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Gender Stereotype towards Academic Achievements in Natural Science Fields of Study among University Students

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ABSTRACT
The purpose of this study was to investigate gender stereotype and academic achievement in natural science fields among university students. The participants of the study were 404 under graduate students selected from Addis Ababa and Dire Dawa Universities. The sample of study was taken through stratified and simple random sampling techniques. To collect the data, questionnaires and archival data were used. The data was analyzed and interpreted by both descriptive and inferential statistical methods. The results of the study indicated that there is a negative correlation between students' academic achievement of CGPA score and gender stereotype beliefs (GSB), r = -.100, n = 404, p = .045, and with gender stereotype attitude (GSA), r = -.098, n = 404, p = .048. Whereas, there is a strong positive correlation between GSB & GSA scores, r = .524; r = n = 404, p = .000. There is no statistically significant difference between male and female students in both Grade-12 EHEECE exam scores and CGPA scores (t= -.107, p= .915) and (t= .570, p= .569) respectively. There was a statistically significant difference across university CGPA scores for the four fields of study, F (3, 400) = 2.575, p = .054. The interaction effect between gender and fields of study on university CGPA score was statistically significant, F (3, 396) = 10.245, p = .000. The interaction effect between gender and fields of study on GSB score was statistically significant, F (3, 396) = 3.353, p = .019. There is also an interaction effect between gender and fields of study on GSA score was statistically significant, F (3, 396) = 5.473, p = .001. Educators and counselors can facilitate educational and counseling interventions to help university students to interact without gender stereotype to overcome academic challenges.

Keywords: *Gender Stereotype, Academic Achievements, Natural Science Fields, University Students*

1. Introduction

In all levels of higher education institutions across the country, students from different diverse groups are often the recipients of gender stereotype towards their fields and career choice despite the fact that universities are supposedly a place of enlightened discourse and where students learn more about their academic and social world. Related to the wider issue of negative stereotype threat, the gender dimension of student interest and attitudes towards mathematics and science may not only affect learning achievement in these subjects but also choices for further study and careers (UNESCO, 2015).

In Ethiopia the proportion of females to male in higher education academic achievement and participation has not yet reached the same (MOE, 2014). This shows that the higher education females are still a long way off, as compared to what is desired by the country. Female admission rate at undergraduate regular program has improved to 38% from 25% from baseline.

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While the enrolment of female students in higher education has improved over time, gender equality in higher education has not yet been achieved given there is still prevalent disparities in female enrolment, retention and achievement in higher education (MOE, 2014). Although the participation of women in higher education has increased, they are still underrepresented. Yet the scarcity of women in STEM careers remains stark. What drives these gender disparities in STEM? And what are the solutions? Research points to different answers depending on the stage of human development and describes how specific learning environments, peer relations, and family characteristics become obstacles to STEM interest, achievement, and persistence in each period (Dasgupta and Stout, 2014). This study try to investigate the current status between male and female if differ from such previous study.

In Ethiopia there are many researchers conducted the research in this area at higher education, at primary and high school level e.g. Sileshi (2001) and Tamirie (2006) were some indications. As the Ethiopian higher education institution is a current phenomenon, this study may play a crucial role for showing the current trends. The study of revisiting gender stereotype and academic achievements particularly in areas of science fields in higher education in Ethiopia tries to investigate the current status between male and female if differ from such previous study. Therefore, this study tries to investigate gender stereotype and academic achievements in natural science fields among Addis Ababa and Dire Dawa university students.

1.2. Objective of the study

- To examine the relationship between student's academic achievement and gender stereotype attitudes and beliefs of students.
- To identify gender difference in academic achievement in different fields of study (Biology, Chemistry, Physics and Mathematics).
- To explore the impact of gender and fields of study on students' gender stereotype beliefs and attitudes towards academic achievement in in natural science fields.

2. Review of Related Literature

2.1. The Nature and Dimension of Gender Stereotype

Gender is one of the most important categories in human social life. Gender is distinct from "sex" and refers to socially constructed and not biologically defined characteristics of human being. It refers to the social construction of what is considered male and female based on socio-cultural norms and power (Ifegbesan, 2010). One is born male or female, but becoming

a man or a woman is the result of social and cultural expectations that pattern men's and women's behavior. Gender refers to social attributes that are learned or acquired during socialization as a member of a given community. Because these attributes are learned behaviors they can change over time and vary across cultures.

Gender can be defined as a set of characteristics, roles, and behavior patterns that distinguish women from men socially and culturally and relations of power between them (Hirut, 2004). These characteristics, roles, behavior patterns and power relations are dynamic; they vary over time and between different cultural groups because of the constant shifting and variation of cultural and subjective meanings of gender (Hirut, 2004). According to Eckes and Trautner (2000), gender imbued with a host of cultural meanings and practices pervading each and every aspect of individual, interpersonal, group and societal processes. Ethiopia is a patriarchal society that keeps women in a subordinate position (Haregewoin and Emebet, 2003). There is a belief that women are docile, submissive, patient, and tolerant of monotonous work and violence, for which culture is used as a justification (Hirut, 2004). The socialization process, which determines gender roles, is partly responsible for the subjugation of women in the country.

Ethiopian society is socialized in such a way that girls are held inferior to boys. In the process of upbringing, boys are expected to learn and become self-reliant, major bread winners, and responsible in different activities, while girls are brought up to conform, be obedient and dependent, and specialize in indoor activities like cooking, washing clothes, fetching water, caring for children, etc. (Haregewoin and Emebet, 2003; Hirut, 2004). The differences in the ways in which individuals are treated through the socialization process, due mainly to their sex status, leads to the development of real psychological and personality differences between males and females (Almaz, 1991). Thus, all known cultures and societies provide rich and well-differentiated sets of concepts and terms to categorize and characterize boys and girls, men and women, to separate between male and female roles, rights and responsibilities. It is expected that human beings continued being categorized based on various social psychological variables. Among which gender is one which pattern a person based on his/her beliefs, attitudes and perceptions in this social world.

Previous studies mostly address gender disparity in academic achievements at subject levels; for instance disparity in Mathematics achievements of grade 5 and 6 (primary schools) students (Seleshi, 2001). Related to the wider issue of negative stereotype threat, the gender

dimension of student interest and attitudes towards mathematics and science may not only affect learning achievement in these subjects but also choices for further study and careers (UNESCO, 2015). It is too common to see most female advised by their family and others to join fields such as social science and language than hard science such as technology and natural science based on their stereotype that categorize social science for female and natural science for male. This study, therefore, aims to explore the issue of gender stereotype and academic achievements in natural science fields from social psychological perspective by taking up and analyzing gender stereotype beliefs and attitude, science fields and academic achievement among university students in Ethiopia.

However, there were no detailed research studies were conducted in areas of gender stereotype and academic achievements in natural science fields among students in higher education institutions in Ethiopia. Even though girls' enrollment in education, at all levels, is increasing from time to time, the national and regional studies shows that female academic achievement is significantly lower than males' academic achievement (MOE, 2014). In reviewing the various findings, Deaux and Lafrance (1998) concluded, with Eagly (1987), that people typically describe women using communal (interpersonally oriented)attributes, whereas descriptions of men cluster around agentic (achievement oriented) attributes. Women are described as affectionate, emotionally expressive and responsive to others; men are described as independent, assertive and active (Ashmore, Delboca, and Wohlers, 1986). But, global stereotypes cannot provide the specific information that people need. Most researchers assert that people stereotype because stereotypes organize information and facilitate inferences. In a similar vein, Taylor (1981) proposed that stereotypes organize social information, permitting people to make rapid, good-enough inferences about others.

2.2. Gender Stereotype and Academic Achievements in Natural Science Fields

Social psychologists and sociologists define stereotype in many ways. The term stereotype *(stereo* is derived from a Greek word meaning "solid"), a simplified description applied to every person in some category (Macionis, 2008). Stereotypes are not only harmful in their own right; they do damage by fostering prejudice and discrimination in intergroup relationship. Gender stereotypes exist in all human societies and in all human endeavors, professions, careers and institutions. Most of these stereotypes often described men as intellectually, competent, strong and brave, while women areas homely, warm and expressiveness, incompetent and passive. Although psychologists often differ in the precise

way they define stereotype, most agree that it involves overgeneralizations about the members of a group. Most researchers assert that people stereotype because stereotypes organize information and facilitate inferences. In a similar vein, Taylor (1981) proposed that stereotypes organize social information, permitting people to make rapid, good-enough inferences about others.

According to Ifegbesan (2010) stereotypes often described men as intellectually, competent, strong and brave, while women areas homely, warm and expressiveness, incompetent and passive. His study which conducted in Nigeria also indicates that most of the teachers surveyed directly or indirectly promote gender-stereotypes. On the other hand, the study conducted by Castillo, et al., (2014) revealed that there is shortages in the supply of trained professionals in disciplines related to Science, Technology, Engineering, and Mathematics (STEM) may weaken the innovation potential of a society. A wide gender gap has persisted over the years at all levels of STEM disciplines throughout the world.

The question of gender stereotype accuracy has generated a growing body of research. According to Makarova, Aeschlimann and Herzog (2019) findings, math is most strongly perceived as a masculine subject among female and male secondary school students, followed by physics and then chemistry, which has the weakest masculine connotations. In similar vein, Kessels (2014), reveal that a STEM subject such as Math's and Physics are perceived as "boys' subjects" and as unfeminine or masculine subjects. STEM is seen as more appropriate for male than for female students, and students ascribe more talent, ability, and interest in mathematics to boys than to girls. Stereotypes are thought to be developed and maintained from a multitude of factors, contexts, and influences that occur continually throughout an individual's lifespan (Ashmore & Del Boca, 1981). Thus, stereotypes are examined here as a component or root for many of the explanations for women's under-representation in some Science and Technology fields.

Social scientists have built a compelling empirical case that individual and social beliefs about women's abilities and interests are related to women's under-representation in Science and Engineering (S&E) via occupational stereotypes. Since these stereotypes influence occupational choices, undergraduate students perceive S&E professions in light of stereotypes about women and men and thus they make gender-appropriate choices of majors associated with those professions accordingly (Beyer, 1999). However, students' academic

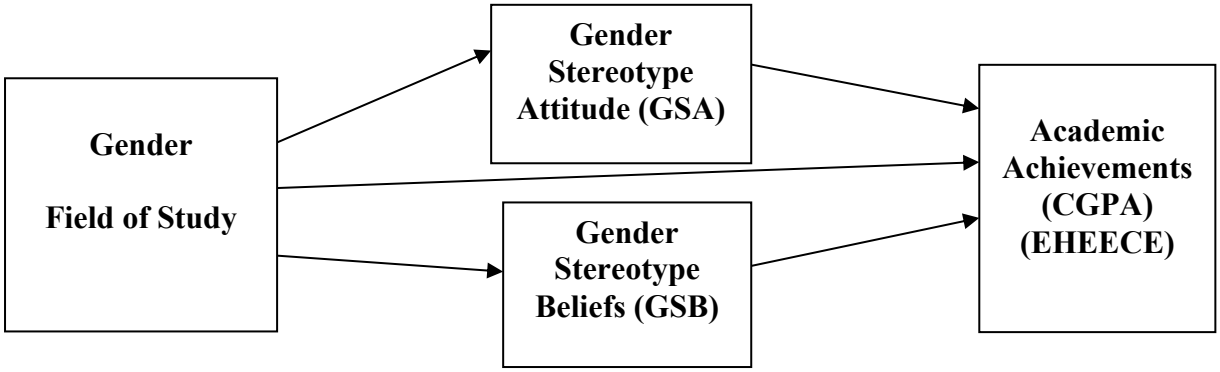
performance and persistence take place within an educational environment filled with racial, ethnic, and gender stereotypes that have tangible effects.

2.3.Conceptual Framework

The theory used as basis for this study was Social Cognitive Theory. Social Cognitive Theory refers to a psychological model of behavior that emphasizes the acquisition of social behavior mainly through observation. It emphasizes that learning occurs in a social context – where personal, behavioral and environmental factors influence one another in a bidirectional and reciprocal manner. (Cognitions are thoughts, attitudes, beliefs, expectations, etc.). A persons' functioning is the product of a continuous interaction between cognitive, behavioral and contextual factors.

Albert Bandura (1999) advanced a view of human functioning that accords a central role to cognitive, vicarious, self-regulatory, and self-reflective processes in human adaptation and change. People are viewed as self-organizing, proactive, self-reflecting and self-regulating rather than as reactive organisms shaped by environmental forces, inner forces, etc. Human functioning is viewed as the product of a dynamic interplay of personal, behavioral and environmental influences – reciprocal determinism. The assumption here concerns the view that individual's on-going functioning (achievement in the case of this study), cognitive behavioral, and environmental factors influence one another in a bidirectional, reciprocal fashion. The study explored those aspects of knowledge to determine their possible roles in the achievement of the students, that is, to test those theories. The following diagram indicate that the independent variables such as gender and fields of study can affect students' gender stereotype attitude (GSA) and gender stereotype belief (GSB) and their academic achievements (Cumulative Average Grade Point (CGPA) and Ethiopian Higher Education Entrance Certificate Examination (EHEECE).

2.3.1 Conceptual Frameworks for Gender Stereotype and Academic Achievement



3. Methods and Materials

The study was designed to investigate gender stereotypes and academic achievements in natural science fields among university students. A cross-sectional survey study design with quantitative approaches was chosen for its objectivity and measurability in exploring behavioral issues, as recommended by John Creswell (2007). The study area encompassed two major city administrations in Ethiopia, Addis Ababa and Dire Dawa, home to universities specializing in science and technology. These locations were selected to allow for a comprehensive exploration of the issue across diverse socio-cultural groups.

The study population included undergraduate regular students from the College of Natural and Computational Science at Addis Ababa and Dire Dawa Universities, focusing on departments such as Biology, Chemistry, Mathematics, and Physics. Sampling techniques involved stratified random sampling among undergraduate students in the College of Natural Science at academic levels of 2nd year and above. The sample size was determined using a standard formula by Kurtz (1983), resulting in a total of 404 participants across both universities.

Data collection instruments comprised questionnaires, scales, and archival data from university registrars. Questionnaires were adapted from previous studies published in reputable journals, such as Ursula Kessels (2014) Stereotypes about STEM fields, Ifegbesan (2010) Gender-Stereotypes Belief and Practices in the Classroom and Tomal & Schulze (2004), Gender Stereotyping among USA College and University Students, and a pilot study was conducted to ensure their validity. Procedures for data collection included obtaining official permissions from the universities, briefing participants on the research's ethics and objectives, and ensuring voluntary participation with anonymous questionnaire completion.

Validity and reliability tests were conducted to ensure the quality of the instruments. Content validity was assessed by expert evaluators, leading to improvements in questionnaire items. The reliability of the questionnaire was evaluated through a pilot test administered to a subset of participants. The instrument was pilot tested on 50 (17 females and 33 males) randomly selected students from Technology institute of AAU. The researchers had selected the setting owing to the homogeneity of the population under study and to avoid forewarning effect due to communication. The same procedure for data collection and scoring were used initially, questionnaires having 14 items for gender stereotype beliefs (GSB) and 26 items for gender

stereotype attitudes (GSA) were distributed for the participants. Accordingly, a scale analysis on SPSS version 24.0 has revealed 8 items for gender stereotype belief and 16 items for gender stereotype attitudes were reliable and the remaining was excluded (i.e. values less than 0.7) The reliability estimate for each variable scale i.e. GSB and GSA had a reliability estimate of r = (.821) and (.812) respectively using Cronbach Alpha method to see the internal consistence of the items to be measured.

Data analysis involved descriptive statistics, T-test, One and Two-way ANOVA, and Pearson correlation coefficient using SPSS version 24.0. The analysis aimed to explore relationships and differences among variables, with a significance level set at alpha = 0.05.

4. Results

4.1. Results of the Study

The results of the study variables are presented in both descriptive and inferential statistics and followed with discussion. In this part, the data analysis results are presented. In the first section, the results of the descriptive statistics including means and standard deviations regarding to the demographic variables of the respondents are presented. In the second part, the Person Correlation between student's academic achievement and gender stereotype is presented**.** In the third part, the means and standard deviations regarding to the Gender Difference in Academic Achievement in Different Fields of Study (Biology, Chemistry, Physics and Mathematics) is presented**.** Then, the results of t-test, one and two way ANOVA which was performed to examine the difference among gender, fields of study, academic achievement and gender stereotype scores with the rest of independent variables are presented. In this particular data analysis and presentation, the age, gender, university, academic level and field of study were treated as independent variables; whereas, the scores on EHEECE, CGPA, GSB and GSA scale were treated as dependent variables. The process of analysis conducted through the SPSS software version 24.0.

The sample consisted of 404 undergraduate students, ranging in age from 18 to 35 years. Participants gender composition indicate that two-hundred-twenty-eight 228 (56.4%) fifty-six percent of the sample were females, and one-hundred seventy-six 176 (43.6%) forty three percent of the sample were males. Regarding participants field of study, 181 (44.8%) were from Biology, 92 (22.8%) were from Chemistry, 75 (18.6%) were from Mathematics and 56 (13.9%) were from Physics field of study. The academic status (levels) of participants

indicated that 203 (50.2%) were third year and 201 (49.8%) were second year. The mean and standard deviation score for the dependent variables for GSB scale was (*M*=19.22, *SD*=3.881) and for GSA scale (*M*=39.90, *SD*=8.831) was significantly different from the mean score of other independent variables. The mean score for university CGPA was indicate that (*M*=2.91, *SD*=.451) and that of EHEECE was (*M*=334.28, *SD*=67.148) which indicate the higher among independent variables.

Table-1: Descriptive Statistics of the Study Variables

Variables	*N*	*Minimum*	*Maximum*	*M*	*SD*
Age	404	18.00	35.00	22.53	2.320
Gender	404	1.00	2.00	1.56	.496
University	404	1.00	2.00	1.49	.500
EHEECE	404	206.00	475.00	334.28	67.148
CGPA	404	2.00	3.94	2.91	.451
Fields of Study	404	1.00	4.00	2.01	1.091
Academic Levels	404	1.00	2.00	1.50	.500
GSB	404	8.00	32.00	19.22	3.881
GSA	404	18.00	60.00	39.90	8.831

As indicated in table-1 above, the mean and standard deviation of all study variables depicted with the minimum and maximum ranges. The higher mean and standard deviation scores were belong to the dependent variables such as EHEECE, CGPA, GSB and GSA.

4.2.The Relationship between Gender Stereotype and Academic Achievement

The relationship between gender stereotype (as measured by gender stereotype scale such as GSB & GSA) and academic achievements (as measured by the grade-12, EHEECE-exam scores and University CGPA-semester base score) was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There is no correlation between students' academic achievement of EHEECE score and gender stereotype beliefs (GSB), r = -.053, n = 404, p = .292, and with gender stereotype attitude (GSA), r = -.013, n = 404, p = .788. There is a negative relationship between students' CGPA and gender stereotype score. There is a negative correlation between students' academic achievement of CGPA score and gender stereotype beliefs (GSB), r = -.100, n = 404, p = .045, and with gender stereotype attitude (GSA), r = -.098, n = 404, p = .048. Whereas, there is a strong positive correlation between GSB & GSA scores, r = .524; $r = n$ = 404, p = .000.

Table-2: Pearson Product-Moment Correlations between Gender Stereotype and Academic Achievement

Variables	*1*	*2*	*3*	*4*
EHEECE	1	.-.080	-.053	-.013
CGPA		1	-.100**	-.098**
GSB			1	.524**
GSA				1

**. Correlation is significant at the 0.05 level (2-tailed).

There is no relationship between EHEECE score and CGPA score with *r*= -.080, n=404, *p* = .109. There is no relationship between gender stereotype score with Grade-12 EHEECE exam score. Scores on the gender stereotype scale such as gender stereotype belief (GSB) and gender stereotype attitudes (GSA) show that there is no correlations with (EHEECE *r*= -.053 and *r*-.013) respectively. There is a negative significant relationship between gender stereotype scores with that of university CGPA score. Scores on the gender stereotype scale such as gender stereotype belief (GSB) and gender stereotype attitudes (GSA) show that there is negative correlations with (CGPA *r*= -.100and *r*= -.098) respectively. As such, based on this finding, there is a significant relationship between students' academic achievement of CGPA and their gender based beliefs and attitudes they held towards natural science fields of study.

4.3. Gender Difference in Academic Achievement in Different Fields of Study (Biology, Chemistry, Physics and Mathematics)

To examine whether there is gender difference in students' academic achievement regarding their scores on EHEECE and CGPA across field of study such as Biology, Chemistry, Physics and Mathematics, we were employed both descriptive and inferential statistics.

Table-3: Gender Difference in Academic Achievement in Different Fields of Study

Variables	*Gender*	*Fields of Study*	*M*	*SD*	*N*
EHEECE	Male	Biology	330.15	67.442	78
		Chemistry	335.84	68.889	52
		Mathematics	334.46	58.354	26
		Physics	342.55	63.997	20
	Female	Biology	338.31	66.341	103
		Chemistry	330.62	72.447	40
		Mathematics	329.63	75.604	49
		Physics	335.16	60.425	36
CGPA	Male	Biology	2.99	.430	78
		Chemistry	2.85	.420	52
		Mathematics	2.85	.361	26
		Physics	2.93	.406	20
	Female	Biology	2.77	.467	103
		Chemistry	3.22	.469	40
		Mathematics	2.96	.445	49
		Physics	2.80	.366	36

As depicted in Table-3, the descriptive statistics of the study shows that grade-12 score of EHEECE of Biology male students (*M*= 330.15, *SD* = 67.442) are slight differences with that of Biology female students (*M*=338.31, *SD*= 66.341) and CGPA of university achievements of Biology male and male students (*M* = 2.99, *SD* = .430) and (*M* = 2.77, *SD* = .467) respectively. Regarding gender differences in EHEECE achievement in Chemistry fields of study indicate that better mean and standard deviation of male indicated. The EHEECE scores of male chemistry students (*M*= 335.84, *SD* = 68.889) are better than that of Chemistry female students (*M*=330.62, *SD*= 72.447) and CGPA of university achievements of Chemistry female and male students (*M* = 3.22, *SD* = .469) and (*M* = 2.85, *SD* = .420) respectively. Regarding gender differences in academic achievement in Mathematics fields of study again better mean and standard deviation of EHEECE for male indicated. The EHEECE scores of male Mathematics students (*M*= 334.46, *SD* = 58.354) are better than that of Mathematics female students (*M*=329.63, *SD*= 75.604) and CGPA of university achievements of Mathematics female students are better than male students (*M* = 2.96, *SD* = .445) and (*M* = 2.85, *SD* = .361) respectively.

Finally, the gender differences in academic achievement in Physics fields of study again better mean and standard deviation of male students indicated in EHEECE score. The EHEECE scores of male Physics students (*M*= 342.55, *SD* = 63.997) are better than that of Physics female students (*M*=335.16, *SD*= .60.425). The CGPA of university achievements of Physics male students (*M* = 2.93, *SD* = .406) is better than Physics female students score (*M*

= 2.80, *SD* = .366). To look at further investigation on where there is gender difference in academic achievement across natural science field of study such Biology, Chemistry, Mathematics and Physics, T-test and ANOVA were conducted.

4.4.Gender Difference in EHEECE and University CGPA Scores

An independent-samples t-test was conducted to compare the academic achievement scores for males and females. There was no significant difference in EHEECE scores for males (*M* = 333.88, *SD* = 65.814) and females (*M* = 334.60, *SD* = 68.303; *t* (402) = -.107, *p* = .915, two-tailed).

Table -4: Respondents' Gender Difference in EHEECE and University CGPA

Variables	*Gender*	*N*	*M*	*SD*	*T*	*Sig.*
EHEECE	Male	176	333.88	65.814	-.107	.915
	Female	228	334.60	68.303		
CGPA	Male	176	2.92	.417	.570	.569
	Female	228	2.90	.476		

**shows significant level at 0.05*

As depicted in Table-4, the descriptive statistics of the study shows that grade-12 score of EHEECE of female students (*M* = 334.60, *SD* = 68.303) are better than that of male students (*M* = 333.88, *SD* = 65.814) and CGPA of university achievements of female and male students (*M*=2.90, *SD*=.476) and (*M*=2.92, *SD*=.417) respectively. This study shows that male students are performing better in university CGPA levels than female students. Furthermore, the inferential statistics shows that there is no statistically significant difference between the university CGPA of male and female students (t= .570, p= .569). There is no statistically significant difference between male and female students in both Grade-12 EHEECE exam scores and CGPA scores (t= -.107, p= .915) and (t= .570, p= .569) respectively. Moreover, the data reveals that the achievement of male students in university CGPA is better as compared to female achievement. This shows that the achievement gap or disparity between female and male student is tight at university academic achievement than at high school achievements. The implication is that, even though more female students are entering into higher education, they did not show much difference as compared to male in their academic performance.

4.5. Results of One-Way-ANOVA Regarding Fields of Study and University CGPA Score

Before performing ANOVA, assumptions of the test, which are independence of observation, normality and homogeneity, were checked. For the independence of observation assumption,

is assured by the design of the study in which, each participant answered the questionnaires once and independent of any other participant. For the second assumption of ANOVA, skewness and kurtosis values were examined to check the normality of dependent variable. For the normality range for ANOVA, Levine's test of equality of error variances was examined. The test did not reveal a significant result (p>.05), which shows that the homogeneity assumption was satisfied.

In order to determine whether any difference between university CGPA score and fields of study exists, one-way ANOVA was held since there is one independent and one dependent variable with many groups. Table-5 presented the interaction effect results of variables retrieved from ANOVA. Fields of study were categorized into four groups according to the types of natural science fields of study (Group 1: Biology; Group 2: Chemistry; Group 3: Mathematics; Group 4: Physics). There was a statistically significant difference at the $p < .05$ level in university CGPA scores for the four fields of study groups: F (3, 400) = 2.575, p = .054. Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group-1 (M = 2.86, SD = .464) was significantly different from Group-2 (M = 3.01, SD = .478). Group-3 (M = 2.93, SD = .418) was significantly different from Group-4 (M = 2.85, SD = .382). The homogeneity of variance was conducted by using Levine's test for homogeneity of variances, which tests whether the variance in scores is the same for each of the three groups. Check the significance value (Sig.) for Levine's test. In this case, the Sig. value is .134. As this is greater than .05, we have not violated the homogeneity of variance assumption.

Table-5: One Way ANOVA for Fields of Study and University CGPA

CGPA	***Sum of Squares***	***Df***	***Mean Square***	***F***	***Sig.***
Between Groups	1.556	3	.519	2.575	.054*
Within Groups	80.594	400	.201		
Total	82.150	403			

**shows significant level at 0.05*

The ANOVA output above (Table-6) is the key table because it shows whether the overall F ratio for the university CGPA is significant. As the F ratio (2.575) is significant (p = .054) at the .05 alpha level, we can report this finding as F (3, 400) = 2.575, p = .05. At this juncture, we can have the ability of only rejecting the null hypothesis (H_o) that at least one of the group means is significantly different from the others, since $p < 0$. Thus, we can conclude that the

field of study across the university CGPA score is not equal. But in order to make further conclusion beyond this, we need to conduct a post hoc multiple comparisons test to determine which means exactly are differ from each other. A one-way between-groups analysis of variance was conducted to explore the impact of fields of study on the university CGPA score. Although SPSS does not generate it for this analysis, it is possible to determine the effect size for this result. The information you need to calculate eta squared, one of the most common effect size statistics, is provided in the ANOVA table (a calculator would be useful here). The formula is: Eta squared = Sum of squares between groups/ Total sum of squares. In this case, we need to do is to divide the sum of squares for between-groups (1.556) by the total sum of squares (82.150). The resulting eta squared value is .02, which in Cohen's (1988, pp. 284–7) terms would be considered a small effect size. Cohen classifies (.01-.05) as a small effect, (.06-.09) as a medium effect and (>.14) as a large effect (Pallant, 2010, pp, 249-56)**.** The effect size, calculated using eta squared, was .02.

4.6.The Interaction Effects of Gender and Fields of Study on Gender Stereotype Beliefs

The advantage of using a two-way design is that we can test the 'main effect' for each independent variable and also explore the possibility of an 'interaction effect'. An interaction effect occurs when the effect of one independent variable on the dependent variable depends on the level of a second independent variable (Julie Pallant, 2010). Two-way ANOVA allows us to simultaneously test for the effect of each of your independent variables on the dependent variable and also identifies any interaction effect. In order to explore the effects of gender and fields of study, we were conducted two-way ANOVA to see differences and interaction effects between independent variable and dependent variable.

Table-6: Two Way ANOVA for Gender, Fields of Study and Gender Stereotype Beliefs
Dependent Variable: GSB

Source	*Type III Sum of Squares*	*Df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Gender	133.018	1	133.018	9.144	.003	.023
Fields	93.851	3	31.284	2.151	.093	.016
Gender * Fields	146.305	3	48.768	3.353	.019	.025
Error	5760.441	396	14.547			
Total	155393.000	404				

a. R Squared = .051 (Adjusted R Squared = .034)

A two-way between-groups analysis of variance was conducted to explore the impact of gender and fields of study on levels of gender stereotype beliefs, as measured by the GSB

scale. Participants were divided into four groups according to their fields of study (Group 1: Biology; Group 2: Chemistry; Group 3: Mathematics; Group 4: Physics). The interaction effect between gender and fields of study was statistically significant, F (3, 396) = 3.353, p = .019, the effect size was small (partial eta squared =.03). There was statistically significant main effect for gender, F (1, 396) = 9.144, p = .003; however, the effect size was small (partial eta squared =.023). The main effect for fields of study, F (3, 396) = 2.151, p = .093, was not reach statistical significance. At this juncture, we can state that gender and fields of study can affect students' gender stereotype beliefs, since $p < 0$. Thus, we can conclude that there is statistical significant effect of gender and fields of study on gender stereotype beliefs. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group-1 (M = 19.80, SD = 4.24) was significantly different from Group-2 (M = 18.64, SD = 3.37) and Group-3 (M = 18.70, SD = 3.72). But, the mean score for Group-1 did not differ significantly from Group-4(M = 19.01, SD = 3.42). The homogeneity of variance was conducted by using Levine's test for homogeneity of variances, which tests whether the variance in scores is the same for each of the three groups. Check the significance value (**Sig.**) for Levine's test. In this case, the Sig. value is 2.267. As this is greater than .05, we have not violated the homogeneity of variance assumption.

As the figure below indicated, the estimated marginal means of gender stereotype belief scores clearly show us the differences between the male-female groups. The means of male increases as the female groups means decline from biology to physics subjects. In line with the findings of this study, our results reveal that students' gender stereotype belief score across fields such as chemistry, mathematics and physics increases by male group than female group, but also that there is a considerable similarity and interaction effects on biology subjects between male and female group's gender stereotype belief scores. The gender difference in marginal means indicate that the male group stereotype increases in fields such as chemistry, mathematics and physics whereas female stereotype increases in biology subject. It seems there is an interaction effect of gender on biology subjects.

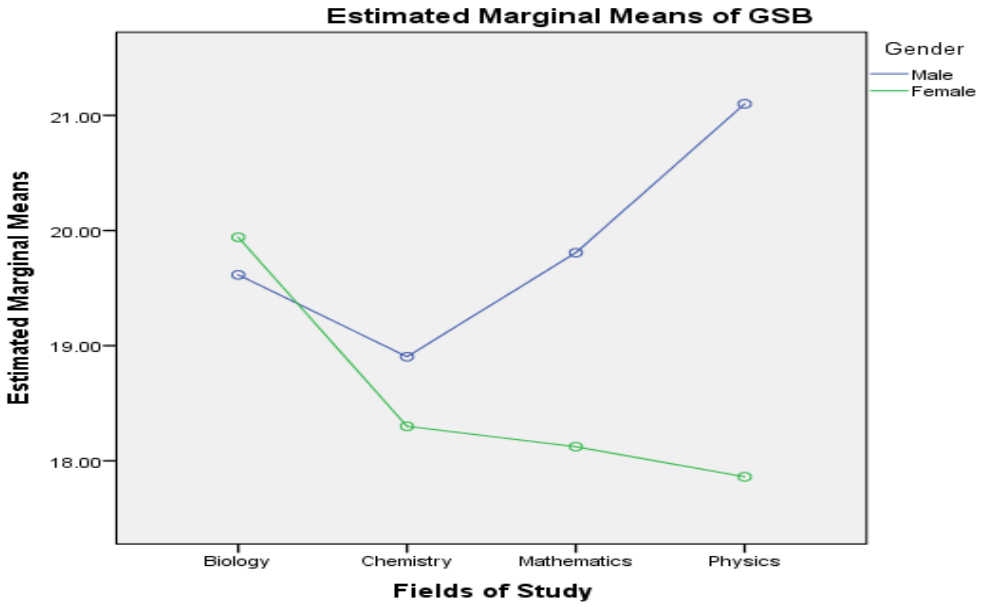


FIGURE-1: Estimated Marginal Means of Gender Stereotype Belief

In line with the findings of this study, our results reveal that students' gender stereotype belief (GSB) across fields such as biology, chemistry, math and physics increases by male group than female group, but also that there is a considerable difference in the strength of the association of each subject with the male gender stereotype.

4.7.Gender Difference in Student's Attitude towards Academic Achievement in Natural Science Fields of Study

To examine the interaction effects of gender and fields of study on student's attitude towards academic achievement in Natural Science fields of study such as Biology, Chemistry, Mathematics and Physics, two-way ANOVA was conducted as follow:

Table-7: Two Way ANOVA for Gender, Fields of Study and Gender Stereotype Attitude

Dependent Variable: GSA

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Gender	410.672	1	410.672	5.423	.020	.014
Fields	114.708	3	38.236	.505	.679	.004
Gender * Fields	1243.353	3	414.451	5.473	.001	.040
Error	29990.168	396	75.733			
Total	674719.000	404				

a. R Squared = .046 (Adjusted R Squared = .029)

A two-way between-groups analysis of variance was conducted to explore the impact of gender and fields of study on students' attitude towards academic achievements in natural science fields, as measured by the GSA scale. Participants were divided into four groups

according to their fields of study (Group 1: Biology; Group 2: Chemistry; Group 3: Mathematics; Group 4: Physics). The interaction effect between gender and fields of study group was statistically significant, F (3, 396) = 5.473, p = .001. There was statistically significant main effect for gender, F (1, 396) = 5.423, p = .020; however, the effect size was small (partial eta squared =.014). The main effect for fields of study, F (3, 396) = .505, p = .679, was not statistical significant. At this juncture, we can have the ability of answering our last research questions which state that "Is there a significant male-female difference in student's attitude towards academic achievements in natural science fields?" since $p < 0$. Thus, we can conclude that there is statistical significant effect of gender and fields of study on students' attitude towards academic achievements in natural science fields. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group-1 (M = 40.39, SD = 9.089) was significantly different from Group-2 (M = 39.75, SD = 8.567). But, the mean score for Group-3 (M = 39.88, SD = 8.042) did not differ significantly from Group-4 (M = 38.58, SD = 9.492). The homogeneity of variance was conducted by using Levine's test for homogeneity of variances, which tests whether the variance in scores is the same for each of the three groups. Check the significance value (Sig.) for Levine's test. In this case, the Sig. value is .414. As this is greater than .05, we have not violated the homogeneity of variance assumption.

As the figure below indicated, the estimated marginal means of gender stereotype attitude scores clearly show us the differences between the male-female groups. The means of male increases as the female groups means decline from biology to physics subjects. In line with the findings of this study, our results reveal that students' gender stereotype attitude score across fields such as chemistry, mathematics and physics increases by male group than female group, but also that there is a considerable differences and interaction effects on biology subjects between male and female group's gender stereotype attitude scores. The gender difference in marginal means indicate that the male group stereotype increases in fields such as chemistry, mathematics and physics whereas female stereotype increases in biology subject. It seems there is an interaction effect of gender in stereotype attitude score on biology subjects.

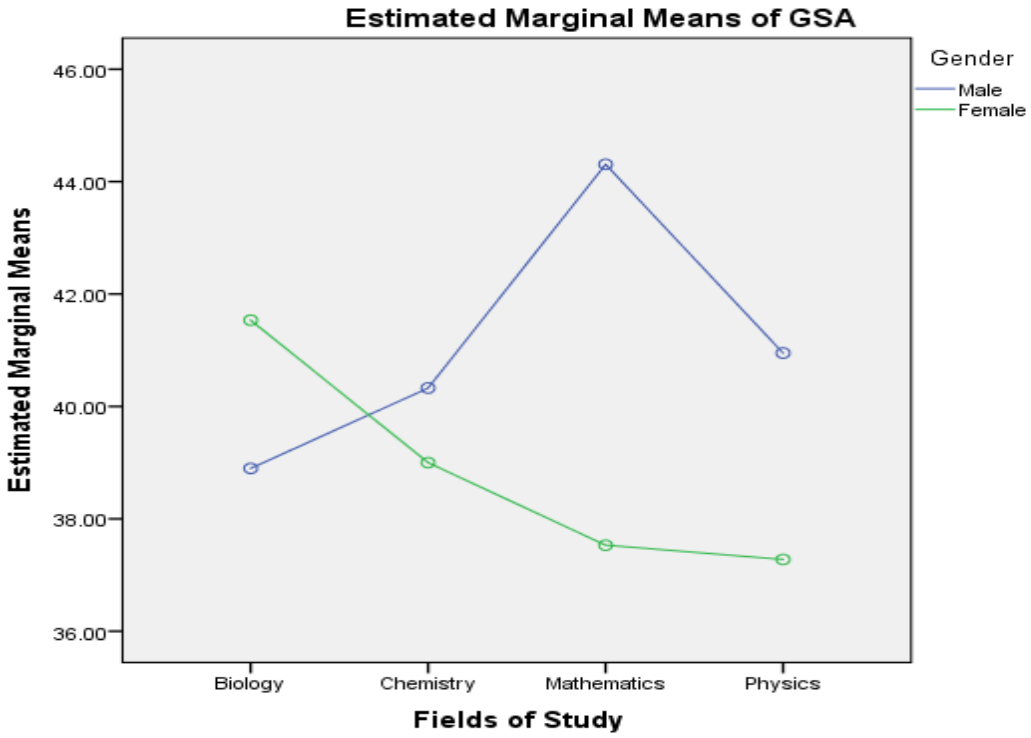


FIGURE-2: Estimated Marginal Means of Gender Stereotype Attitude

5. Discussions

The objective of this study was to investigate gender stereotype and academic achievements in natural science fields among university students. Furthermore, it was planned to examine the relationship and differences occurred by gender, fields of study and assess the relationship between gender and fields of study among second and third year regular students were investigated. This study was tried to seek answers for the following basic research questions: (1) Is there a significant relationship between student's academic achievement and gender stereotype attitudes and beliefs of students? (2) Is there a significant gender difference in academic achievement in different fields of study (Biology, Chemistry, Physics and Mathematics)? (3) Is there a significant gender and field of study difference in student's gender stereotype attitudes and beliefs towards academic achievements in natural science fields? Therefore, in this part of the study, the current findings and previous studies in relation to aforementioned variables are discussed as follows:

5.1.The Relationship between Gender Stereotype and Academic Achievement

There is a negative correlation between students' academic achievement of CGPA score and gender stereotype beliefs (GSB), r = -.100, n = 404, p = .045, and with gender stereotype attitude (GSA), r = -.098, n = 404, p = .048. Whereas, there is no relationship between students' academic achievement of EHEECE scores with their gender stereotype belief and

attitude. There is a strong positive correlation between GSB & GSA scores, $r = .524$; $r = n = 404$, $p = .000$. This study was similar to the study (Wakgari and Teklu, 2013), which reveal that there is a relationship between gender stereotype and academic achievement, the current study clearly demonstrated that there is negative relationships between students CGPA and students' gender stereotype beliefs. We think that the various orientation and remedial actions given for university students may alter senior students' beliefs, attitude and perceptions.

Moreover, the disparity in academic achievement between male and female students seems too tight in hard sciences like mathematics, physics, biology and chemistry. The findings of the study have proven that there is no statistically significant difference between male and female students in both EHEECE and CGPA academic achievements. From the t-test analysis, there is no statistically significant difference in EHEECE and CGPA of male and female students regarding their academic achievement. This is in fact because of positive discrimination made during admission procedures. However, while there is a significant relationship exists between gender stereotype and academic achievement in CGPA, but there is no statistically significant difference in academic achievement between male and female students across their academic achievement of EHEECE and CGPA. The results of this study was too much different surprisingly from the previous study which reported that male students score highest and female students score the lowest in their academic achievements in hard (natural) science fields. The results between gender and students' CGPA were different from previous research studies that claimed male students receiving higher CGPA compared to female students (Wakgari, and Teklu, 2013; Tamire, 2006 & 2008). According to Yeboah and Smith (2016), students' motivations affect their anxiety and study strategies. The female university students may value academic performance more than their male counterpart. It is possible that female students strive for high CGPA because of their motivations of academic success. It is also possible that male students feel less threatened in the university and strive less for CGPA and value enjoying campus life rather than holding different attitudes towards their fields of study.

5.2. Gender Difference in Academic Achievement in Different Fields of Study (Biology, Chemistry, Physics and Mathematics)

The study shows that grade-12 score of EHEECE of Biology male students (M= 330.15, SD = 67.442) are slight differences with that of Biology female students (M=338.31, SD= 66.341) and CGPA of university achievements of Biology male and male students (M = 2.99, SD = .430) and (M = 2.77, SD = .467) respectively. Regarding gender differences in

EHEECE achievement in Chemistry fields of study indicate that better mean and standard deviation of male indicated. The EHEECE scores of male chemistry students (M= 335.84, SD = 68.889) are better than that of Chemistry female students (M=330.62, SD= 72.447) and CGPA of university achievements of Chemistry female and male students (M = 3.22, SD = .469) and (M = 2.85, SD = .420) respectively. Regarding gender differences in academic achievement in Mathematics fields of study again better mean and standard deviation of EHEECE for male indicated. The EHEECE scores of male Mathematics students (M= 334.46, SD = 58.354) are better than that of Mathematics female students (M=329.63, SD= 75.604) and CGPA of university achievements of Mathematics female students are better than male students (M = 2.96, SD = .445) and (M = 2.85, SD = .361) respectively.

Finally, the gender differences in academic achievement in Physics fields of study again better mean and standard deviation of male students indicated in EHEECE score. The EHEECE scores of male Physics students (M= 342.55, SD = 63.997) are better than that of Physics female students (M=335.16, SD= .60.425). The CGPA of university achievements of Physics male students (M = 2.93, SD = .406) is better than Physics female students score (M = 2.80, SD = .366).

According to Kessels (2014), Stereotypes about STEM are widely held, oversimplified, and overgeneralized beliefs about the characteristics of STEM subjects (i.e. science, technology, engineering, and mathematics) and about the people who excel, work in, or like these domains. In this study, the gender difference in marginal means indicate that the male group stereotype increases in fields such as chemistry, mathematics and physics whereas female stereotype increases in biology subject. This findings is similar with Makarova, Aeschlimann and Herzog (2019) study, physics was significantly more highly stereotyped as a masculine subject compared to young women with a STEM career choice. Among young men there were no significant differences in the attribution of masculinity to the subject physics between male students who had chosen STEM and those who had chosen another study field. According to the very recent research conducted among female and male secondary school students by (Makarova, Aeschlimann and Herzog, 2019) with respect to differences between female and male students in the gender-stereotypical connotations of science, their findings illustrate that female secondary school students perceive all three subjects such as chemistry, math and physics considerably more strongly as a male domain fields. It is too much similarity with our findings. In this study the marginal mean indicated that the male group

stereotype increases in fields such as chemistry, mathematics and physics whereas female stereotype increases in biology subject.

An independent sample t-test was conducted to explore gender difference in EHEECE and CGPA score. There is no statistically significant difference between male and female students in both Grade-12 EHEECE exam scores and CGPA scores (t= -.107, p= .915) and (t= .570, p= .569) respectively. However, the result of this study is in contrary with the study conducted by Wakgari and Teklu (2013) which revealed that more female students joined the college they are performing less than male students. But, our study findings is similar with the study conducted in Nigeria by Udousoro, U. J.(2011) which indicated that gender does not have any significant effect on the academic performance of students in Chemistry. Because there is no significant gender difference in both EHEECE score and CGPA score as indicated in t-test result reported in this study.

This finding is similar with the current research findings in America by Liang,Y., Jones, D. and Robles-Pina, R. (2018).According to the stereotypical threat theory, the decrease of social-psychological anxiety can lower individuals' negative stereotypes in academic performance (Awad, 2007). It is possible that female students have higher levels of social coping than male students, which decreases social-psychological anxiety and helps with academic access (Morganson, Jones, & Major, 2010). It is possible to say that the current 70:30 higher education policy of Ethiopia enhance more students to join university in science and technology. As such, female students earn special support and strive for high GPA because of their motivations of academic success. It is also possible that male university students feel less threatened in the university as they are dominated hard science previously, so they strive less for GPA and value enjoying campus life rather than pursuing GPA.

5.3. Gender and Field of Study Difference in Student's Gender Stereotype Attitude and Beliefs towards Academic Achievement in Natural Science Fields of Study

A two-way between-groups analysis of variance was conducted to explore the impact of gender and fields of study on students' attitude towards academic achievements in natural science fields, as measured by the GSA scale. The interaction effect between gender and fields of study group was statistically significant, F (3, 396) = 5.473, p = .001. There was statistically significant main effect for gender, F (1, 396) = 5.423, p = .020; however, the effect size was small (partial eta squared =.014). The main effect for fields of study, F (3, 396) = .505, p = .679, was not statistical significant. At this juncture, we can have the ability

of answering our last research questions which state that "Is there a significant male-female difference in student's attitude towards academic achievements in natural science fields?" since $p < 0$. Thus, we can conclude that there is statistical significant effect of gender and fields of study on students' attitude towards academic achievements in natural science fields.

Since these stereotypes influence occupational choices, undergraduate students perceive S&E professions in light of stereotypes about women and men and thus they make gender-appropriate choices of majors associated with those professions accordingly (Beyer, 1999). Furthermore, study conducted in America also revealed that attitude toward a discipline is one of the major factors in students' choice of majors and careers. Pursuit of higher education in science and technology (S&T) depends, to a great extent, on students' attitudes toward these disciplines (Gokhale and Machina, 2017). On the other hand, study conducted by Ursula Kessels (2014), indicate that stereotypes about STEM are widely held, oversimplified, and over generalized beliefs about the characteristics of STEM subjects (i.e. science, technology, engineering, and mathematics) and about the people who excel, work in, or like these domains. In this particular study, gender stereotype was contextualized as the attitudes, beliefs and perceptions students' hold regarding their academic achievement in the natural science field of study.

A two-way between-groups analysis of variance was conducted to explore the impact of gender and fields of study on levels of gender stereotype beliefs, as measured by the GSB scale. The interaction effect between gender and fields of study was statistically significant, $F(3, 396) = 3.353$, $p = .019$, the effect size was small (partial eta squared =.03). There was statistically significant main effect for gender, $F(1, 396) = 9.144$, $p = .003$; however, the effect size was small (partial eta squared =.023). The main effect for fields of study, $F(3, 396) = 2.151$, $p = .093$, was not reach statistical significance. At this juncture, we can state that gender and fields of study can affect students' gender stereotype beliefs, since $p < 0$. Thus, we can conclude that there is statistical significant effect of gender and fields of study on gender stereotype beliefs.

According to Makarova, Aeschlimann and Herzog (2019) findings, math is most strongly perceived as a masculine subject among female and male secondary school students, followed by physics and then chemistry, which has the weakest masculine connotations. In similar vein, Kessels (2014), reveal that a STEM subject such as Math's and Physics are

perceived as “boys’ subjects” and as unfeminine or masculine subjects. STEM is seen as more appropriate for male than for female students, and students ascribe more talent, ability, and interest in mathematics to boys than to girls.

6. Conclusions and Recommendations

6.1.Conclusions

The study has yielded crucial insights. Key conclusions drawn include the absence of a correlation between academic achievements and gender stereotype beliefs or attitudes, although a strong positive correlation was found between gender stereotype beliefs and attitudes. Gender differences in academic performance were not significant, while the influence of fields of study on CGPA scores was statistically notable. The study also emphasized the significant interaction effects of gender and fields of study on gender stereotype beliefs and attitudes, highlighting the intricate relationships between gender, fields of study, academic achievements, and gender stereotypes among university students. These findings provide essential guidance for fostering gender equality and combating stereotypes in academic environments.

6.2.Recommendations

Based on the findings of the study the following, points were suggested:

- Implement educational programs and awareness campaigns to challenge and debunk gender stereotypes related to academic achievements in natural science fields. Encouraging open discussions and providing accurate information can help combat biased beliefs.
- Create a supportive and inclusive environment within universities that promotes diversity and equal opportunities for all students, regardless of gender or field of study. This can include mentorship programs, support groups, and initiatives to empower students.
- Review and update curricula to ensure they are gender-inclusive and free from biases. Encourage interdisciplinary approaches that promote gender equality and diversity in natural science fields of study.
- Offer training and workshops for faculty and staff on gender sensitivity and unconscious bias to foster a more inclusive learning environment. This can help educators understand and address stereotypes that may affect students' academic experiences.

- ❖ Establish peer support programs where students can engage with and learn from each other, fostering a sense of community and solidarity among students pursuing natural science fields.

7. Limitation of the study and Implications for Future Research

This study was limited to one college namely natural and computation science in two universities. Combining various students across many fields of study in both public and private higher education institutions across the country may be helpful for generalization. The results from these two universities would not be sufficient to generalize the findings to all higher institutions in Ethiopia. In addition, there was no private university students incorporated in this study. Since, the present research focused on to investigate gender stereotype and academic achievements in natural science fields among second and third year university students, further research could be carried out the gender stereotype levels perceived by freshmen undergraduate students. It is also possible to say that gender stereotype and academic achievements among university students can be determined by individual's personality characteristics, which did not included in this study and therefore further research could explore individual differences in experiencing gender stereotype and academic achievements as the function of personality types.

References

Almaz, E. (1991). Perspectives on Gender and Development. In: Tsehai Berhane Selassie (Ed.) gender Issues in Ethiopia. Institute of Ethiopian Studies. Addis Ababa University, Addis Ababa.

Ashmore, R. D., and Delboca, F.K.(1986). *Toward a social psychology of female-male relationships.*Orlando, FL:Academic Press.

Awad, G. H. (2007). The role of racial identity, academic self-concept, and self-esteem in the prediction of academic outcomes for African American students. *Journal of Black Psychology*, *33*(2), 188-207.

Bandura, A. (1999). 'Human Agency in Social Cognitive Theory'. *American Psychologist*, 44, 1175 – 1184

Beyer, S., and Bowden, E.M. (1997). Gender differences in self-perceptions: Convergent evidence from three measures of accuracy and bias. Personality and Social Psychology Bulletin, 23, 157-172.

Beyer, Sylvia. (1999). The accuracy of academic gender stereotypes. Sex Roles: *A Journal of Research*, 40 (9-10), 787-813.

Creswell, J.W. (2007*). Research Design: Qualitative, Quantitative and Mixed methods Approaches*, (2nd ed.) . New Delhi: Sage Publication.

Dasgupta, N. and Stout, G. (2014). Girls and Women in Science, Technology, Engineering, and Mathematics: STEMing the Tide and Broadening Participation in STEM Careers. *Policy Insights from the Behavioral and Brain Sciences*, 1(1) 21–29

Deaux, K. & Lafrance, M.(1998). *Gender*. In D. T.Gilbert, S.T., Fiske & G. Lindzey (Eds.),

The Handbook of Social Psychology (4th ed.). Boston: McGraw-Hill Campany.
Eagly, A.H.(1987). Sex differences in social behavior.NJ: Lawarence Erlbaum Associates.
Eckes, T. & Trautner, H. (2000). The Developmental Social Psychology of Gender. New Jersey: Lawrence Enbaum Associates, Inc, Publisher.
Gokhale, A. A. Machina, K. F. (2017). Why do Student Attitudes toward Science & Technology Matter? *Open Access J Sci* 1(1): DOI: 10.15406/oajs.2017.01.00001
Guimond, Serge, and Roussel, Lydie. (2001). Bragging about one's school grades: Gender stereotyping and students' perception of their abilities in science, mathematics, and language. *Social Psychology of Education*, 4 (3-4), 275-293.
Haregewoin, C. & Emebet, M. (2003). Towards Gender equality in Ethiopia. A Profile of Gender Relations. Swedish International Development Cooperation Agency.
Helen, T. (2010). Contributing Factors for Female Students' Attrition in Science Education: The Case of Faculty of Science, Unpublished Master Thesis, Addis Ababa University, Ethiopia.
Hirut, T. (2004). Violence Against Women in Ethiopia: A Strong Case of Civil Society Concern. In: Chowdhury, S., Wais, A., and Kahsai Wolde Giorgis (Eds) Civil Society in Ethiopia: Reflections on Realities and Perspectives of Hope. African – Asian Studies Promotion Association.
Ifegbesan, A. (2010). Gender-Stereotypes Belief and Practices in the Classroom: The Nigerian Post-Primary School Teachers'. *Global Journal of Human Social Science* 10 (4).
Kessels, U. (2014). Bridging the Gap by Enhancing the Fit: How Stereotypes about STEM Clash with Stereotypes about Girls. *International Journal of Gender, Science and Technology*, 7(2), 280-296.
Kessels, U. (2005). Fitting into the stereotype: How gender-stereotyped perceptions of prototypic peers relate to liking for school subjects. *European Journal of Psychology of Education 20(3)*, 309–323.
Kurtz, N. R. (1983).Introduction to Social Statistics. Japan: International student edition.
Liang,Y., Jones,D. and Robles-Pina,R. (2018).Ethnic and gender stereotypes on college students' academic performance. *Research in Higher Education Journal*, (35)1-12.
Macioniss J. (2005). Sociology,(12th ed.). Pearson Education, Inc. Upper Saddle River, New Jersey
Makarova, E, Aeschlimann, B. and Herzog, W. (2019). The Gender Gap in STEM Fields: The Impact of the Gender Stereotype of Math and Science on Secondary Students' Career Aspirations. Front. Educ. 4(60). doi: 10.3389/feduc.2019.00060
Ministry of Education (2005). Education Statistics: Annual Abstract 1997E.C. /2004-05/. Addis Ababa: EMIS
Ministry of Education. (2014). The Federal Democratic Republic of Ethiopia Ministry of Education, Gender Strategy for the Education and Training Sector.
Morganson, V. J., Jones, M. P., & Major, D. A. (2010). Understanding women's underrepresentation in science, technology, engineering, and mathematics: The role of social coping. *Career Development Quarterly*, *59*(2), 169-179.
Pallant, J. (2010). SPSS, SURVIVAL MANUAL: A step by step guide to data analysis using SPSS. (4th) edition. Published by Allen & Unwin Book Publishers, Australia
Schulze, E. & Tomal, A. (2004). Gender Stereotyping among Christian Students. Presented at the 2004 CBFA Meeting San Antonio, Texas.
Seleshi, Z. (2001).Gender Difference in Mathematics Performance among fifth and sixth Grade Children in Addis Ababa. *The Ethiopian Journal of Education*. XXV (1), 2-5
Tamire, A. (2008). Trend Analysis, Assertiveness and Causal Attribution of Female

Academic Achievement in BDU First Year Students: Proceeding of the National Workshop. Addis Ababa, AAU Press.

Tamirie, A. (2006). "Trend Analysis of Females' and Males' Academic Achievement in Different Educational Levels", *Journal of Education for Development*, 1(1)

Taylor, M. G. (1996). The Development of Childern's Beliefs about Social and Biological Aspects of Gender Differences. *Journal of Social and Personality Psychology*, 67, 1555-1571.

UNESCO. (2015). The United Nations Educational, Scientific and Cultural Organization, place de Fontenoy, 75352 Paris 07 SP, France,

Wakgari Tasisa and Teklu Tafesse . (2013). Gender Disparity in Academic Achievements in Ethiopian Colleges of Teacher Education. *International J. Soc. Sci. & Education*, l3(3).

Yeboah, A. K., & Smith, P. (2016). Relationships between minority students online learning experiences and academic performance. *Online Learning*, *20*(4), 1-35.

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