

The bidirectionality of the relationship between  
insomnia, anxiety and depression in adolescents: A  
longitudinal study

Pasquale K Alvaro

Bachelor of Psychology (Hons)

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School of Psychology  
Faculty of Health Sciences  
University of Adelaide

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## Declaration

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I hereby declare this submission is my own work and that, to the best of my knowledge and belief, it contains no material that has been accepted for the award of any other degree or diploma of a university or other institute of higher learning, except where due acknowledgement is made in the body of the text. All work contained in the submission was initiated, undertaken, and prepared within the period of candidature. In addition, I certify that no part of this work will, in the future, be used in a submission in my name for any other degree or diploma in any university or other tertiary institutions without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint award of this degree. I give consent to this copy of my thesis when deposited in the University Library, being made available for loan and photocopying, subject to the provisions of the Copyright Act 1968. The author acknowledges that copyright of published works contained within this thesis (as listed below) resides with the copyright holder(s) of those works.

Alvaro, P. K., Roberts, R. M., & Harris, J. K. (2013). A systematic review assessing bidirectionality between sleep disturbances, anxiety, and depression. *Sleep*, 36(7), 1059-1068.

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Pasquale Alvaro  
PhD Candidate

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## Abstract

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Bidirectionality refers to whether variable  $x$  predicts and/or is predicted by variable  $y$ . This thesis identified and accounted for gaps within the literature on the bidirectionality of the relationship between insomnia, depression, and anxiety during adolescence. Namely, bidirectionality was assessed across different subtypes of anxiety, using continuous variables. The independent effect of chronotype on the bidirectionality of the relationship between insomnia and depression, and insomnia and subtypes of anxiety were also considered.

Study one systematically reviewed the literature of the bidirectional associations between sleep disturbances, anxiety and depression across all age groups. In total, the systematic review contained nine independent studies. Best available evidence indicates that insomnia is bidirectionally related to anxiety and depression. The limited data available suggests that bidirectionality may extend beyond insomnia to other sleep disturbances, although additional research is needed to further clarify this notion.

Study two assessed the cross-sectional independent relationships between insomnia and depression, and insomnia and various subtypes of anxiety during adolescence. The predictive effect of chronotype on insomnia, depression, and subtypes of anxiety was also assessed. Baseline data from 318 South Australian high school students in grades 7 to 11 (age range 12-18, mean  $14.96 \pm 1.34$ ) were collected. Insomnia, depression, subtypes of anxiety and chronotype were assessed by validated self-report questionnaires. Insomnia predicted depression and panic disorder (PD) after controlling for confounders, although the latter was not considered clinically significant. Depression and generalised anxiety disorder

(GAD) predicted insomnia after confounders were controlled. Insomnia was not significantly associated with other subtypes of anxiety once depression was controlled. Eveningness uniquely predicted insomnia and depression, but was not associated with any anxiety subtype.

Study three investigated the bidirectionality of the relationship between insomnia and various subtypes of anxiety, and insomnia and depression; and the independent predictive effects of chronotype on insomnia, depression, and each subtype of anxiety during adolescence. The study was longitudinal, with a 6-month follow-up. Two-hundred and fifty-five high school students completed self-report questionnaires at baseline and follow-up. Once depression was controlled, insomnia predicted depression and GAD after controlling for other variables, and vice-versa, but was not related to other anxiety subtypes in either direction. An evening chronotype predicted insomnia once other variables were controlled, but did not predict depression or subtypes of anxiety once insomnia was controlled.

Together, the results suggest that insomnia is bidirectionally related to depression and GAD, and related to other subtypes of anxiety through a common factor, depression. Furthermore, chronotype predicts the development of insomnia, and is related to depression and anxiety subtypes through the common factor of insomnia. Chronotype, then, may be a risk-factor for the development of insomnia, which may subsequently contribute to depression or GAD, which in turn may create a vulnerability to other anxiety disorders. Ultimately, these findings may significantly enhance prevention and treatment. Chronotype, depression and GAD should be considered while implementing insomnia interventions, insomnia may be important to address in the treatment of depression and GAD, and

depression should be assessed and considered for all sleep and anxiety disorder presentations.