Supplementary Online Content

Quach JL, Nguyen CD, Williams KE, Sciberras E. Bidirectional associations between child sleep problems and internalizing and externalizing difficulties from preschool to early adolescence. *JAMA Pediatr*. Published online December 4, 2017. doi:10.1001/jamapediatrics.2017.4363

eTable. Confirmatory Factor Analyses for Sleep Measures: Standardised Factor Loadings and Model Fit Indices (Chi-square Test, RMSE, CFI, and TLI)

eFigure 1. Autoregressive and Cross-sectional Correlations Model for Sleep, Internalizing, Hyperactivity and Conduct Problems

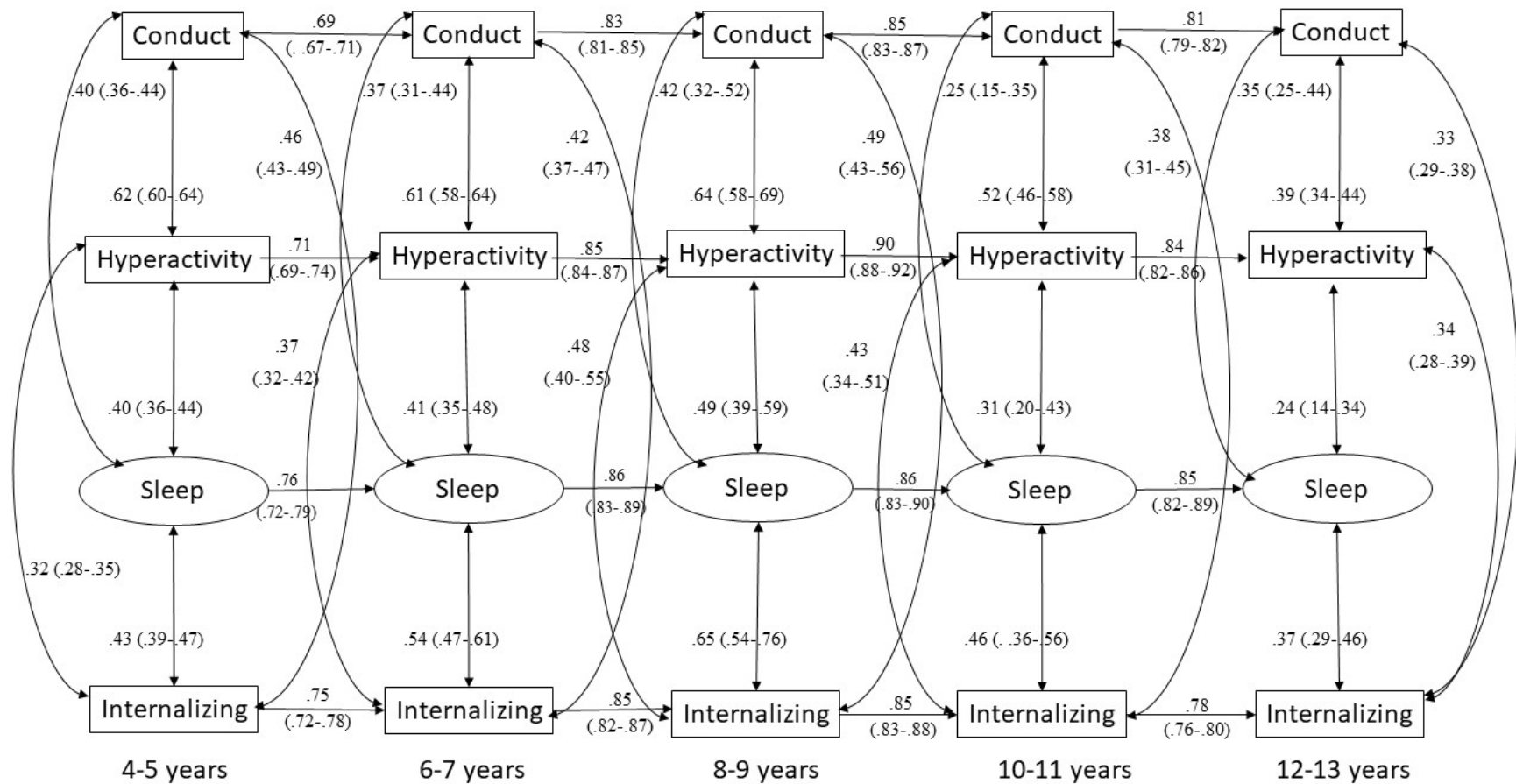**eFigure 2.** Transactional Model for Sleep and Hyperactivity

eFigure 3. Transactional Model for Sleep and Conduct Problems

eFigure 4. Transactional Model for Sleep, Internalizing, Hyperactivity, and Conduct Problems

This supplementary material has been provided by the authors to give readers additional information about their work.
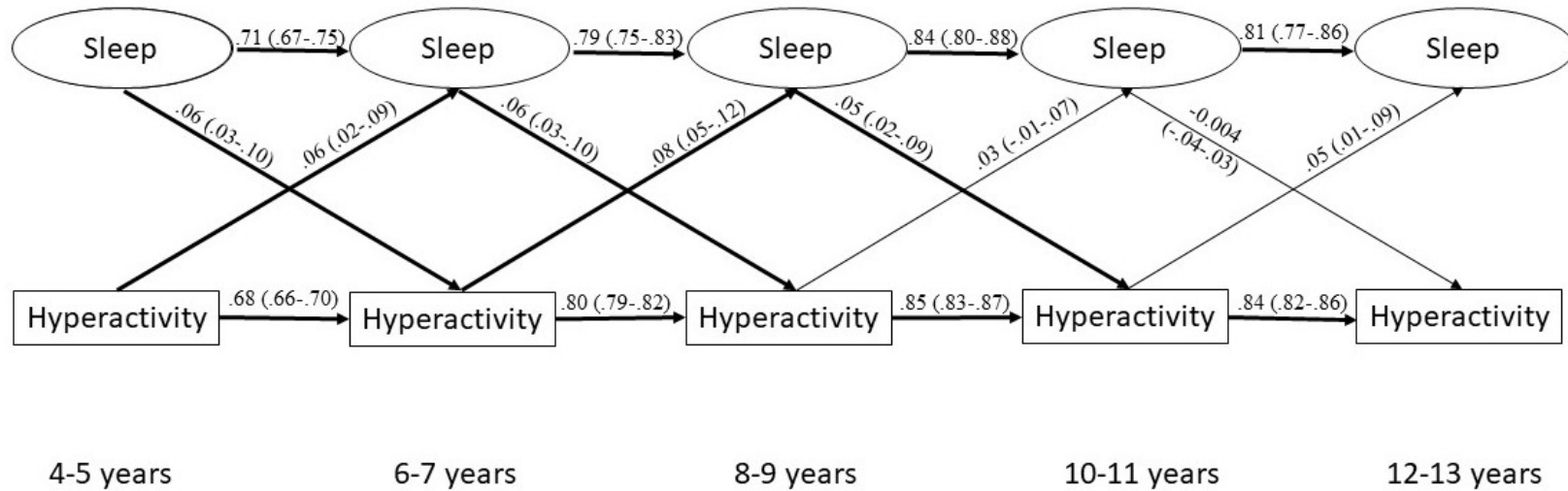
eTable. Confirmatory Factor Analyses for Sleep Measures: Standardised Factor Loadings And Model Fit Indices (Chi-square Test, RMSE, CFI, and TLI)

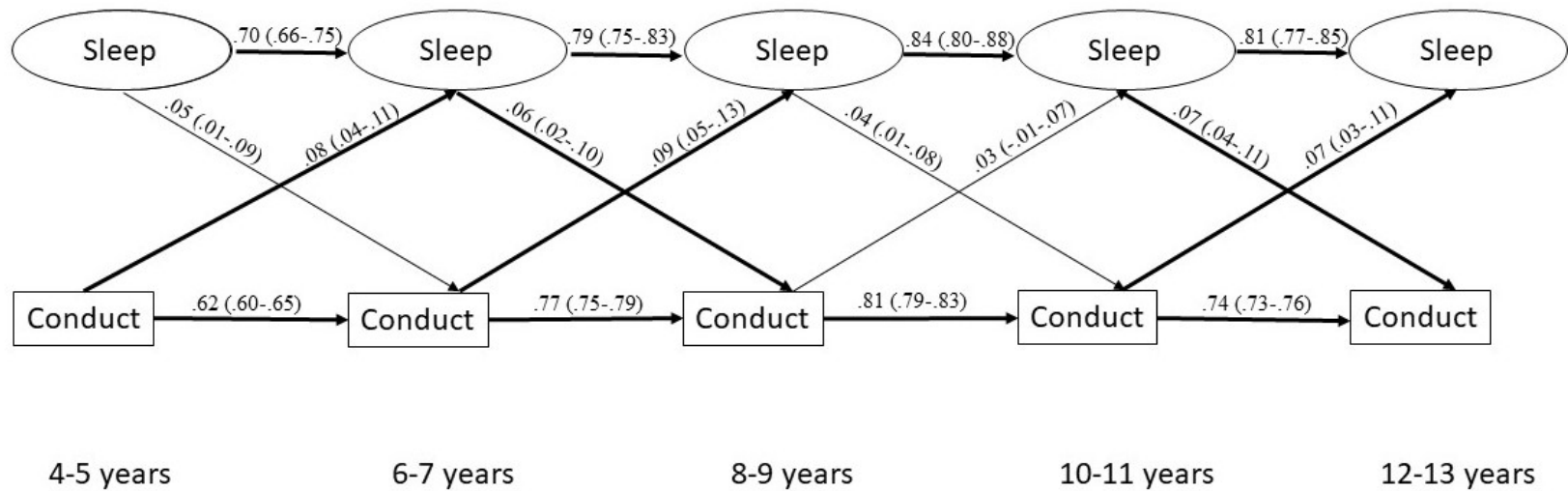|	Wave 1 4/5 years	Wave 2 6/7 years	Wave 3 8/9 years	Wave 4 10/11 years	Wave 5 12/13 years
Sleep problem					
Difficulty getting off to sleep	0.71	0.74	0.78	0.80	0.81
Not happy to sleep alone	0.64	0.66	0.65	0.63	0.49
Waking during the night	0.64	0.67	0.68	0.71	0.69
Seeming tired in the morning	0.60	0.67	0.76	0.70	0.76
How much is child's sleeping pattern or habits a problem?	0.91	0.88	0.89	0.88	0.82
Model fit indices					
χ^2 (degrees of freedom)	68.525 (5)	80.730 (5)	56.660 (5)	53.010 (5)	2.345 (5)
RMSEA	0.051	0.058	0.049	0.048	0.000
CFI	0.982	0.970	0.983	0.983	1.000
TLI	0.964	0.940	0.966	0.965	1.002

eFigure 1. Autoregressive and Cross-sectional Correlations Model for Sleep, Internalizing, Hyperactivity and Conduct Problems.

Fit indices: χ2(df) =3442 (679); RMSEA = .03; CFI = .95; TLI = .94. Standardized estimates (standard errors) are shown. Factor loadings for the five sleep problem indicator variables are not shown.
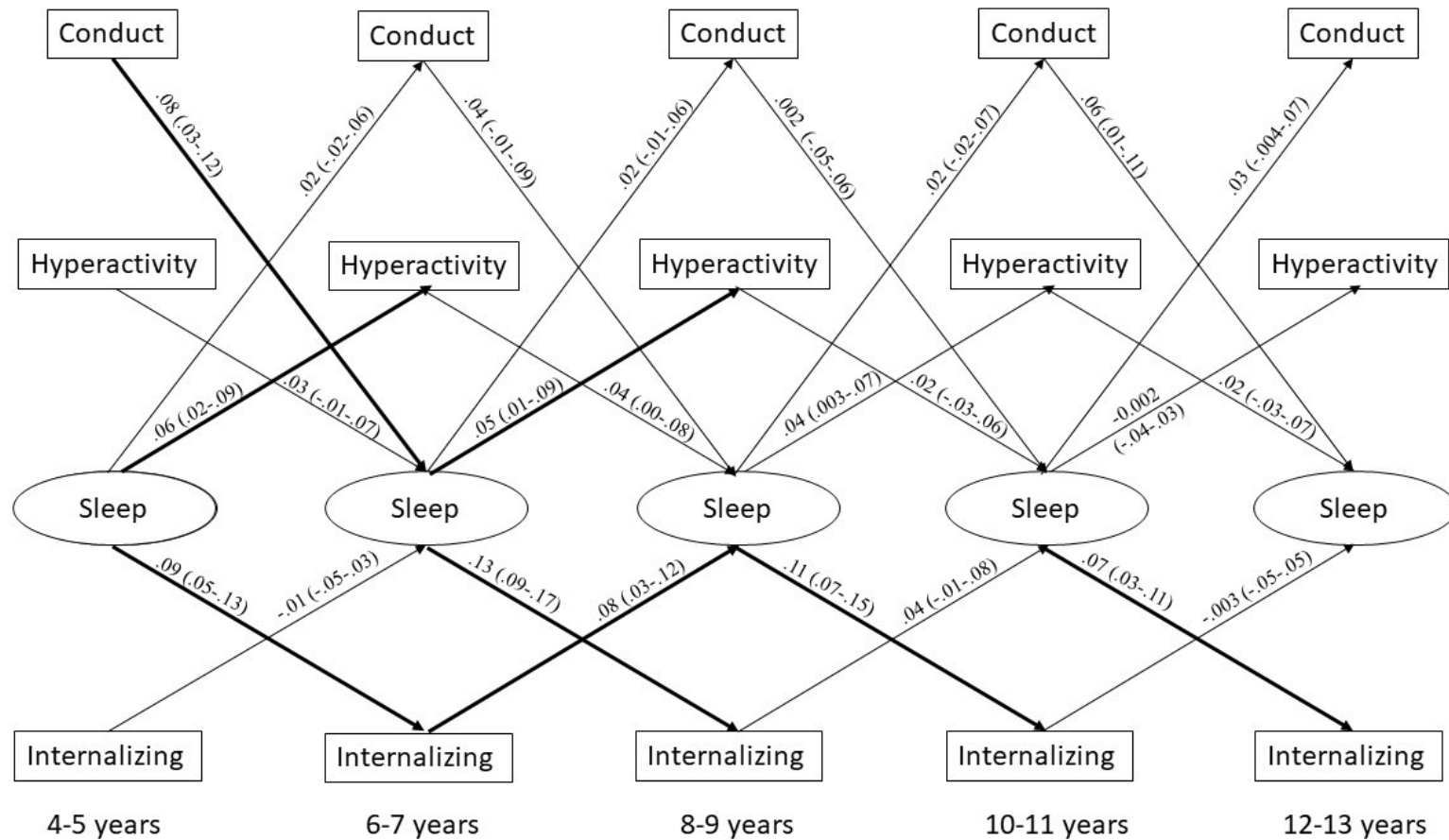
eFigure 2. Transactional Model for Sleep and Hyperactivity.

Fit indices: χ2(df) =1220(359); RMSEA = .02, CFI = .98, TLI = .97. Standardized estimates (standard errors) are shown. Thick lines indicate significant paths at p < 0.01. Cross-sectional correlations among constructs were estimated but are not shown here. Factor loadings for the five sleep problem indicator variables are not shown.

eFigure 3. Transactional Model for Sleep and Conduct Problems.

Fit indices: χ^2(df) =1404 (359); RMSEA = .02; CFI = .97; TLI = .97. Standardized estimates (standard errors) are shown. Thick lines indicate significant paths at p < 0.01. Cross-sectional correlations among constructs were estimated but are not shown here. Factor loadings for the five sleep problem indicator variables are not shown.

eFigure 4. Transactional Model for Sleep, Internalizing, Hyperactivity, and Conduct Problems.

Fit indices: χ2(df)=2201 (631); RMSEA = .02; CFI = .97; TLI = .96. Standardized estimates (standard errors) are shown. Thick lines indicate significant paths at p < 0.01. Autoregressive paths, cross-sectional correlations among constructs, and cross-lagged paths between internalizing, hyperactivity and conduct problems were estimated but are not shown here. Factor loadings for the five sleep problem indicator variables are not shown.