**Appendix**

Table A Description of the LINA cohort (eight-year-old follow-up) and comparison with our study population

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | LINA cohort n (%),  n = 334 | Study population n (%),  n=217 | χ² -test |
| **Gender** |  |  |  | 0.484 |
| Female |  | 164 (49.10) | 103 (47.47) |  |
| Male |  | 170 (50.90) | 114 (52.53) |  |
| **Household members (6 y.)** |  |  |  | 0.784 |
| 2 |  | 14 (4.19) | 8 (7.37) |  |
| 3 |  | 89 (26.65) | 60 (28.11) |  |
| ≥ 4 |  | 227 (67.96) | 146 (64.52) |  |
| **Parental education** |  |  |  |  |
| Low |  | 4 (1.20) | 2 (0.92) | 0.320 |
| Middle |  | 64 (19.16) | 37 (17.05) |  |
| High |  | 266 (79.64) | 178 (82.03) |  |
| **Household income (pregnancy)** |  |  |  | 0.066 |
| < € 2000 |  | 107 (32.04) | 70 (34.65) |  |
| € 2000 - 4000 |  | 177 (52.99) | 108 (53.47) |  |
| > € 4000 |  | 29 (8.68) | 24 (11.88) |  |
| **Mode of travel to school** |  |  |  | 0.001 \*\* |
| On foot/by bike |  | 124 (37.24) | 96 (44.24) |  |
| Partially on foot/by bike |  | 106 (31.83) | 63 (29.03) |  |
| By car |  | 103 (30.93) | 58 (26.73) |  |
| **Body Mass Index (BMI)** |  |  |  | 0.161 |
| Not overweight |  | 243 (72.75) | 159 (73.27) |  |
| Overweight |  | 25 (7.49) | 19 (8.76) |  |
| Obese |  | 5 (1.50) | 5 (2.30) |  |

\*\* p<0.01

Table B Outcome and predictor variables included in the analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Indicator | Year/Date | Data source |
| Outcome variable |  |  |  |
| Mode of transport to school | *excl. on foot/by bike (1), part. on foot by bike (2), excl. by car (3)* | 2014-2017 | LINA (8 y. own classification) |
| Individual variables |  |  |  |
| Gender | *gender (male/female)* | 2006-2008 | LINA (after birth) |
| Sleep duration | *sleep duration hours* | 2014-2017 | LINA (8 y.) |
| Time outside | *average reported hours spent outside (summer/winter)* | 2014-2017 | LINA (8 y.) |
| Loner | *loner [true or partly true] (n (%))* | 2014-2017 | LINA (8 y.) |
| Low self-confidence | *low self-confidence [true or partly true] (n (%))* | 2014-2017 | LINA (8 y.) |
| Is anxious | *is anxious [true or partly true] (n (%))* | 2014-2017 | LINA (8 y.) |
| Behaves carelessly around traffic | *behaves carelessly around traffic (n (%))* | 2014-2017 | LINA (8 y.) |
| Body Mass Index (BMI) classes | *BMI based on examination or questionnaire (normal weight, overweight/obese - reference population WOF)* | 2014-2017 | LINA (8 y.) |
| Family variables |  |  |  |
| Siblings | *number of siblings living in household* | 2014-2017 | LINA (8 y.) |
| Dog ownership | *dog ownership (y/n)* | 2014-2017 | LINA (8 y.) |
| Education qualification level | *highest education qualification level* | 2006-2008 | LINA (pregnancy) |
| Household income | *net household income* | 2006-2008 | LINA (pregnancy) |
| Maternal sport habits | *frequency of sport activities during pregnancy* | 2006-2008 | LINA (pregnancy) |
| Life satisfaction | *maternal life satisfaction (1-5) during pregnancy* | 2006-2008 | LINA (pregnancy) |
| Household size | *number of household members* | 2012-2015 | LINA (6 y.) |
| Children in household | *number of children in household* | 2012-2015 | LINA (6 y.) |
| Maternal employment | *Maternal working hours* | 2012-2015 | LINA (6 y.) |
| Residential environment |  |  |  |
| Population density | *inhabitants per km²* | 31.12.2016 | Ordnungsamt Leipzig: Einwohnerregister |
| School children rate | *proportion of children aged 6 to 15 in entire population* | 31.12.2016 | Ordnungsamt Leipzig: Einwohnerregister |
| Youth rate | *proportion of children aged 0 to 14 compared to proportion of inhabitants aged 15 to 65* | 31.12.2016 | Ordnungsamt Leipzig: Einwohnerregister |
| Migration rate | *proportion of migrants in population* | 31.12.2016 | Ordnungsamt Leipzig: Einwohnerregister |
| Employment | *employment rate in working-aged population* | 31.12.2016 | Bundesagentur für Arbeit |
| Unemployment | *unemployment rate in working-aged population* | 31.12.2016 | Bundesagentur für Arbeit |
| Household size | *average number of household members* | 31.12.2016 | Amt für Statistik und Wahlen Leipzig |
| Household income | *average net household income* | 31.07.2016 | Amt für Statistik und Wahlen Leipzig: Kommunale Bürgerumfrage 2016 |
| University graduates | *proportion of university graduates among inhabitants aged 18 and over* | 31.07.2016 | Amt für Statistik und Wahlen Leipzig: Kommunale Bürger-umfrage 2016 |
| Car ownership | *number of private cars/1000 inhabitants* | 31.12.2016 | Kraftfahrt Bundesamt |
| Crime rate | *number of offenses/1000 inhabitants* | 2016 | Landeskriminalamt Sachsen |
| Satisfaction with neighbourhood | *satisfaction with neighbourhood (1: very satisfied – 5: dissatisfied) from citywide questionnaire (n= 6423, approx. 100 inh. per district)* | 31.07.2016 | Amt für Statistik und Wahlen Leipzig: Kommunale Bürgerumfrage 2016 |
| Satisfaction with own health status | *satisfaction with own health status (1: very satisfied – 5: dissatisfied) from citywide questionnaire)* | 31.07.2016 | Amt für Statistik und Wahlen Leipzig: Kommunale Bürgerumfrage 2016 |
| Weight status | *average BMI (citywide questionnaire)* | 31.07.2016 | Amt für Statistik und Wahlen Leipzig: Kommunale Bürgerumfrage 2016 |
| Green areas | *proportion of parks, forests in 400 m buffer around place of residence* | 01.06.2016 | ATKIS |
| Distance to city centre | *Euclidean distance between place of residence and city centre* |  | own calculation |
| School characteristics |  |  |  |
| School type | *public school, private school* | school year 2016/17 | Amt für Jugend, Familie und Bildung |
| Primary school promoting physical activity | *primary school certified as ‘Active School’ (2), promoting physical activity (1), not promoting physical activity (0)* | 03.06.2019 | Sächsiche Schuldatenbank |
| Route characteristics |  |  |  |
| Route length | *shortest route (m)* | 2014-2017 | LINA (own calculation) |
| Perceived duration | *route duration (in min)* | 2014-2017 | LINA (8 y.) |
| Detour factor | *route length/linear Euclidean distance (school, home)* | 2014-2017 | LINA (own calculation) |
| Busy road along route | *perceived busy road along route (y/n)* | 2014-2017 | LINA (8 y.) |
| Crime rate | *number of offenses/1000 inhabitants within 100 m buffer along route* | 2016 | Landeskriminalamt Sachsen |
| Green areas | *during route crossed or passed (+2m) parks, forests* | 01.06.2016 | ATKIS |
| Street trees | *number of street trees within 25 m buffer per 100 route metres* | 16.02.2015 | Amt für Stadtgrün und Gewässer |
| Accidents | *accidents involving pedestrian(s) or cyclist(s) on weekdays (6:00-17:59) per 1000 route metres* | 31.12.2016 | Statistisches Landesamt des Freistaates Sachsen |
| Main road proportion | *main road proportion (%)* | 14.11.2017 | OpenStreetMap |
| Footpath proportion | *footpath proportion (%)* | 14.11.2017 | OpenStreetMap |

Table C Respondent characteristics: descriptive statistics and bivariate tests for influencing variables for travel mode types (χ²: chi-square test, H: Kruskal-Wallis test)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | Study population | Active travel | Part. active travel | Non-active travel | Bivariate test | p-value | Pairwise test (act-car) |
| Number of children (n (%)) | 217 (100) | 96 (44.24) | 63 (29.03) | 58 (26.73) |  |  |  |
| Health outcome | | | | | | | | |
| Body Mass Index (BMI) (n (%)) |  |  |  |  | χ² = 0.087 | 0.958 |  |
| normal weight | 159 (86.89) | 70 (87.50) | 47 (87.04) | 42 (85.71) |  |  |  |
| overweight/obese | 24 (13.11) | 10 (12.50) | 7 (12.96) | 7 (14.29) |  |  |  |
| Individual variables | | | | | | | | |
| Gender: female (n (%)) | 103 (47.47) | 43 (44.79) | 32 (50.79) | 28 (48.28) | χ² = 0.570 | 0.752 |  |
| Sleep duration [h] (mean ± SD) | 9.88 ± 0.75 | 9.85 ± 0.74 | 9.86 ± 0.82 | 9.93 ± 0.70 | χ² = 8.004 | 0.628 |  |
| Average time spent outside in summer [h] | 4.34 ± 1.62 | 4.28 ± 1.65 | 4.75 ± 1.54 | 4.00 ± 1.59 | H = 6.172 | **0.046** | 0.760 |
| Loner [true or partly true] (n (%)) | 54 (25.12) | 29 (30.20) | 14 (22.95) | 11 (18.48) | χ² = 4.408 | 0.354 |  |
| Low self-confidence [true or partly true] (n (%)) | 98 (45.58) | 42 (43.75) | 29 (47.54) | 27 (46.55) | χ² = 9.291 | 0.054 |  |
| Is anxious [true or partly true] (n (%)) | 81 (38.03) | 35 (36.84) | 22 (36.07) | 24 (42.11) | χ² = 9.886 | **0.042** | 0.802 |
| Behaves carelessly around traffic (n (%)) | 11 (5.14) | 6 (6.25) | 3 (4.92) | 2 (3.51) | χ² = 0.560 | 0.756 |  |
| Family variables | | | | | | | | |
| Number of siblings (n (%)) |  |  |  |  | χ² = 7.271 | 0.297 |  |
| no siblings | 79 (36.41) | 37 (38.54) | 21 (33.33) | 21 (36.42) |  |  |  |
| one sibling | 113 (52.07) | 44 (45.83) | 34 (52.97) | 35 (60.34) |  |  |  |
| 2-3 siblings | 25 (11.52) | 15 (15.63) | 8 (12.70) | 2 (3.44) |  |  |  |
| Dog owner (n (%)) | 13 (6.00) | 5 (5.21) | 5 (7.94) | 3 (5.17) | χ² = 0.597 | 0.742 |  |
| Academic qualification level (n (%)) | 179 (82.49) | 78 (81.25) | 53 (84.13) | 48 (82.76) | χ²= 1.180 | 0.881 |  |
| Household income group [1-8] | 5.50 ± 2.23 | 5.36 ± 2.08 2500-3000 | 5.31 ± 2.11 2500-3000 | 6.18 ± 2.53 3000-3500 | χ² = 34.895 | **0.010** | 0.2079 |
| Maternal sport frequency (n (%)) |  |  |  |  | χ² = 8.098 | 0.231 |  |
| never | 66 (30.84) | 25 (26.32) | 14 (22.22) | 17 (30.36) |  |  |  |
| several times per week | 42 (19.63) | 25 (26.32) | 12 (19.05) | 5 (8.93) |  |  |  |
| Life satisfaction [1-4] (mean ± SD) | 3.33 ± 0.54 | 3.34 ± 0.50 | 3.27 ± 0.60 | 3.37 ± 0.52 | χ² = 6.434 | 0.169 |  |
| Household size | 3.67 ± 0.99 | 3.71 ± 1.06 | 3.56 ± 1.03 | 3.72 ± 0.83 | χ² = 15.622 | 0.337 |  |
| Children in household | 1.85 ± 0.78 | 1.92 ± 0.85 | 1.76 ± 0.76 | 1.83 ± 0.68 | χ² = 8.178 | 0.612 |  |
| Maternal employment [h] | 31.08 ± 11.12 | 30.35 ± 12.36 | 31.72 ± 10.46 | 31.54 ± 9.84 | H = 0.036 | 0.982 |  |
| Residential environment | | | | | | | | |
| Population density [inh./km²] | 5132 ± 3744 | 6369 ± 3732 | 5027 ± 3496 | 3200 ± 5336 | H = 29.993 | **<0.001** | **<0.001** |
| School children rate [%] | 7.19 ± 1.17 | 7.20 ± 1.03 | 7.16 ± 1.02 | 7.20 ± 1.51 | H = 0.279 | 0.870 |  |
| Youth rate [%] | 21.07 ± 2.62 | 21.57 ± 2.29 | 20.75 ± 2.51 | 20.61 ± 3.11 | H = 8.504 | **0.014** | **0.015** |
| Migration rate [%] | 11.20 ± 4.94 | 11.64 ± 4.02 | 12.45 ± 6.22 | 9.11 ± 4.10 | H = 15.270 | **<0.001** | **0.003** |
| Employment rate [%] | 59.02 ± 4.16 | 58.82 ± 3.21 | 57.52 ± 4.66 | 60.98 ± 4.28 | H = 16.447 | **<0.001** | **0.005** |
| Unemployment rate [%] | 4.86 ± 2.09 | 4.86 ± 1.92 | 4.98 ± 2.37 | 4.74 ± 2.05 | H = 0.432 | 0.806 |  |
| Household size | 1.81 ± 14.05 | 1.78 ± 0.11 | 1.82 ± 0.17 | 1.85 ± 0.14 | H = 8.632 | **0.013** | **0.010** |
| Household income | 1959 ± 291 | 1964 ± 272 | 1926 ± 308 | 1988 ± 305 | H = 1.075 | 0.584 |  |
| University graduate rate | 0.43 ± 0.15 | 0.48 ± 0.13 | 0.43 ± 0.15 | 0.38 ± 0.14 | H = 17.634 | **<0.001** | **<0.001** |
| Cars per 1000 inh. | 379 ± 90 | 356 ± 71 | 372 ± 99 | 425 ± 93 | H = 20.533 | **<0.001** | **<0.001** |
| Crimes per 1000 inh. | 148 ± 211 | 131 ± 85 | 178 ± 368 | 143 ± 87 | H = 0.259 | 0.878 |  |
| Satisfaction with neighbourhood | 2.03 ± 0.23 | 2.00 ± 0.23 | 2.05 ± 0.26 | 2.04 ± 0.21 | H = 2.417 | 0.299 |  |
| Satisfaction with own health status | 2.19 ± 0.19 | 2.14 ± 0.16 | 2.19 ± 0.18 | 2.27 ± 0.20 | H = 15.219 | **<0.001** | **<0.001** |
| BMI | 25.42 ± 1.02 | 25.18 ± 0.94 | 25.37 ± 0.99 | 25.89 ± 1.03 | H = 17.488 | **<0.001** | **<0.001** |
| Green areas [%] | 15.94 ± 13.90 | 13.74 ± 11.83 | 17.45 ± 16.34 | 17.94 ± 13.93 | H = 2.925 | 0.232 |  |
| Distance to city centre [m] | 4169 ± 2274 | 3424 ± 1813 | 4229 ± 2468 | 5336 ± 2272 | H = 24.136 | **<0.001** | **<0.001** |
| School characteristics | | | | | | | | |
| Public school (n (%)) | 189 (87.1) | 92 (95.8) | 55 (87.3) | 42 (70.7) | χ² = 17.649 | **<0.001** | **0.040** |
| School certified as an ‘Active School’ (n (%)) | 51 (23.50) | 22 (43.14) | 21 (41.18) | 8 (15.68) | χ² = 13.436 | **0.009** | 0.998 |
| Route characteristics | | | | | | | | |
| Route length [m] | 1648 ± 1891 | 771 ± 1157 | 1560 ± 1320 | 3193 ± 2386 | H = 98.183 | **<0.001** | **<0.001** |
| Reported route duration [min] | 10.8 ± 6.84 | 8.58 ± 4.55 | 14.61 ± 8.09 | 10.36 ± 6.87 | H = 30.002 | **<0.001** | 0.465 |
| Detour factor | 1.32 ± 0.26 | 1.36 ± 0.32 | 1.29 ± 0.22 | 1.28 ± 0.16 | H = 0.888 | 0.641 |  |
| Reported busy road along route: yes (n (%)) | 131 (60.37) | 48 (50.00) | 40 (63.49) | 43 (74.14) | χ² = 9.167 | **0.010** | **0.033** |
| Crimes per 1000 inh. along route | 152 ± 146 | 148 ± 132 | 163 ± 178 | 149 ± 128 | H = 0.089 | 0.957 |  |
| Green route proportion | 0.16 ± 0.14 | 0.14 ± 0.12 | 0.18 ± 0.16 | 0.18 ± 0.14 | H = 3.302 | 0.192 |  |
| Street trees per 100 route metres | 4.54 ± 4.05 | 4.65 ± 4.8 | 4.45 ± 3.69 | 4.46 ± 2.97 | H = 1.090 | 0.580 |  |
| Accidents per 1000 route metres | 1.06 ± 1.73 | 0.95 ± 1.81 | 1.31 ± 2.07 | 0.97 ± 1.07 | H = 8.079 | **0.018** | **0.036** |
| Main road proportion [%] | 21.28 ± 25.30 | 14.36 ± 23.51 | 24.00 ± 25.10 | 29.78 ± 25.65 | H = 23.249 | **<0.001** | **<0.001** |
| Footpath proportion [%] | 10.75 ± 13.47 | 10.14 ± 14.23 | 11.06 ± 15.91 | 11.41 ± 10.09 | H = 5.883 | **0.053** | **0.042** |

Table D Principal component analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Factor loadings | Factor I: socio-demographics | Factor II: socio-economics | Factor III: route length, school type | Factor IV: traffic |
| Population density | -0.68 |  |  |  |
| Youth rate | -0.64 |  |  |  |
| Migrant proportion |  | -0.82 |  |  |
| Employment rate |  | 0.82 |  |  |
| Household size |  | 0.90 |  |  |
| University graduate rate | -0.87 |  |  |  |
| Private cars/1000 inh. |  | 0.82 |  |  |
| Health satisfaction | 0.90 |  |  |  |
| BMI | 0.88 |  |  |  |
| Distance to city centre | 0.72 |  |  |  |
| Route length |  |  | 0.82 |  |
| Reported busy road |  |  |  | 0.47 |
| Accidents/1000 m |  |  |  | 0.46 |
| Main road proportion |  |  |  | 0.59 |
| Footpath proportion |  |  |  | -0.70 |
| School type |  |  | 0.79 |  |
| proportion of variance | 0.27 | 0.25 | 0.12 | 0.10 |
| cumulative variance | 0.27 | 0.51 | 0.64 | 0.73 |

Table E Outlier analysis

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Active travel |  | | Non-active travel | |
|  | **long route** (n=5) | | **others** (n=91) | **short route** (n=12) | **others** (n=46) |
| Route length | 4524.66 ± 3333.73 | | 565.17 ± 305.90 | 890.38 ± 245.33 | 3793.63 ± 2326.70 |
| Population density | 6439 ± 4543 | | 6365 ± 3713 | 4890 ± 4000 | 2759 ± 2842 |
| Employment rate | 59.84 ± 1.97 | | 58.76 ± 3.27 | 59.49 ± 3.24 | 61.37 ± 4.47 |
| Reported busy road (n (%)) | 3 (60%) | | 45 (49.45%) | 7 (58.33%) | 36 (78.26%) |
| Accidents per 1000 route metres | 3.70 ± 1.57 | | 0.80 ± 1.70 | 0.90 ± 1.37 | 0.98 ± 1.00 |
| Public school attendees  (n (%)) | 89 (97.80%) | | 3 (60.00%) | 12 (100.00%) | 30 (65.22%) |
| Main road proportion | 35.40 ± 21.71 | | 13.21 ± 23.16 | 17.67 ± 20.93 | 32.93 ± 26.01 |
| Female  (n (%)) | 2 (40.00%) | | 41 (45.05%) | 9 (75.00%) | 19 (41.30%) |