



# The Relationship between Sense of Coherence and Depression, Anxiety, and Stress among First-Year Students in Princess Nourah University

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## ABSTRACT

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Since Saudi Arabia is committed to improving education and is interested in understanding factors affecting students' academic achievement, this study aims to assess first-year students' baseline assessment scores for depression, anxiety, stress, and sense of coherence (SOC) to help with the prescription of an individualized mental health intervention. Additionally, the study assesses the correlation between students' evaluation scores for depression, anxiety, stress, and SOC as well as the likelihood that these scores will predict students' SOC. A cross-sectional questionnaire structure was utilized to measure the scores of 364 first-year college students for SOC, depression, anxiety, and distress. SOC and students' depression, anxiety, and stress scores are significantly correlated. SOC has a negative predicting ability on depression, anxiety, and stress ( $F(1,442) = 388.65, p < .001$ , and  $R^2 = .47$ ), whereas a high SOC has been linked to low stress, emotional distress, and anxiety ratings. The present study explored the impact of an individualized mental health intervention on DASS-21 and SOC for the students at Princess Nourah University. Also, it identified some prevalence of mental health issues among university students and reported nonadherence to psychiatric medical use and the prevalence of psychological pressure among university students.

**Keywords:** Sense of Coherence, Anxiety, Depression, Stress, Students.

## INTRODUCTION

As part of the Vision 2030 framework (2020), Saudi Arabia prioritized education to increase employment and diversify its economy (1). Given the growing demand for education in Saudi Arabia, there is increased interest in determining factors that influence students' academic achievement (2). One known factor is the first-year college experience and its associated stressors. More than two-thirds of students who drop out of college are in their first or second year, according to (3). The starting year is a crucial time for new students to transfer and acclimate. These learners often face significant psychological stress due to various academic, social, and emotional stressors (4). Significant investigation has been done on the impacts of SOC on intellectual and physical fitness. However, little research is dedicated to SOC's influence on first-year college students' psychological well-being in Saudi Arabia. Understanding the relationship between SOC, depression, anxiety, and distress may highlight opportunities for developing mental health interventions for first-year college in Saudi Arabia. The following research queries are attempted to be answered by this study:

1. What are first-year college students' baseline assessment scores for depression, anxiety, stress, and SOC?
2. What is the interrelation between first-year college students' assessment scores for depression, anxiety, stress, and SOC?

Are first-year college students' assessment scores for depression, anxiety, and stress predictive of their scores for SOC?

## LITERATURE REVIEW

Depression, Anxiety, and Distress among College Students

There has been little research on depression, anxiety, and stress among Saudi students. Much of the literature has been conducted in Western countries showing that 14–33% of secondary school-aged students have experienced depression, 40–49% have encountered anxiety, and 35% have faced stress (5, 6). The most recent study was carried out by Amr et al. (2013), who used the Patient Health Questionnaire to assess depression and anxiety in 1,696 Saudi undergraduate students (7). The researchers found that 21.9% of students reported some form of depression or anxiety, with females declaring higher rates than males (7). These differences have previously been attributed to cultural differences (7, 8). It is suspected that these rates are higher among first-year students, given that this student population is known to experience stress due to the transition to college life.

#### Sense of Coherence

The sense of coherence (SOC) refers to a comprehensive outlook that indicates the level of confidence one has in perceiving the world around them (Antonovsky, 1979 & Carlén et al., 2020). It encompasses three key elements: Firstly, the belief that the stimuli encountered in one's internal and external environments are structured and predictable and can be understood; secondly, the assurance that sufficient resources are available to effectively handle the demands presented by these stimuli; and, thirdly, the recognition that these demands are meaningful challenges that are worth investing time and effort in (9) (Antonovsky, 1987). A strong SOC helps individuals cope and manage life stressors and correlates with an individual's mental and physical health (10, 11). Further, researchers have claimed that SOC could reliably predict mental health issues (12–14).

## METHODOLOGY

The DASS-21 was utilized to discriminate between depression and anxiety symptoms (15). There are items on the depression subscale that gauge how severe anhedonia is (item 3: “I was unable to feel any good emotions at all”), inertia (item 5: “I had a hard time getting the motivation to take action”), hopelessness (item 10: “I thought that there was nothing to look forward to”), dysphoria (item 13: “I was depressed and blue”), lack of interest/involvement (item 16: “Nothing excited me and I couldn't get into it”), self-deprecation (item 17: “I considered myself to be a person of little value”), and devaluation of life (item 21: “Life seemed pointless to me”).

Assessing autonomic arousal is the purpose of the anxiety subscale (item 2: “I was conscious of dryness in my mouth” and item 19: “Without engaging in any physical activity, I was aware of how my heart was responding (for example, I felt it beat faster and slower)”), skeletal muscle effects (item 4: “I had breathing problems, such as overly rapid breathing and dyspnea without physical effort” and (item 7: “I shook (for example, in my hands)”), situational anxiety (item 9: “I was concerned that I would become flustered and act foolishly in certain circumstances”), and subjective experience of anxious affect (item 15: “Panic gripped me” and item 20: “I experienced fear for no apparent reason”).

The distress subscale is designed to detect chronic nonspecific arousal. It evaluates difficulty in relaxing (item 12: “It was hard for me to unwind” and item 1: “My ability to relax was challenging”), uneasy exhilaration (item 8: “I felt that my anxious energy was being expended heavily”), being quickly disappointed/heated (item 11: “I could feel my temper rising”), being irritable/overreactive (item 18: “I perceived myself to be quite sensitive” and item 6: “I tended to overreact to situations”), and being impatient (item 14: “Any obstruction to my ability to complete my task infuriated me”). On the other hand, SOC-13 consists of three constructs: meaningfulness, comprehensibility, and manageability. There are five items for comprehensibility, four for manageability, and four for meaningfulness; however, the scale is utilized to assess a single score of SOC.

For further clarification, the accuracy construct is comprised of items 2, 6, 8, 9, and 11, whereas manageability entails items 3, 5, 10, and 13 and meaningfulness covers items 1, 4, 7, and 12. A reliability coefficient of 0.82 was recently discovered when the component structure and psychometric features of the Arabic adaption of the SOC-13 were evaluated (95% confidence interval (CI): 0.67–0.72), demonstrating an acceptable internal consistency (16).

## RESULTS

### Descriptive Statistics: Demographic Identifying Data (University Students)

Descriptive statistical methods (Table 1) were implemented to evaluate the study's analytical identifying information which was specifically addressed by frequencies (n) and percentages (%).

**Table 1.** Descriptive statistics: demographic information of university students participating in the study

Variable	n	%	Cumulative %
<b>Age</b>			
18–25	353	96.98	96.98
26–33	10	2.75	99.73
34–41	1	0.27	100.00
<b>Marital Status</b>			
Single	341	93.68	93.68

Married	17	4.67	98.35
Divorced	6	1.65	100.00
Region			
Central	195	53.57	53.57
Eastern	134	36.81	90.38
Northern	10	2.75	93.13
Southern	10	2.75	95.88
Western	15	4.12	100.00

#### Descriptive Statistics: University Students' Study Participants' Background Information

Descriptive statistical methods (Table 2) were carried out to rate the research's participant background information. The background analytical information for study participants recognized as university students was particularly discussed by frequencies (n) and percentages (%).

**Table 2.** Descriptive statistics for study participants' background data of university students

Variable	N	%	Cumulative %
Psychiatric history			
No	350	96.15	96.15
Yes	14	3.85	100.00
Mental health issues			
No	286	78.57	78.57
Yes	78	21.43	100.00
Psychiatric med use			
No	359	98.63	98.63
Yes	5	1.37	100.00
Ruqia history			
No	295	81.04	81.04
Yes	69	18.96	100.00
Smoking			
No	350	96.15	96.15
Yes	14	3.85	100.00
Substance use			

No	361	99.18	99.18
Yes	3	0.82	100.00
Psychological pressure			
No	138	37.91	37.91
Yes	226	62.09	100.00

#### Descriptive Statistics: University Students' Perceptions of Sense of Coherence (SOC)

By performing descriptive statistical techniques (Table 3), the study explored the response set data of university student participants for the SOC design. The SOC data were analyzed using occurrence rates, mean scores to identify typical values, dispersion indicators, standard errors of the mean (SEM) as precision estimates, and symmetry analysis (skew; kurtosis). Brief descriptive statistics for university students' perceptions of SOC.

**Table 3.** Descriptive statistics summary table: university student perceptions of SOC

SOC item	M	SD	n	SEM	Min	Max	Skewness	Kurtosis
SOC 1	4.24	2.32	364	0.12	1.00	7.00	-0.19	-1.43
SOC 2	3.08	2.12	364	0.11	1.00	7.00	0.55	-1.11
SOC 3	3.59	2.19	364	0.11	1.00	7.00	0.25	-1.28
SOC 4	4.96	2.08	364	0.11	1.00	7.00	-0.62	-0.86
SOC 5	4.10	2.49	364	0.13	1.00	7.00	-0.05	-1.65
SOC 6	3.92	2.35	364	0.12	1.00	7.00	0.08	-1.49
SOC 7	4.81	2.09	364	0.11	1.00	7.00	-0.57	-0.90
SOC 8	2.72	2.16	364	0.11	1.00	7.00	0.89	-0.69
SOC 9	2.62	2.23	364	0.12	1.00	7.00	1.01	-0.58
SOC 10	3.21	2.03	364	0.11	1.00	7.00	0.44	-1.06
SOC 11	3.30	2.38	364	0.12	1.00	7.00	0.45	-1.36
SOC 12	3.81	2.36	364	0.12	1.00	7.00	0.16	-1.50
SOC 13	3.46	2.30	364	0.12	1.00	7.00	0.35	-1.37

#### Descriptive Statistics: DASS Score for University Students' Study Participants (Table 4)

To ascertain the response set data related to the construct of DASS for university student participants, descriptive statistical techniques were employed in the study. The DASS data were characterized using various statistical measures, incorporating occurrence rates (n) to determine occurrence rates, averages such as mean scores to identify typical values, dispersion indicators such as minimum/maximum values and standard deviations, precision estimates, and symmetry analysis through measures of skewness and kurtosis.

**Table 4.** Descriptive statistics summary table: DASS score for university students by DASS survey items

DASS item	M	SD	n	SEM	Min	Max	Skewness	Kurtosis
DASS 1	2.24	0.82	364	0.04	1.00	4.00	0.59	-0.03
DASS 2	1.63	0.89	364	0.05	1.00	4.00	1.34	0.90
DASS 3	1.80	0.92	364	0.05	1.00	4.00	0.94	-0.06
DASS 4	1.67	0.91	364	0.05	1.00	4.00	1.18	0.37
DASS 5	1.99	0.96	364	0.05	1.00	4.00	0.74	-0.37
DASS 6	2.04	1.00	364	0.05	1.00	4.00	0.70	-0.55
DASS 7	2.05	0.99	364	0.05	1.00	4.00	0.67	-0.56
DASS 8	2.32	1.10	364	0.06	1.00	4.00	0.27	-1.24
DASS 9	2.12	1.04	364	0.05	1.00	4.00	0.48	-0.96
DASS 10	1.86	1.02	364	0.05	1.00	4.00	0.91	-0.39
DASS 11	2.02	1.01	364	0.05	1.00	4.00	0.68	-0.64
DASS 12	2.02	0.91	364	0.05	1.00	4.00	0.66	-0.30
DASS 13	2.02	1.01	364	0.05	1.00	4.00	0.70	-0.59
DASS 14	2.06	1.03	364	0.05	1.00	4.00	0.60	-0.81
DASS 15	1.74	0.99	364	0.05	1.00	4.00	1.13	0.09
DASS 16	2.18	1.08	364	0.06	1.00	4.00	0.50	-1.02
DASS 17	1.96	1.11	364	0.06	1.00	4.00	0.81	-0.74
DASS 18	1.92	1.02	364	0.05	1.00	4.00	0.80	-0.57
DASS 19	2.02	1.03	364	0.05	1.00	4.00	0.69	-0.68
DASS 20	1.87	0.97	364	0.05	1.00	4.00	0.90	-0.20
DASS 21	1.84	1.00	364	0.05	1.00	4.00	1.02	-0.10

**Internal Reliability: SOC**

By adopting the statistical technique of Cronbach's alpha ( $\alpha$ ) (17), the internal reliability of study participants' responses to survey items on the SOC research instrument was assessed. The qualitative descriptors assigned to the numeric alpha levels achieved in the analysis followed the conventions of Cronbach's alpha interpretation (Table 5). As a result, the internal reliability level obtained for study participants across all 13 items on the SOC instrument was regarded as satisfactory ( $\alpha = .78$ ).

**Table 5.** Evaluating internal reliability: summary table for SOC (university students)

Scale	No. of items	$\alpha$	Lower bound	Upper bound
SOC	13	.78	.75	.80

Note. The lesser and greater bounds of Cronbach's  $\alpha$  were estimated using 95.00% CI.

## Internal Reliability: DASS

By employing the statistical technique of Cronbach's alpha ( $\alpha$ ) (17), the internal reliability of study participants' responses to survey items on the DASS research instrument was rated (Table 6). Numeric Cronbach's alpha levels were interpreted according to established conventions to assign qualitative descriptors. Consequently, the internal reliability level attained for study participants across all 21 items on the DASS instrument was deemed outstanding ( $\alpha = .94$ ).

**Table 6.** Evaluating internal reliability: summary table for DASS (university students)

Scale	No. of items	$\alpha$	Lower bound	Upper bound
DASS	21	.94	.93	.95

Note. The lesser and higher bounds of Cronbach's  $\alpha$  were determined utilizing a 95.00% CI.

## Findings

## Research Question #1

The response set summary information for the depression, anxiety, and stress components for university students who participated in the study was evaluated using detailed statistical methods (Table 7). The study examined the summary information of depression, anxiety, and stress forms by utilizing various statistical measures, including occurrence rates (n), averages (mean scores), dispersion (minimum/maximum; standard deviations), precision estimates, and symmetry analysis (skewness; kurtosis).

**Table 7.** Descriptive statistics summary table: depression, anxiety, and stress for university students in the study.

Variable	M	SD	n	SEM	Min	Max	Skewness	Kurtosis
Depression	2.29	1.27	364	0.07	1.00	4.00	0.24	-1.63
Anxiety	2.60	1.30	364	0.07	1.00	4.00	-0.17	-1.69
Stress	2.13	1.20	364	0.06	1.00	4.00	0.45	-1.40

## Research Question #2

Pearson's Product-Moment Correlation Coefficient ( $r$ ) statistical technique was employed to estimate the mathematical association between SOC and the mental health issues of depression, anxiety, and stress for study participants identified as university students (Table 8). A statistically significant inverse connection was observed between SOC and depression ( $r = -.64$ ), signifying a large impact size ( $p < .001$ , 95.00% CI = [-.70, -.57]) and suggesting as the rise of SOC perceptions and decline of depression perceptions. A statistically significant inverse interrelation was noticed between perceptions of SOC and those of anxiety ( $r = -.53$ ), highlighting a high impact size ( $p < .001$ , 95.00% CI = [-.60, -.45]) and implying that anxiety tends to diminish when SOC rises. Moreover, a statistically significant inverse link was marked between perceptions of SOC and those of stress ( $r = -.60$ ), pinpointing a large impact size ( $p < .001$ , 95.00% CI = [-.66, -.53]) and demonstrating that perceptions of stress tend to reduce when perceptions of SOC elevate.

**Table 8.** Mathematical relationship summary table: sense of coherence and depression, anxiety, and stress for university students

Variable combination	$r$	95.00% CI	n	p
SOC-Depression	-.64	[-.70, -.57]	364	< .001
SOC-Anxiety	-.53	[-.60, -.45]	364	< .001
SOC-Stress	-.60	[-.66, -.53]	364	< .001

## Research Question #3

## Depression

Statistically significant results were obtained from the predictive model ( $F(1,362) = 248.65$ ,  $p < .001$ , and  $R^2 = .41$ ), elucidating that 41% of the divergence in perceptions of SOC is intelligible by concepts of depression (Table 9). Perceptions of depression were inverse and statistically significantly anticipating perceptions of SOC ( $B = -0.59$ ,  $t(362) = -15.77$ , and  $p < .001$ ), declaring that almost SOC decreases by 0.59 units for every unit rise in depression perception.

**Table 9.** Predicting SOC by perceptions of depression for university students

Model	B	SE	95.00% CI	$\beta$	t	p
(Intercept)	5.04	0.10	[4.84, 5.23]	0.00	51.17	< .001
Depression	-0.59	0.04	[-0.67, -0.52]	-0.64	-15.77	< .001

**Anxiety**

A statistically significant prediction model was identified ( $F(1,362) = 139.33$ ,  $p < .001$ , and  $R^2 = .28$ ), stipulating that relatively 27.79% of the deviation in perceptions of SOC is explicable by perceptions of anxiety (Table 10). Perceptions of anxiety were inverse and statistically significantly predictive of perceptions of SOC ( $B = -0.48$ ,  $t(362) = -11.80$ , and  $p < .001$ ), reflecting that, customarily, a one-unit increment in perceptions of anxiety will lessen the percentage of SOC by 0.48 units.

**Table 10.** Predicting SOC by perceptions of anxiety for university students

Model	B	SE	95.00% CI	$\beta$	t	p
(Intercept)	4.92	0.12	[4.69, 5.16]	0.00	41.75	< .001
Anxiety	-0.48	0.04	[-0.56, -0.40]	-0.53	-11.80	< .001

**Stress**

Statistics showed that the predicted model was accurate ( $F(1,362) = 204.22$ ,  $p < .001$ , and  $R^2 = .36$ ), clarifying that nearly 36.07% of the variation in perceptions of SOC is due to perceptions of stress (Table 11). Perceptions of stress were inverse and statistically significantly predictive of those of SOC ( $B = -0.59$ ,  $t(362) = -14.29$ , and  $p < .001$ ), highlighting that, mostly, a one-unit escalation in perceptions of stress will lower the percentage of SOC to 0.59 units.

**Table 11.** Predicting SOC by perceptions of stress for university students

Model	B	SE	95.00% CI	$\beta$	t	p
(Intercept)	4.93	0.10	[4.73, 5.13]	0.00	48.96	< .001
Stress	-0.59	0.04	[-0.67, -0.51]	-0.60	-14.29	< .001

**Analysis**

An additional analysis of interest was conducted as a follow-up to the principal research issues of the study. The study's main subject was to evaluate the predictive relationship between study participants' DASS scores and perceptions of SOC for study participants recognized as university students (Table 12).

Applying the simple linear regression statistical method for predictive examination purposes, the predictive model was discovered to be inverse and statistically significant ( $F(1,442) = 388.65$ ,  $p < .001$ , and  $R^2 = .47$ ), describing that roughly 46.79% of the variance in concepts of SOC is resolvable by DASS score. DASS score was statistically significant in forecasting concepts of SOC ( $B = -1.19$ ,  $t(442) = -19.71$ , and  $p < .001$ ), displaying that, broadly, a one-unit rise in DASS score will decrease the percentage of perceptions of SOC by 1.19 units.

**Table 12.** Predicting perceptions of SOC by DASS score for university students

Model	B	SE	95.00% CI	$\beta$	t	p
(Intercept)	6.02	0.13	[5.77, 6.27]	0.00	47.57	< .001
DASS Score	-1.19	0.06	[-1.31, -1.07]	-0.68	-19.71	< .001

**DISCUSSION**

Based on the study outcomes, the prevalence of mental health symptoms and their indicators in the sample of university students was significant. The study endorsed that the prevalence of psychiatric history was only 3.85%. The announced prevalence was relatively low compared to that expressed by other studies. For instance, Tessema, Gebremariam and Abebe (2019) and Dachew, Azale Bisetegn and Berhe Gebremariam (2015) ascertained a psychiatric disorder prevalence of 22.3% and 40.9% among university students in Ethiopia, respectively (18, 19). Over the past years, there has been a noticeable variation in the stated psychiatric distress among college students in various countries.

Our study also established that only 1.37% of the participants used psychiatric medication. Although psychiatric medication has been proclaimed to significantly affect the severity of mental health issues, nonadherence to these medications has been noticed (20). This nonadherence is mainly considered intentional. Velligan, Sajatovic, Hatch, Kramata and Docherty (2017) have asserted that stigma of the side effects, poor insight, and negative perceptions were the main reasons for nonadherence to psychiatric medical use (20).

The study showed that mean SOC scores ranged from 2.62 to 4.96. The study implemented the SOC-13 scale, combining a Cronbach alpha value of 0.78. The instrument's reliability was adequate, as claimed by Eriksson and Lindstrom (2005) (10) who found that the Cronbach alpha for the SOC-13 scale fluctuated from 0.70 to 0.92. According to (21), high scores on the SOC-13 scale reflect a greater SOC. The average DASS score recorded was 1.97. The highest DASS-21 score was 2.24, whereas the lowest was 1.63. In line with the DASS-21 cut-off scores, the scores documented explain extremely severe depression, anxiety, and stress.

The study employed regression analysis to investigate the predictive ability of depression, anxiety, and stress on SOC. The regression models were all significant, implying that the independent variables (depression, anxiety, and stress) were crucial indicators of SOC. The coefficients for the independent variables were negative, pointing out that a unit increase in the independent variables significantly decreased the dependent variable (SOC). These outcomes concur with prior studies that have recorded a profound relationship between SOC and students' depression, anxiety, and stress (22). The research also confirmed that SOC had a crucial interceding influence on the pathway between stress and anxiety and the pathway between stress and depressive symptoms among the participating college students.

The application of DASS-21 and SOC-13 instruments to this research adds to the study's strengths. The test-retest reliability was not estimated for the instruments since they are state measures and not trait measures (15) (Aladağ et al., 2003 & Alharbi et al., 2022). Further, the reliability of the tools reported by other studies suggests that the DASS-21 and SOC-13 exhibit adequate internal consistency across different populations and languages. One limitation of this study is due to the fact that students were only sampled from one university. Thus, it is inappropriate to generalize the results to other students across the country. Another possible limitation of the study is that the majority of the sample was between 18 and 25 years old, meaning that the results could not be generalized to older students (Del-Pino-Casado et al., 2019 & Tinto, 1993)

### RECOMMENDATIONS FOR FUTURE STUDIES

Although depression, anxiety, and stress were found to have a negative effect on SOC, it would be important to study the impact of other factors on SOC. Therefore, for future studies, we recommend the investigation of SOC with depression, anxiety, and stress while controlling other factors, such as academic excellence, financial stability, gender, and age. This study approach would reveal the effect of these factors on students' SOC in diverse contexts.

### CONCLUSION

The present study explored the impact of an individualized mental health intervention on DASS-21 and SOC for the students at Princess Nourah University. Moreover, it identified some prevalence of mental health issues among university students and also reported nonadherence to psychiatric medical use and the prevalence of psychological pressure among university students. As highlighted in this study, SOC and students' depression, anxiety, and stress were significantly correlated. SOC had a negative predicting ability on depression, anxiety, and stress, whereas a high SOC has been associated with low stress, emotional distress, and anxiety ratings. This study provides valuable information to university management and key decision-makers; therefore, the findings can be utilized to develop interventions aimed at strengthening the sense of coherence among university learners. This research has also demonstrated the efficiency of using DASS-21 and SOC-13 tools in evaluating students' depression, which can be used frequently by institutions to monitor the state of their students.

### DECLARATIONS

#### Funding

The Princess Nourah bint Abdulrahman University's Deanship of Scientific Research financed this study through its Research Funding Program.

#### Ethical Approval

Al-Hada Armed Forces Hospital Research and Ethics Committee and Noura University Ethics Committee have given their clearance and they also agreed to the manuscript's publishing. All procedures were carried out in conformity with the rules and regulations established by the Al-Hada Armed Forces Hospital Research and Ethics Committee and the Nourah University Ethics Committee. Before the start of the online questionnaire, each participant provided their written informed consent and acceptance to participate in the study.

#### Data Availability

The data is available from the principal investigator at reasonable and written request.

#### Authors' Contributions

FA & BA: creation and design of the study and analysis of the literature. AA& DA: gaining ethical and administrative permissions, creating the survey, collecting the dataset, and writing the discussion section. MO&FA: examining the data and producing the final draft.

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#### Conflict of Interests

No opposing commercial or other interests have been disclosed by the authors.



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