Bidirectional Relationship between Sleep Disturbances and Stress: The Role of Coping and Quality of Life

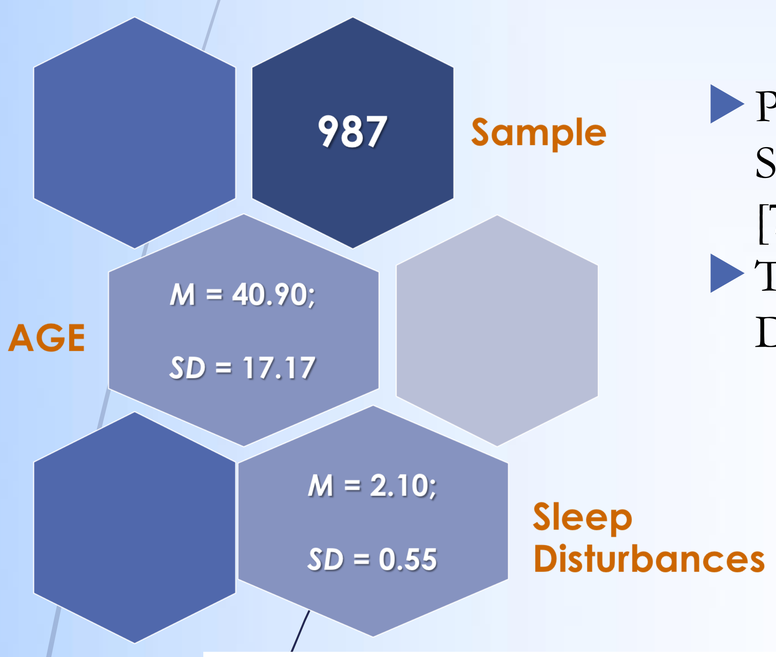
Jorge Cardoso[1*], Telma Almeida[1], Catarina Ramos[1], Sara Sousa[2] & José Brito[1]

[1]Centro de Investigação Interdisciplinar Egas Moniz (CiiEM), Instituto Universitário Egas Moniz (IUEM), Monte da Caparica, Portugal; [2]Instituto Universitário Egas Moniz (IUEM), Monte da Caparica, Portugal.

Introduction

Perceived stress (PS) is strongly associated with sleep disturbances (SD) [e.g., 1]. Despite the growing body of evidence linking these two variables, research examining the non-recursive relationship is lacking. The effect of coping [e.g., 2] and quality of life (QoL) [e.g., 3] in sleep patterns is also well established.

The main **objective** of this research was to analyze the bidirectional relation between PS and SD with a model that includes coping and QoL as predictors of both variables.



Materials and Methods

- Participants completed questionnaires about SD (BaSIQS [4]), PS (Perceived Stress Scale [5]), coping strategies (BriefCOPE [6]) and QoL (WHOQOL-BREF [7]).
- The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and all participants signed informed consent.

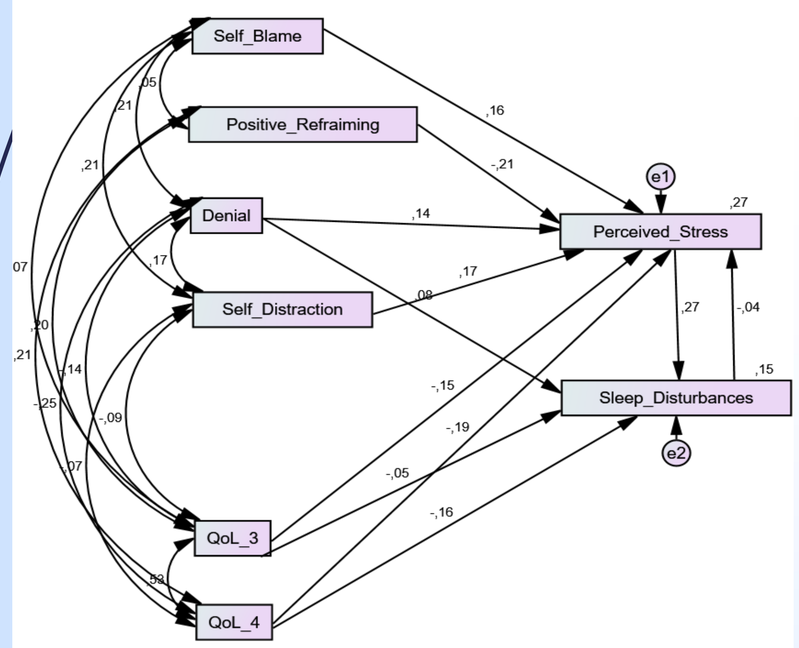


Figure 1. SEM with PS and SD as Dependent Variable (Standardized Values)

Results

Table 1

Canonical Correlations, Coefficients and Loadings for the Canonical Variables (U_i, V_i)

Canonical variables	Canonical Correlations	Variables[a]	Raw canonical Coefficients	Standardized canonical Coefficients	Canonical loadings[b]	% variance explained by canonical variables
U_1, V_1	0.562[c] (0.561)	Y1	0.460	0.306 (0.308)	0.591 (0.593)	In Set 1, by U_1: 63.32 (63.35)
		Y2	1.295	0.855 (0.854)	0.957 (0.957)	
		X1	-0.402	-0.284 (-0.316)	-0.484 (-0.485)	
		X2	0.408	0.267 (0.270)	0.400 (0.401)	
		X3	0.389	0.262 (0.270)	0.524 (0.525)	
		X4	0.432	0.301 (0.307)	0.428 (0.429)	In Set 2, by V_1: 23.93 (25.97)
		X5	-0.177	-0.129 (-0.123)	-0.227 (-0.228)	
		X6	-0.104	-0.254 (-0.264)	-0.642 (-0.643)	
		X7	-0.174	-0.371 (-0.379)	-0.703 (-0.705)	
		X8	0.061	0.032	0.463	
		X9	-0.095	-0.060	-0.359	
U_2, V_2	0.146[c] (0.141)	Y1	1.526	1.016 (1.015)	0.806 (0.806)	In Set 1, by U_2: 36.68 (36.65)
		Y2	-0.950	-0.627 (-0.628)	-0.289 (-0.290)	
		X1	0.638	0.451 (0.466)	0.260 (0.271)	
		X2	-0.718	-0.470 (0.535)	-0.506 (-0.524)	
		X3	0.459	0.309 (0.251)	0.216 (0.220)	
		X4	-0.449	-0.314 (0.361)	-0.369 (-0.384)	In Set 2, by V_2: 10.55 (13.40)
		X5	-0.055	-0.040 (0.047)	-0.088 (-0.090)	
		X6	0.004	0.010 (0.045)	-0.190 (-0.193)	
		X7	-0.317	-0.674 (0.684)	-0.575 (-0.590)	
		X8	-0.549	-0.286	-0.263	
		X9	-0.151	-0.095	0.020	

Notes. [a] Sleep Disturbances (Y1), Perceived Stress (Y2), Positive Reframing (X1), Self-Blame (X2), Denial (X3), Self-Distraction (X4), Humor (X5), QoL-Social Relationships (X6), QoL-Environment (X7), Behavioral Disengagement (X8) and Active Coping (X9); [b] Correlations between canonical variables and corresponding variables. [c] Canonical correlations. Values between brackets refer to model without X8 and X9.

Canonical Correlation Analysis' results showed that the first correlation (0.562), dominated by PS, suggested a direct association with SD. The second correlation (0.146), dominated by SD, suggested a reverse association with PS. (Table 1)

Structural Equation Modeling' results showed excellent model fit (X2/df = 0.916, p = .469, GFI = 0.992, RMSEA = 0.000 [0.000 - 0.042]). Self-Blame, Positive Reframing, Denial, Self-Distraction, Social Relationships and Environment were significant predictors of PS. Denial and Environment significantly predicted SD. (Figure 1)

Discussion and Conclusions

- **SD depends on PS**, but no evidence of a direct effect of SD on PS was observed.
- Although the bidirectional relationship has not been confirmed, **this study supports the importance of PS in the management of SD**.
- **Coping strategies are important factors in explaining PS** rather than SD and the social relationships and environment are the two domains of quality of life that are predictors of PS. **Environment is also a predictor of SD.**

References:
[1] Darling CA, Coccia C, Senatore N. Women in midlife: stress, health and life satisfaction. Stress and health. 2012 Feb 1;28(1):31-40.
[2] Abe Y, Mishima K, Kaneita Y, Li L, Ohida T, Nishikawa T, Uchiyama M. Stress coping behaviors and sleep hygiene practices in a sample of Japanese adults with insomnia. Sleep and Biological Rhythms. 2011 Jan 1;9(1):35-45.
[3] Bolge SC, Doan JF, Kannan H, Baran RW. Association of insomnia with quality of life, work productivity, and activity impairment. Quality of life Research. 2009 May 1;18(4):415.
[4] Allen Gomes A, Ruivo Marques D, Meia-Via AM, Meia-Via M, Tavares J, Fernandes da Silva C, et al. Basic Scale on Insomnia complaints and Quality of Sleep (BaSIQS): Reliability, initial validity and normative scores in higher education students. Chronobiology international. 2015 Mar 16;32(3):428-40.
[5] Trigo M, Canudo N, Branco F, Silva D. Estudo das propriedades psicométricas da Perceived Stress Scale (PSS) na população portuguesa. Psychologica. 2010 Dec 1:353-78.
[6] Ribeiro JL, Rodrigues AP. Questões acerca do coping: A propósito do estudo de adaptação do Brief Cope. Psicologia, Saúde & Doenças. 2004 Jul;5(1):3-15.
[7] Vaz Serra A, Canavarro MC, Simões M, Pereira M, Gameiro S, Quartilho MJ, et al. Estudos psicométricos do instrumento de avaliação da qualidade de vida da Organização Mundial de Saúde (WHOQOL-Bref) para Português de Portugal. In Psiquiatria clínica 2006 (Vol. 27, No. 1, pp. 41-49).

*Corresponding author:
jorgecardoso.psi@gmail.com