The relationship between psychotic experiences, nightmares and emotion dysregulation: results from a student population

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Elsevier Editorial System(tm) for The Lancet Psychiatry

Manuscript Draft

Manuscript Number: THELANCETPSYCH-D-19-00839

Title: The relationship between psychotic experiences, nightmares and emotion dysregulation: Results from a student population

Article Type: Article (Original Research)

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Manuscript Region of Origin: UNITED KINGDOM

Abstract: Background: Sleep-disruption is commonly associated with psychotic experiences. Whilst sparse, the literature to date highlights nightmares and related distress as prominent risk factors for psychosis in students. We aimed to further explore the relationship between specific nightmare symptoms and psychotic experiences in university students whilst examining the mediating role of emotion dysregulation. Method: A sample (N=1273) of students respondents from UK Universities completed measures of psychotic experiences, nightmare disorder symptomology, and emotion dysregulation. Findings: Hierarchical linear regression analysis showed that psychotic experiences were significantly associated (Adjusted R2 = 32.4%) with perceived nightmare intensity, consequences and resulting awakenings, and with emotion regulation difficulties. Furthermore, multiple mediation analysis showed that the association between psychotic experiences and nightmare factors was mediated by emotion regulation difficulties. Interpretation: Adaptive regulation of dream content during rapid eye-movement sleep has previously been demonstrated to attenuate surges in affective arousal by controlling the intensity and variability of emotional content. Deficits in emotion regulation may partially explain the experience of more intense and disruptive nightmares amongst individuals with psychotic experiences. Emotion regulation may represent an important control mechanism that safeguards dream content and sleep quality.

The relationship between psychotic experiences, nightmares and emotion dysregulation: Results from a student population

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For submission to The Lancet Psychiatry

Words: 2729
References: 45
Number of Tables: 4
Number of Figures: 0
Keywords: Sleep, Psychosis, Emotion Regulation, Student Mental Health
Data Availability Statement: Data will be made available on reasonable request.
Declaration of Competing Interests: No conflicts of interest declared in relation to this paper.
Contributors: All authors contributed to developing the design of this experiments and data collection. Data was analysed by UA and JS. Interpretation of results was conducted by UA, JS. An initial version of the manuscript was written by UA. Following, input was sought from all other authors who approved the final version of the manuscript.
Acknowledgments: We would like to thank the students who completed the experiment for their time.
Funding: n/a – no funding received

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Abstract

Background: Sleep-disruption is commonly associated with psychotic experiences. Whilst sparse, the literature to date highlights nightmares and related distress as prominent risk factors for psychosis in students. We aimed to further explore the relationship between specific nightmare symptoms and psychotic experiences in university students whilst examining the mediating role of emotion dysregulation. **Method:** A sample (N=1273) of students respondents from UK Universities completed measures of psychotic experiences, nightmare disorder symptomology, and emotion dysregulation. **Findings:** Hierarchical linear regression analysis showed that psychotic experiences were significantly associated (Adjusted R^2 = 32.4%) with perceived nightmare intensity, consequences and resulting awakenings, and with emotion regulation difficulties. Furthermore, multiple mediation analysis showed that the association between psychotic experiences and nightmare factors was mediated by emotion regulation difficulties. **Interpretation:** Adaptive regulation of dream content during rapid eye-movement sleep has previously been demonstrated to attenuate surges in affective arousal by controlling the intensity and variability of emotional content. Deficits in emotion regulation may partially explain the experience of more intense and disruptive nightmares amongst individuals with psychotic experiences. Emotion regulation may represent an important control mechanism that safeguards dream content and sleep quality.

Research in context

Evidence before this study: The experience of nightmare distress has previously been evidenced as more predictive of general psychiatric difficulty than nightmare frequency in students. These observations are important as they parallel examinations of positive symptoms of psychosis where distress accompanying the experience of voices and unusual beliefs differentiates the need for intervention. Whilst childhood nightmares predict future psychotic experiences in young adulthood, the role of nightmares in relation to psychotic experiences in students has received little attention. To the best of our knowledge, only two studies have examined this relationship to date. **Added value of this study:** Previous work highlights the importance of examining possible underlying mechanisms which may shed light on the relationship between the experience of nightmares and psychotic experiences. Here, we highlight the role of specific impairments in emotion regulation which may be therapeutically targeted above existing cognitive behavioural treatment strategies. Additionally, for the first time we highlight the role of perceived psychical, psychological and interpersonal consequences of nightmares in predicting the extent of psychotic experiences. **Implications of all the evidence:** Poor wellbeing and distress among university students is continually rising, with recent data highlighting a fivefold increase in the number of students revealing their mental health difficulties to institutional support services over the past decade. Certainly, students face considerable life changes and academic challenges which may contribute to the experience of such psychiatric symptoms. Appropriate screening of nightmare symptoms and emotion regulation difficulties amongst students reporting psychotic experiences may therefore guide student-support services when making judgments regarding treatment approach (e.g. guiding the patient to accept or actively decrease distress).

Introduction

Disturbed sleep plays a crucial role in predicting the development of first-onset psychosis (Fisher et al., 2014) and paranoid thinking (Freeman et al., 2009). Specifically, abnormalities in sleep architecture (i.e. increased sleep onset latency, time in bed, and fragmentation) and circadian rhythm disruption are commonly reported in people experiencing psychosis (Bromundt et al., 2011; Freeman et al., 2009; 2012). Sleep disruption at disorder level (i.e. insomnia and obstructive sleep apnoea) has also been evidenced in this population (Freeman et al., 2012; Winkleman et al., 2001; Wulff et al., 2012; Ritzner et al., 2004). However, whilst persistent reports of childhood nightmares appear to predict future psychotic experiences in young adulthood (Freeman et al., 2009), the role of nightmares in relation to psychotic experiences in young adults has received little attention until recently (Sheaves et al., 2015, 2016).

Nightmares are highly prevalent during adolescence and young adulthood (Fisher et al., 2014; Levin & Fireman, 2002). In the general population, weekly nightmares present at a rate of up to 6% (Bixler et al., 1979; Janson et al., 1995). In contrast, approximately 19% of young students frequently experience clinically severe nightmares (Arora et al., 2014; Russell et al., 2018). Vivid, dysphoric and followed by startling awakenings, nightmares entail frightening dreams comprising of threats to survival, security or physical integrity resulting in significant daytime impairment and reduced quality of life (Nielsen & Levin, 2007; Ohayon & Morselli, 1997). Nightmares are commonly associated with poor physical health (Krakow, 2006), marked psychological distress (Levin & Fireman, 2002), and symptoms of anxiety, depression, post-traumatic stress and psychosis (Krakow, 2006; Semiz et al., 2008).

Sheaves and colleagues (2015) were the first to examine the occurrence of nightmares amongst patients with psychosis. With the use of a retrospective dream log, over half of the sample (55%) reported weekly distressing nightmares indicative of severe pathology - a rate markedly higher than in the general population (0.9 to 6.8%: Nielsen & Levin, 2007; Li et al., 2010; Janson et al., 1995). Only one study (Sheaves et al.,2016) examined the relationship between nightmares and psychotic experiences in UK students as part of The Oxford Sleep Survey, and found that a dose-response increase in nightmare frequency and associated distress was positively associated with higher scores in psychiatric difficulty (i.e. hallucinations, paranoia, depression, anxiety and hypomania).

Exposed to significant life changes (e.g. increased independence, social demands) and academic challenges (e.g. independent learning) accompanied with the loss of parental support and oversight, university students are particularly vulnerable to psychological distress and the development or exacerbation of psychiatric difficulty (Taylor et al., 2013). Given emerging evidence that nightmares and their associated distress confer risk for psychosis in students (Levin & Fireman, 2002; Sheaves et al., 2016), it is important to empirically examine mediating variables that may be amenable to mental health interventions. Psychotic experiences and nightmare symptoms often coincide with deficits in the ability to deploy adaptive emotion regulation

strategies (Badcock et al., 2011; Levin & Nielsen, 2009; Livingstone et al., 2009; Phillips & Seidman, 2008). Therefore, we consider emotion dysregulation to possibly mediate the relationship between nightmares and psychotic experiences among students, potentially serving as a novel focal point for treatment.

In this paper, we further explore the relationship between nightmare symptoms and psychotic experiences in university students whilst examining the potential mediating role of emotion dysregulation. Specifically, we examined if psychotic experiences are greater among those reporting nightmares, and if emotion dysregulation can explain the association between nightmare symptoms (i.e. severity, intensity, frequency, awakenings, perceived consequences) and psychotic experiences.

Methods

The study was approved by the Sheffield Hallam University Research Ethics Committee, and all participants provided online informed consent. A cross-sectional online questionnaire-based study was implemented comprising of questions designed to assess the relationship between psychotic experiences, nightmare disorder symptomology, and emotion dysregulation. Students from six UK universities were recruited through institutional course participation schemes, social media groups, and faculty emails. This resulted in a sample of N=1650 individuals who began the survey which was delivered using the Qualtrics platform (Qualtrics, Provo, UT), and 1273 respondents (mean age=20.88±4.53, range 18-56, 84% female) providing complete data who were entered into the analysis. Students who requested course credit were remunerated on completion.

The Prodromal Questionnaire 16 was administered to assess psychotic experiences (Ising et al., 2012). Sixteen yes/no items evaluate the occurrence of positive/negative symptoms and avolition. Yielding a score between 0-16, higher scores indicate an increased presence of psychotic symptoms, with ≥6 suggesting an at-risk mental state (Ising et al., 2012). The internal consistency (Cronbach's' alpha) of the scale in the current study was 0·85. The Disturbing Dreams and Nightmare Severity Index was used to examine nightmare complaints (DDNSI: Krakow et al., 2002). Seven items assess: nightmare frequency (amount experienced per week); number of awakenings due to nightmares (0=never/rarely, 4=always); intensity of nightmares themselves (0=not intense, 6=extremely severe intensity); and the severity of the overall problem (0=no problem, 6=very severe problem). Total scores range between 0-37 with higher scores indicating greater difficulty with nightmares. The internal consistency of the scale in the present study was 0·75. The scale also presents an optional 10 item subscale which examines the extent of impairments which are perceived to be a consequence of the nightmare disturbance. Here, the summation of statements (e.g. my disturbing dreams or nightmares interfere with social or recreational activities: 0=not at all, 3=a great deal) yield a total score ranging between 0-30 with higher scores indicating greater perceived consequences of nightmares. Internal consistency of this subscale was ·91. The Short Form Difficulties in Emotion Regulation Scale (DERS-SF: Kaufman et al., 2016) assessed individuals' ability to adequately regulate emotions. Six subscales examine: *nonacceptance* (nonacceptance of emotional states); *goals* (difficulties engaging in goal directed behaviour in the context of

emotional distress); *impulse* (difficulty controlling behaviours when upset); *awareness* (lack of emotional awareness); *strategies* (limited access to adaptive emotion regulation skills) ; and *clarity* (lack of emotional clarity). Each subscale is comprised of three items scored on a 5-point likert scale ranging from 1 (almost never) to 5 (almost always). Mean scores are created for each subscale, with higher scores indicating greater emotion dysregulation. Internal consistency of subscales in the present study: Nonacceptance, 0·90; Goals, 0·92; Impulse, 0·93; Awareness, 0·82; Strategies, 0·90; and Clarity, 0·83. SPSS (version 24, IBM Corp., Armonk, New York, United States) was used to perform formal statistical analyses of the data.

Results

One-way analysis of variance (ANOVA) showed that psychotic experiences (4.84±3.54) were significantly more prevalent in students reporting nightmares (and subsequently completing the DDNSI: n=757) relative to those who did not (n=516: 3.09±2.83), $F(1,1255)=86.96, P < .0001$, Cohen's $d = 0.55$. Mean scores for the final sample completing the DDNSI are presented in Table 1.

Insert-Table-1

Correlations between Nightmare Symptoms & Psychotic Experiences

Among individuals reporting nightmares, increased psychotic experiences were positively associated with the severity, (r=.22,p=.001), intensity (r=.25,p=.001), frequency (r=.21,p=.001), resulting awakenings (r=.08,p=.02) and perceived consequences (r=.42,p=.001) of reported nightmares. Likewise, total nightmare scores were also positively associated with psychotic experiences (r=.26,p=.001). The results from the correlation analysis are summarized in Table 2.

Insert-Table-2

Direct Association between Nightmare Symptoms, Emotion Dysregulation & Psychotic Experiences

A hierarchical multiple regression analysis was used to examine the association of nightmare symptoms and emotion dysregulation with psychotic experiences. The analysis was completed in two steps and the first step included nightmare symptoms (i.e., severity, intensity, frequency, resulting awakenings and perceived consequences of nightmares), and emotion dysregulation dimensions were added in the second step . An overall significant model, $F(10,743)=36.5, p<.001$, emerged predicting 32.4% (Adjusted R^2) of the variance in psychotic experiences, and tolerance levels were acceptable (>.361), thus, suggesting that the predictor variables were independently associated with the criterion variable. In the first step, psychotic experiences were significantly associated with nightmare intensity (ß= .11, p=.01), resulting awakenings (ß= -.08, p=.02) and perceived consequences (ß= .41, p<.0001) of nightmares. In the second step of the analysis, the addition of emotion dysregulation dimensions significantly increased predicted variance by 14.8%, $F_{change}(6, 733) = 27.06$, $p < .001$. Intensity and perceived consequences of nightmares retained their significant association with psychotic experiences, but the effect of resulting awakening turned marginally non-significant (ß= -.06,

p=.07). All the emotion dysregulation dimensions but goals, were significantly associated with psychotic experiences. The results are summarized in Table 3.

Insert-Table-3

Indirect Association between Nightmare Symptoms & Psychotic Experiences, via Emotion Dysregulation

Regression-based multiple mediation modelling was used with the SPSS macro by Hayes (2007), in order to examine the indirect association between perceived nightmare consequences, intensity and resulting consequences, via the effects of the six emotion regulation difficulties (i.e., strategies, non-acceptance, impulse, goals, awareness, and clarity). Three multiple mediation models were respectively examined for each predictor variable. Following Preacher and Hayes' (2008) and Hayes (2009) recommendations, bootstrapping with 1000 resamples and bias-corrected and accelerated confidence intervals were used, and the Sobel test (z) indicted the size of the mediation effect. The results from Model 1 (Figure 1) showed that the association between perceived nightmare consequences and psychotic experiences was mediated by strategies ($z = 2.26$, $p = .02$), non-acceptance ($z = 2.10$, $p = .03$), impulse ($z = 2.85$, $p < .005$), and clarity ($z = 4.69$, $p < .001$). The results from Model 2 (Figure 2) showed that the association between perceived nightmare intensity and psychotic experiences was mediated by strategies ($z = 2.49$, $p = .01$), non-acceptance ($z = 2.61$, $p = .008$), impulse ($z = 2.70$, $p = .006$), and clarity ($z = 3.29$, $p = .001$). Finally, the results from Model 3 (Figure 3) showed that the association between nightmare-induced awakenings and psychotic experiences was mediated by strategies ($z = 2.25$, $p = .02$), non-acceptance ($z = 2.49$, $p = .01$), and clarity ($z = 2.01$, $p = .04$).

Insert-Figures-1-3

Discussion

The primary purpose of this study was to evaluate the relationship between nightmare symptoms and psychotic experiences in university students, and also to examine the mediating role of emotion dysregulation. Our results showed that self-reported psychotic experiences were positively associated with different nightmare symptoms, although the observed effect sizes were small to moderate ($r \sim .08$ - $.42$). We, therefore, provide further evidence of increased reports of psychotic experiences among students presenting nightmare symptoms (Levin & Fireman, 2002; Sheaves et al., 2016). In line with previous work (Levin et al., 2002) we moved away from the global assessment of nightmares which fail to decompose specific factors facilitating symptom severity scores. In our bivariate analysis, increased psychotic experiences were associated to the severity, intensity, frequency, resulting awakenings and perceived consequences of reported nightmares. More crucially, after accounting for shared variance among nightmare symptoms only the intensity, resulting awakenings and perceived consequences of nightmares were significantly associated with psychotic experiences. Together, these outcomes underscore the role of intensity and consequential distress resulting

from the nightmare experience, rather than incidence, as key factors influencing psychotic symptoms amongst university students.

The experience of nightmare distress has previously been evidenced as more predictive of general psychiatric difficulty than nightmare frequency in students (Levin & Fireman, 2002). This outcome was confirmed amongst a small sample of patients reporting symptoms of psychosis, where nightmare distress was related to greater delusion severity, anxiety, stress, and depression (Sheaves, 2015). Recently, students identified as high-risk for severe mental illness reported nightmares as more distressing relative to their low-risk counterparts (Sheaves et al., 2016). These observations are important as they parallel examinations of positive symptoms of psychosis (Sheaves et al., 2015) where distress accompanying the experience of voices and unusual beliefs differentiates the need for intervention (Davies et al., 2001; Peters et al., 1999; Van Os J et al., 1999). Whilst nightmare distress reliably indicates psychiatric difficulty and psychotic experiences (Levin & Fireman, 2002; Sheaves et al., 2015, 2016), the present outcomes shed light on mechanisms driving such distress in a non-clinical student population. In particular, psychotic experiences were predominately influenced by nightmare intensity, resulting awakenings and perceived consequences of nightmares which interfere with: sleep quality, mood, mental and psychical health, and social and occupational functioning.

Difficulties in emotion regulation are considered key features of psychotic experiences (Lincoln et al., 2015) and the production of nightmares (Kramer, 1991,1993). Whilst our results demonstrate the intensity, awakenings and consequences of nightmares to be associated with psychotic experiences, this outcome was differentially mediated by difficulties in emotion regulation. A surge in affective arousal (i.e. limbic activation, eye-movement, respiratory activity) is usually observed during rapid eye-movement sleep (REM) (Nielsen & Levin, 2007). During the REM phase, it is speculated that adaptative regulation of dream content contain these surges through regulation of the intensity and variability of emotional content (Goldstein & Walker, 2014; Kramer, 1991, 1993; Nielsen & Levin, 2007; Van Der Helm et al., 2011; Walker & Van Der Helm, 2009). Generally, evidence points towards emotional experiences and thoughts prior to sleep as influencing the nature of dream content (Kramer, 1991, 1993; Piccione et al., 1976). As dreams consequently influence mood state the following day (Kramer, 1982), persistently experiencing intense and distressing nightmares and associated consequences may indicate emotional regulation deficits which may contribute to the development and maintenance of psychotic symptoms (Nielsen & Levin, 2007: Sheaves et al., 2015). Indeed, a number of studies evidence emotion regulation difficulties in psychotic disorders. Whilst outcomes remain mixed, this population reports difficulty in the identification of emotions (Kimhy et al., 2012; Van da Meer et al., 2009; Lincoln et al., 2015), and greater nonacceptance of their feelings (Lincoln et al., 2015; Perry et al., 2011, 2012). Alternatively, it is possible that the continual and disrupted experience of daytime distress associated with psychotic experiences influence the onset of nightmares (Sheaves et al., 2015). Indeed, dreaming is considered to play a vital role in attenuating fear and regulation emotions (Desseilles et al., 2011;

Gujar et al., 2011; Nielsen & Levin, 2007). That said, further research is required to clarify the causal direction of the relationship between the experience of nightmares and psychotic symptoms.

The independent relationship between resulting awakenings and psychotic experiences should be taken with caution when considering the strength of the correlation coefficient (.08). Here statistical significance may be explained by a Type 1 error resulting from the large size of the current sample. In contrast, this weak relationship could be the result of only measuring 'resulting awakenings', which is one specific aspect of sleep disruption rather than an overall assessment of disturbed sleep in the context of nightmares. Several limitations of this work should be noted. Whilst use of online self-report measures allowed for wider recruitment and consequential return of a large sample size, they are limited in depth and subjective accounts of sleep. That said, nightmare content, resulting distress and perception of functional impairment remain limited to subjective measures. Whilst, patient awakenings during/following polysomnographicly determined REM may gain novel patient insight regarding nightmare content, compromising sleep continuity and confounding examination nightmare related awakenings would provide no additional insight in the context of the current examination. Next, by recruiting from multiple institutions from the UK, we expand on previous findings limited to a homogenous sample of University of Oxford students (Sheaves et al., 2016) potentially allowing a degree of generalisability to be made in the outcomes of both studies. However, the cross-sectional design employed leaves the current outcomes vulnerable to inflation bias between variables and prevents the causality of the relationships identified from being conclusively defined. It is well established that females more frequently report nightmares and consequential distress, particularly during adolescence and young adulthood (Schredll & Reinhard, 2001). As the current sample consisted mostly of female participants this may limit generalisability to male students. Nevertheless, they still add valuable insight into relationship between nightmare symptoms and psychotic experiences.

Previous work highlights the importance of examining possible underlying mechanisms which may shed light on the relationship between the experience of nightmares and psychotic experiences. Here, we highlight the role of specific impairments in emotion regulation which may be therapeutically targeted above existing cognitive behavioural treatment strategies. Additionally, for the first time we highlight the role of perceived psychical, psychological and interpersonal consequences of nightmares in predicting the extent of psychotic experiences. Poor wellbeing and distress among university students is continually rising, with recent data highlighting a fivefold increase in the number of students revealing their mental health difficulties to institutional support services over the past decade (Ibrahim et al., 2013; Thorley, 2017). Certainly, students face considerable life changes (e.g. increased independence, social demands) and academic challenges (e.g. independent learning) which may contribute to the experience of such psychiatric symptoms (Cohen et al., 2013). Therefore, appropriate screening of nightmare symptoms and emotion regulation difficulties amongst students reporting psychotic experiences may therefore guide student-support services when making

judgments regarding treatment approach (e.g. guiding the patient to accept or actively decrease distress: Lincoln et al., 2015).

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Tables

Table 1

Mean scores (± standard deviations) of psychotic experiences, nightmares and emotion dysregulation for the final sample completing the DDNSI (N=757)

	Range	**Mean Score**
Psychotic Experiences	0 - 16	4.84 ± 3.38
DDNSI		
Composite	3 - 37	14.22 ± 5.37
Severity	0 - 6	2.40 ± 1.17
Intensity	0 - 6	2.95 ± 1.22
Frequency	2 - 14	4.67 ± 2.32
Awakenings	0 - 4	1.87 ± 1.17
Consequences	0 - 30	8.18 ± 6.24
DERS-SF		
Nonacceptance	3 - 15	8.44 ± 3.57
Goals	3 - 15	10.28 ± 3.39
Impulse	3 - 15	6.08 ± 3.36
Awareness	3 - 15	7.43 ± 2.95
Strategies	3 - 15	7.91 ± 3.45
Clarity	3 - 15	7.21 ± 3.02

Note: DDNSI, Disturbing Dreams and Nightmare Severity Index; DERS-SF, Difficulties in Emotion Regulation Scale Short Form.

Table 2
Correlations between psychotic experiences, nightmares and emotion dysregulation

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Psychotic Experiences												
DDNSI												
2. Composite	.26**											
3. Consequences	.42**	.55**										
4. Severity	.22**	.73**	.53**									
5. Intensity	.25**	.71**	.48**	.67**								
6. Frequency	.21**	.87**	.39**	.42**	.38**							
7. Awakenings	.08*	.54**	.32**	.40**	.42**	.21**						
DERS-SF												
8. Nonacceptance	.42**	.30**	.42**	.26**	.22**	.25**	.14**					
9. Goals	.31**	.22**	.33**	.17**	.19**	.17**	.12**	.48**				
10. Impulse	.42**	.24**	.36**	.21**	.15**	.22**	.07	.48**	.48**			
11. Awareness	.17**	.03	.11**	.01	-.01	.06	-.04	.11**	-.06*	.06*		
12. Strategies	.47**	.30**	.44**	.23**	.25**	.25**	.12**	.62**	.62**	.67**	.11**	
13. Clarity	.46**	.20**	.32**	.17**	.15**	.18**	.07*	.49**	.35**	.43**	.29**	.53**

Note: Psychotic Experiences, Prodromal-16 Count; DDNSI, Disturbing Dreams & Nightmare Severity Index; DERS-SF, Difficulties in Emotion Regulation Scale-SF; Correlations are shown for the final sample completing the DDNSI;
* $p < .05$, ** $p < .01$

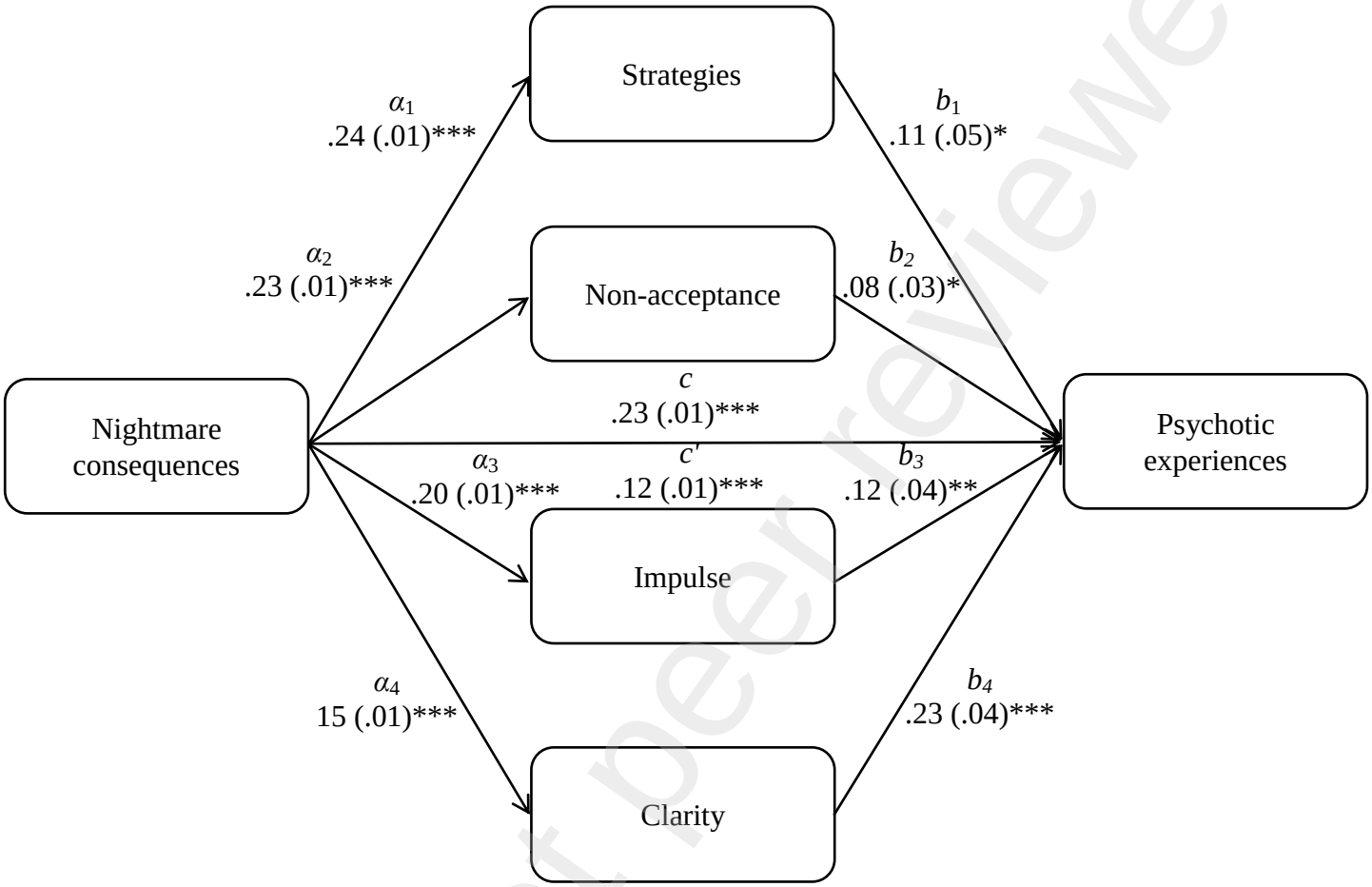
Table 3

Direct Associations between Nightmare Symptoms, Emotion Dysregulation & Psychotic Experiences

		B	β	95% CIs for B	Adjusted R^2
Step 1					18%
	Severity	-.140	-.046	-.425 - .146	
	Intensity	.326	.113*	.063 - .589	
	Awakenings	-.249	-.082*	-.472 - -.026	
	Consequences	.236	.416***	.191 - .280	
Step 2					32.4%
	Severity	-.168	-.055	-.430 - .093	
	Intensity	.320	.111*	.080 - .561	
	Awakenings	-.182	-.060	-.385 - .021	
	Consequences	.125	.221***	.080 - .170	
	Strategies	.101	.100*	.002 - .201	
	Non accceptance	.089	.090*	.011 - .167	
	Impulse	.127	.128**	.047 - .207	
	Goals	-.020	-.019	-.102 - .062	
	Awareness	.091	.077*	.015 - .166	
	Clarity	.241	.207***	.155 - .326	

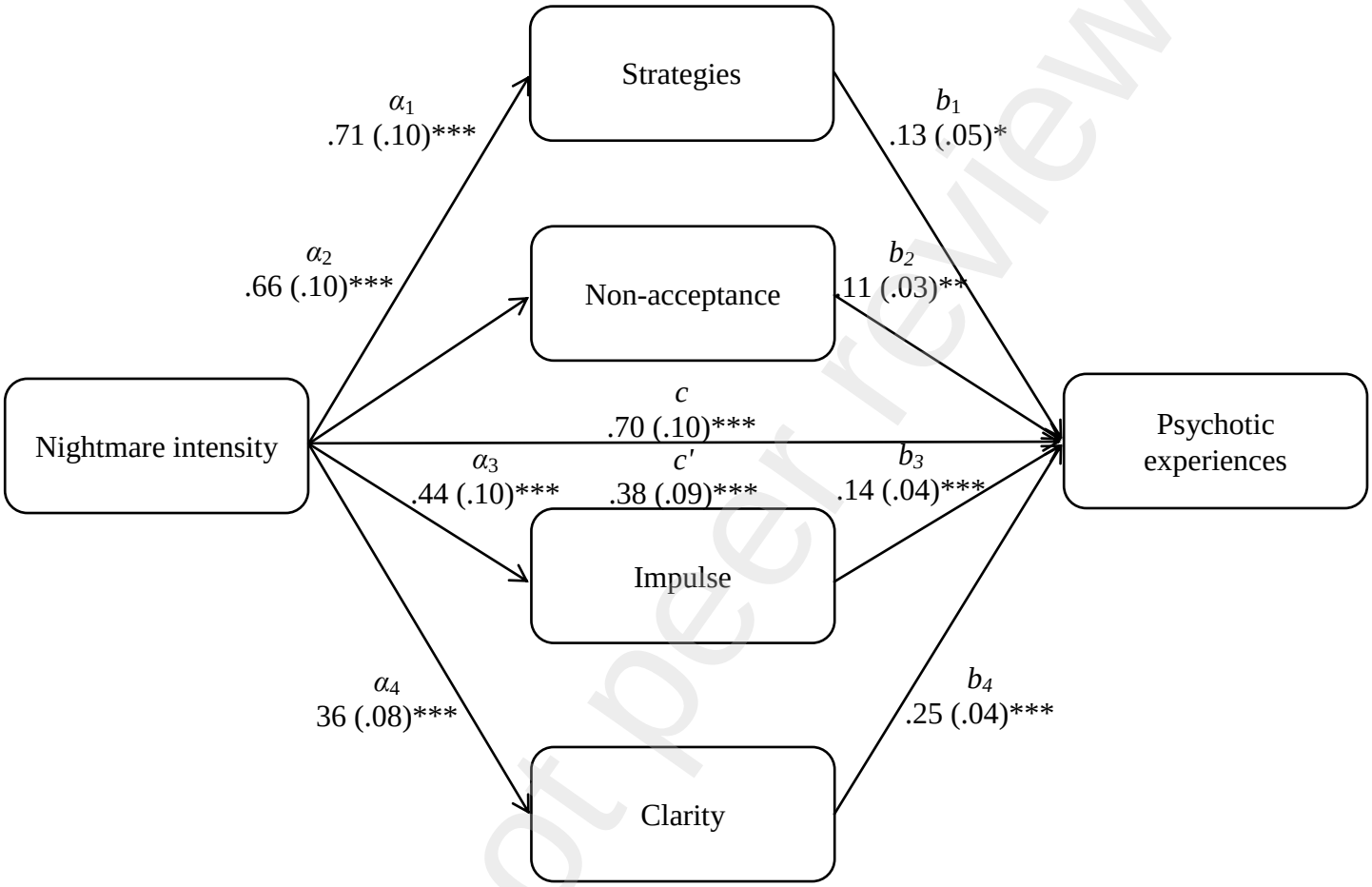
Note. RLS/PLM = Restless legs syndrome/periodic limb movement; CRD = Circadian rhythm disorder; *p < .05, **p < .005, ***p < .001.

Figure 1. Indirect association between nightmare consequences and psychotic experiences



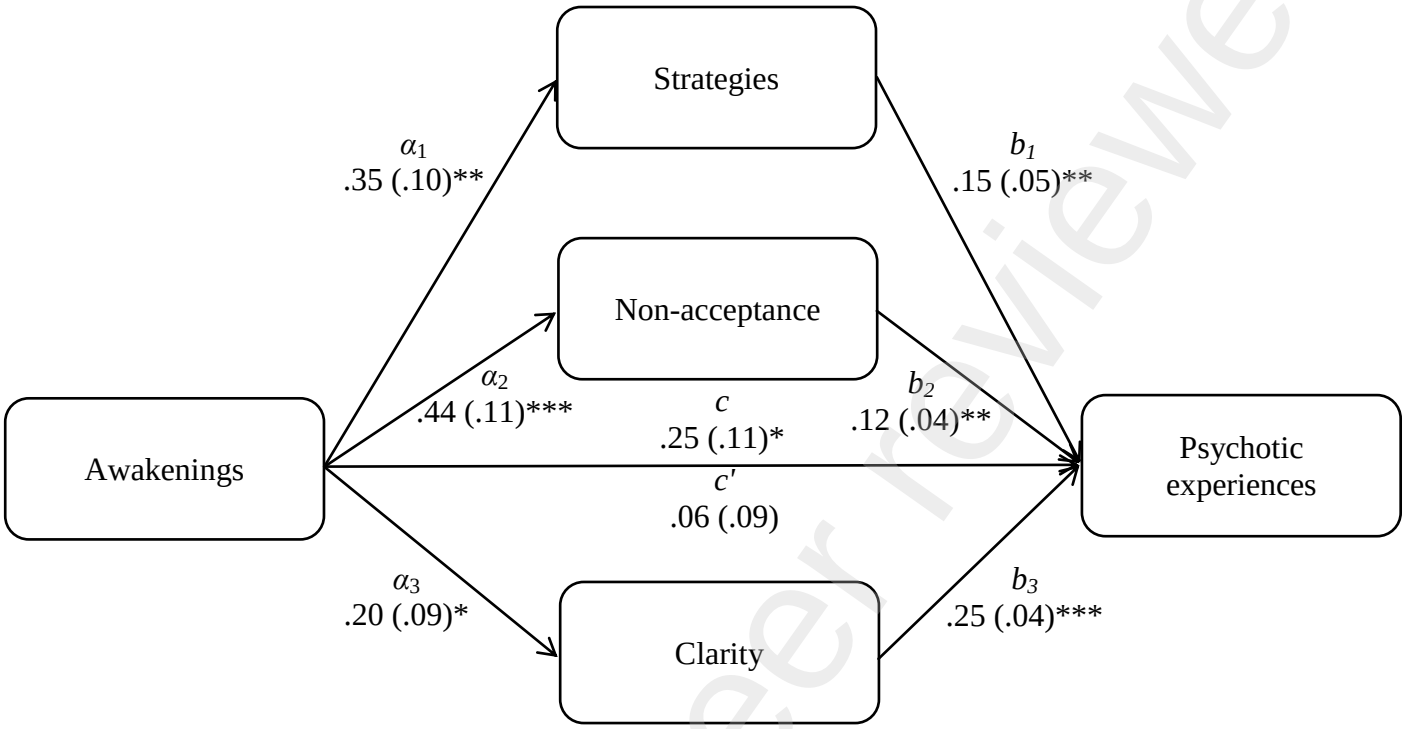
Note. The total (c) and the indirect effect (c') of nightmare consequences on psychotic experiences are shown; Unstandardized path coefficients are presented, with standard errors in brackets; *$p < .05$, **$p < .005$, *** $p < .001$.

Figure 2. Indirect association between nightmare intensity and psychotic experiences



Note. The total (c) and the indirect effect (c') of nightmare intensity on psychotic experiences are shown; Unstandardized path coefficients are presented, with standard errors in brackets; *p < .05, **p < .005, *** p < .001.

Figure 3. Indirect association between nightmare-induced awakenings and psychotic experiences



Note. The total (c) and the indirect effect (c') of nightmare-induced awakenings on psychotic experiences are shown; Unstandardized path coefficients are presented, with standard errors in brackets; *p < .05, **p < .005, *** p < .001.