

# Morningness-eveningness's relationship to depression is mediated by positive, not negative, affect



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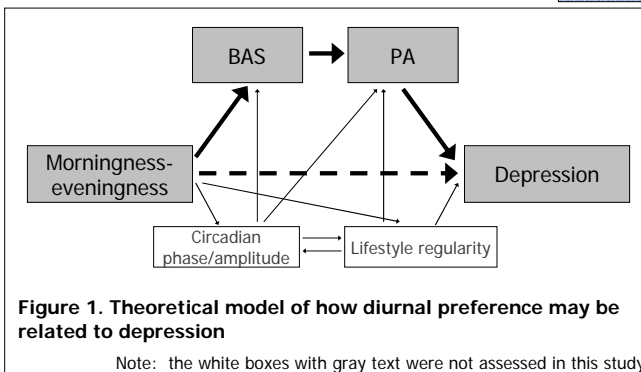


## Introduction

Research suggests that morningness-eveningness, which is correlated with circadian phase, predicts overall psychological health. Specifically, greater eveningness appears to be associated with greater psychological distress. A separate literature connects circadian rhythms to the Behavioral Approach System (BAS) and positive affect (PA), but not to the Behavioral Inhibition System (BIS) or negative affect (NA). Integrating this research and theoretical underpinnings, morningness-eveningness should relate to depression severity and also BAS and PA, but not to BIS and NA.

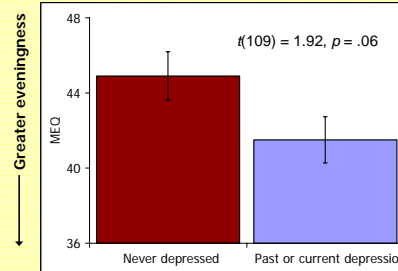
## Methods

In the context of a larger study investigating risk for depression, 109 adults (mean age = 21.62 ± 22.05 years, 81 females) completed the Horne-Ostberg Morningness-Eveningness Questionnaire (MEQ), Behavioral Inhibition and Behavioral Approach System Questionnaire (BIS/ BAS), Positive and Negative Affect Schedule (PANAS), and Beck Depression Inventory, 2nd Edition (BDI-II). To assess potential causal pathways, hierarchical linear regressions were run to assess relative contributions of the MEQ, BAS-Reward Responsivity and Drive (BAS-RR and BAS-D) subscales, and PA in predicting the BDI-II. Indirect (mediation) effects were also assessed.



## Results

**Figure 2. Diurnal preference by Major Depressive Disorder Diagnosis (per SCID-I)**

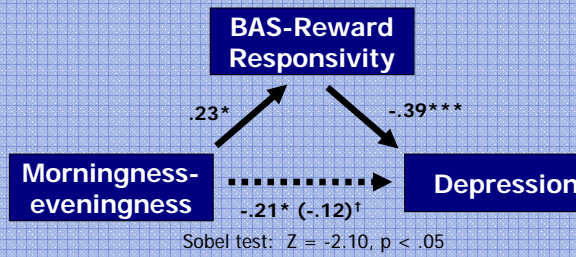


**Table 1. Correlations between morningness-eveningness scores, mood, and motivation measures**

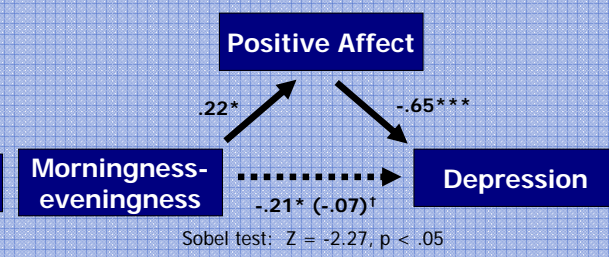
Variable	1	2	3	4	5	6	7	8
1. Morningness-eveningness, MEQ	—							
2. Depression, BDI-II	-.21*	—						
3. BAS-Reward Responsivity	.23*	-.42***	—					
4. BAS-Drive	.20*	-.34***	.50***	—				
5. BAS-Fun Seeking	-.03	-.34***	.42***	.50***	—			
6. BIS	-.06	.53***	.03	-.19*	-.29**	—		
7. PA, from PANAS	.22*	-.66***	.64***	.48***	.56***	-.40***	—	
8. NA, from PANAS	-.14	.76***	-.17	-.20*	-.19*	.63***	-.45***	—

Note: Higher MEQ scores denote greater morningness; \* =  $p < .05$ ; \*\* =  $p < .01$ ; n = 109

**Figure 3. BAS-Reward Responsivity fully mediates the relationship between M-E and depression**



**Figure 4. Positive affect fully mediates the relationship between M-E and depression**



\* $p < .05$  \*\*\* $p < .001$  †Parentetical values indicate direct effect of MEQ on BDI-II after taking mediator into account

- ⊙ Indirect effects for reversed mediators (e.g., MEQ→BDI→BAS-RR) were significant
- ⊙ Indirect effects for reverse pathways (e.g., BDI→BAS-RR→MEQ) were not significant
- ⊙ Shared variance between BAS-Reward Responsivity and PA appears to account for mediation effects (based on analyses using their respective residuals after accounting for shared variance)

## Conclusions

- ⊙ Greater eveningness is associated with (and may lead to...) more severe depression
- ⊙ This link may be mediated via circadian effects on the Behavioral Approach System and positive affect
- ⊙ Based on related research, depression may be associated with a blunted rhythm in positive affect
- ⊙ Eveningness may also be associated with blunted rhythms (literature is inconsistent)
- ⊙ Greater variability in sleep timing among evening-types may be also be an important factor in this link (data not reported here)

## Acknowledgements

The data collection phase of this research was supported by a grant from the National Institutes of Health (R01- MH066902)

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