



Pilot study of the study behavior inventory: Preliminary analysis of a new tool for health science education students

Penni Smith Foster, Natalie White Gaughf

ABSTRACT

Objective: While educational researchers have considered many factors related to academic performance in undergraduate education, the impact of specific study behaviors and skills directly related to improving performance in health science education have been largely overlooked. The purpose of the current study was to examine the preliminary reliability and validity of the study behavior inventory (SBI), a tool used for measuring study behaviors associated with higher academic performance among students in health science education programs. **Materials and Methods:** Participants were 34 ($n = 34$) students enrolled in various health science education programs (graduate studies in the health sciences = 11, health related professions = 6, medicine = 11, nursing = 3, and pharmacy = 3) receiving academic support services at an academic health science center in the southeastern United States. Students completed the SBI, the learning and study strategies inventory (LASSI), and the approaches and study skills inventory for students (ASSIST) prior to receiving services.

Results: The internal consistency and the convergent validity of the SBI were assessed. The results indicated adequate Cronbach's alpha for SBI's time allocation (TA) scale (0.76) and strategy (ST) scale (0.71). Statistically significant positive correlations were found for the TA scale and LASSI's time management scale and ASSIST's strategic approach. Statistically significant positive correlations were found for the ST scale, and several LASSI scales measure learning strategies and ASSIST's strategic and deep approaches. **Conclusions:** This pilot study provided preliminary evidence that the SBI is a reliable tool with convergent validity that can be used to assess study time management and study strategies utilized by health science students. More research on the psychometric properties of the SBI is warranted to establish the SBI as a valuable tool in the identification of study behaviors and skills related to academic performance in health science students.

KEY WORDS: Health education, student assessment, study skills, study strategies

Office of the Associate
Vice Chancellor for
Academic Affairs,
University of Mississippi
Medical Center, Jackson,
MS 39216, USA

Address for correspondence:
Natalie White Gaughf,
University of Mississippi
Medical Center, 2500
North State Street,
Jackson, MS 39216,
USA. Tel.: 601-815-4233,
Fax: 601-815-5828,
E-mail: nwgauhf1@umc.edu

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INTRODUCTION

Historically, educational researchers have considered many factors related to academic performance, including student personality and learning styles [1-3], teaching and learning environments [4,5], student learning approaches [6], student perceptions of academic quality [7], and the impact of specific study skills (e.g., rereading, self-testing) [8-12]. However, this research has frequently focused on undergraduate college students. There are limited studies relative to academic performance of academic health science students. The few studies documenting the benefits of specific study skills in health science students have focused on medical students. For example, time management, organizing study, and self-testing have been shown to impact medical students' academic performance [9], like improvements on the course specific examinations [13]. However, the literature does not address the use of time management and self-testing for other health

science students. These students would benefit from research directly related to their individual characteristics and programs of study. In addition, there are limited data on the specific strategies that students should utilize to improve behaviors and skills such as time management, organization, or self-testing. The current study attempts to address these deficits in the literature by developing a tool that measures concrete study behaviors among students of various professions within the health sciences.

The purpose of the current study was to examine the preliminary reliability and validity of the study behavior inventory (SBI). The SBI assesses specific student study behaviors by students enrolled in undergraduate and graduate level health science education programs, such as dentistry, graduate studies in the health sciences, health related professions, medicine, nursing, and pharmacy. A pilot study was utilized to assess the internal consistency of the SBI, as

well as its convergent validity using two existing assessment tools of study strategies and approaches with established psychometric properties.

MATERIALS AND METHODS

Instruments

The SBI is a tool designed to measure the study behaviors associated with the academic performance of students in health science education. The SBI consists of two questions, which assess hours of study time by day and week and three scales: Time allocation (TA), source (SO), and strategy (ST). The 13-item TA section measures how individuals manage time while studying (e.g., “I routinely take breaks while studying”), and the 21-item SO section assesses the frequency with which individual students use specific information resources (e.g., “electronic textbooks,” “journal articles”). The 12-item ST section measures how often students use particular study techniques to learn information (e.g., “reading,” “reciting information aloud”). The questions assessing daily and weekly study time are measured in hours (e.g., “5-6 h”), the TA section utilizes a 5-point Likert scale to measure agreement (i.e., strongly disagree, uncertain, strongly agree), and the SO and ST sections utilize 5-point Likert scales to measure frequency (e.g., very rarely, occasionally, very frequently).

Learning and study strategies inventory (LASSI). The LASSI is an 80-item self-report instrument that assesses students’ specific strategies for learning [14]. The assessment results in standardized scores and percentile scores for 10 different scales that are based on national norms. The authors report coefficient alphas for these scales as anxiety = 0.87, attitude = 0.77, concentration = 0.86, information processing = 0.84, motivation = 0.84, selecting main ideas = 0.89, self-testing = 0.84, study aids = 0.73, test strategies = 0.80, and time management = 0.85. The LASSI has been previously utilized by researchers to assess study strategies associated with academic success in medical education [15,13].

Approaches and study skills inventory for students (ASSIST). The ASSIST is a 52-item self-report instrument that assesses students’ approaches (i.e., deep, strategic, or surface) to learning [16]. The deep approach is characterized by an interest in ideas and personally meaningful learning. The strategic approach is related to students’ organization of information, time management, and understanding of their own learning effectiveness. The surface approach is characterized by external motivation, memorization, and replication of information. Cronbach’s alphas for deep, strategic, and surface approaches have been reported as 0.74, 0.73, and 0.74, respectively [17]. The ASSIST has been utilized in the medical education literature, and both deep and strategic approaches have been found to be associated with academic success in medical students [18,19].

Participants

Participants were 43 ($n = 34$) health science education students seeking academic support services fall 2013 at an academic

health science center in the southeastern United States. Students were enrolled in the following schools: Graduate studies ($n = 11$), health related professions ($n = 6$), medicine ($n = 11$), nursing ($n = 3$), and pharmacy ($n = 3$). Approximately, 82% ($n = 28$) of respondents were female, and the racial composition was 3% ($n=1$) American Indian/Alaskan Native, 6% ($n = 2$) Asian, 50% ($n = 17$) Black/African American, and 41% ($n = 14$) White. Two individuals (6%) described their ethnicity as Hispanic/Spanish/Latino.

Procedure

Students completed the SBI, LASSI, and ASSIST as part of an overall learning assessment prior to receiving academic support services. The institutional IRB approved this study, and this work was carried out in accordance with the 1964 Declaration of Helsinki. All students provided informed consent prior to participation.

RESULTS

The internal consistency of scores was assessed. Cronbach’s alphas for the TA scale and the ST scale were 0.76 and 0.71, respectively. The SO scale did not yield an adequate Cronbach’s alpha (0.57), which was likely due to its composition of distinct information resources.

Correlational analyses were used to examine the relationship between the TA and ST scales and the LASSI and ASSIST. Pearson’s correlation coefficients were calculated for the TA scale and the 10 LASSI scales. Since four participants did not complete the LASSI, the 30 complete and corresponding SBI and LASSI scores were utilized for this analysis. Significant correlations were found for the TA scale and the following LASSI scales: Concentration ($r = 0.437, P < 0.05$), self-testing ($r = 0.540, P < 0.01$), and time management ($r = 0.633, P < 0.00$). Pearson’s correlation coefficients were calculated for the TA scale and the three ASSIST approaches to learning. Since one participant did not complete the ASSIST, the 33 complete and corresponding SBI and ASSIST scores were utilized for this analysis. A significant positive correlation was found between the TA scale and ASSIST’s Strategic learning approach ($r = 0.560, P < 0.001$), while a significant negative correlation was found between the TA scale and the surface approach ($r = -0.425, P < 0.05$).

Pearson’s correlation coefficients were calculated for the ST scale and the 10 LASSI scales. Again, 30 SBI and LASSI scores were utilized for this analysis. Significant correlations were found for the ST scale and the following LASSI scales: Concentration ($r = 0.534, P < 0.01$), information processing ($r = 0.430, P < 0.05$), motivation ($r = 0.458, P < 0.05$), self-testing ($r = 0.637, P < 0.00$), selecting main ideas ($r = 0.439, P < 0.05$), study aids ($r = 0.468, P < 0.01$), time management ($r = 0.399, P < 0.05$), and testing strategies ($r = 0.478, P < 0.01$).

Pearson’s correlation coefficients were calculated for the ST scale and the three ASSIST scales. Again, 33 SBI and ASSIST

scores were utilized for this analysis. Significant positive correlations were found between the ST scale and the ASSIST's strategic approach ($r = 0.562, P < 0.001$) and deep approach ($r = 0.425, P < 0.05$). A significant negative correlation was found between the ST scale and the surface approach ($r = -0.471, P < 0.01$).

DISCUSSION

Results from the pilot study of the SBI indicated adequate internal consistency for the TA and ST scales. Findings also suggested that assessment of internal consistency for the SO scale was inappropriate due to the scale's composition of distinct items. Convergent validity was examined only for the TA and ST scales.

The TA scale was found to be significantly and positively correlated with LASSI's concentration, self-testing, and time management scales and ASSIST's strategic approach, which includes a time management subscale. The ST scale was significantly and positively correlated with several LASSI scales used to assess study strategies believed to improve academic performance (concentration, information processing, motivation, self-testing, selecting main ideas, study aids, time management, and testing strategies). In addition, the ST scale was positively associated with ASSIST's strategic and deep learning approaches, which are associated with greater academic performance among medical education students. Both the TA and the ST scales were negatively correlated with ASSIST's surface learning approach, which has been found by previous researchers to be related to lower performance among medical education students.

Overall, this pilot study indicates that the SBI is a reliable tool in assessing study time management and study strategies utilized by health science students. In addition, the authors found preliminary evidence of the convergent validity for the TA and ST scales of the SBI. These findings suggest that more advanced assessment of the psychometric properties of this new tool is warranted. Future research will examine the reliability and validity, including criterion validity, of the SBI with larger population of health education students. The future aim is for this new measure to be an effective tool in identifying study behaviors and skills related to academic performance of health education students.

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