

The Threat of Stereotypes Among University Students

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Abstract

The current research aims to verify the hypothesis that indicates the existence of a threat to the stereotyped image of university students in science, technology, engineering and mathematics disciplines (STEM). And did there is a statistically significant difference in the threat of stereotyped image according to the variable of academic achievement (Bachelor's degree in the first stage, Bachelor's degree in the fourth stage, Master's degree, PhD) among university students in the fields of science, technology, engineering and mathematics (STEM).

In this study, the researcher used the descriptive approach, and the current community consisted of students of primary and higher morning studies at Al-Mustansiriya University, the University of Baghdad, and the University of Technology for the departments of mathematics and physics for the academic year (2022-2023). female student, and the researcher used the stereotype threat scale among university students, the scale of identities and social attitudes (SIAS), by Biko and Brown (Biko and Brown, 2011), and the psychometric characteristics were extracted for it, as the stability of the alpha scale was (0.85), which is thus considered a good stability coefficient. The researcher used a number of statistical methods through the statistical bag (SPSS) The research reached a number of results, including:

- 1- *The research sample members have a stereotype threat.*
- 2- *There is a statistically significant difference in stereotype threat, according to the variable of academic achievement.*

In light of this, the research presented a number of recommendations and suggestions for subsequent research.

Keywords: *The threat of Stereotypes, Science, Technology, Engineering, Mathematics.*

Introduction

Realizes women in science, technology, engineering, and mathematics (STEM) fields (STEM) that others may judge their own behavior, including their performance, given the stereotype that women have inferior STEM skills than men, and perhaps not surprisingly, women feel a lower sense of fitness and job satisfaction compared to their male peers in STEM These areas (23, p. Seymour & Hewitt 1997).

This realization leads them to feel pressured to engage in impression management because of the mismatch between their gender norms versus their generally male-dominated profession in these disciplines, which is reflected in a decreased nature of the relationship existing between these disciplines and masculinity. increased fatigue,

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cognitive depletion, decreased social comfort, worse health outcomes, increased social withdrawal, and increased negative affect, including feelings of guilt and shame (Bodzin and Gehringer, 2001, p.36).

And it seems that this negative perception by others distract Women about the task that they stand out, resulting in a performance more consistent with the stereotype than if do them without threat (Keller, 2007, p.323).

like that Stereotype threat can also impair executive functions, and he has proved to be pressures Impedes proper brain development, including the brain centers that house working memory and executive functions, and this will affect the performance fold Steele & Aronson, 1995).

Based on the foregoing, the problem of the current research can be identified by identifying the level of stereotype threat among university students in majors science, technology, engineering and mathematics (STEM).

Research assumes Hypotheses

1- There is a threat to stereo types I have University students majoring in science, technology, engineering and mathematics (STEM).

2- There is difference D Statistical in the threat of stereotyped image according to the variable of academic achievement (Bachelor's degree in the first stage, Bachelor's degree in the fourth stage, Master's degree, PhD) for Dr. baht the university in science, technology, engineering and mathematics disciplines (STEM).

Define terms:

definition the term:

Stereotype threat Stereotype Threat:

Steele recognized her (Steele, 1997), that itA phenomenon in which certain groups of individuals are affected by an unconscious fear of confirming a negative stereotype regarding their performance on a particular task (for example, that men are better than women at math) (Steele, 1997).

Theoretical explanation of stereotype threat

Stereotype threat model Steele, 1997 identity threat theory

Stereotype threat is a phenomenon in which certain groups of people are affected individuals Unconsciously afraid of confirming a negative stereotype regarding their performance on a given task (eg, that men are better than women at math). The idea is that women, when the stereotype is primed before taking a math test, perform worse on the test than women in a situation where the stereotype is not primed, while men perform equally in both situations. Steele, 1997).

Consistent with the concept of stereotype threat, women in the stereotype-avoiding condition can be expected to perform better, given they are provided information inconsistent with anthropomorphic type (eg, about the performance of girls as well as boys in mathematics). of women in normal or stereotypical threatening circumstances (Smith & White, 2002).

The conditions under which the effects of the threat stereotype occur

When discussing the effects of stereotype threat, it is important to identify who and under what circumstances these effects occur, Previous research with college students has suggested that for women to be affected by stereotype threat, women must be introduced to athletes and take a challenging math test in an assessment setting in which their gender is prominent.

Psychologists Claude Steele, Ph.D., Joshua Aronson, and Stephen Spencer found, Through a number of studies traditional assumptions that they conducted that genetics or cultural differences cause some students, such as African Americans or girls, to perform poorly on standardized academic tests and other academic propositions. And It becomes apparent that negative stereotypes trigger inhibited doubts and intense anxiety in the mind of the test taker, leading to the phenomenon of "stereotype threat". It even fleeting reminders of that individually belonging to one group or another, such as a group stereotyped as inferior in academics, can ruin test performance.

Studied by Steele, Aronson, and Spencer(Steele, Aronson and Spencer)How collective stereotypes can threaten how students evaluate themselves, altering academic identity and intellectual performance, And Believes In this socio-psychological dilemma can besiege members of any group that exists In which Negative stereotypes(Steele et al., 2002).

Steele and Aronson gave undergraduate students from Blacks and whites(Black and White) a half-hour test Workers vertebrae difficult than verbal exam to for graduates, In the case of stereotype threat, tell the students that the test diagnoses intellectual ability, and thus potentially elicits the stereotype that blacks are less intelligent than whites. In the absence of stereotype threat, the researchers told the students that the test was a task Experimental to solve problems and said nothing about ability, which probably makes stereotypes irrelevant. In the event of a stereotype threat, the result of the study showed that Performance of blacks - who were matched with whites in their group with test results SAT - lower performers than whites. In the absence of a stereotype - a threat -so the test itself is described exactly as a task Experimental it did not indicate ability - the performance of blacks rose to match that of whites of equal skill, as that additional trials that reduced the stereotype threat endemic to standardized tests also resulted in equal performance. One study found that when students only recorded their race (presumably to make the stereotype salient), and were not told that the test was a diagnostic of their abilities, blacks performed worse than whites.

Spencer and Steele find Diane (Spencer, Steele and Diane, Quinn,1999) also showed that simply telling women that a math test did not show gender differences improved test performance. The researchers administered a math test to men and women after telling half of the women that the test showed gender differences, and telling the rest that it found none. When the test administrators told the women that the tests showed no gender differences, the women performed just as well as the men.Those told to the test showed that the sex differences were significantly worse than the men, just as women who were not told anything about the test. This experiment was done with women who were excelling in math, just as the experiments were done on race with strong, motivated students (Spencer et al., 1999).

reach outPsychologists and educators need to understand the true nature of one of the barriers to equal educational achievement. Although psychologists such as Steele, Aronson, and Spencer acknowledge that gaps in test scores probably cannot be entirely attributed to stereotype threat, the threat appears to be impactful enough that educators, students, researchers, policymakers, and parents are paying attention to it. At the very least, the findings undermine the tendency to blame unsupported genetic and cultural factors, such as whether African Americans "value" education or girls just can't do math.

showed throughmicro studiesAlso the subtle and insidious nature of the stereotype threat. For example, because the threat of stereotypes affected women even whenpointed outThe researchers said the test showed no differences between the sexes - and thus still determined probability - social psychologists believe that even mentioning a stereotype in a benign context can sensitizeindividuals.

Thought (Aronson1970) Aaronson notes that the study of stereotype threat offers some "exciting and encouraging answers to these age-old questions(on achievement gaps)By looking at the psychology of stigma—the way humans respond to negative stereotypes

about their ethnic group or gender.” By subtly changing the test situation to remove the threat of the stereotype, Aronson and his colleagues showed a significant improvement in standardized test scores among members of negatively stereotyped groups.

Indicates Aronson, “We have found that we can do much to enhance both achievement and enjoyment of school by understanding and paying attention to these psychological processes, thereby undoing the power of stereotypes and prejudice to thwart the academic aspirations of young people who, solely by virtue of being born black, brown, or female, are subject to suspicions of inferiority.” (1970 Aronson).

Symmetry with mathematics.

suggest (Steel, 1997) That stereotype threat affects individuals who correspond to the field of interest (in this case, women with mathematics (Steel, 1997).

Learning about math involves two components: the feeling that you are good at math and the feeling that it is important for you to be good at math (Smith & White, 2001).

Research with high school and college students shows that women who are at least moderately identified with mathematics are more susceptible to stereotype-threatening effects than those who are not identified their level in mathematics (Nguyen and Ryan, 2008).

Test conditions.

Perform the tests that are offered as tests Evaluative or refers to an individual's ability to feel that poor performance on a test indicates poor ability. This, along with highlighting the gender of the individual, leads women to believe that if their performance is weak in the test, they are at risk of confirming negative stereotypes about women and mathematics. Note that gender can be highlighted in many ways, such as stating gender differences, discriminating gender, or taking the test in a mixed-sex group (Steele, 1997).

The effects of these feelings are most evident when women undergo difficult tests for at least two reasons. First, women are more likely to perform poorly on these assessments, which makes their fear of stereotype confirmation more plausible (Neuville & Croizet, 2007).

Second, the more difficult tests contain items that require more processing in working memory, and because working memory appears to be compromised when students are under stereotype threat (Schmader et al., 2008), performance on components that require more working memory to re-source will suffer more than performance on components that require less working memory resources. These characteristics of the participants and the test case are crucial when examining stereotype threat. (Schmader and Jones, 2003).

Method

The researcher adopted the descriptive approach as the most appropriate method in her study.

research community population of the search:

The current research includes undergraduate students and supreme morning at Al-Mustansiriyah University and the University of Baghdad and the University of Technology for the departments of mathematics and physics for the academic year (2022-2023), from Females and scientific specializations, whose number is (1247) student.

The research sample of the search:

chosen The sample of the statistical analysis using the stratified random method, as it amounted to (400) female students, and were selected from the research community by a simple random proportional method.

Scale Stereotype threat Stereotype Threat

Because there is no local or Arab tool that measures the threat of stereotypes The researcher adopted a scale identities and social attitudes (SIAS), by Picot and Brown (Biko and Brown, 2011), which is composed of (43) paragraphs Seven alternatives from (1) (strongly disagree) to (7) (I totally agree), After translating it and adopting the theory of threatening Steele's stereotype, (Steele, 1997).

The validity of the translation of the scale:

After the researcher looked at the scale Biko and Brown (2011) to threaten the stereotype In the English language, and for the purpose of verifying the veracity of the translation, the researcher translated the paragraphs of the scale, which are (43) paragraphs.

Checking the validity of paragraphs (virtual honesty):

After verifying the validity of the translation of the paragraphs of the scale and its instructions, the researcher prepared a questionnaire for the arbitrators, to present a questionnaire of the opinions of experts and specialists in psychology, whose number is (11). And after calculating the proportion of the agreement 80% All paragraphs have been preserved, amounting to (43) Paragraph, with the exception of five paragraphs that did not obtain the percentage of agreement, which are (7-12-19-23-30), and accordingly the number of vertebrae became (38) paragraph.

Statistical analysis of scale paragraphs:

The researcher verified the discriminatory validity of the paragraphs, as follows:

First: the peripheral comparison method (two extreme samples style) Extreme Groups Method:

And he has It turns out that all items are distinct because their calculated t-values are higher than the tabular t-values (1.96) at a level of (0.05) and a degree of freedom (214).

Second: The relationship of the paragraph score with the total score of a scale Stereotype threat (paragraphs validity) internal consistency Internal Consistency Method:

The researcher used (Pearson correlation coefficient), As it showed The results are that all correlation coefficients are statistically significant at the level of significance (0.05) and degree of freedom (398) Thus, the stereotype threat scale consisted of (38) items.

Scale Stability reliability:

To calculate stability in this way, EstI worked Completed sample forms, and after applying the Vachronbach equation for internal consistency, the stability coefficient of the scale reached (0.85).

Discussion of the results:

The first hypothesis: There is a threat to the stereotyped image of female university students in science, technology, engineering and mathematics disciplines (STEM).

And to achieve this H the premise The researcher applied the stereotype threat scale to the research sample of (400 individuals, and the results showed that their average score on the scale was (130.72) degrees, with a standard deviation of (19.81) degrees, and when balancing this average with the hypothetical mean ((for scale and amount) 114) degrees, and by using the t-test for one sample, it was found that the difference is statistically significant and in favor of the arithmetic mean, as the calculated t-value was higher than the tabular t-value of (1.96) with a degree of freedom (399) and a level of significance (0.05) and table (14). explains it.

Schedule (1) The t test for the difference between the sample mean and the hypothetical mean of the stereotype threat scale

significance level	degrees of freedom	tabular t-value	The calculated t value	Hypothetical average	theaStandard deviation	SMA	the sample
D	399	1.96	16.88	114	19.81	130.72	400

The second hypothesis: There is a statistically significant difference in the threat of stereotyped image according to the variable of academic achievement (Bachelor’s degree in the first stage, Bachelor’s degree in the fourth stage, Master’s degree, PhD) among university students in the fields of science, technology, engineering and mathematics (STEM).

And to achieve thisH the premise One-way analysis of variance was used to find out the differences to threaten Image stereotypes depending for a variable achievement scholasticand table (2) explains it:

Schedule (2) Arithmetic means and standard deviations of stereotype threat scale according to the variable of academic achievement

standard deviation	SMA	the number	thephase
19.25	136.74	148	Bachelor's degree first
19.95	125.97	150	Bachelor's degree fourth
18.15	129.39	51	Master's
18.60	128.59	51	Ph.D
19.81	130.72	400	total

Schedule (3) One-way analysis of variance to reveal the significance of differences in stereotype threat according to the variable of academic achievement

indicationSig	f valueF	mean of squaresMS	degrees of freedomDF	sum of squaress.of.s	source of contrasts.of.v
D	8.11	3,022,710	3	9068.131	between groups
		372,520	396	147,518,066	within groups
		---	399	156,586,198	total

The above result indicates that there is a statistically significant difference in stereotype threat according to the variable of academic achievement, as the calculated p-value was (8.11), which is higher than the tabular p-value of (2.60) at the level of (0.05) and a degree of freedom (396-3.)

In order to find out the differences in stereotype threat according to the different levels of achievement, Scheffet's test for post comparisons was used, and the table (4) explains it:

Schedule (4) Evaluate the differences between the means and Scheffe's critical values to identify differences in stereotype threat according to different achievement levels

indication	Chevy's critical value	The difference between the two mediums	SMA	the number	comparisons
0.05 d when in favor of First baccalaureate	6.25	10.77	136.74	148	First baccalaureate
			125.97	150	Fourth Bachelor
is significant at 0.05	8.75	7.34	136.74	148	First baccalaureate
			129.39	51	

					Master's
is significant at 0.05	8.75	8.15	136.74	148	First baccalaureate
			128.59	51	Ph.D
is significant at 0.05	8.74	3.42	125.97	150	Fourth Bachelor
			129.39	51	Master's
is significant at 0.05	8.74	2.62	125.97	150	Fourth Bachelor
			128.59	51	Ph.D
is significant at 0.05	10.67	0.80	129.39	51	Master's
			128.59	51	Ph.D

General discussion

The result of the table (1) to that members of the research sample to threat to a stereotype. The current result is interpreted in the light of the adopted theory - the stereotype threat theory - that cultural differences pay off many of the female students to arouse frustrated doubts and intense anxiety in mind female students, or even fleeting reminders to a group of stereotypes that student what they belong to one group or another, can lead to a threat to stereotypes. It also seems that the collective stereotypes with which the research sample coexisted had an impact on me how to evaluate female students for himself. This may affect me academic identity and intellectual performance, in light of this they think that this socio-psychological dilemma can be trapped. They with any a group in which there are negative stereotypes.

The researcher believes that this is an experience of pain, anxiety, or concern in which case the ability to assert negative stereotypes about his group. Social which could lead to reduced performance of female students, the latter belong to negative stereotypes, and to hinder his ability to perform at the highest level. Since most female students they own at least one social identity will be a negative stereotype, most will feel a vulnerability to stereotype threat in the event of a situation related to B the stereotype associated with gender.

As the role-matching theory suggests that individuals seek to build a positive self-image, any that the women, they feel that in lower status identities (majors science, technology, engineering, and mathematics (STEM) are involved. In management communication with the aim of strengthening social identity. So do the women mind interest manage their identity associated. In some scientific professions it may be associated with stereotypes about whether these professions are associated with networking opportunities (i.e. serving others, maintaining relationships). This appears clearly in the early days of women's admission to these scientific disciplines, in a sense that appears more clearly in the first academic year and decreases with the adaptation of women in the subsequent academic stages, accordingly. Response: Women clear through show their sexual identity and tend to be higher in orientations. They.

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