Appendix
Analyses of Measurement Equivalence

Table A1
Evaluation of measurement invariance assessment for all measures included in the study

| Model                        | WLSMV$\chi^2$ | df  | $\Delta\chi^2$ | $\Delta df$ | CFI  | RMSEA | RMSEA 90% CI |
|------------------------------|----------------|-----|----------------|------------|------|--------|--------------|
| The SDQ                      |                |     |                |            |      |        |              |
| Configural invariance        |                |     |                |            |      |        |              |
| 5-factor, 17-item congeneric model | 452.95***     | 219 |                |            | .920 | .061   | .053 – .069  |
| Metric invariance            |                |     |                |            |      |        |              |
| All factor loadings constrained equal except for loadings of items 2 & 24 | 457.88***     | 234 | 19.13$^a$      | 15         | .924 | .057   | .050 – .065  |
| Scalar invariance $^c$       |                |     |                |            |      |        |              |
| All factor loadings and intercepts constrained equal except for intercepts from items 2 & 24 | 484.51***     | 248 | 36.33***$^b$   | 14         | .920 | .057   | .050 – .065  |
| The perceived benefits scale |                |     |                |            |      |        |              |
| Configural invariance        |                |     |                |            |      |        |              |
| 1-factor, 11-item congeneric model | 452.62***     | 99  |                |            | .978 | .111   | .101 – .122  |
| Metric invariance            |                |     |                |            |      |        |              |
| All factor loadings constrained equal | 308.43***     | 110 | 11.75$^a$      | 11         | .988 | .079   | .069 – .090  |
| Scalar invariance $^c$       |                |     |                |            |      |        |              |
| All factor loadings and intercepts constrained equal except for intercepts from items 6, 10, & 11 | 307.74***     | 118 | 14.79$^b$      | 8          | .988 | .075   | .064 – .085  |
| The perceived barriers scale |                |     |                |            |      |        |              |
| Configural invariance        |                |     |                |            |      |        |              |
| 3-factor, 7-item congeneric model (item 5 removed) | 53.08***      | 29  |                |            | .973 | .054   | .030 – .076  |
| Metric invariance            |                |     |                |            |      |        |              |
| All factor loadings constrained equal | 55.25***      | 36  | 7.08$^a$       | 7          | .978 | .043   | .017 – .064  |
| Scalar invariance            |                |     |                |            |      |        |              |
| All intercepts constrained equal | 59.01***      | 43  | 5.75$^b$       | 7          | .982 | .036   | .000 – .057  |
Table A1 (continued)

| Model                                      | WLSMV $\chi^2$ | df | $\Delta \chi^2$ | $\Delta df$ | CFI  | RMSEA | RMSEA 90% CI |
|--------------------------------------------|----------------|----|-----------------|------------|------|--------|-------------|
| **The perceived severity scale**           |                |    |                 |            |      |        |             |
| **Configural invariance**                  |                |    |                 |            |      |        |             |
| 1-factor, (9-item congeneric model (with item 5 removed) | 125.02*** | 61 |                 |            | .976 | .060   | .045 – .075 |
| **Metric invariance**                      |                |    |                 |            |      |        |             |
| All factor loadings constrained equal except for items 1, 2, 3, & 8 | 128.27*** | 66 | 9.52$^a$        | 5          | .977 | .057   | .042 – .072 |
| **Scalar invariance** ^c                    |                |    |                 |            |      |        |             |
| All intercepts constrained equal except intercepts for items 1, 2, 3, & 8 | 130.37*** | 71 | 6.02$^b$        | 5          | .978 | .054   | .039 – .068 |
| **The perceived susceptibility scale**     |                |    |                 |            |      |        |             |
| **Configural invariance**                  |                |    |                 |            |      |        |             |
| 1-factor, (9-item congeneric model (with item 5 removed) | 135.74*** | 61 |                 |            | .971 | .066   | .051 – .081 |
| **Metric invariance**                      |                |    |                 |            |      |        |             |
| All factor loadings constrained equal except for items 1, 2, 3, & 8 | 124.19*** | 69 | 5.43$^a$        | 9          | .977 | .053   | .037 – .067 |
| **Scalar invariance** ^c                    |                |    |                 |            |      |        |             |
| All intercepts constrained equal except intercepts for items 1, 2, 3, & 8 | 126.05*** | 74 | 4.9$^b$         | 5          | .980 | .049   | .034 – .064 |
| **The self-efficacy scale**                |                |    |                 |            |      |        |             |
| **Configural invariance**                  |                |    |                 |            |      |        |             |
| 1-factor, (7-item congeneric model (with items 1, 4, & 9 removed) | 71.72*** | 31 |                 |            | .980 | .067   | .047 – .088 |
| **Metric invariance**                      |                |    |                 |            |      |        |             |
| All factor loadings constrained equal except for items 2, 6, & 7 | 74.86*** | 35 | 8.74$^a$        | 4          | .981 | .063   | .043 – .082 |
| **Scalar invariance** ^c                    |                |    |                 |            |      |        |             |
| All intercepts constrained equal except the intercepts for items 2, 6, & 7 | 147.79*** | 39 | 61.19***$^b$   | 4          | .948 | .098   | .082 – .115 |

All models based on $N = 570$ ($N = 284$ fathers and $N = 286$ mothers)

WLSMV $\chi^2$ = chi-square statistic from the robust weighted least squares estimator, df = degrees of freedom, CFI = comparative fit index, RMSEA = root mean square error of approximation, CI = confidence interval, SDQ = Strengths and Difficulties Questionnaire

*** $p < .001$

$^a$ as compared with the free estimated model

$^b$ as compared with the metric equivalence model

$^c$ subsequent tests did not provide support for partial scalar invariance
Summary of the results presented in Table A1

*The SDQ* The analysis indicated that the 5-factor, 17-item model fitted the data satisfactorily for both mothers and fathers. Eight items needed to be removed from the original model due to insignificant factor loadings or lack of associations with other items.\(^1\) The results supported partial metric invariance across mothers and fathers.\(^2\)

*The perceived benefits scale* The analysis indicated that the 1-factor, 11-item model showed satisfactory fit for both mothers and fathers. The results supported full metric and partial scalar invariance across mothers and fathers.

*The perceived barriers scale* The analysis indicated that the 3-factor, 7-item model fitted the data well for both fathers and mothers. One item needed to be removed from the model, due to insignificant factor loading.\(^1\) The results supported full metric and scalar invariance across mothers and fathers.

*The perceived severity scale* The CFA revealed that the 2-factor, 9-item model fitted the data well for both fathers and mothers. One item needed to be removed from the model due to insignificant factor loadings.\(^1\) The results supported full metric and scalar invariance across mothers and fathers.

*The perceived susceptibility scale* The analysis showed that the 2-factor, 9-item model fitted the data well for both fathers and mothers. One item needed to be removed from the model due to insignificant factor loadings.\(^1\) The results supported full metric and scalar invariance across mothers and fathers.

*The perceived self-efficacy scale* The analysis indicated that the 1-factor, 7-item model fitted the data well for both groups. Three items needed to be removed for the models due to insignificant factor loadings. The results supported full metric and scalar invariance across mothers and fathers.

\(^1\) For details, please contact the corresponding author.

\(^2\) Recent literature indicates that valid comparisons can be made if only partial equivalence is achieved (at least two indicators per latent variable are equivalent between groups; Byrne, B. M., & Watkins, D. (2003). The issue of measurement invariance revisited. *Journal of Cross-Cultural Psychology, 34*(2), 155-175. doi: 10.1177/0022022102250225).
3. Often complains of headaches, stomach aches, or sickness.

8. Many worries or often seems worried.

16. Nervous or clingy in new situations, easily loses confidence.

24. Many fears, easily scared.

5. Often loses temper.

7. Generally well behaved, usually does what adults request.

18. Often argumentative with adults.

22. Can be spiteful to others.

2. Restless, overactive, cannot stay still for long.

10. Constantly fidgeting and squirming.

15. Easily distracted, concentration wanders.

25. Good attention span, sees work through to the end.

19. Picked on or bullied by other children.

23. Gets along better with adults than with other children.

4. Shares readily with other children, for example toys, treats, pencils.

9. Helpful if someone is hurt, upset, or feeling ill.

20. Often volunteers to help others (parents, teachers, other children).

**Fig. A1**

Factor structure of the SDQ (Strengths and Difficulties Questionnaires) for mothers and fathers. Standardized factor loadings. Model fit: WLSMV $\chi^2 (234) = 457.88$, $p < .001$; CFI = .924; RMSEA = .057 95%CI (.050-.065); all models based on $N=284$ fathers and $N = 286$ mothers; all factor loadings significant at $p < .001$
How much do you agree with each of the following statements?

If I attend a parenting program...

1. I will become better at teaching my child skills such as sharing and assuming responsibility.
2. I can reduce the risk of my child developing problem behaviors later in life.
3. I will learn to encourage positive behavior in my child.
4. I will have a better relationship with my child.
5. I will learn to handle problems that my child may have.
6. I can help my child be more self-confident.
7. I can help my child do better at school.
8. My child will be less likely to have problems as a teenager.
9. I will be a better parent.
10. I will feel more confident as a parent.
11. I will have more tools to use while parenting.

**Perceived Benefits**

- 1. I will become better at teaching my child skills such as sharing and assuming responsibility. 
  - Factor loadings: M = .77, F = .81
- 2. I can reduce the risk of my child developing problem behaviors later in life. 
  - Factor loadings: M = .86, F = .88
- 3. I will learn to encourage positive behavior in my child. 
  - Factor loadings: M = .84, F = .86
- 4. I will have a better relationship with my child. 
  - Factor loadings: M = .85, F = .85
- 5. I will learn to handle problems that my child may have. 
  - Factor loadings: M = .88, F = .84
- 6. I can help my child be more self-confident. 
  - Factor loadings: M = .79, F = .84
- 7. I can help my child do better at school. 
  - Factor loadings: M = .85, F = .84
- 8. My child will be less likely to have problems as a teenager. 
  - Factor loadings: M = .84, F = .85
- 9. I will be a better parent. 
  - Factor loadings: M = .87, F = .88
- 10. I will feel more confident as a parent. 
  - Factor loadings: M = .80, F = .78
- 11. I will have more tools to use while parenting. 

**Fig. A2**

Factor structure of the perceived benefits scale for mothers and fathers. Standardized factor loadings. Model fit: WLSMV $\chi^2 (118) = 307.74, p < .001$; CFI = .988; RMSEA = .075 95%CI (.064 – .085); all models based on $N=284$ fathers and $N = 286$ mothers; all factor loadings significant at $p < .001$
There are many reasons why parents might not attend a parenting program. Below is a list of some common ones. For each item, please indicate how much it would stop you from attending.

1. I don’t have time.
2. I can’t attend meetings that are held in the evenings.
3. The meetings clash with other activities (e.g., my work or my child’s sport activities).
4. I have difficulty getting to the meetings (getting a ride, driving, taking a bus).
5. I don’t get support from my partner (or friends/relatives) to attend the meetings.
6. I’m concerned about having to talk about my parenting to strangers.
7. I’m worried about being criticized for how I am as a parent.

Fig. A3
Factor structure of the perceived barriers scale for mothers and fathers. Standardized factor loadings. Model fit: WLSMV $\chi^2 (43) = 59.01, p < .001$; CFI = .982; RMSEA = .036 95%CI (.000 – .057); all models based on $N=284$ fathers and $N = 286$ mothers; all factor loadings significant at $p < .001$; correlation between latent constructs significant at $p < .001$. 
How often do you think your child will engage in (experience) each of the following behaviors (difficulties) two years from now?

1. Making a mess.
2. Nagging.
3. Fighting with siblings or other children.
4. Not getting ready on time in the morning.
5. Getting angry and screaming.
6. Repeatedly interrupting you.
7. Having difficulty at school.
8. Giving up easily.
9. Finding it difficult to cooperate.
10. Finding it difficult to cooperate.

Fig. A4
Factor structure of the perceived susceptibility scale for mothers and fathers. Standardized factor loadings. Model fit: WLSMV $\chi^2 (74) = 126.05$, $p < .001$; CFI = .980; RMSEA = .049 95%CI (.034-.064); all models based on $N = 284$ fathers and $N = 286$ mothers; all factor loadings significant at $p < .001$; correlation between latent constructs significant at $p < .001$.
How bad do you think it would be if your child were to engage in (experience) each of the following behaviors (difficulties) two years from now?

1. Making a mess.
2. Nagging.
3. Fighting with siblings or other children.
4. Not getting ready on time in the morning.
5. Getting angry and screaming.
6. Repeatedly interrupting you.
7. Having difficulty at school.
8. Giving up easily.
9. Finding it difficult to cooperate.

Fig. A5
Factor structure of the perceived severity scale for mothers and fathers. Standardized factor loadings. Model fit: WLSMV $\chi^2(71) = 130.37$, $p < .001$; CFI = .978; RMSEA = .054 95%CI (.039 – .068); all models based on $N = 284$ fathers and $N = 286$ mothers; all factor loadings significant at $p < .001$; correlation between latent constructs significant at $p < .001$
How much do you agree with each of the following statements?

2. I can learn a lot by listening to lectures.

3. I can easily admit when I am wrong.

5. I can change the way I behave with my child.

6. I can talk about my issues in a parent group.

7. I can learn to think in new ways.

8. I can easily learn new things.

10. I can change my attitude if I decide to do so.

Fig. A6
Factor structure of the perceived self-efficacy scale for mothers and fathers. Standardized factor loadings. Model fit: WLSMV $\chi^2(39) = 147.79, p < .001$; CFI = .948; RMSEA = .08 95%CI (.082 – .115); all models based on $N = 284$ fathers and $N = 286$ mothers; all factor loadings significant at $p < .001$