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The association between insomnia and emotion dysregulation: A meta-analysis across 57 studies

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INTRODUCTION

A growing body of evidence indicates an association between insomnia and emotion dysregulation (ED) [1]. However, a quantitative estimate of the interrelationship is lacking in the literature and some issues remain:

I. ED is often considered as a uniform construct, while different conceptualizations exist for it. Some refers to ED as more frequent implementation of maladaptive emotion regulation (ER) strategies and/or reduced ability to use adaptive ER strategies [2]. Others emphasize ED represents dispositional difficulty in the multiple aspects of ER [3].

II. Despite theoretical and intervention implications investigating sleep and emotion variables (and the links between them) depend to factors such as age, gender, and health-related status of individuals, these potential factors that might moderate the link between insomnia and ED are not well understood.

We integrated the effect sizes (ESs) of available findings on insomnia-ED interrelations through a meta-analytical approach, and quantitatively represent the link between insomnia and ED. We specified health-related status (i.e.,), mean age, female ration as well as ED aspect (i.e., difficulties in ER, adaptive/maladaptive ER strategy) as potential moderators, and performed a series of meta-regression analyses to assess whether the insomnia-ED link varies due to these potential moderators.

METHOD

Literature Search: The PubMed, Scopus, Web of Science, and PsycINFO databases were searched up to August 2023.

In/exclusion criteria and study selection: Considering the different conceptualization of ED, the studies were eligible to include if they measured ED by frequency of maladaptive (i.e., avoidance, rumination, and suppression) and adaptive ER strategies (i.e., problem-solving, acceptance, and reappraisal) using the self-reported scales such as ERQ or apply difficulty in emotion regulation scale (DERS) to measure ED as a dispositional model of difficulties in ER. Those that consider (a) correlations between insomnia symptoms (measured by a self reported scale) and sub-domains of ED and/or (b) mean differences of sub-domains of ED in groups of individuals with insomnia and good sleepers were included (Figure1). Studies on distinct variables of emotional reactivity and sleep deprivation were excluded.

A.

		Group differences		correlations
		people with Insomnia	good sleepers	Insomnia symptoms
Difficulty in ER	DERS-Total	Means + SDs	Means + SDs	Pearson r
	Awareness			
	Clarity			
	Non-acceptance			
	Goals			
	Impulse			
	Strategy			
Adaptive ER strategies	Problem solving			
	Acceptance			
	Reappraisal			
Maladaptive ER strategies	Avoidance			
	Suppression			
	Rumination			

B.

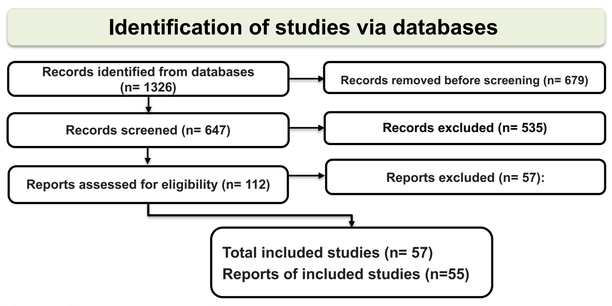

Figure1: A. details of the data extraction, B. PRISMA flow diagram of literature search and study selection

Effect Size Calculation: We calculated Fisher's z-transformed index of the reported correlation coefficient, and the Hedges' g, which is a simple corrected form of standardized mean difference (Cohen's d).

Pooling Effect Sizes Approach: Two independent sets of analyses were conducted for correlational and group comparison studies. We conducted moderator/(multiple)meta-regression analyses based on the three-level random effect model, as multiple outcomes were reported within many studies for the same samples. Robust Variance Estimation (RVE) was also applied to the model since the random effect structure may not fully capture all dependencies in the underlying true effects. The heterogeneity was assessed based within and between I^2 statistic, and heterogeneity variance τ^2. We also assessed the presence of publication bias through the small-study effect methods: the contour-enhanced funnel plot and Egger's regression test.

RESULT

The results demonstrated noticeable estimates of the link between insomnia and ED. The estimated ES of the insomnia-ED link can vary due to the health-related status and ED aspect. However, they could not be a source for the observed high-level between/within-study heterogeneity (Table 1,2).

Table1: statistics From meta-analyses of correlational studies

Moderator		n	k	PE	I^2_{btw}	I^2_{wthn}	τ^2_{btw}	τ^2_{wthn}	P-val $_{Ftest}$
-		47	119	.28	67.95	30.12	.022	.05	-
Mean age & female ratio	Mean age	47	119	.006*	62.21	31.86	.023	.05	-
	Female ratio	47	119	.123					
Health-related status	healthy	25	69	.21****	72.66	25.66	.018	.05	.0001
	mental health issues	13	30	.40****					
	significant coping stress	9	20	.31****					
ED Aspect	Difficulties in ER	16	60	.36****	82.26	14.89	.042	.08	.001
	Adaptive ER strategy	20	25	-.006					
	Maladaptive ER strategy	26	34	.35****					
ED Aspect + Health-related status	Difficulties in ER	16	60	.41****	89.51	7.42	.003	.04	.001
	Adaptive ER strategy	10	25	.053					
	Maladaptive ER strategy	26	34	.41****					
	healthy	25	69	-.10					
	significant coping stress	9	20	.05					

n: Number of studies, k: Number of effect sizes, PE: Pooled effect size Estimate, τ^2: heterogeneity variance, and I^2: total heterogeneity / total variability, btw: between study, wthn: within study.

* p<.05. ** p<.01, *** p<.001, **** p<0.0001

Table2: Statistics From meta-analyses of group comparison studies

Moderator		n	k	PE	I^2_{btw}	I^2_{wthn}	τ^2_{btw}	τ^2_{wthn}	P-val $_{Ftest}$
-		16	55	.98*	76.42	22.16	1.42	.52	-
Mean age & female ratio	Mean age	16	55	.002	73.89	21.56	1.12	.63	-
	Female ratio	16	55	-.11					
ED Aspects	Difficulties in ER	8	31	.75**	70.99	24.67	.49	.12	>.05
	Maladaptive ER strategy	10	11	.91*					

n: Number of studies, k: Number of effect sizes, PE: Pooled effect size Estimate, τ^2: heterogeneity variance, and I^2: total heterogeneity / total variability, btw: between study, wthn: within study.

* p<.05. ** p<.01, *** p<.001, **** p<0.0001

The non-significant results of Egger tests revealed no publication bias for correlational studies as well as group comparison studies (Figure 2)

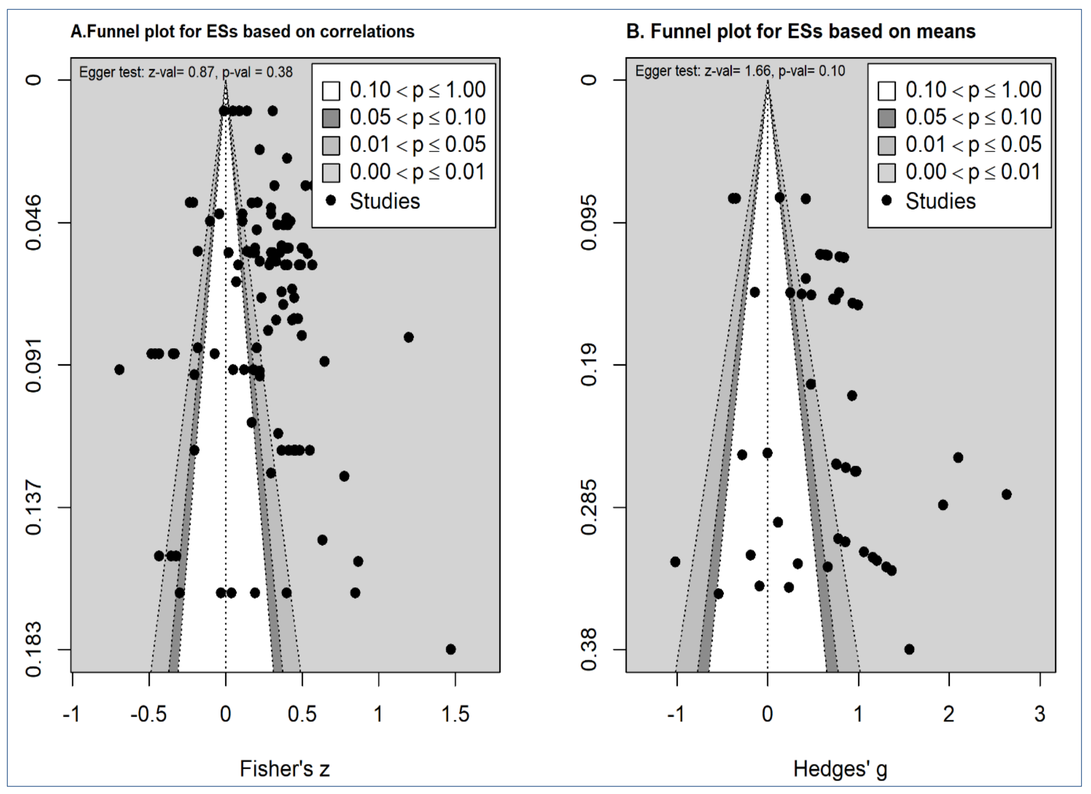

Figure2: Contour-enhanced funnel plots displaying all effect sizes from (A) correlational and (B) group comparison studies.

CONCLUSION

The findings of this quantitative meta-analysis indicate a robust link between insomnia and ED. Hence, further studies are needed to identify the underpinning neurophysiological mechanisms of this association.

References

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