

# Lower psychological flexibility can enhance the effects of dysfunctional beliefs on insomnia severity.

## The association between sleep-related cognitions, psychological flexibility, and insomnia symptoms

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### Introduction

The cognitive-behavioral model of insomnia proposes that arousal, cognitions, behaviors, and perceived consequences play an important role in maintaining insomnia symptoms. The **metacognitive model of insomnia** expands this idea by defining cognitive activity as primary arousal and how one interprets those thoughts as a secondary arousal. Because **primary and secondary processes mutually influence each other**, the content of maladaptive sleep-related thoughts can impact the maintenance of insomnia disorder more strongly if one is rigidly attached to them.

### Objective

To investigate if psychological inflexibility moderates the relationship between dysfunctional beliefs about sleep and insomnia severity.

### Methods

Data were collected from online surveys responded by 629 adults, aged 18 to 59 years, who reported experiencing insomnia symptoms. Participants completed self-report questionnaires, including:

- Hospital Anxiety and Depression Scale (HADS);
- Insomnia Severity Index (ISI);
- Dysfunctional Beliefs and Attitudes about Sleep Scale (DBAS-16);
- Acceptance and Action Questionnaire (AAQ-II).

All continuous predictors were standardized prior to data analysis. A linear model (estimated using OLS) was fitted to predict ISI scores from DBAS-16 and AAQ-II with age, sex and HADS subscales as covariates:

$$ISI \sim Age + Sex + HADSA + HADSD + DBAS \times AAQII$$

### Results

Table 1: Study participants (N = 629) descriptive statistics.

	N/Mean (%/SD)
Age (years)	38 (10.1)
Gender	
Female	492 (78.2)
Male	137 (21.8)
Race/ethnicity	
Asian	31 (4.93)
Black	154 (24.5)
Other/Not informed	5 (0.795)
White	439 (69.8)
Education	
≤ 12th grade	62 (9.86)
College degree or higher	462 (73.4)
Some college	105 (16.7)
Region of origin	
Central-West	28 (4.45)
North	11 (1.75)
Northeast	43 (6.84)
South	53 (8.43)
Southeast	494 (78.5)
Sleep Medication	
1-5 days a week	141 (22.4)
6-7 days a week	234 (37.2)
Don't use	254 (40.4)

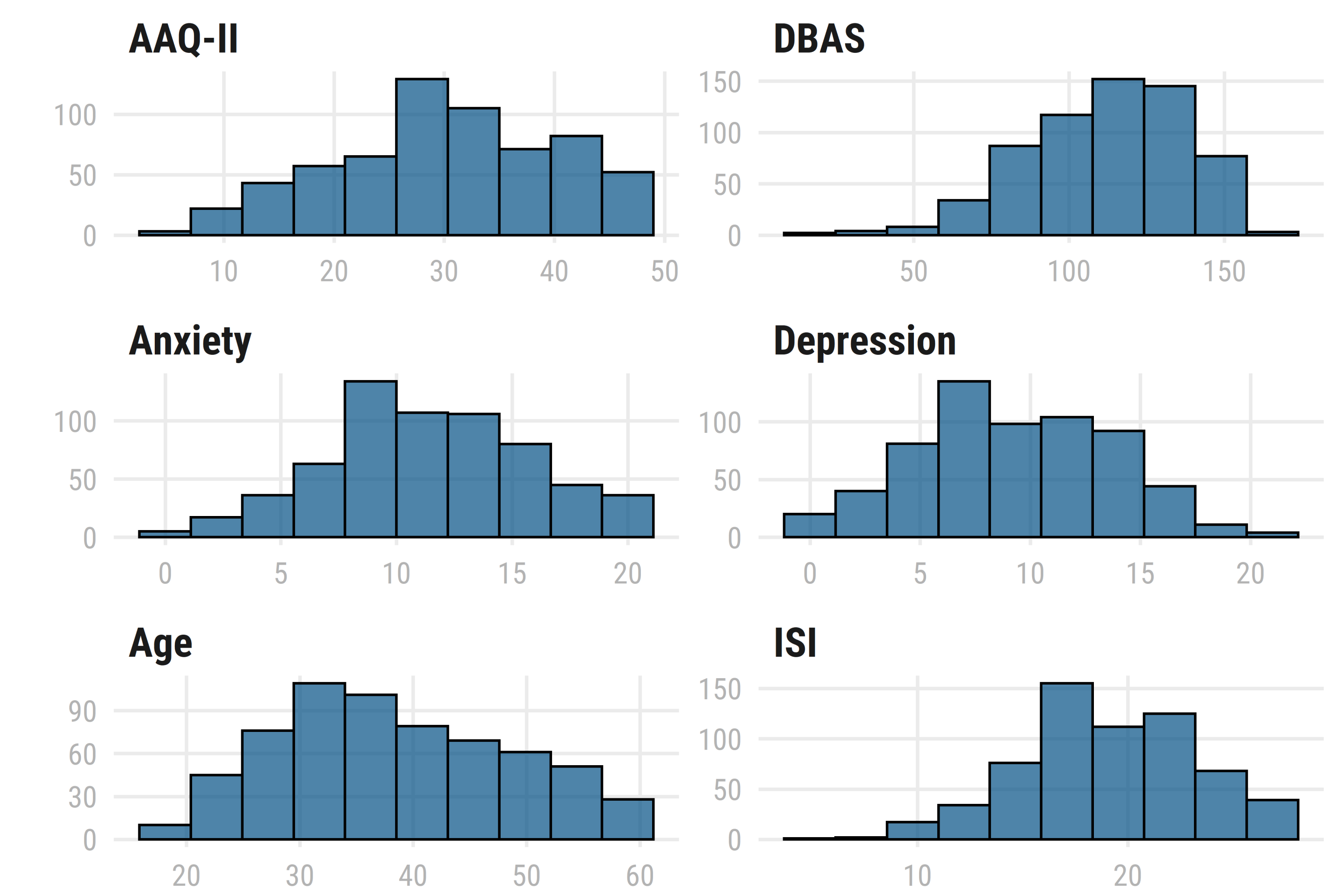


Figure 1: Distribution of continuous variables in the model.

The results of the regression indicated that the model significantly predicted ISI scores ( $F(621, 7) = 42$ ),  $p < 0.001$ ,  $R^2_{adj} = 0.31$ ), accounting for 31% of the variance.

Table 2: Results from the regression model examining the effects of age, sex, cognitive processes (DBAS-16 and AAQ-II) and anxiety and depressive symptoms (HADS-A and HADS-D) on the severity of insomnia.

	Coef.	Std.Error
Age	0.003 [-0.003, 0.010]	0.003
Sex	0.027 [-0.131, 0.185]	0.080
HADS-A	0.149 [0.057, 0.241]**	0.047
HADS-D	0.071 [-0.023, 0.165]	0.048
DBAS-16	0.393 [0.317, 0.469]***	0.039
AAQ-II	0.107 [0.006, 0.208]*	0.051
DBAS-16 x AAQ-II	0.068 [0.009, 0.127]*	0.030

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

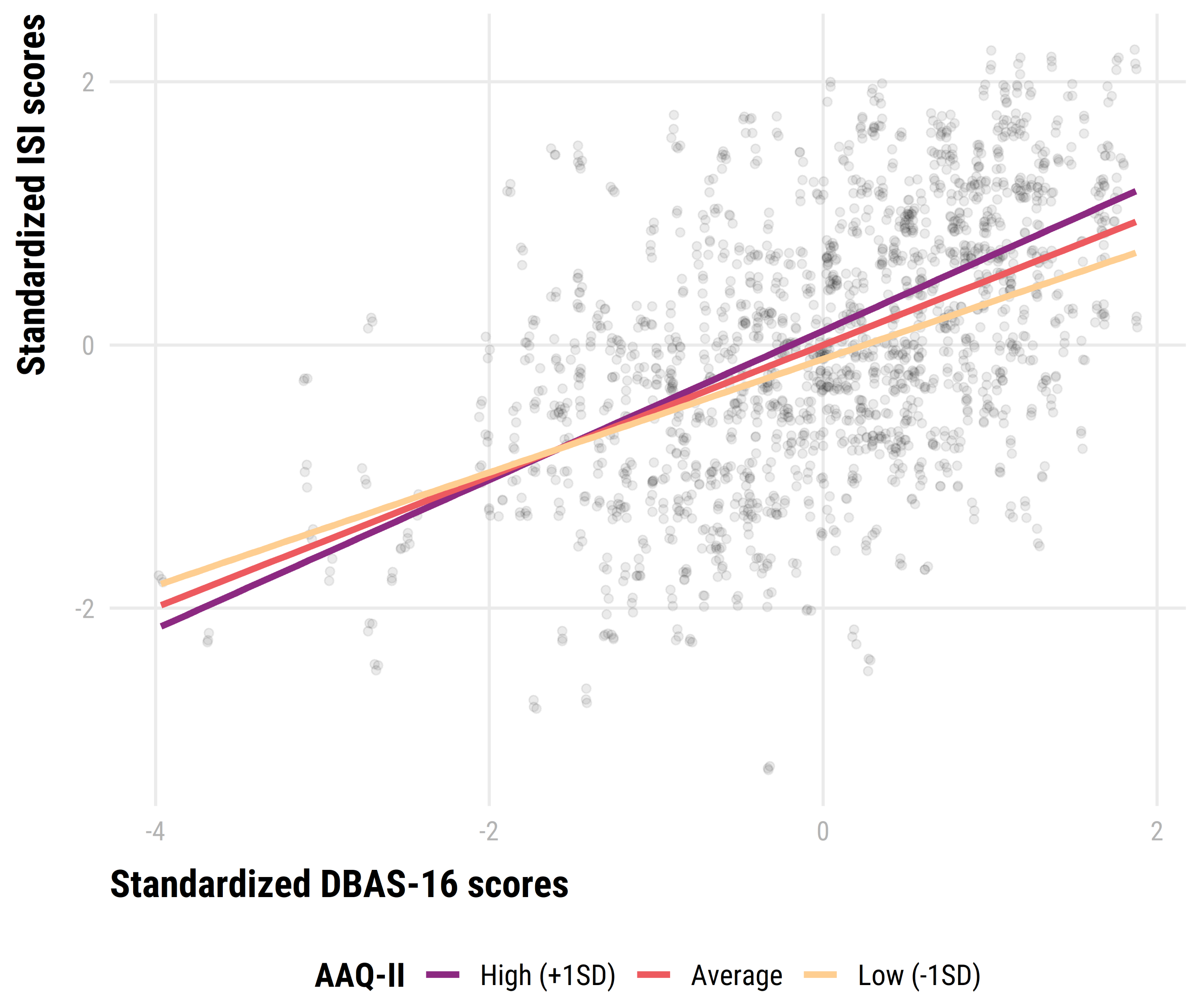


Figure 2: Decomposing dysfunctional beliefs about sleep by psychological inflexibility interaction via simple slopes for psychological inflexibility.

### Conclusion

Insomnia severity scores were influenced by higher scores on anxiety, dysfunctional beliefs about sleep and psychological inflexibility. The **significant interaction effect** indicates that the prediction effect of dysfunctional beliefs about sleep may become more positive for additional levels of psychological inflexibility.

### Remarks

This poster was created using **posterdown** package for R (**Thorne, 2019**). Reproducible code available at <https://bit.ly/postercbs>

### References

Harvey, A. G. (2002). A cognitive model of insomnia. *Behaviour Research and Therapy*, 40(8), 869–893. <https://doi.org/fwxq35>  
Morin, C. M., Stone, J., Trinkle, D., Mercer, J., & Remsburg, S. (1993). Dysfunctional beliefs and attitudes about sleep among older adults with and without insomnia complaints. *Psychology and Aging*, 8(3), 463–467. <https://doi.org/frwwvp>  
Ong, J. C., Ulmer, C. S., & Manber, R. (2012). Improving sleep with mindfulness and acceptance: A metacognitive model of insomnia. *Behaviour Research and Therapy*, 50(11), 651–660. <https://doi.org/f4fczt>  
Thorne, B. (2019). *Posterdown: Generate PDF conference posters using r markdown*. <https://github.com/brenthorne/posterdown>

