

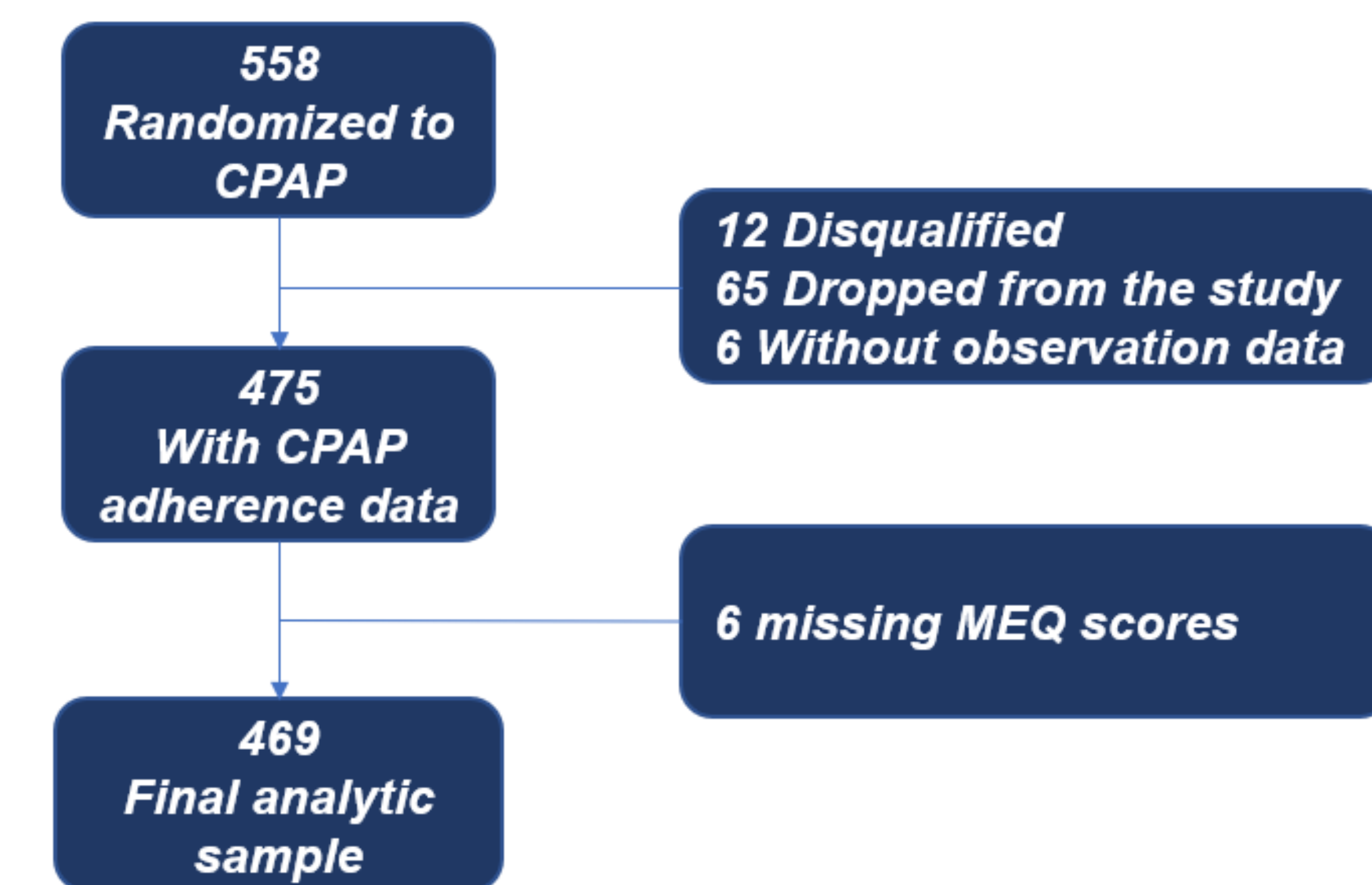


### BACKGROUND

Continuous positive airway pressure therapy (CPAP) is an efficacious treatment for obstructive sleep apnea (OSA). However, despite interventions targeting established determinants of CPAP use, adherence to CPAP remains poor. An individual's chronotype can influence behavior including adherence to dietary changes and alcohol abstinence. We hypothesized that chronotype will be associated with CPAP adherence and aimed to identify the mechanisms of this association.

### METHODS

Secondary data analysis of the active CPAP arm (n=469) from the Apnea Positive Pressure Long-term Efficacy Study, a multicenter randomized controlled trial of CPAP therapy in a sleep clinic population was performed.



**Figure 1.** Flow diagram of participant selection

### METHODS

The Morningness-Eveningness Questionnaire (MEQ) was used to identify three chronotype categories: Evening (MEQ score: 16-41), Neither (42-58) and Morning (59-86) types. Daily average CPAP adherence over 6-months (hours/night) objectively measured using smart-card downloads was our primary outcome with CPAP adherence measured as per Centers for Medicare & Medicaid Services criteria the secondary outcome. Linear mixed modelling evaluated the association between the chronotype and CPAP adherence, adjusting for confounders (e.g., age) as noted in Table 1.

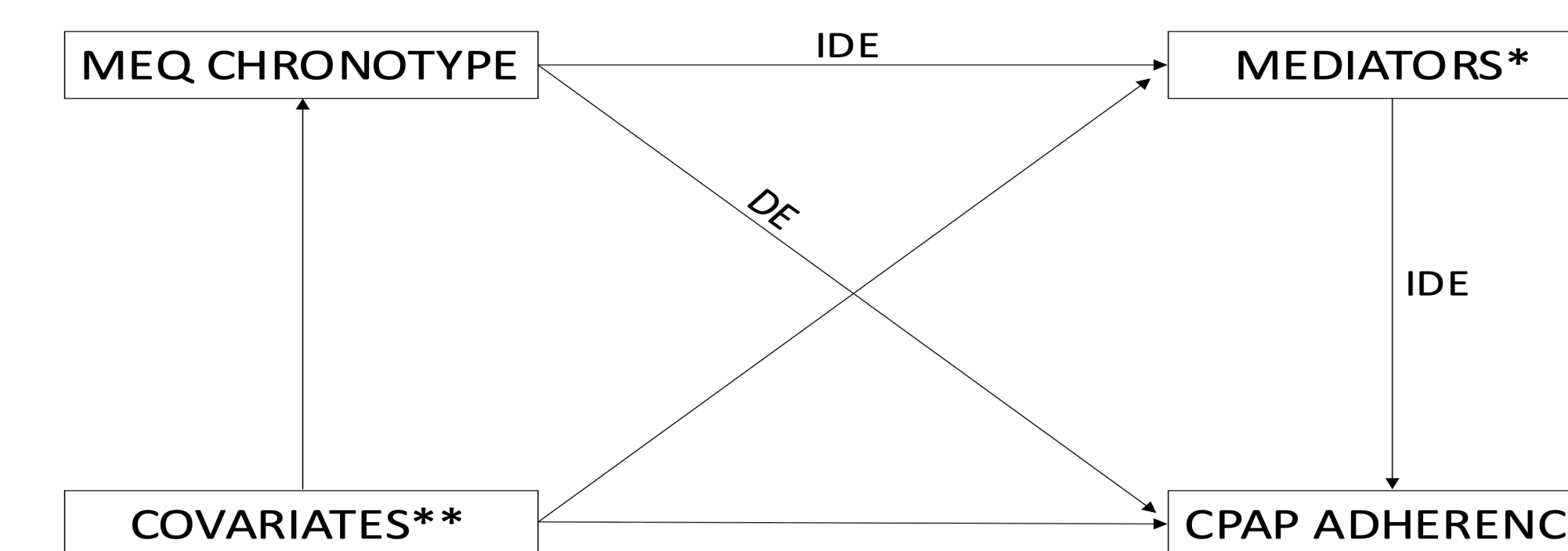
CONFOUNDERS	COVARIATES	MEDIATORS
Age	AHI	Sleep duration
Gender/Sex	Time < 85% O2 sat	Social jet lag (WE-WD sleep)
Race/Ethnicity	Arousal threshold	Anxiety
	Marital status	Depression
	Level of education	Sleepiness (ESS, MWT)
		Sleep efficiency
		Insomnia
		BMI
		Symptoms (SHQ: Fatigue, unrested, insufficient sleep)
		insufficient sleep)

**Table 1.** Confounders, Covariates and Mediators

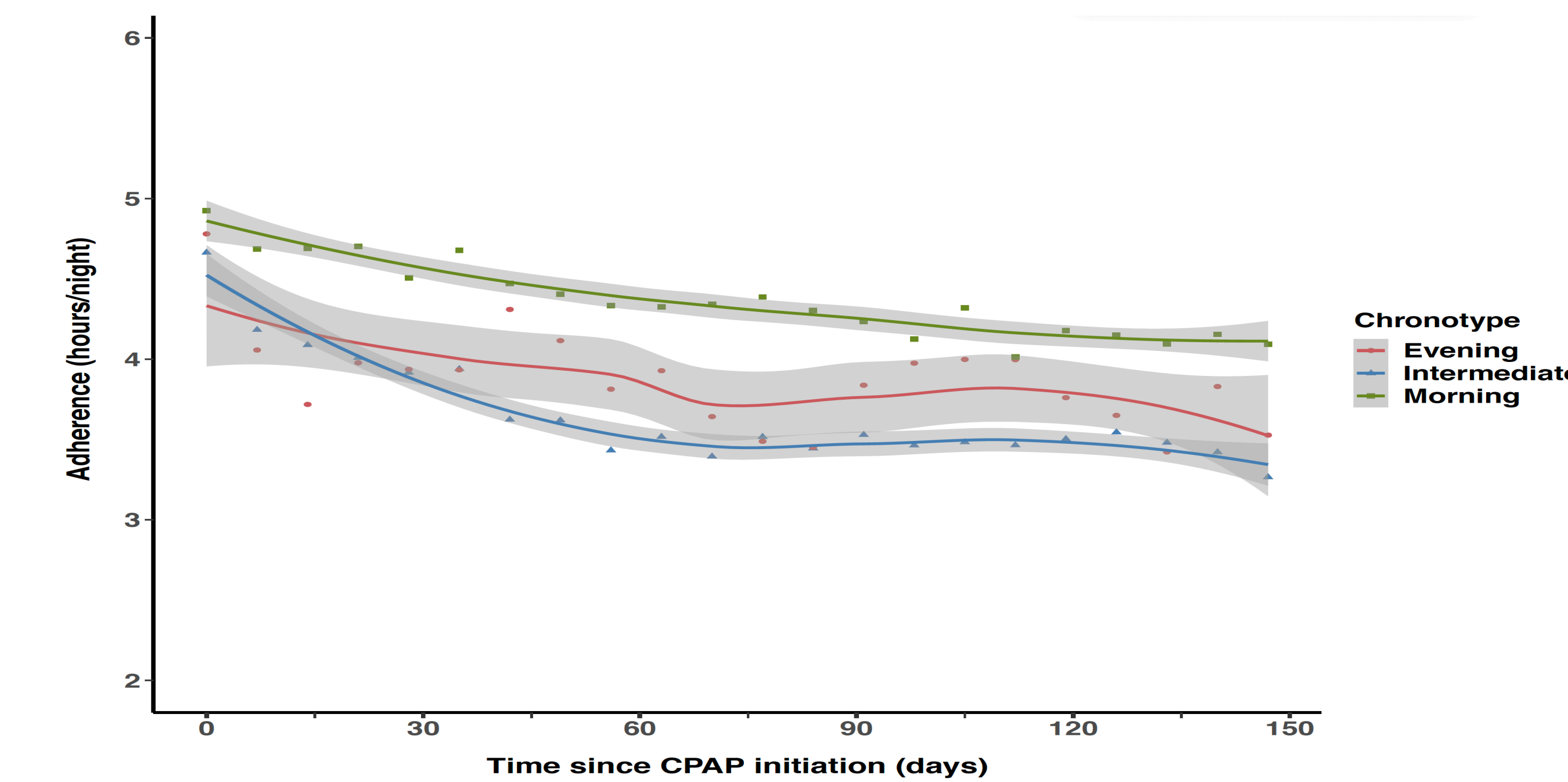
Mechanisms of this association were examined by  $\Delta b$  for the chronotype with addition of potential mediators such as sleep duration, sleep efficiency, insomnia, social jetlag, anxiety, depression, BMI, fatigue and sleepiness as measured with the Epworth sleepiness score. Sensitivity analysis was done with MEQ as a continuous variable

### RESULTS

There were 206(44%), 38(8%) and 219(47%) Morning, Evening and Neither chronotype patients, respectively. Evening types were youngest ( $48.0 \pm 13.4$  vs.  $50.3 \pm 11.3$  and  $56.3 \pm 11.4$  years,  $p < 0.001$ ) with highest body mass index (BMI,  $34.9 \pm 10.5$  vs.  $31.2 \pm 10.5$  and  $32.7 \pm 10.5$  kg/m<sup>2</sup>,  $p = 0.006$ ) and longest sleep on weekends ( $7.9 \pm 2.0$  vs.  $7.3 \pm 1.3$  and  $7.6 \pm 1.5$  hours,  $p = 0.017$ ) compared to Morning and Neither types. A higher proportion of Evening types also reported symptoms of insomnia and fatigue (p-values 0.017 and 0.048 respectively). Morning chronotypes had less social jetlag and slept less on weekends. CPAP adherence did not differ between Evening and Neither types ( $p = 0.276$ ). However, compared to the Neither types, Morning types exhibited significantly higher CPAP adherence ( $\beta = 40$ mins/night,  $p = 0.001$ ) with a slight decrease after adjusting for age, sex, race, marital status, education, and OSA severity ( $\beta = 33$ mins/night,  $p = 0.012$ ). Our predetermined mediators including sleep duration, insomnia, BMI, Depression, Anxiety and fatigue did not play a role in this association.



**Figure 2.** Proposed mediating pathways of the association between MEQ chronotype and CPAP adherence



**Figure 3.** CPAP adherence measured over 6 months according to MEQ category.

### CONCLUSIONS

1. Novel finding: chronotype may contribute to CPAP adherence
2. We did not identify potential mediators of this relationship
3. Mechanisms need to be delineated
4. Prospective and longitudinal study design
5. Chronotype maybe a modifiable factor among the biopsychosocial PAP adherence determinants

### REFERENCES

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2. Roenneberg T, et al. Epidemiology of the human circadian clock. *Sleep Med Rev*. 2007 Dec;11(6):429-38.
3. Crawford MR, et al. Integrating psychology and medicine in CPAP adherence--new concepts? *Sleep Med Rev*. 2014 Apr;18(2):123-39.