
Criterion-Group Validity of the Noctcaelador Inventory: Differences Between Astronomical Society Members and Controls

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ABSTRACT - This study examined the criterion-group validity of the Noctcaelador Inventory, a scale that purports to measure strong interest in, and attachment to, the night-sky. Participants included 95 members of astronomical societies and 95 college student controls drawn from a larger normative database. Significant differences were found on noctcaelador scores: astronomical society members scored significantly higher than the control sample. The results supported the validity of the inventory as a measure of interest in, and psychological attachment to, the night-sky.

Evidence exists that humans have been watching the night-sky for thousands of years (Brecher & Feirtag, 1979). Historically, the night-sky has been watched for aesthetic appreciation, inspiration (cultural and spiritual), and attaining insight or knowledge (Brashier & Lewis, 2001; Hoskin, 1999; Wyman, 1936). Despite the long history of night-sky watching among humans and the obvious importance of this behavior to large groups of contemporary individuals who spend large amounts of resources – money, time, and energy – to watch the night-sky (i.e., amateur astronomers and astro-tourists), little is known about the psychology of individuals who watch the night-sky.

In preliminary research of the psychology of night-sky watching, Kelly (2003) and Kelly and Kelly (2003) identified a latent construct which appeared to largely account for night-sky watching behaviors and attitudes. This construct has been termed noctcaelador (Kelly, 2003), and is defined as an adoration and psychological attachment to the night-sky. The Noctcaelador Inventory (NI;

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Kelly, 2004) was developed as a measure of the construct. The NI is a 10-item scale with adequate psychometric properties (Kelly, 2004). As yet, the validity of the measure is based solely on correlations with other self-report measures.

Kelly (2004) reported that the NI was positively correlated at an average of .45 with self-report responses to questions assessing frequency of night-sky watching, choosing living accommodations to improve opportunities to watch the night-sky, sacrificing sleep before an important examination to watch the night-sky, and recalling instances of watching the night-sky as a child. Kelly further reported additional evidence of validity through a strong, unidimensional factor structure (Kelly, 2004). Although these preliminary results are promising, additional validity studies of the scale are needed. The aim of this study was to partly fill that need.

One potentially useful method of evidencing validity is to demonstrate a difference between groups where, hypothetically, a difference should exist, or criterion-group validity. Using this approach, groups "thought to be high on the construct measured by the test should obtain high scores, whereas persons with presumably low amounts of the construct should obtain low scores" (Gregory, 2000, p. 109). Therefore, individuals who are more devoted to observing the night-sky, should score higher on a measure of noctcaelador than those who presumably do not. One such group which should have higher amounts of noctcaelador is astronomical society members. Members of astronomy societies, anecdotally, devote a significant amount of time and resources specifically focused on the night-sky. It was predicted, therefore, that astronomical society members would score significantly higher on the NI than a control sample of college students.

Method

Participants and Procedure

After obtaining informed consent, a demographics survey and the NI were administered to two samples. The demographics survey included questions asking participants to indicate their age by checking categories (each category included a range of about five years) and their gender. Sample 1 included 95 members of two statistically homogenous astronomical societies (Batey, 2004). The astronomical societies sample included 78 males and 17 females. One participant did not indicate gender. The mean and median age category of astronomical society members was between 46 and 50 years.

Sample 2 was included as a control group consisting of 95 college students randomly drawn from a larger NI college student normative database of over 1,000 respondents. The college student sample included 27 males and 68 females. The mean and median age category of the control sample was between 21 and 25 years.

Measure

The Noctcaelador Inventory (NI; Kelly, 2004) is a 10-item self-report scale designed to measure psychological attachment to the night-sky. Participants respond to items using a 5-point Likert scale ranging from 1 = "strongly disagree" to 5 = "strongly agree." Responses to items are summed to produce a total score; higher scores are purported to indicate higher levels of noctcaelador. Kelly (2004) reported this scale to have good internal consistency ($\alpha = .92$), test-retest reliability (.88, one month), and preliminary validity.

Results and Discussion

The astronomical society and control samples were not significantly different in the number of males and females, $\chi^2(1) = 2.1, p > .05$. There was, however, a significant difference in age, $t(188) = 15.0, p < .001$, with the astronomical society being older (see description of participants above). The coefficient alpha of the NI for the astronomical society sample was .90; the control sample coefficient alpha was .95. For the control sample, there was no significant correlation between age and NI scores, $r = .12, p > .05$. However, for the astronomical society sample, there was a significant correlation between age and NI scores, $r = -.36, p < .001$, with younger astronomical society members scoring higher on the NI. There was no significant gender difference in NI scores for the astronomical society, $t(93) = .53, p > .05$, or the control sample, $t(93) = .52, p > .05$.

Because of the significant correlation between age and NI scores for the astronomical society sample and the significant age difference between samples, age was used as a covariate for further analyses. Using age as the covariate, an Analysis of Covariance (ANCOVA) was calculated to compare NI scores for the astronomical society and control samples. The result was significant, $F(1, 187) = 48.9, p < .0001$. The astronomical society sample reported significantly higher NI scores ($M = 38.1, SD = 7.4$) in comparison to the control sample ($M = 27.9, SD = 9.2$).

The results of this study were consistent with the hypothesis; astronomical society members scored significantly higher on the NI than a sample of college student controls. These results indicate that the NI possesses adequate criterion-group validity in that a sample hypothetically higher on the construct of noctcaelador in fact scored significantly higher than a control sample.

Although the results of this study in conjunction with those of Kelly (2004) provide some support for the validity of the NI, additional tests of the scale's validity are needed. Such studies might attempt to correlate the scale with observable behaviors as well as self-report measures to garner further evidence of the scale's validity.

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