



Using Mobile Technologies to Investigate Impaired Sleep, Mood, and Energy as Real-Time Triggers of Migraine

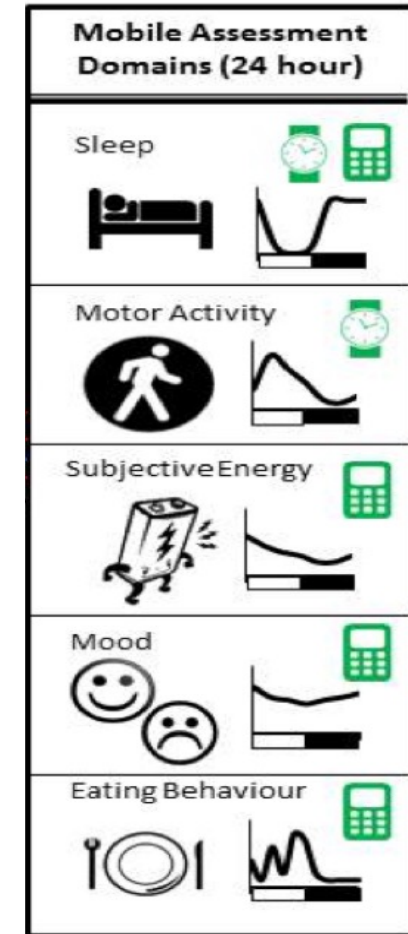
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Electronic Diaries (EMA)

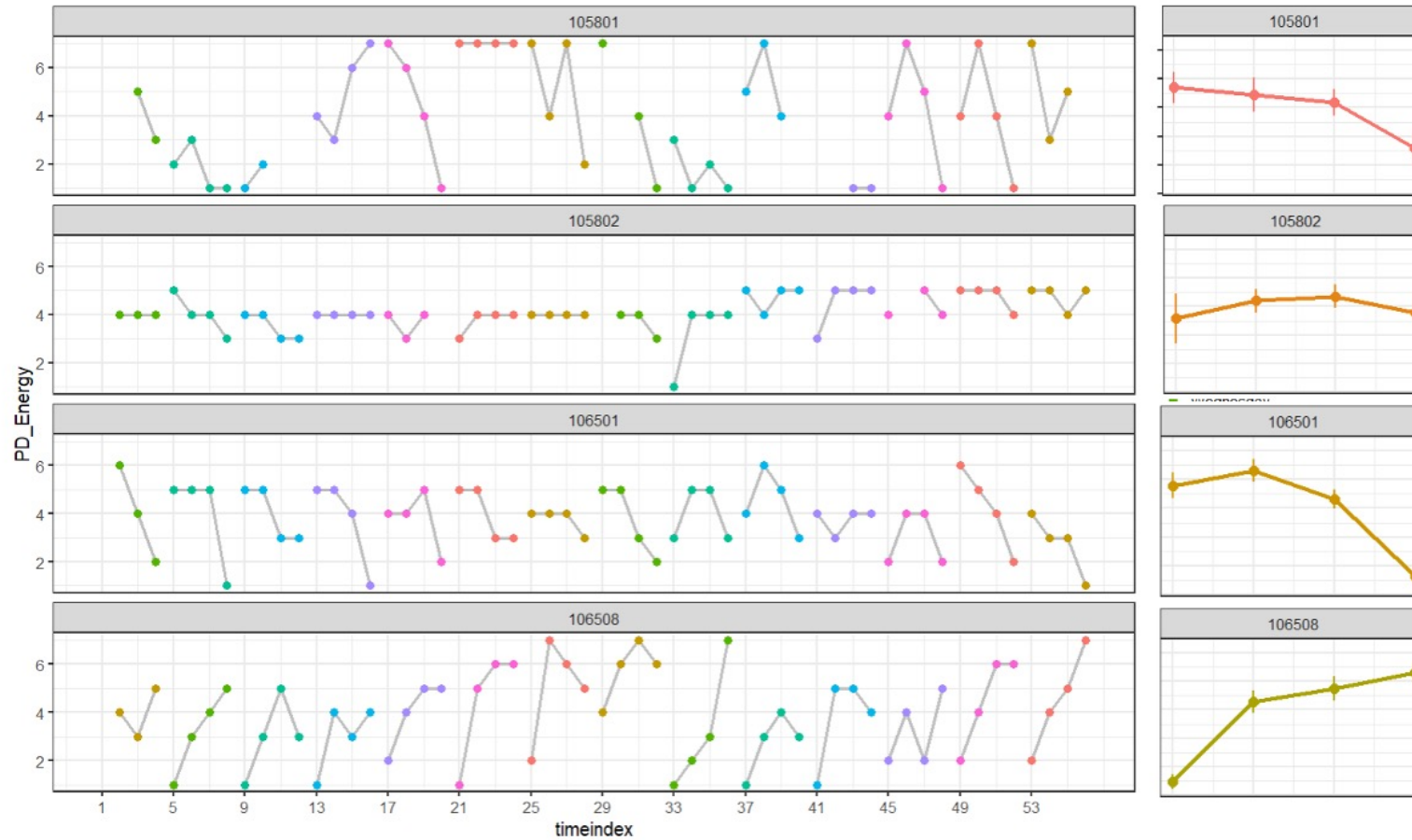
- Real-time self-reports of **mood, energy, stress, pain-level, anxiety, headache** recorded through smartphones.
- Objectively recorded **physical activity** and **sleep** through smartwatches.
- Intensive longitudinal data.



NIMH Family Study

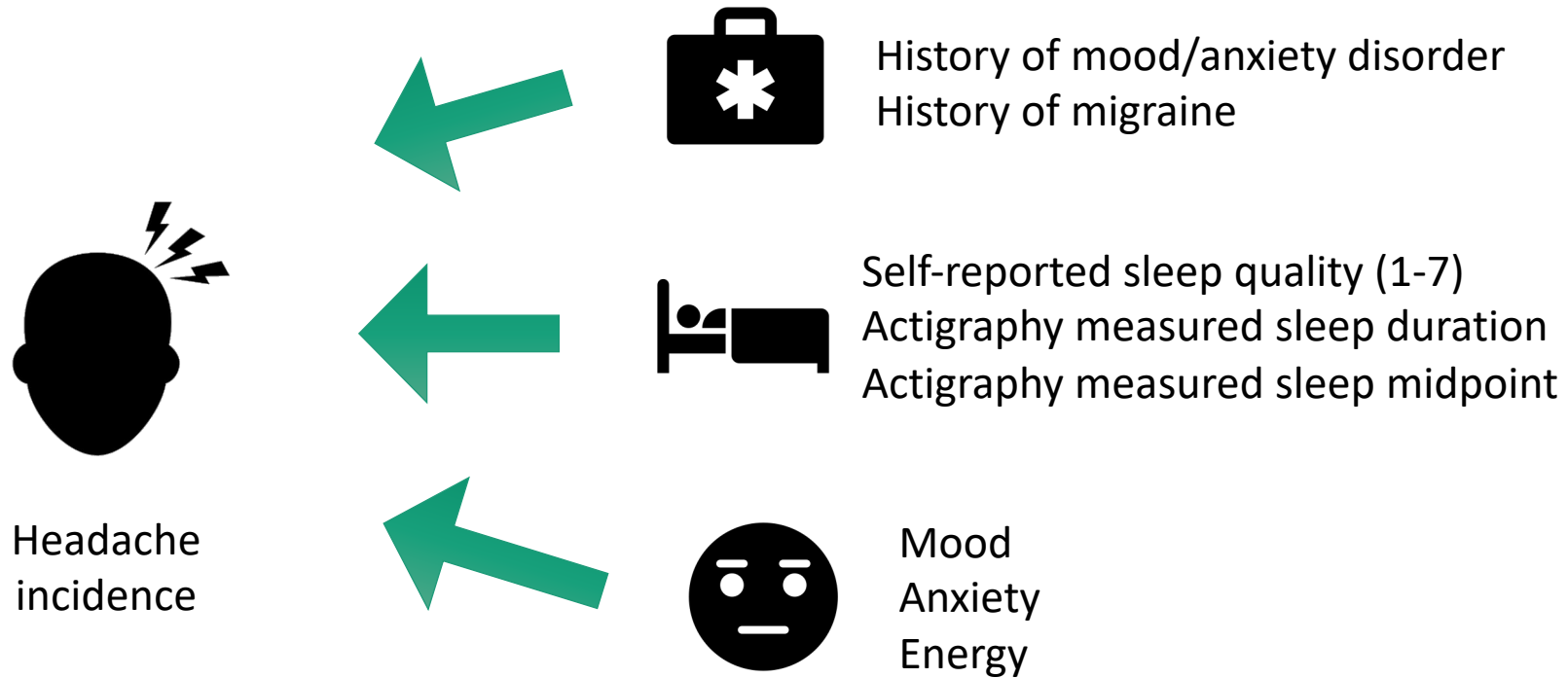
- A nested case-control design of 499 adults with cases being subjects with different mood disorders.
- An actigraphy device worn on the nondominant wrist plus EMA 4 times per day for 2 weeks.

Trajectories of Energy (scale 1-7)



Headache incidence

Sleep, mood, medical history



First Look

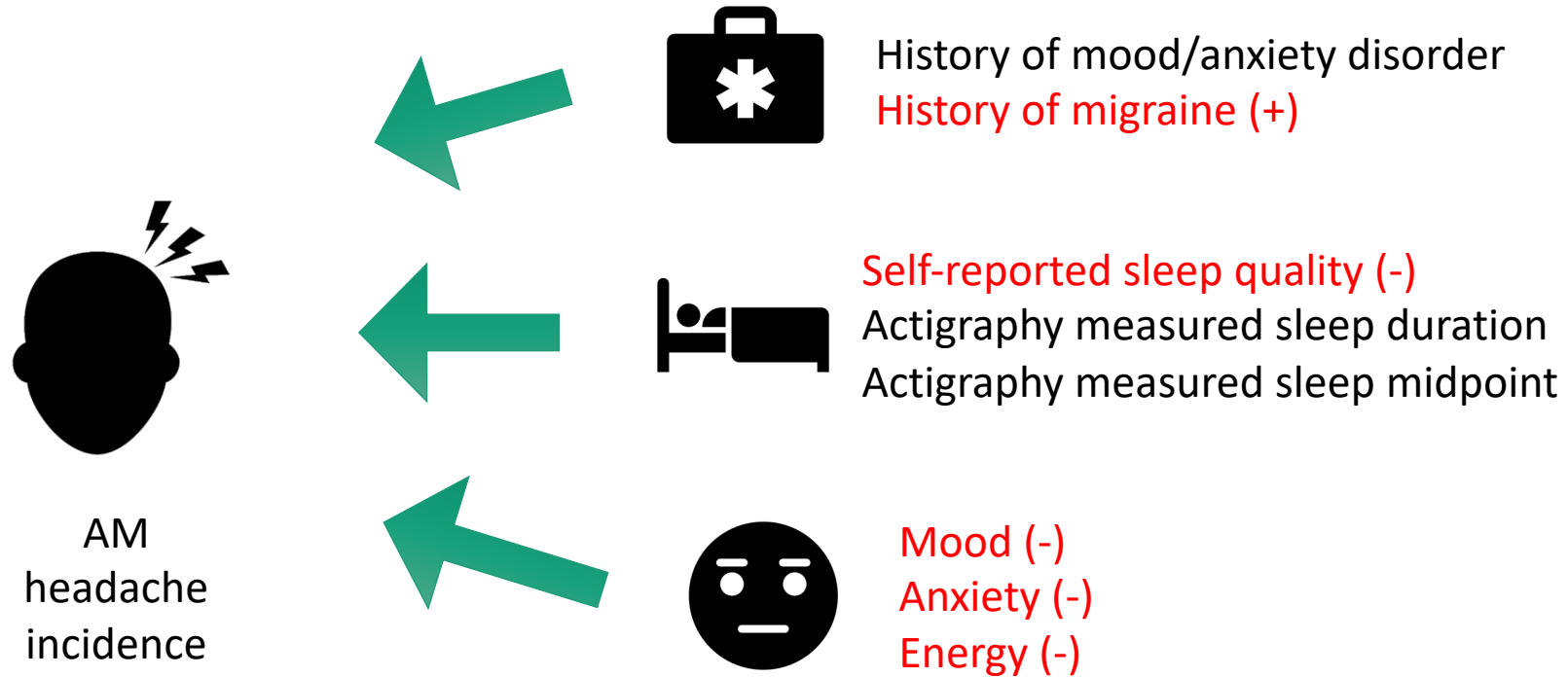
- Subjects with a history of migraine were more likely to experience at least one headache attack as compared to those without history of migraine (Males: **78%** versus **46%**; Females: **84%** versus **62%**).
- Males and females with a history of migraine reported **longer sleep duration** but **lower sleep quality** on average than those without a history of migraine

Time-dependent covariates



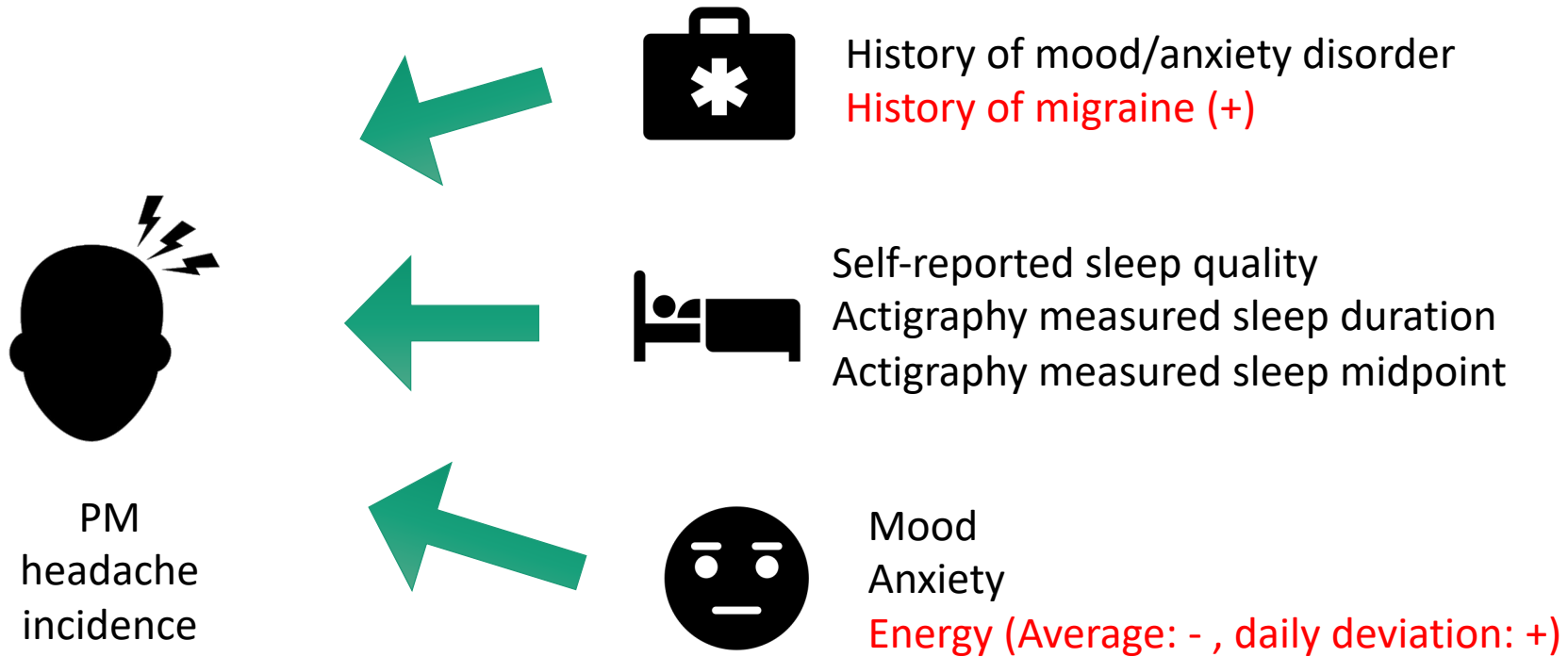
Significant associations

Linear mixed effects model



Significant associations

Linear mixed effects model



Conclusions

- **Circadian pattern:**

Subjects with migraine were more likely to have a headache both in the morning and evening compared to those without migraine, **however** this effect was **far more significant** for the morning headaches

- **Sleep** and **stress reactivity** may potentially mediate the association between mood/anxiety disorders and headache.

THANK YOU!