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# Sleep associated monitoring on awakening mediates the relationship between cutaneous body image dissatisfaction and insomnia symptoms

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## ABSTRACT

**Introduction:** This study examined the relationship between dissatisfaction with cutaneous body image and insomnia symptoms, incorporating the mediating role of monitoring for signs of poor-sleep on awakening and throughout the day. **Methods:** Two hundred twenty-one participants completed The Insomnia Severity Index, Cutaneous Body Image Scale, and subscales of the Sleep Associated Monitoring Index. **Results:** The results demonstrated that insomnia symptoms were significantly associated with a greater dissatisfaction with cutaneous body image. Moreover, this relationship was partially mediated by sleep associated monitoring on awakening, but not throughout the day. **Conclusions:** These findings provide further understanding of the potential mechanisms underlying negative self-perceptions of physical appearance in insomnia.

**Keywords:** Body image; Self-perception; Insomnia; Sleep.

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## INTRODUCTION

The extent to which an individual has slept well may subsequently influence how our physical appearance is perceived by others and how we perceive our appearance. Recent research concurs that the poor nature of one's sleep can be observed through a number of dermatologic characteristics (e.g. wrinkles/fine lines around eyes) pertaining to tiredness<sup>1,2</sup>. Moreover, photographs of sleep-deprived faces are rated as less attractive, less healthy and more tired relative to when well-rested<sup>3</sup>. Considering the importance of appearance in terms of influencing social judgments (i.e. perceived attractiveness, trustworthiness), these physical representations of poor-sleep may have psychosocial implications relating to partner interaction, interactions in the workplace and with health care providers<sup>4</sup>.

Cutaneous body image refers to the mental perception of the appearance of the skin, hair and nails<sup>5</sup>, and research notes that dissatisfaction with one's own cutaneous body image appears to be related to increased insomnia symptoms<sup>4</sup>. Similarly, poor-sleepers appear to show greater self-perceived dissatisfaction with aspects of their facial appearance (i.e. complexion) and skin-age compared to normal-sleepers<sup>6</sup>. Therefore, it seems that poor sleep and symptoms of insomnia confound an individual's judgements of physical self-perception. Considering persistent poor sleep may eventually present dermatologic changes, it is perhaps not surprising that symptoms of insomnia are related to a negative self-perception of physical appearance.

Whilst these studies show associations between poor sleep, insomnia symptoms, and cutaneous body image dissatisfaction, little is known about possible underlying mechanisms concerning this relationship. People with insomnia often report selectively attending to and monitoring bodily sensations on waking, and throughout the day for physical signs (i.e. heavy eyes) that are consistent with a poor night's sleep<sup>7</sup>. Further, recent evidence suggests that individuals with insomnia misinterpret and selectively attend to dermatologic cues pertaining to tiredness<sup>1,8</sup>. As such, cognitive mechanisms including selective attention and monitoring may potentially mediate the relationship between insomnia symptoms and cutaneous body image. Specifically, inadvertently attending to cutaneous features whilst monitoring for signs of poor-sleep (i.e. poor complexion) may contribute to dissatisfaction with cutaneous body image.

As a first step in examining this proposition, this exploratory study aimed to further investigate the relationship between dissatisfaction with cutaneous body image and insomnia symptoms by examining the potential mediational role of sleep associated monitoring on awakening and during the day. Specifically, we aimed to determine whether an association between cutaneous body image and insomnia symptoms would be mediated by the extent to which participants reported monitoring body sensations on awakening and during the day. In line with existing evidence<sup>4</sup> it was hypothesized that an increased report of insomnia symptoms would be related to greater cutaneous body image dissatisfaction. Secondly, it

was hypothesized that this relationship would be mediated by monitoring for body sensations on awakening and throughout the day.

## METHODS

### Sample and Procedure

A cross-sectional online questionnaire based study was implemented comprising of 40 questions designed to assess the extent of participants insomnia symptoms, sleep-related monitoring behaviours, and self-perceptions of cutaneous body image. The study was approved by the Northumbria University Faculty of Health and Life Sciences Ethics Committee (Protocol Number: SUB102\_Akram\_290716), and all participants provided informed consent prior to participation.

The survey was advertised to members of the general population via emails to students at Northumbria University, and social media. 280 participants began the survey, and 255 respondents provided complete data. Participants who indicated that they conducted shift work, suffered from a disorder of the central nervous system, or had a prior head injury or reported symptoms of a sleep disorder other than insomnia were excluded from analysis ( $n=34$ ). This resulted in a final sample of 221 participants (mean age= $24.65 \pm 7.72$ , range 18-56, 80% female) who were entered into the analysis.

### Measures

#### *Insomnia Severity Index*

Insomnia symptoms were assessed using The Insomnia Severity Index (ISI)<sup>9</sup>. The ISI consists of 7 items examining the severity of insomnia symptoms over the past two weeks including difficulty initiating and maintaining sleep, and awakening too early. Items are scored on a 5-point likert scale, with total scores ranging from 0–28. Higher scores represent greater insomnia severity. Assessment of internal consistency yielded a Cronbach's alpha of .88.

#### *Sleep Associated Monitoring Index*

Monitoring was assessed using two subscales (daytime monitoring for body sensations: DM; monitoring for body sensations on awakening: WM) from the Sleep Associated Monitoring Index (SAMI)<sup>10</sup>. Items are measured on a 5-point scale on which participants indicate what is true for them over the past month (1 = not at all, 5 = all the time). Mean scores for subscales reflect total subscale scores divided by the number of items in the scale. Each subscale comprised of five items. For the DM subscale, participants are asked how often they are aware of the following throughout the day: arms and/or legs feeling tired or heavy; muscle aches, cramps, or pain; shoulders, neck or back feeling tense or sore; feelings of tension or discomfort in body; stiffness in body.

Whereas for the WM subscale, participants are asked to report the extent to which they notice: feelings of tiredness or heaviness in the body; heaviness, soreness, or itchiness in the eyes; arms or legs feeling tired or heavy; feeling fatigued; feelings

or sensations caused by sleep deprivation. Higher mean scores for each subscale represent increased monitoring for physical cues and sensations which may be attributed to poor sleep. Assessment of internal consistency yielded a Cronbach's alpha of .91 for DM; .88 for WM.

#### Cutaneous Body Image Scale

Cutaneous body image was assessed using the Cutaneous Body Image Scale [CBIS: <sup>5</sup>]. Seven items on a 10-point likert scale examine satisfaction with skin appearance, complexion, facial appearance, hair and nails. Ratings of: 0 indicating 'not at all'; 1-3 indicating 'mildly'; 4-6 indicating moderately; and 7-9 indicating 'a great deal'. The mean of the 7 ratings indicates the final score. Higher scores represent greater satisfaction; lower scores represent greater dissatisfaction. Assessment of internal consistency yielded a Cronbach's alpha of .91.

#### Statistical Analyses

Pearson's bivariate correlations examined associations between insomnia symptoms, sleep associated monitoring and cutaneous body image. This was followed by hierarchical linear regression analyses, with insomnia symptoms as the dependent variable, in order to determine whether any significant association between cutaneous body image and symptoms of insomnia were mediated by sleep associated monitoring behaviour(s) after controlling for age and sex. All statistical analyses were performed using SPSS version 22.0 (IBM Corp, 2013), and significance was considered at the  $p < 0.05$  level (two-tailed).

## RESULTS

Mean scores on the ISI, SAMI and CBIS are presented in Table 1. Correlational analysis indicated that insomnia symptoms were moderately associated with a greater dissatisfaction with cutaneous body image ( $r = -.44$ ,  $p = .001$ ) and the SAMI subscales of monitoring body sensations on awakening ( $r = .60$ ,  $p = .001$ ) and during the day ( $r = .52$ ,  $p = .001$ ). In addition, the SAMI subscales of monitoring body sensations on awakening ( $r = -.43$ ,  $p = .001$ ) and during the day ( $r = .34$ ,  $p = .001$ ) showed moderate to weak associations with greater CBI dissatisfaction (see Table 2 for all correlations).

Linear regression analyses indicated that cutaneous body image and age (step 2: 23% total variance explained) significantly predicted insomnia symptoms after controlling for age and sex (step 1: .05% variance). After accounting for sleep associated monitoring, cutaneous body image, age and monitoring for body sensations on awakening remained significant predictors in the subsequent step (step 3: 46% Variance; see Table 3). Therefore, whilst dissatisfaction with cutaneous body image is related to increased insomnia symptoms, this relationship appears to be partially mediated by age and monitoring of body sensations on awakening, but not throughout the day.

**Table 1.** Scores for insomnia severity, cutaneous body image, and sleep associated monitoring.

	Range	M $\pm$ SD
Insomnia Severity Index	0-27	9.02 $\pm$ 5.89
Cutaneous Body Image Scale	0-9	4.80 $\pm$ 2.08
SAMI: Daytime Monitoring Body Sensations	1-5	2.35 $\pm$ 1.00
SAMI: Waking Monitoring Body Sensations	1-5	2.70 $\pm$ 1.14

SAMI, Sleep Associated Monitoring Index; M  $\pm$  SD, Mean and Standard deviation.

**Table 2.** Correlations between insomnia severity, cutaneous body image and sleep associated monitoring.

	1.	2.	3.
1. ISI			
2. CBIS	-.44**		
3. SAMI DM	.52**	-.34**	
4. SAMI WM	.60**	-.34**	.68**

ISI, Insomnia Severity Index; CBIS, Cutaneous Body Image Scale; SAMI, Sleep Associated Monitoring Index; DM, Daytime Monitoring for Body Sensations; WM, Monitoring for Body Sensations on Awakening. \*Sig at  $< .001$ .

**Table 3.** Linear regression with insomnia symptoms as the dependent variable; age, sex, cutaneous body image, and sleep associated monitoring as predictors.

Predictors in the model	R <sup>2</sup>	$\beta$	t	Sig.
Step 1	.05			
Age		.15	2.29	.023*
Sex		.17	2.58	.010**
Step 2	.23			
Age		.15	2.46	.015*
Sex		.08	1.23	.218
Cutaneous Body Image		-.43	-7.06	.001**
Step 3	.46			
Age		.13	2.54	.012**
Sex		.00	.01	.991
Cutaneous Body Image		-.26	-4.69	.001*
Daytime Monitoring of Body Sensations		.07	.89	.375
Monitoring for Body Sensations on Awakening		.36	4.92	.001**

\*Sig at  $< .05$ ; \*\* $< .001$ .  $\beta$ , Beta.

## DISCUSSION

The present study aimed to determine whether the relationship between cutaneous body image and insomnia symptoms was mediated by the extent to which participants reported monitoring body sensations on awakening and during the day. The current results provide further evidence that insomnia symptoms are associated with cutaneous body image dissatisfaction. In addition, our findings demonstrate that this relationship appears to be partially mediated by sleep associated monitoring for body sensations on awakening, but not throughout the day. These outcomes provide insight into the relationship between insomnia symptoms and cutaneous body image dissatisfaction by providing suggestive evidence that that mechanisms perpetuating insomnia (i.e. sleep associated

monitoring) potentially influence aspects of physical self-perception in a negative manner.

Symptoms of insomnia have often been related to ill health<sup>11</sup>, and this may be observable from the physical appearance of one's cutaneous features. Indeed, as sleep deprived individuals are rated as less attractive, unhealthy and tired<sup>3</sup>, it is likely that individuals experiencing symptoms of insomnia develop dermatologic changes due to the poor nature of their sleep<sup>4</sup>. Considering this, it is perhaps not surprising that symptoms of insomnia are related to a negative self-perception of physical appearance. However, whilst our results indicate that insomnia symptoms are associated with cutaneous body image dissatisfaction, this relationship appears to be partially mediated by monitoring body sensations on awakening for signs consistent with a poor night's sleep (i.e. heavy sore and itchy eyes, heaviness in body, feelings of fatigue).

In terms of the current findings, It is possible that individuals who experience insomnia symptoms show a propensity to monitor cutaneous attributes of their physical appearance on awakening (i.e. facial complexion), perhaps inadvertently whilst assessing the poor nature of their sleep. Consequently, monitoring for signs of poor-sleep may contribute to accentuating an existing dissatisfaction with cutaneous body image.

From a clinical perspective, targeting and improving self-perceptions of cutaneous body image may reduce a tendency to monitor for cues consistent with a poor night's sleep (e.g. heavy eyes, poor facial complexion) on awakening, which in turn may perpetuate negative thought cycles as proposed by cognitive models of insomnia<sup>12</sup>. That said, only suggestive evidence for this notion can be provided from the current data considering our use of a self-report assessment to determine the extent of monitoring behaviour. As such, future research should objectively examine whether selective attention towards cutaneous features is indeed characteristic of insomnia.

The current data also demonstrates that the relationship between symptoms of insomnia and cutaneous body image dissatisfaction was partially mediated by age. This may have emerged as older adults may show early signs of skin-aging, and may consequently be more sensitive to, and make more negative judgments regarding their cutaneous features<sup>1</sup>.

Several limitations of the current study should be noted. The current sample consisted primarily of female participants, and as such the present findings may not be fully generalizable to males. However, it is relevant to note that women are more likely than men to be diagnosed with insomnia<sup>13</sup>. Moreover, whilst the present study used a comprehensive assessment to address insomnia symptoms amongst the general population from the perspective of diagnostic criteria, the current findings cannot be extrapolated to individuals meeting meeting diagnostic criteria for insomnia. That said, the use of a general population sample can be regarded as a practical step towards the identification of the mediating role of monitoring behavior.

Symptoms of, and primary mechanisms underlying, insomnia can be viewed to exist along a continuum<sup>14</sup>. The same processes are likely present amongst both general population and clinical samples, however divergent in terms of severity. Thus, it is possible that the moderate to weak pattern of associations currently identified may be conservative in a general population sample, whereas the current outcomes may be more profound amongst a sample meeting diagnostic criteria for insomnia.

Regardless of these caveats, this study further examined the relationship between insomnia symptoms and cutaneous body image dissatisfaction by incorporating the mediational role of sleep associated monitoring on awakening and during the day. The current outcomes add to the growing body of literature on the relationship between negative self-perceptions of physical appearance and insomnia by providing an understanding of a potential mechanism which may underlie this relationship<sup>1,4,6</sup>. To provide support for these preliminary results, future research should examine the present research questions amongst a sample meeting diagnostic criteria for insomnia.

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