

Mobile phone use during night and its impact on health and cognitive functions in adolescents

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- Mobile phone use increased in adolescents
- Adolescents tend to leave their mobile phone turned on during night



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Effects on health:

- Short sleep duration, poor sleep quality, daytime sleepiness and insomnia symptoms
(Munezewa et al, 2011)
- Increased tiredness
(Van den Bulck et al, 2007)

Effects on cognitive functions:

- faster and less accurate responding
(Abramson et al, 2009)
- facilitating effect on attention functions
(Lee et al, 2001)

HERMES

(Health Effects Releated to Mobile phonE use in adolescentS)

- In Central Switzerland (Lucerne, Zug, Schwyz, Uri, Nidwalden and Obwalden)
- 439 study participants, 12-17 years (Baseline)
- Written questionnaire: mobile phone use, health, sociodemographic data
- Cognitive tests: concentration capacity, verbal and figural memory
- Operator data (6 months prior to baseline until baseline)



Mobile phone use during night: exposure

- Mobile phone turned on during night
- Being awakened at night by mobile phone
 - ↳ Being responsive during night

→ Selfreported data and operator data



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www.examiner.com

Health outcomes:

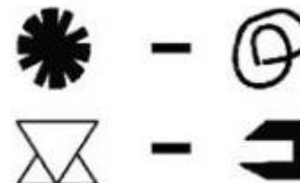
- Headache
→ HIT-6 (headache impact test)
- Tiredness, lack of energy, lack of concentration, exhaustibility
→ von Zerssen score
- Physical wellbeing
→ Kidscreen

Cognitive functions:

- Concentration capacity
→ FAKT (*Frankfurter Adaptiver Konzentrationsleistungs-Test*)



- Verbal and figural memory
→ Subtest of IST (*Intelligenz-Struktur-Test 2000R*)



Results:

- 412 (93.9%) owned a mobile phone
- 265 (60.4%) were female
- Mean age: 14.0 years

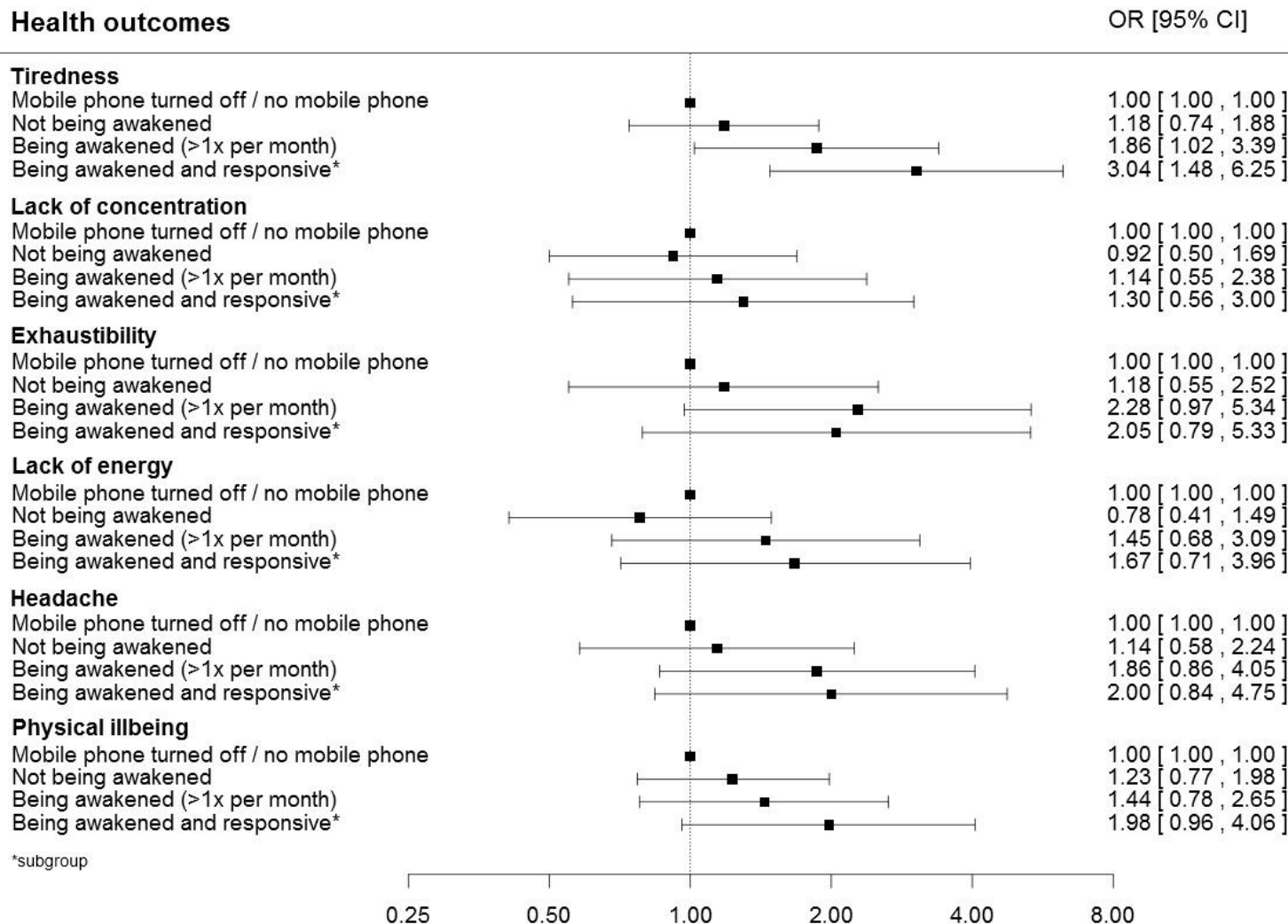
Questionnaire data:

- 126 (28.7%) switch off mobile phone during night / no mobile phone
- 216 (49.3%) not being awakened
- 96 (21.9%) being awakened at least once a month
 - ↳ 61 (67.8%) being responsive when being awakened

Objectively recorded mobile phone use data:

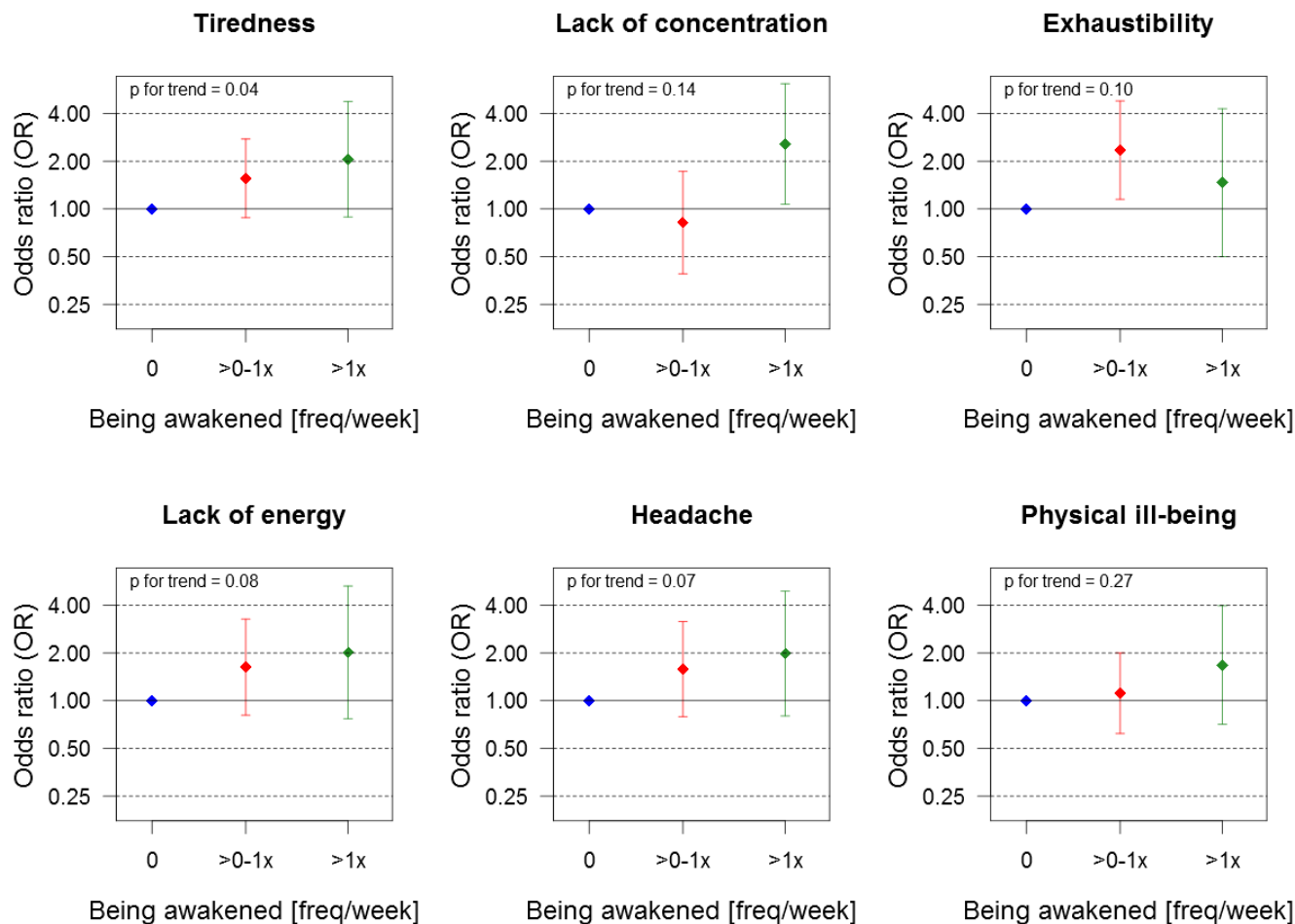
- Operator data for 234 (53.3%) study participants
- 132 (50.6%) being awakened at least once a month

Selfreported mobile phone use during night and symptoms



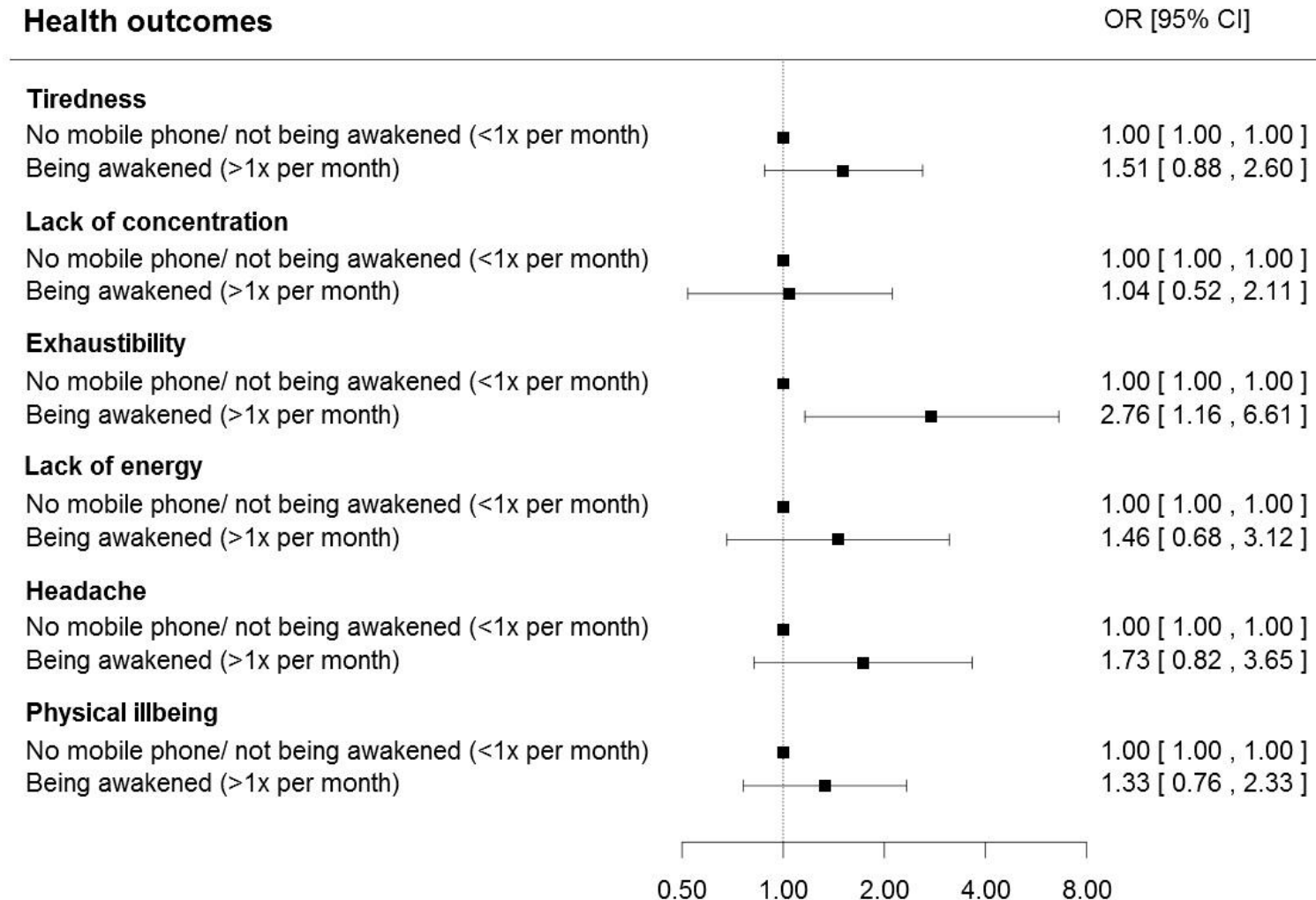
Adjusted for: age, sex, class level, nationality, school level, physical activity, alcohol and education of parents ,frequency of mobile phone calls

Selfreported mobile phone use during night and symptoms: dose-reponse frequency



Adjusted for: age, sex, class level, nationality, school level, physical activity, alcohol and education of parents , frequency of mobile phone calls

Confirmed with operator data: being awakened > 1x per month



Adjusted for: age, sex, class level, nationality, school level, physical activity, alcohol and education of parents , duration of mobile phone calls

Selfreported mobile phone use during night and cognitive functions

Cognitive functions

Coeff [95% CI]

Power of concentration

Mobile phone turned off / no mobile phone	0.00 [0.00, 0.00]
Not being awakened	1.51 [-5.43, 8.45]
Being awakened (>1x per month)	1.28 [-7.67, 10.22]
Being awakened and responsive*	6.70 [-3.90, 17.30]

Accuracy of concentration

Mobile phone turned off / no mobile phone	0.00 [0.00, 0.00]
Not being awakened	0.19 [-1.21, 1.60]
Being awakened (>1x per month)	0.83 [-0.99, 2.64]
Being awakened and responsive*	1.21 [-0.94, 3.37]

Homogeneity of concentration

Mobile phone turned off / no mobile phone	0.00 [0.00, 0.00]
Not being awakened	1.93 [-2.22, 6.08]
Being awakened (>1x per month)	1.25 [-4.10, 6.60]
Being awakened and responsive*	4.52 [-1.82, 10.87]

Verbal memory

Mobile phone turned off / no mobile phone	0.00 [0.00, 0.00]
Not being awakened	0.08 [-0.54, 0.69]
Being awakened (>1x per month)	-0.22 [-1.01, 0.56]
Being awakened and responsive*	-0.10 [-1.02, 0.82]

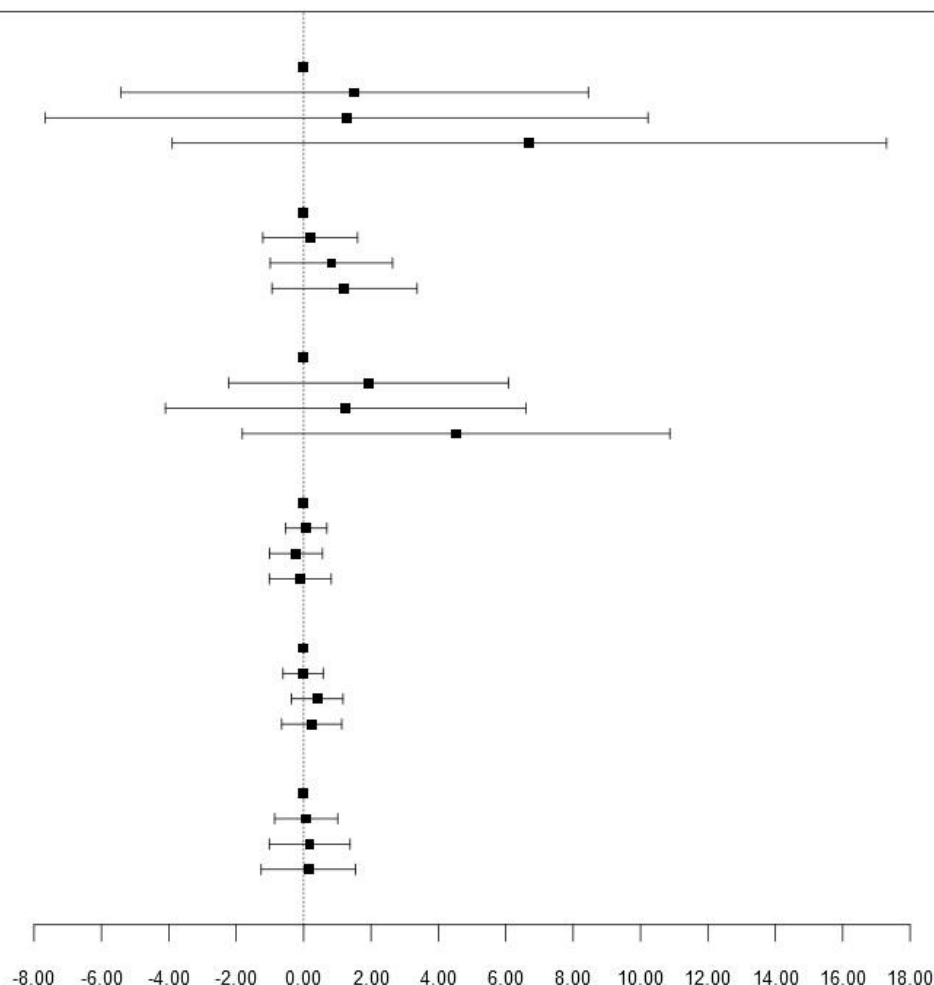
Figural memory

Mobile phone turned off / no mobile phone	0.00 [0.00, 0.00]
Not being awakened	-0.02 [-0.61, 0.58]
Being awakened (>1x per month)	0.40 [-0.36, 1.17]
Being awakened and responsive*	0.24 [-0.65, 1.13]

Memory overall

Mobile phone turned off / no mobile phone	0.00 [0.00, 0.00]
Not being awakened	0.07 [-0.86, 1.01]
Being awakened (>1x per month)	0.18 [-1.02, 1.38]
Being awakened and responsive*	0.14 [-1.26, 1.54]

*subgroup



Adjusted for: age, sex, class level, nationality, school level, physical activity, alcohol and education of parents, frequency of mobile phone calls

Conclusions

Health outcomes:

- Impaired health and physical well-being
- Confirmed by objectively recorded mobile phone data

Cognitive functions:

- No effects for cognitive functions, neither for concentration capacity nor for memory

→ Public health prevention strategies:

focus on information and advice, helping adolescents to set limits for their accessibility by mobile phone during night.



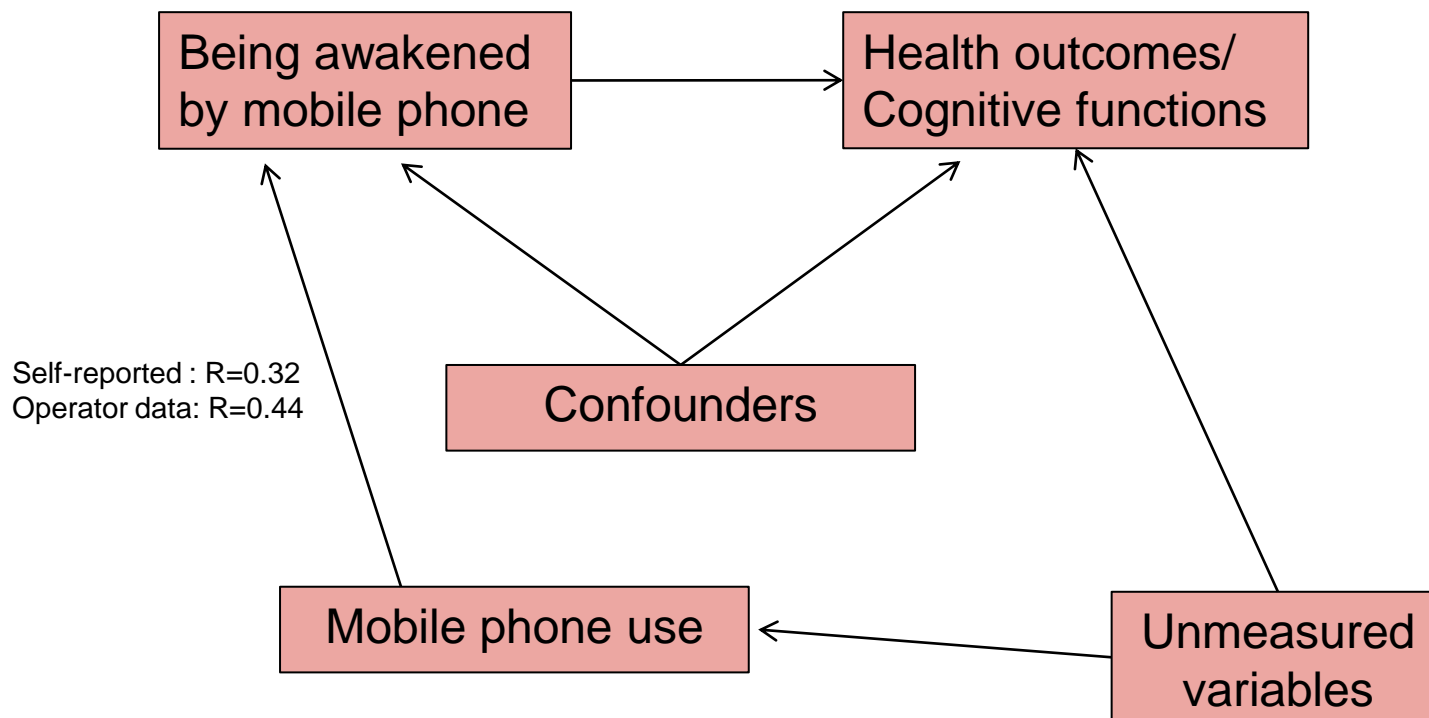
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Project Number 138190

Thanks for your attention!

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Different models:

Crude: bivariate

Confounders: age, sex, class level, nationality, school level, physical activity, alcohol and education of parents → adjusted1

Confounders: age, sex, class level, nationality, school level, physical activity, alcohol and education of parents + **mobile phone use (freq. / duration)** → adjusted2