anxiety, depression and relationship satisfaction for all parents. Parental stress was significantly associated with the two parental psychological adjustment variables (anxiety and depression), and with partner relationship satisfaction. Parents with high scores on anxiety and depression also had high scores on parental stress. Those parents with high scores on the GRIMS (which reflect a poorer relationship quality) had higher scores on parental stress.

Family Type

Analyses showed that the correlations between parental stress and anxiety were the same, regardless of family type, after controlling for caregiver role, $\chi^2(4) = 7.63$, $P = 0.106$. Similarly, the association between parental stress and relationship satisfaction (after controlling for caregiver role) was the same, regardless of family type, $\chi^2(4) = 6.29$, $P = 0.178$. However, the correlation between parental stress and depression differed significantly across family types, controlling for caregiver role, $\chi^2(4) = 26.99$, $P < 0.001$, so post hoc pairwise comparisons were tested using a further adjusted $\alpha = 0.0167/3 = 0.0056$. The