# Supplementary Material

**Supplementary Table S1**

*Means and standard deviations respectively frequencies of the used variables*

|  |  |  |
| --- | --- | --- |
|  | *M (SD)* or frequency | *N* |
| Urbanicity (% number of inhabitants ≥ 100 000) | 61.9 % | 399 |
| CBCL total score | 29.61 (18.25) | 394 |
| Cortisol concentration in morning urine (ng/ml) a | 29.99 (25.72) | 368 |
| Creatinine concentration in morning urine (mg/dl) | 73.95 (30.99) | 368 |
| Time of urine sample | 7:44 (0:59) | 368 |
| Wearing a night diaper | 4.6 % | 368 |
| Cortisol concentration in saliva (nmol/l): a |  |  |
|  Baseline sample before stress test | 1.90 (1.74) | 337 |
|  10 minutes after stress test | 2.07 (1.88) | 337 |
|  30 minutes after stress test | 2.37 (2.0) | 337 |
|  40 minutes after stress test | 2.54 (2.49) | 337 |
| AUCI of salivary cortisol concentration b | 1.80 (9.08) | 337 |
| Daytime of baseline sample (% morning) | 49.9 % | 337 |
| Household income per month in Euro | 4 280.79 (2117.18) | 399 |
| Years of education of the mother | 14.62 (2.34) | 399 |
| Sex of the child (% female) | 53.6 % | 399 |

*Notes.* a Not transformed values, before winsorizing. b calculated using log10-transformed values

|  |
| --- |
| **Supplementary Table S2** *Product-Moment-correlations by Pearson of the used variables* |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1 Urbanicity a | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 CBCL total score b | .07 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 Urinary cortisol c, d | -.09+ | -.04 l | 1 |  |  |  |  |  |  |  |  |  |  |  |
| 4 Salivary cortisol baseline e, f | .13\* | -.06 m | .01 n | 1 |  |  |  |  |  |  |  |  |  |  |
| 5 Salivary cortisol 10 min e, f | .06 | -.09+, m | .002 n | .74\*\* | 1 |  |  |  |  |  |  |  |  |  |
| 6 Salivary cortisol 30 min e, f | .04 | -.09+, m | .01 n | .54\*\* | .82\*\* | 1 |  |  |  |  |  |  |  |  |
| 7 Salivary cortisol 40 min e, f | .05 | -.08 m | -.02 n | .45\*\* | .72\*\* | .90\*\* | 1 |  |  |  |  |  |  |  |
| 8 AUCI salivary cortisol f, g | -.07 | -.05 m | -.003 n | -.31\*\* | .35\*\* | .59\*\* | .60\*\* | 1 |  |  |  |  |  |  |
| 9 Time Saliva Sample f, h | .08 | .11\*, m | -.06 n | -.23\*\* | -.24\*\* | -.23\*\* | -.29\*\* | -.07 | 1 |  |  |  |  |  |
| 10 Time Urine Sample d  | .05 | .10+, l | .11\* | .03 n | .03 n | .07 n | .09 n | .04 n | -.11+, n | 1 |  |  |  |  |
| 11 Wearing a night diaper d, i | -.07 o | .12\*, l | .16\*\* | -.03 n | .004 n | .04 n | .07 n | .07 n | -.03 n | .12\* | 1 |  |  |  |
| 12 Household income j | -.14\*\* | -.31\*\* | .09+ | -.06 | .05 | .05 | .07 | .13\* | -.18\*\* | -.08 | -.04 | 1 |  |  |
| 13 Maternal years of education h | -.14\*\* | -.24\*\* | .11\* | -.06 | .08 | .09 | .06 | .15\*\* | -.06 | -.09+ | -.04 | .54\*\* | 1 |  |
| 14 Sex child k | .05 o | .10+ | .08 | .02 | -.04 | -.07 | -.11+ | -.09+ | .02 | -.05 | .08 o | -.02 | .03 | 1 |
| *Notes.* \*\* *p* < .01, \* *p* < .05, + *p* < .10 (two-sided), *N* = 399. a less than 100 000 inhabitants is coded as 1. b n = 394. c in ng/ml. d n = 368. e in nmol/l. f n = 337. g calculated using log10-transformed values. h Spearman-Rank-correlation. i not wearing a night diaper is coded as 0. j per month, in Euro. k female is coded as 0. l n = 364. m n = 333. n n = 317. o Phi coefficient. |

**Supplementary Figure S3**



*Figure S3.*Mediation analysis of the relationship of urbanicity and behavior problems using urinary cortisol concentration as mediator and the covariates sex, household income, years of education of the mother, wearing a night diaper, and time of urine sample, *n* = 364

|  |
| --- |
| **Supplementary Table S4***Parameter estimation to predict log10-transformed urinary cortisol* |
|  | *B* | *SE B* | *t* | *p* |
| Constant | -1.15 | 0.23 | -5.02 | < .001 |
| Urbanicity a | -0.05 | 0.04 | -1.20 | .23 |
| Sex b | 0.05 | 0.04 | 1.38 | .17 |
| Household income | 0.000006  | 0.00001 | 0.51 | .61 |
| Maternal education | 0.02 | 0.01 | 2.12 | .03 |
| Wearing a night diaper c | 0.26 | 0.09 | 2.73 | .007 |
| Time of urine sample | 0.00001 | 0.000006 | 2.35 | .02 |

*Notes. n* = 364.

a less than 100,000 inhabitants was coded as 1. b female was coded as 0. c not wearing a night diaper was coded as 0.

|  |
| --- |
| **Supplementary Table S5***Parameter estimation to predict CBCL total score* |
|  | *B* | *SE B* | *t* | *p* |
| Constant | 34.65 | 10.90 | 3.18 | .002 |
| Urinary cortisol a | -1.76 | 2.44 | -0.72 | .47 |
| Urbanicity b | 0.81 | 1.92 | 0.42 | .67 |
| Sex c | 3.10 | 1.83 | 1.69 | .09 |
| Household income | -0.002 |  0.0005 | -4.18 | < .001 |
| Maternal education | -0.63 | 0.47 | -1.34 | .18 |
| Wearing a night diaper d | 8.28 | 4.40 | 1.88 | .06 |
| Time of urine sample | 0.0003 | 0.0002 | 1.28 | .20 |

*Notes. n* = 364.

a log10-transformed. b less than 100,000 inhabitants was coded as 1. c female was coded as 0. d not wearing a night diaper was coded as 0.

**Supplementary Figure S6**



*Figure S6.*Mediation analysis of the relationship of urbanicity and behavior problems using salivary cortisol response after stress exposure (AUCI; calculated using log10-transformed values) as mediator and the covariates sex, household income, years of education of the mother, and time of baseline saliva sample, *n* = 333

|  |
| --- |
| **Supplementary Table S7***Parameter estimation to predict AUCI of salivary cortisol concentration (calculated using log10-transformed values)* |
|  | *B* | *SE B* | *t* | *p* |
| Constant | 0.66 | 4.97 | 0.13 | .89 |
| Urbanicity a | -0.56 | 1.03 | -0.54 | .59 |
| Sex b | -1.54 | 0.99 | -1.57 | .12 |
| Household income | 0.0002 | 0.0003 | 0.78 | .43 |
| Maternal education | 0.47 | 0.25 | 1.89 | .06 |
| Time of baseline saliva sample | -0.0001 | 0.00007 | -1.65 | .099 |

*Notes. n* = 333.

a less than 100,000 inhabitants was coded as 1. b female was coded as 0.

|  |
| --- |
| **Supplementary Table S8***Parameter estimation to predict CBCL total score* |
|  | *B* | *SE B* | *t* | *p* |
| Constant | 44.08 | 9.75 | 4.52 | < .001 |
| AUCI of salivary cortisol concentration a | 0.02 | 0.11 | 0.15 | .88 |
| Urbanicity b | -0.85 | 2.02 | -0.42 | .68 |
| Sex c | 2.68 | 1.94 | 1.38 | .17 |
| Household income | -0.002 | 0.0006 | -4.44 | < .001 |
| Maternal education | -0.52 | 0.49 | -1.06 | .29 |
| Time of baseline saliva sample | 0.00008 | 0.0001 | 0.64 | .53 |

*Notes. n* = 333.

a calculated usinglog10-transformed values. b less than 100,000 inhabitants was coded as 1. c female was coded as 0.

**Supplementary Figure S9**

*Figure S9.*Mediation analysis of the relationship of urbanicity and behavior problems using salivary cortisol response after stress exposure (AUCI) as mediator and the covariates sex, household income, years of education of the mother, and time of baseline saliva sample, *n* = 333

|  |
| --- |
| **Supplementary Table S10***Parameter estimation to predict AUCI of salivary cortisol concentration* |
|  | *B* | *SE B* | *t* | *p* |
| Constant | 20.78 | 28.40 | 0.73 | .46 |
| Urbanicity a | -2.47 | 5.89 | -0.42 | .67 |
| Sex b | -14.18 | 5.63 | -2.52 | .01 |
| Household income | 0.001 | 0.002 | 0.64 | .52 |
| Maternal education | 2.11 | 1.42 | 1.49 | .14 |
| Time of baseline saliva sample | -0.0007 | 0.0004 | -1.79 | .074 |

*Notes. n* = 333.

a less than 100,000 inhabitants was coded as 1. b female was coded as 0.

|  |
| --- |
| **Supplementary Table S11***Parameter estimation to predict CBCL total score* |
|  | *B* | *SE B* | *t* | *p* |
| Constant | 43.84 | 9.75 | 4.49 | < .001 |
| AUCI of salivary cortisol concentration | 0.01 | 0.02 | 0.64 | .52 |
| Urbanicity a | -0.83 | 2.02 | -0.41 | .68 |
| Sex b | 2.83 | 1.95 | 1.45 | .15 |
| Household income | -0.002 | 0.0006 | -4.46 | < .001 |
| Maternal education | -0.54 | 0.49 | -1.10 | .27 |
| Time of baseline saliva sample | 0.00009 | 0.0001 | 0.69 | .49 |

*Notes. n* = 333.

a less than 100,000 inhabitants was coded as 1. b female was coded as 0.