# Academic performance, attention, and nightmare frequency among college students: A preliminary investigation

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*Summary*. Previous research has produced inconsistent findings regarding the relationship between academic performance and nightmare frequency. The current preliminary study sought to examine this further by accounting for the possible influences of attention and examining both objective and perceived academic performance. The relationships between measures of objective and perceived academic performance, attention, and nightmare frequency were investigated among a sample of 130 university students. The results indicated that nightmare frequency was significantly related to attention and perceived academic performance, but not objective academic performance. Attention was also not significantly related to objective academic performance. A regression analysis revealed that attention mediated the relationship between nightmares and perceived academic performance. The results and suggestions for future research were discussed.

*Keywords:* Nightmares, academic performance, grade-point average, attention

## 1. Introduction

Previous investigators have reported inconsistent findings regarding the relationship between nightmares, story-like dreams associated with unpleasant emotions (American Psychiatric Association [APA], 2013), and various forms of academic performance such as exam outcomes and perceived scholastic performance. A study of 104 medical students found a small, statistically insignificant correlation between self-reported retrospective nightmare frequency and average scores on end-of-year examinations across several subjects (Johns, Dudley, & Masterton, 1976). Another study of 6359 children observed that higher parental ratings of retrospective weekly nightmare frequency were significantly associated with parent's subjective ratings of childrens' poor academic performance over the past year (Li et al., 2010). Reasons for these inconsistent findings were not clear. It was possible that the differences might have been due simply to methodological differences. While Johns et al. (1976) used an objective measure of performance, Li et al. (2010) used subjective parental ratings. It was also possible that variables such as sleep quality or executive functioning might have affected the results.

After a review of the literature Curcio, Ferrara, and de Gennaro (2006) suggested that poor sleep quality, which has been associated with nightmares (Lancee, Spoormaker, van den Bout, 2010), was related to decreased learning ability and poorer academic performance. However, empirical research into the relationship between sleep quality and performance on academic task-related variables has not generally supported this suggestion. Using single-item assessments Alapin et al. (2000) found that college students who reported sleep inefficiency and distress about their sleep attributed their concentration difficulties to sleep problems. Academic performance, however, was not included as a variable. Using two lengthier, validated measures of sleep quality, Ellis, Walczyk, Buboltz, and Felix (2014) found that poor sleep quality actually predicted better performance on a reading comprehension task, which could be a factor in academic performance. Finally, Gray and Watson (2002) found that neither sleep quantity, quality, nor sleep schedule were significantly related to overall college grade-point averages. Given the inconsistent findings regarding sleep quality, perhaps a more likely explanation of the relationship between nightmares and academic performance was executive functioning, specifically attention.

Attention has been defined as the ability to sustain focus on stimuli that are most salient at a given moment (Sternberg, 1996). In one study executive functioning of individuals with frequent nightmares (those who reported one or more per week) and controls (fewer than two nightmares in the past year) was compared. It was concluded that individuals with frequent nightmares had more difficulty suppressing irrelevant semantic information when performing tasks, e.g., maintaining attention, than controls (Simor, Pajkossy, Horváth, & Bódizs, 2012). Similarly, college students who reported more frequent retrospective nightmares self-reported more attentional difficulties as well (Gau et al., 2006). Furthermore, adult patients diagnosed with Attention-Deficit Hyperactivity Disorder (ADHD) reported significantly more nightmares than controls (Schredl, Bumb, Alm, & Sobanski, 2017). Though surprisingly few studies have examined the relationship between attention and academic performance, one study found that college students' self-reported attentional issues were correlated with lower first year grade point average (GPA) (Frazier, Youngstrom, Glutting, and Watkins, 2007).

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In sum, there have been inconsistent findings regarding the relationship between nightmares and academic performance, perhaps depending on whether performance was operationalized objectively or subjectively. Though sleep quality has been suggested as relating to both nightmares and performance, findings regarding performance and sleep quality have been inconsistent. However, attention, conceptualized both as objective executive functioning and self-reported attentional difficulties has been related to nightmare frequency and could be important in understanding the relationship between nightmares and academic performance. However, previous research has not accounted for this.

The purpose of the current, preliminary study was to add to the research on the relationship between nightmares and academic performance by testing the possible mediation effects of attention. Also, given the discrepant results of previous studies using different methodologies in assessing academic performance (Johns et al., 1976; Li et al., 2010), the current study sought to examine simultaneously both perceived and objective academic performance. No previous studies could be located that examined the relationship between nightmare frequency and cumulative GPA in college students. Thus, the current study extended previous research in this regard as well. Based findings of the studies reported above, it was hypothesized that both nightmares (negatively) and attention (positively) would be significantly related to both objective and subjective academic performance. It was further hypothesized that attention would serve as a mediator between nightmares and academic performance.

## 2. Method

### 2.1. Participants

Participants included 130 (101 female) students enrolled in undergraduate psychology courses at a small university in the United States. The average age of the sample was 24.57 years (SD=6.95).

### 2.2. Measures

*Nightmares*. Nightmare frequency was measured using a single self-report item taken from Kelly (2009a). Participants were asked to estimate the number of nightmares they recalled over the past 6 months. Possible responses were 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 20, 30, 40, 50, more than 50. This measure was chosen in order to obtain a relatively continuous measure of nightmare frequency. In a pilot investigation for the current study, among a sample of university students (N=60; 63% females; $M_{age}$ = 20.0), this nightmare frequency measure was significantly (p<.01) correlated with Schredl's (2004) dream recall frequency scale (r=.36) and Kelly's (2002) Sleep Disturbance Ascribed to Worry Scale (r=.43), a measure of anxiety-related sleep disturbance. However it was not significantly correlated with Reynold's (1982) measure of social desirability (r=-.14). These findings provided preliminary evidence of convergent and discriminant validity of the measure.

*Objective Academic Performance*. To estimate objective academic performance, participants were asked to self-report their overall college GPA. Gray and Watson (2002) reported that self-reported and independently verified university GPAs were highly correlated (.84), allowing some confidence in self-reported GPA as a valid measure of overall objective academic performance.

*Perceived Academic Performance*. Perceived academic performance was measured by adapting an item from Macan, Shahani, Dipboye, and Phillips (1990). The item asked participants to "evaluate your college academic performance as compared to how you believe other students are performing." Participants responded using a 10-point scale ranging from "Very poor" (1) to "Very good" (10). Macan et al. reported this item to be strongly related to self-reported GPA.

*Attention*. Participants self-reported attention by responding to the 5-item Robert Morris Attention Scale (RMAS; Kelly, 2008). Item content and correlates suggested that the RMAS measured ability to maintain attention to tasks through self-discipline and suppression of irrelevant information (Kelly, 2008, 2009b). Kelly (2008) indicated the scale was unidimensional across two samples and correlated with hypothetically related measures. Kelly (2009b) reported the scale had adequate internal consistency (.81), test-retest reliability (.81, one week), and convergent validity through correlations with both self-report and performance-based measures of attention. Participants responded using a 5-point scale (1="Strongly Disagree" to 5="Strongly Agree"). Responses were summed to produce a total attention score. Higher scores indicated more attention. A Sample item was, "It's easy for me to pay attention and concentrate on my activities."

### 2.3. Procedure

Participants were recruited before undergraduate psychology courses to complete a questionnaire on "Sleep Experiences and Personality." After obtaining informed consent, participants completed a paper and pencil questionnaire in classroom settings. They were instructed not to identify themselves on the questionnaires. No time limit was provided for completing questionnaires. There were no exclusion criteria for participants. Data from all students who participated were included in analyses.

### 2.4. Statistical Analysis

Given that scales provided interval data, Pearson correlations were used to examine the relationships among variables. A hierarchical multiple regression was calculated to examine potential mediating effects of attention. All analyses were conducted using SPSS 16.0.

*Table 1*. Correlations Between Nightmares, Academic Performance, and Attention

| | M | SD | OP | PP | RMAS |
|---|---|---|---|---|---|
| | | | | Correlations | |
| NF | 6.36 | 10.73 | -.12 | -.20* | -.28** |
| OP | 2.74 | 0.55 | | .51** | .01 |
| PP | 6.80 | 1.58 | | | .23** |
| RMAS | 14.35 | 3.89 | | | |

Note: N = 130. NF=Nightmare Frequency, OP=Objective Academic Performance, PP=Perceived Academic Performance, RMAS = Robert Morris Attention Scale.
*p < .05   **p<.01.

## 3.  Results

Average scores in this sample and zero-order correlations between variables were presented in Table 1. The coefficient alpha of the RMAS in this sample was .79. As can be seen in the table, objective academic performance was not significantly correlated with nightmares or RMAS scores. Objective performance was, however, significantly correlated with perceived academic performance. Nightmare frequency and RMAS scores were significantly negatively correlated. Perceived academic performance was significantly positively correlated with RMAS scores and negatively related to nightmares.

Because objective academic performance was not significantly correlated with nightmares or RMAS scores, a mediational model was not calculated for this variable. However, due to their interrelatedness, mediational influences of attention on the relationship between nightmares and *perceived* performance were examined. A multiple regression was calculated using perceived academic performance as the criterion. RMAS scores and nightmare frequency were entered simultaneously as predictors. The overall model was significant accounting for 6% (adj. $R^2$) of the variance, $F (2, 124) = 4.92$, $p < .01$. Inspection of the within groups predictors revealed that when controlling for nightmares, the RMAS accounted for significant unique variance in perceived performance, $t = 2.16$, $p < .05$, $\beta = .19$. However, when accounting for the RMAS, nightmares no longer significantly predicted perceived performance, $t = 1.61$, $p > .05$, $\beta = -.15$. The change in significance in the relationship between nightmares and perceived performance when accounting for RMAS scores provided support for the mediating effects of RMAS scores.

## 4.  Discussion

The results of the current study indicated that, contrary to the hypothesis, objective academic performance was not significantly related to either nightmare frequency or attention. However, higher *perceived* academic performance was related to both lower nightmare frequency and increased attention. Further, nightmare frequency significantly predicted lower attention scores. Regression analysis provided evidence that attention mediated the relationship between nightmare frequency and perceived academic performance.

Generally these findings were consistent with previous research. For instance, the lack of a significant relationship between an objective measure of academic performance and nightmare frequency was consistent with the findings of Johns et al. (1976). Also, the findings of a significant relationship between estimates of nightmare frequency and perceived performance ratings were consistent with Li et al. (2010). It should be noted that Li et al. studied children and relied on parental ratings of nightmares and performance. Nevertheless, the findings of the current study appeared consistent despite the differences in methodology and population studied. The results of the mediational model suggested that the negative perceptions of academic abilities held by individuals with nightmares could have been at least partly a function of self-knowledge of their difficulty maintaining attention. It was also possible that executive functioning affected both nightmare frequency and self-perceptions of performance (Simor et al., 2012). The exact mechanism of this were unclear, but given that both

attention and self-perceptions could be conceptualized as functions of the ego and previous findings that nightmares were related to ego strength (i.e., Levin, 1989), one possible underlying mechanism in these shared relationships could have been ego functioning. Additional research would be needed to test this proposition.

It was unclear from the current data why a discrepancy existed between objective and subjective ratings of academic performance with regards to nightmares. It was possible that by the time students with nightmares reached the university level they may have developed compensatory strategies (cf., Reis, McGuire, & Neu, 2016) to cope with the effects of attentional difficulties on academic performance, though they might have continued to perceive themselves as ineffective students. It was also possible that the discrepancy between actual and perceived performance signified a misperception of self-reality. For individuals with nightmares, this disconnect between objective and perceived performance could partly have been understood in the context of previous findings that nightmares were associated with symptoms denoting negative self-perceptions (Schredl, 2003).

Additional research is needed to correct the limitations of the current study. For example, in future research, it might be useful to collect recent (i.e., past week or month) estimates of nightmare frequency rather than the previous six months. Also, prospective diaries might provide a more reliable measure of nightmare frequency. Further, it might be useful include an objective measure of attention and official university GPAs. Future research could examine whether nightmare frequency is related to other cognitive tasks which are less subject to compensatory strategies such as acquiring new information in one sitting. Though sleep quality has not been related consistently to objective performance, examining the possible influences of sleep quality on the relationship between attention and perceived academic performance might be of interest. Future research might also include mediating personality variables and distress which might tap into negative self-perception.

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