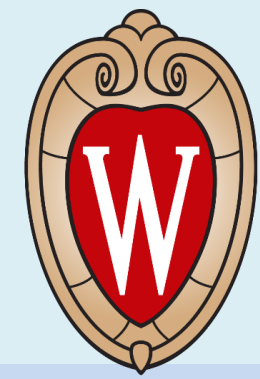


Mismatch between Social Time and Circadian Rhythm

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Background

- Time coordinates human activities
 - Sociologists distinguished “social time” from “astronomical time” (Sorokin & Merton, 1937).
 - Astronomical time: uniform, homogeneous, and purely qualitative concept of time
 - Social time: Qualitative as well as quantitative concept of time shared in the group
- Yet, social time does not always fit to individual rhythm
 - “Schools start too early” (CDC, 2020; Sifferlin, 2015)
 - Evening/night shift works have negative consequences on health (for a review, see Costa, 1996).
- A possible determinant of individual rhythm is genetic factors
 - “Clock genes” as genes regulating biological clock (Clayton et al., 2001; Young & Kay, 2001).
 - Empirical evidence for a polygenic measure of morningness (Jones et al., 2016).
- Examining the misfit of individual rhythm against social time is an important because this may be a source of “structural disadvantage.”

Research Questions

- How is the misfit of circadian rhythm against social time associated with health outcomes?
 - The misfit of circadian rhythm against social time is expected to be associated with negative health outcomes.
- How do the associations between the misfit of circadian rhythm against social time and health outcomes differ over the life course?

Data and Analytical Strategy

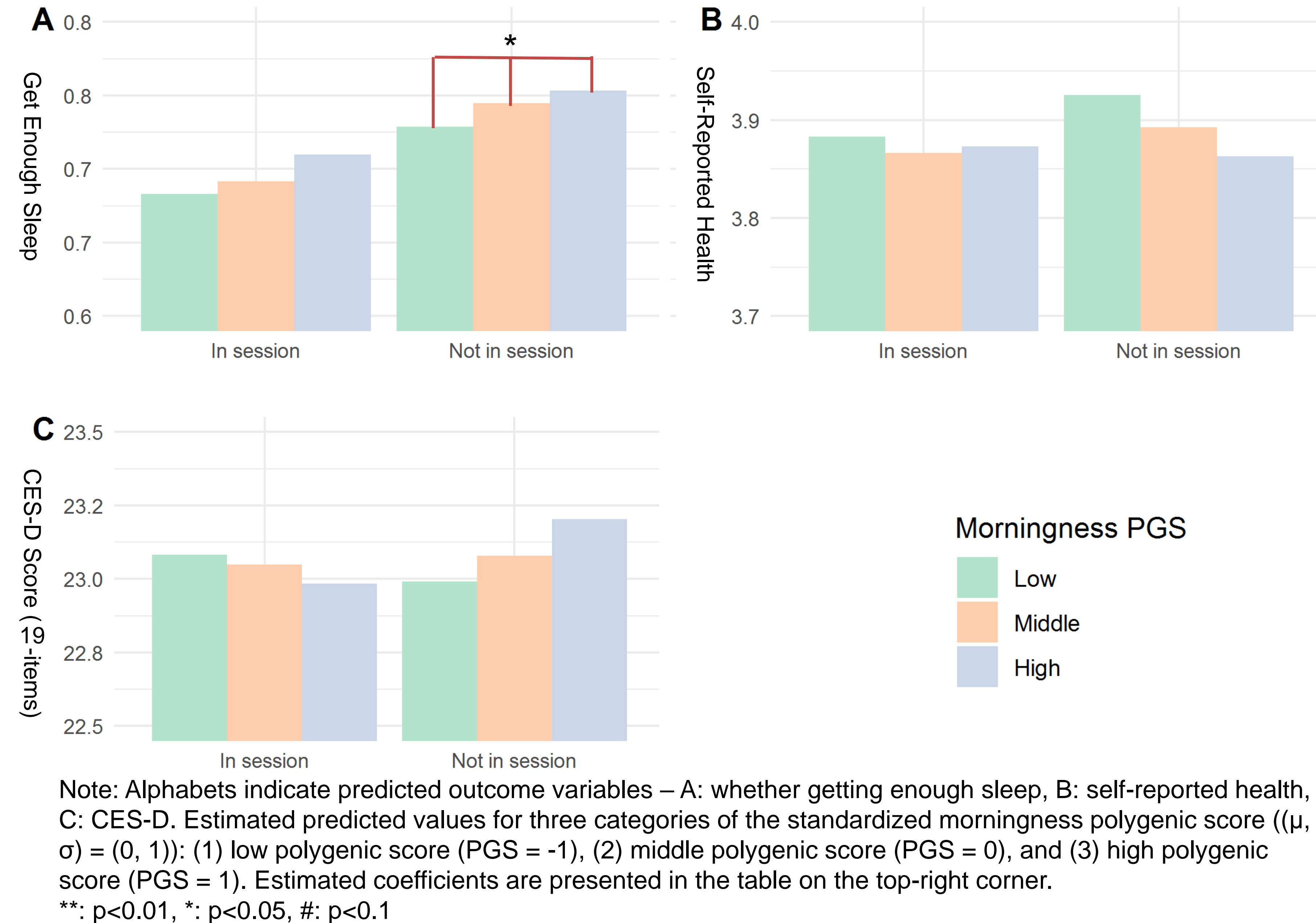
Adolescent to Adult Health (Add Health)

- Wave I, II (adolescents), and IV (young adults)
- Total analytical sample
 - Adolescents: 11,253 ~ 11,282 (depends on outcome variables)
 - Young Adults: 5,772 ~ 5,830 (depends on outcome variables)

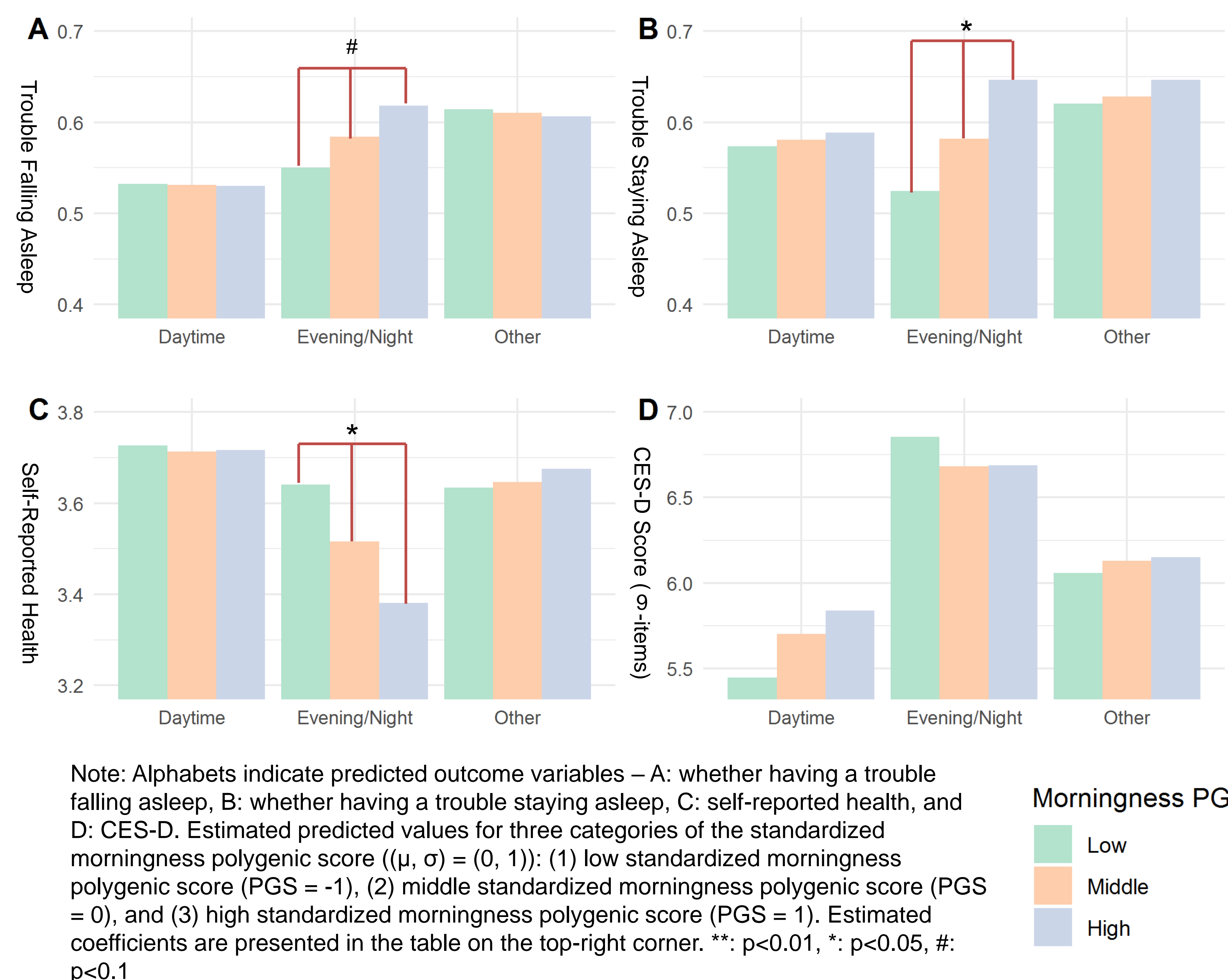
Analytical Strategy

- Polygenic score
 - Morningness PGS
 - Higher PGS indicates “morning larks”
 - Social time
 - School in session (adolescents)
 - Work schedule (young adults)
- Regression
 - $Y_i = \alpha + \beta_1 ST_i + \beta_2 PGS_i + \beta_3 (ST_i * PGS_i) + \beta_4 PC_i + \beta_5 \chi_i + \varepsilon_i$
 - β_1 and β_3 is our primary interest.
 - This indicates how associations between social time and health depend on circadian rhythm.

Results (Adolescents)



Results (Young Adults)



Tables

VARIABLES	A	B	C
School Session (ref: Not in School Session)			
In School Session	-0.05** (0.01)	-0.04 (0.04)	-0.01 (0.07)
Morningness PGS	0.01* (0.01)	-0.03 (0.02)	0.05 (0.04)
School Session x PGS			
In School Session x Morningness PGS	-0.00 (0.01)	0.04 (0.04)	-0.09 (0.07)
Constant			17.96** (0.42)
Observations	11,282	11,284	11,253

VARIABLES	A	B	C	D
Work Schedule (ref: Daytime)				
Evening/Night	0.05* (0.02)	0.01 (0.02)	-0.24** (0.08)	0.69** (0.21)
Other	0.08** (0.02)	0.05** (0.02)	-0.09 (0.06)	0.37* (0.15)
Morningness PGS	-0.00 (0.01)	0.00 (0.01)	0.01 (0.03)	0.07 (0.07)
Work Schedule x PGS				
Evening/Night x Morningness PGS	0.04# (0.02)	0.03 (0.02)	-0.17* (0.09)	-0.16 (0.20)
Other x Morningness PGS	-0.00 (0.02)	0.01 (0.02)	0.00 (0.06)	-0.07 (0.15)
Constant				6.48** (1.04)
Observations	5,772	5,773	5,830	5,822

Robust standard errors in parentheses. Additional controls are not shown.
**: p<0.01, *: p<0.05, #: p<0.1

Limitations and Next Steps

Limitations

- PGS assumed that morningness was fixed at birth
 - This is a strong assumption because morningness may vary over the life course

Next Steps

- Expand the analyses to Wave V
 - Examining differences of the associations between young adults and middle-ages.
- Examine underlying mechanisms
 - Evening/Night workers with a low morningness polygenic score might select their work schedules.
 - Examining changes in work schedule may provide suggestive evidence for the underlying mechanisms.

Acknowledgements

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