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Determinants of Higher Education Aspirations and Expectations Among High Schoolers in Ghana

Clement Adamba
School of Education and Leadership, University of Ghana, P. O Box LG 1181, Legon, Accra
E-mail of the corresponding author: cadamba@ug.edu.gh

Abstract

Using data from 4,081 students collected from across 150 high schools, the paper presents an analysis of high school students' aspirations and expectations for higher education. Two logistic regression models were used to examine the determinants of students' higher education aspirations and expectations. The results suggest that age, gender, parental education, and students' perceptions of Mathematics are important factors influencing high school students' higher education aspirations. Older students have a decreased desire to pursue higher education. Fathers' education, particularly having tertiary education, positively affects students' aspirations. Students' perception of Mathematics has a positive effect on aspirations for higher education. Students with a positive attitude towards Mathematics are more likely to aspire to higher education. Since Mathematics is generally perceived as a difficult subject, a differentiated approach to teaching the subject is recommended to ensure that it is delivered in a manner that does not scare and frustrate students' aspirations. More broadly, what makes the results of this study crucial is that an understanding of the factors that influence students' aspirations and expectations regarding higher education can serve as valuable insights for policymakers, educators, and stakeholders to support students in realizing their full potential and contributing to national progress. Additionally, knowledge of senior high students' aspirations for higher education is essential for identifying barriers to access, guiding career counseling, and supporting college readiness efforts.

Keywords: students' aspirations, expectations, high school students, higher education, perceptions of mathematics, perceptions of science, teachers' attitude to teaching, differentiated pedagogy, Ghana

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1. Background of the study

Higher education is the arena for human capital formation, innovation, and societal progression. Higher education provides a gateway for social mobility, poverty reduction and national development (Chetty et al., 2017; UNESCO, 2018; World Bank, 2019). Over the last decade, global agencies have promoted and supported programmes for young people to have access to basic and higher education as a basic right without any distraction (World Education Forum, 2000). Attwood and Croll (2011) have emphasized the appropriateness of giving younger people the opportunity for higher education to fulfil their educational potential. In many advanced countries, governments have taken up the challenge by creating social advantages that widen opportunities for participation in higher education for citizens (Spohrer, 2011). These include opportunities for scholarships and other market-based mechanisms.

In developing countries, things are however different, and quite difficult for students completing high school to pursue higher education. Students are faced with three classes of factors: There are systemic challenges, family-related factors, and personal factors. Factors such as the capacity of the system to absorb all students desirous of pursuing higher education, the processes of selection, and the cost of higher education are systemic realities. Family-related factors include the burden of financing education on the household, parents' value placed on higher education, and family composition or structure. The individual factors relate to a child's efforts or attitude towards education. It also relates to children's aspirations and expectations for higher education (Attwood and Croll, 2011).

Educational aspirations and expectations are personal convictions that drive achievement and future educational outcomes. Educational aspirations and expectations are individuals' beliefs regarding educational plans (Chen & Hesketh, 2021). While individual aspirations and expectations have a significant influence on higher education progression, studies that have examined determinants of students' aspirations and expectations for higher

education are limited and require extension. Among the past studies on higher education aspirations and expectations of students, a major limitation is that they have focused largely on family-related factors including household socioeconomic background, parental expectations, and parental educational attainment. This paper thus extends the discussion by examining factors that produce differences in students' higher education aspirations and expectations to include students' perception of some subjects that present a challenge to students in school (e.g. Mathematics and Science). The paper thus examines whether differences in higher educational aspirations and expectations can be influenced by the perceptions students have about these subjects.

2. Conceptual Framework

Aspirations and expectations are conceptually similar, but distinguishable. Educational aspirations reflect some degree of hopefulness beyond what one realistically expects to achieve (Bohon, Johnson & Gorman, 2006; Mickelson 1990). The concept of aspiration refers to the intent and attitude one adopts (Haller & Miller, 1971; Lewin, 1936) to achieve a certain life goal. Expectations on the other hand are more realistic self-assessments of one's educational future (Bohon, Johnson & Gorman, 2006; Mickelson 1990). According to Reynolds and Pemberton (2001), educational expectations and aspirations reflect a fundamental difference between what one wishes to achieve and what one realistically expects to achieve. While educational aspirations are idealistic values that reflect the educational attainment that one hopes and desires to achieve, educational expectations are concrete values determined by perceived realities faced by an individual (Khattab, 2015; Sharp, Seaman, Tucker, Van Gundy & Rebellon, 2020).

The choices and dreams of students while pursuing their education are linked to factors that affect their goals and expectations. According to Azmat et al. (2013), students typically aspire to higher academic education, getting higher grades in school, increasing their social network and status, gaining academic freedom, and financial freedom, while expecting to go higher on the academic ladder, increase their earning, and have a good comfortable environment. Mazzarol and Soutar (2002) illustrate the mix of push-pull variables that inspire students to aim higher in their academic endeavors.

The push factors are the student's own or personal aspirations which influence their choice of higher education. These factors may or may not be realistic, but they are factors that have the potential to push students to attain their aspirations and expectations. According to Mazzarol and Soutar (2002), these factors include household economic wealth, educational opportunity for the student, family influence, and demographic factors of the students. These factors push students to achieve their aspirations and dreams while acquiring higher education.

Pull factors are derived from the broader environmental factors that support students' academic aspirations and expectations. These factors are somewhat controlled by the student and have the determination to propel their academic achievement. Critical pull factors such as social network, choice of academic program, student residency status, staff and teaching support, and student knowledge and awareness are fundamental to achieving academic success (Mazzarol & Soutar, 2002). These factors influence both the aspirations and expectations of students.

3. Literature on higher educational aspiration

Students make choices that shape their lives in future, but some of these choices are influenced partly by parents' aspirations and expectations for their children as well as that of the child's own aspirations and expectations and sometimes the opportunities available to them (Bandura et al, 2001). Gutman and Kerman, (2008) argue that understanding the development of aspirations may not be straightforward because it also deals with the characteristics and behaviour of young people, peers, schools, the environment, and a wider social force of society.

Gutman and Kerman, (2008) focused on the educational aspirations of young people by measuring how far the students want to go or how much education the students hope to achieve (aspirations). They found that both parents' education, income, and social class were significant determinants and influenced student's aspirations. Also, the findings of Willitts, Anderson, Tait and Williams, (2005) in their study in the UK on determinants of students' aspirations indicate that socioeconomic factors including occupation and income levels of parents influence the aspirations of students. They concluded that parents who work at least 16 hours per week were more likely to influence the aspirations of students to advance to the university than parents who worked for less than 16 hours. They also argue that parents' social class was a significant factor that influences the aspiration of students to higher education (Willitts et al, 2005).

Schoon, Parsons and Sacker, (2004), using longitudinal data from the British Cohort Study (BCS) found that parents' own educational aspirations for their children as well as their social class were important influencers of students' aspiration to higher education. The authors also found that the educational aspiration of parents were more likely to foster the achievement of young people similar to the findings of Gutman and Kerman (2008). Sanders, Field, and Diego (2001) also argue that students with higher aspirations were usually influenced by the aspirations and expectations of their parents as well as the attitudes and qualifications of their teachers. Carpenter (2008) in his study to determine the relationship between students and parents' aspirations and expectations among Latino immigrant parents found no strong relationship between parent aspirations and expectations of the students and achievement of the students even though it concentrated on the parents and not the students.

Furthermore, Geckova, Tavel, Djik, Abel and Reijneveld, (2010) using primary data on socioeconomic status, school-related factors, perceived social support and self-rated health factors examined the relationship between these factors and the educational aspirations of adolescents. They found that, the educational level of the father, father's employment, school atmosphere, attitudes of students towards school and learning, social support and father's sense of coherence were all significant factors that influenced the aspirations of the students for higher education. The study therefore concluded that, school environment, socioeconomic factors from the family of the students, doubt about the affordability of future studies and the characteristics of the individual students were also associated with the educational aspirations of adolescents.

Derby and Sturt (2012) found that female students in second-cycle institutions had significantly higher educational aspirations than their male counterparts. Gutman et al., (2012) also noted in their study that, male students appeared indecisive when it came to their educational aspirations and that, females were more decisive. Berggren, (2013) in her study on determinants of student aspirations using gender, parental education and ethnicity found that, students were two or three times more likely to aspire to higher levels of education when their parents have a good educational background than those whose parents did not have any education.

It appears clearly from the literature that, the dominant factors that determine students' educational aspirations are parents' expectations, parents' education and to some extent school-related factors. There are limited studies that have considered child-specific factors vis-à-vis their behavioral and psychological predispositions. For instance, a student's realistic assessment of their future educational status may be influenced by their self-assessment of their performance in core subjects or their perception or attitude towards particular academic subjects. This paper extends the discussion of determinants of educational aspirations to include students' perceptions and attitudes towards Mathematics and Science.

It must be stated that one important push factor that drives expectations is student's perceived existential realities about their academic performance. On that score, high-performing students are more likely to perceive that their hoped-for education is feasible. In Ghana, a high quality pass in Mathematics, English Language, Social Studies and Integrated science, being the core subjects, provide a student with near eligibility for higher education. Among these core subjects, Mathematics is the scariest and perceivably the most difficult subject among high school students (and to some extent Science). It is for this reason that a measure of how students' perceive Mathematics and Science included in the analyses to see how that relates to students' aspiration and realistic expectation for higher education.

4. Study Methodology

The study employed discrete choice models (see Greene, 2003; Gujarati, 2004), to analyze the determinants of educational aspiration of students in high schools in Ghana. The binomial logit model was employed because it allows for a dichotomous variable as a dependent variable (Gujarati, 2004). Theoretically, the binomial logit model is employed when the dependent variable has two choices with other covariates as independent variables. Therefore, Ordinary Least Square (OLS) estimation becomes inappropriate for the model. The use of a logistic regression model also lends itself to clinically expressive explanation and the model can easily be expressed in a mathematical form to be estimated (Wooldridge 2002 & Greene, 2003).

The study specifies a probability model of students' aspiration to higher levels of education as:

$$Y_i = X_i\beta + \varepsilon_i \quad \textbf{(1)}$$

Where Y_i from equation (1) is the dependent variable "Aspirations of students to higher levels of education" is made a dichotomous variable and takes a value of 1 if student aspires to higher levels of education (Tertiary

level) and 0 if the aspiration says they will end at the high school level. The study estimates two different models using the same regressors.

First Model:

$$Y = \beta_0 + \beta_1 AGE + \beta_2 GEN + \beta_3 HSE + \beta_4 MEDU + \beta_5 FEDU + \beta_6 MOCCUP + \beta_7 FOCCUP + \beta_8 SATTL + \beta_9 SPSCI + \beta_{10} SPMATH + \beta_{11} TAMATH + \beta_{12} TASCI \quad (2)$$

The first model has a dependent variable (Y) "aspiration of student" measured by the student's desire or wish to get the highest educational level attainable or student intends to reach the highest of the academic ladder. This first model measures the *wish* of the student to progress in his academic education to the next level after high school.

Second Model

$$Y = \beta_0 + \beta_1 AGE + \beta_2 GEN + \beta_3 HSE + \beta_4 MEDU + \beta_5 FEDU + \beta_6 MOCCUP + \beta_7 FOCCUP + \beta_8 SATTL + \beta_9 SPSCI + \beta_{10} SPMATH + \beta_{11} TAMATH + \beta_{12} TASCI \quad (3)$$

The second model has a dependent variable (Y) which measures expectation of student, how *realistically* student thinks they can reach their desired level. The second model allows the student to realistically determine how high they think they can reach taking into consideration inhibiting factors such as socio-economic conditions, parents' education and occupation as well as students' own devoted time for leaning and their attitude towards learning the subjects of Mathematics and Science

Where X_i is a vector of covariates (independent variables) which captures the following:

- Students' perception about mathematics and science (SPSCI and SPMATH)
- Student attitudes to personal learning, (SATTL)
- Socioeconomic characteristics of the students' household (AGE, GEN, HSE)
- Parents educational background and occupations (MEDU, FEDU, MOCCUP, FOCCUP)
- Teachers' attitudes towards teaching mathematics and science (TAMATH and TASCI)

β = is a vector of parameters to be estimated.

ε = is the stochastic error term assumed to follow a logistic distribution.

The probability that a student would realistically aspire to higher levels of education (Tertiary level) (P_i) can be expressed as;

$$p_i = \frac{\exp(X_i \boldsymbol{\beta}_i)}{1 + \exp(X_i \boldsymbol{\beta}_i)} \quad (4)$$

However, the probability that a student would truncate his education at the present level of education (1- P_i) can also be expressed as follows:

$$(1 - p_i) = \frac{1}{1 + \exp(\chi_i \boldsymbol{\beta}_i)} \quad (5)$$

Also, the coefficient of β does not have a simple interpretation, except that, it shows the relationship between the independent variables and the dependent variable (Greene, 2003 & Hill et al., 2008). The model is best interpreted by computing the marginal effects. According to Greene, (2003), the marginal effects measure the expected change in the probability of a dependent variable being positive with respect to a unit change in an independent variable from the mean.

Finally, the study analyzes the perceived factors that inhibit the prospect of students meeting their aspirations and expectations in terms of how far they intend to go in their educational journey. The threat to aspirations and expectations would explain why students who realistically want to progress to higher levels of education think they may not be able to do so because of intrinsic and extrinsic factors. A key limitation of the dataset is the fact that it is school-based and lack direct responses from parents and household heads, except those provided by the students.

Data and summary of statistics

The study used survey data from 150 senior high schools across the country. Data was collected from 745 teachers and 4,081 students. There were four different survey instruments used: student survey, teacher survey, school survey and a teaching observation checklist. Table (1) below shows descriptive statistics of key variables. The student respondents consist of 51.49% males and 48.51% females. In terms of aspiration, 72.55% of the students aspire to a high level of education, while 57.76% realistically expect to achieve higher education level (Bachelors or higher).

Table 1: Descriptive statistics of dependent and basic explanatory variables

Variable	Categories	Percentage
Higher education aspiration	High =1	72.6
	Low = 0	27.5
Higher education expectation	High =1	57.8
	Low = 0	42.2
Gender	Male	51.5
	Female	48.5
Mother's highest education	None	9.5
	Basic Education	69.6
	Secondary Education	17.7
	Tertiary Education	3.2
Fathers' highest education	None	25.8
	Basic Education	42.7
	Secondary Education	21.7
	Tertiary Education	9.9
Mothers' occupation	Agriculture	33.6
	Services	65.2
	Other industry	1.2
Fathers' occupation	Agriculture	49.5
	Services	48.9
	Other industry	1.6

Mother's education was measured by the highest educational level attained by the mother and about 69.61% mentioned basic education, and 3.21% mentioned tertiary education as their highest level of education. Also, fathers' education was measured by the highest educational level attained by the father. The data show that, 42.65% of respondents' fathers had basic education as their highest educational level. The occupation of the father was also measured by his field of work for most of his life. From the table above, 49.50% of the respondents indicated their fathers' occupation was Agriculture while 48.86% were in the Services sector. This means that, majority of the respondents' fathers were into Agriculture and related activities.

5. Analysis and discussion of results

This section presents the findings and discussions of the determinants of high school students' higher education aspirations and realistic expectations. In Table (2) the marginal effects of the logistic regression model of the two outcome variables are presented. The high pseudo R^2 of (0.7160) and (0.7260) for models (1) and (2) respectively indicate the overall strength and predictability of the models. Similarly, both models produce a good fit for the sample data suggesting that they are not significantly different. The individual covariates in the two models are therefore discussed distinctively.

In the first model (higher education aspiration), age of respondent has a significant but negative relationship with the probability of high aspiration for higher education. An increase in the age of student, significantly reduces the probability of the student aspiring to higher levels of education by 2.64%. All other things being equal, ass students grow older, the desire for the pursuit of higher learning diminishes. Relative to male students, female students were more likely to aspire to higher levels of education by 0.157.

A mother's status as employed in the services sector has a negative relationship with student higher educational aspiration compared to mothers employed in the agriculture sector. This means, relative to mothers employed in the service sector, those employed in agriculture were more likely to have a positive influence on children's wish

or desire to aspire to higher levels of education. In the case of father's occupation, fathers employed in the services sector, relative to those in agriculture were less likely to influence students who wish to aspire to higher levels of education. Indeed, fathers employed in the services sector decreases the probability of students aspiring to higher education by 7.85%, less than those in the agriculture sector. Hence, employment in the agriculture sector benefits students than in other sectors such as services and industry.

More so, father's education also influences the aspiration of students to higher levels of education in second cycle institutions. From the findings, fathers with tertiary education as their highest level of education increases the probability of students aspiring to higher education by 8.35% more than those with no education (reference group). This means students are able to emulate their father's aspiration to higher education. Also, fathers with basic and secondary education as their highest education were not significant in influencing students aspiring to higher education.

Table 2: Summary of Marginal Effect of Logistic Model Results

Variables	First Model (High Aspiration)		Second Model (Realistic Expectation)	
	Coefficient	Marginal Effects dy/dx	Coefficient	Marginal Effects dy/dx
Age	-0.1793	-0.0264*	-0.2578	-0.0573*
		(0.000)		(0.000)
Gender	-1.0636	-0.0157*	-0.7491	-0.1652*
		(0.000)		(0.000)
Household Size	0.0024	0.0035	0.0193	0.0042
		(0.941)		(0.484)
Mother's (Educ.=None)				
Basic Education	-0.0891	-0.01296	-0.1371	-0.0302
		(0.687)		(0.462)
Secondary Education	0.1210	0.0173	0.1894	0.0413
		(0.648)		(0.391)
Tertiary Education	0.0342	0.0049	0.7937	0.1509**
		(0.943)		(0.037)
Mother's (occu. =Agric)				
Services	-0.3419	-0.0542***	-0.2306	-0.0526
		(0.085)		(0.172)
Industry	0.1037	0.0148	-0.3586	-0.0838
		(0.873)		(0.522)
Father's (educ=None)				
Basic Education	0.2476	0.0359	0.3393	0.0746*
		(0.141)		(0.018)
Secondary Education	0.1336	0.0192	0.4582	0.0974*
		(0.466)		(0.003)
Tertiary Education	0.6760	0.0835*	0.1021	0.1911*
		(0.004)		(0.000)
Father's (occup. = Agric)				
Services	-0.4983	-0.0785*	-0.2599	-0.0588***
		(0.003)		(0.062)
Industry	0.1467	0.0206	-0.2492	-0.0574
		(0.727)		(0.477)
Student's perception of Mathematics	0.1336	0.0196	0.1525	0.0339*
		(0.275)		(0.007)
Student's perception of Science	-0.2774	-0.0408	-0.3746	-0.0833
		(0.611)		(0.412)
Student's attitude towards personal studies	0.1448	0.0213	-0.00879	-0.0019
		(0.227)		(0.933)
Teachers' attitudes towards Mathematics	0.0677	0.0095	0.4126	0.0918***
		(0.782)		(0.058)
Teachers' attitudes towards Science	0.3369	0.0495	0.0366	0.0082
		(0.194)		(0.850)

First Model: LR chi^2 (18) = 115.17 Prob. > (chi^2) = 0.0000 Pseudo R^2 = 0.710
Second Model: LR chi^2 (18) = 151.44 Prob. > (chi^2) = 0.0000 Pseudo R^2 = 0.726
--Dependent Variable (Higher Level)): takes value of 1 and zero otherwise (lower level)
-- 1%; ** 5% and *** 10% and robust standard error in parenthesis*

Analysis from the second model suggest that age of respondents significantly influences the realistic expectations of students to higher education. Specifically, a unit increase in the age of the respondents from the mean, decreases the probability of the student to expect to achieve high education by 5.7% holding other variables constant. This means that, as the student grows, the expectation to reach higher levels of education decreases. This finding indicates that, as students grow up to certain age limits, it reduces their expectations of advancing in education. This means that, at certain age limits students may not be interested in further education. This finding is not statistically different from the first model, suggesting that age is a significant factor in determining the academic progression of individuals.

It is similarly evident that gender of respondents significantly affects the realistic expectation of students for higher education. This means that, male students in second cycle institutions were less likely to realistically aspire to higher levels of education more than their female counterparts. Relative to male students, female students were 0.165 significantly more likely to realistically aspire to higher levels of education, similar to the findings in the first model above. This finding is similar to the conclusion in Geckova et al., (2010), where it was found that female students were more likely to aspire to higher levels of education than male counterparts. Other line up of studies which made similar finding include Willitts et al., (2005); Gutman and Kerman, (2008); and Atwood and Croll, (2011) which all observed females to have high educational aspirations than their male counterparts.

Parental education is measured by the highest educational level obtained. From the findings, mothers with tertiary education are significantly related to students' realistic aspirations to higher education. This means that students whose mothers have tertiary education are more likely to have realistic aspiration of higher education. Specifically, if a mother has tertiary education, it increases the probability of a child to realistically aspire to higher levels of education by 15.1% more than students whose mothers have no education (reference group). This finding is also similar to the findings in Gutman & Kerman, (2008) who found that, mother's education to have a significant relationship with students' aspirations. Geckova et al, (2010) also found that mothers' education influences greatly the aspirations of the students to higher education but from different tracks (only for vocational and specialized schools).

In the case of a father's educational attainment, fathers with basic education, secondary and tertiary education increase the probability of children realistically having aspiration that they will achieve higher level of education than those with no education. Relative to those with no education, the effect of a father with basic education on a child's realistic aspiration is higher by about 7.4%. Again, fathers with secondary and tertiary education as their highest educational level, relative to those with no education, increases children's likelihood of having realistic aspiration for higher education by 9.7% and 19.1% respectively.

The effect of parental education on children's educational aspiration is well studied and the evidence is supportive of the finding in this paper. Gutman & Kerman, (2008) found that, father's education was a significant determinant of students' aspirations and expectations. Other studies such as Chibuike and Chimezie (2020), Schoon et al, (2007) and Geckova et al, (2010) all are in agreement that father's education significantly determines adolescents' higher education aspiration. Berggren, (2013) observed that, parent's educational level was the most important factor in determining students' aspiration for higher education. Two mutually reinforcing reasons may explain this finding. First, parents are the first agents of socialization and a source of intellectual nurturance for children. Parents socialize and nurture children by transferring their personal values towards education to children when they actively and consciously read to them or help them with their schoolwork. The second reason is that children naturally look up to their parents to give them direction on their journey to adulthood and hence their educational level is expected to serve as a signpost for children in the development of their aspirations.

Findings on parental occupation in the second model suggest that, mothers' whose occupation was services or industry were not significantly more likely to influence children's aspirations and expectations of students for higher education more than those who were in the agricultural sector. This finding is opposed to the result in the first model, which shows that mother's employment in the services sector influences a student's wish for higher education. In the case of fathers' occupation, the results show that, relative to a father who is engaged in agriculture, where a father is engaged in the services sector the likelihood of a child having realistically high aspiration for higher education is lower (5.88%). This is similar to the findings in the first model were fathers employed in the services sector had a negative relationship with students' aspiration for higher education compared to fathers in agriculture. This result is rather counterintuitive as it is ordinarily expected that fathers employed in the services sector are more likely to be educated and therefore should exert more positive influence

on students' realistic expectation for higher education than fathers in agriculture who are likely to be less educated. However, the results may be a response to the effect of *agrarian distress*[1].

The drudgeries and failures of agriculture, resulting from climate variability, post-harvest losses and market uncertainty are becoming severer by the day, resulting in farm households' expectation failures in agriculture. The reason for the apparent counterintuitive result found in respect of the relationship between parental occupation and students' higher education expectation is because, being exposed to agrarian distress, farm parents' redirect their focus to educating their children and pushing them to aspire for non-farm occupations in the future. In other words, the distress of agriculture failures makes parents to discourage their children from aspiring to take over from them in agriculture. Similarly, children in farm households witnessing the risks and disappointments faced by their parents, their aspirations to continue farming weaken, and the aspiration for education increases.

Students who have a positive perception of Mathematics have a higher expectation of achieving higher education. Students with positive perception about Mathematics, have an increased probability of having realistic expectation to high levels of education by 3.4% compared to students who have negative perception about Mathematics. Students with a positive perception about the subject have a good attitude towards the study of Mathematics and believe Mathematics is important for their higher education attainment.

Finally, teachers with good attitude and who exhibit good behaviors during the teaching of Mathematics increases the probability that students would realistically aspire to higher levels of education by 9.2%. Mathematics teachers that arrive on time for lessons, give home assignments and mark them, encourages students to learn, and makes conscious efforts to stimulate students during Mathematics lessons eventually influences the thoughts and realistic aspirations of students toward achieving higher levels of education. Al-Agili et al., (2012) found that, teacher's attribution, instructional quality and teacher's behaviors during lessons were significant factors influencing student's achievement in Mathematics. Again, the findings were similar to the findings of Yilmaz, and Cava, (2008).

6. Threats to aspirations and expectations

Qualitatively, students were asked of potential threats to their aspirations and expectations. The threats identified are summarized and discussed below (Table 3). Majority of the students, representing 70.30% mentioned financing as the biggest potential threat to their aspirations and expectations that could lead to truncation of their educational dreams. Ghana currently has in place a free high school policy which delivers secondary school education at no cost to students and households. The worry of students is how to finance the next level. This means that even though they may have higher aspirations, their realistic expectations are low because they are unsure of where financing for their next level will come from. Teachers noted that it is important various scholarship and bursary schemes are not only made available and accessible to students but that high school students are made aware of these schemes. This has the potential of raising students' aspirations and expectations and thus encouraging them to work hard for higher academic achievement.

Table 3: Main threat to higher level education

Main threats to higher education	Frequency	Percent
Financing	2869	70.3
Academic performance	356	8.72
Family break-up	157	3.85
Pregnancy	52	1.27
Negative peer influence/behavior	42	1.08
Health problems	12	0.29
Others	409	10.08

Source: Students' survey data

[1] **Agrarian distress** refers to the challenges faced by agriculture-dependent households; economic and social) due to factors such as low crop yields due to bad weather, fluctuating prices of agricultural produce, high input costs, and, lack of access to credit among others.

Students also identified own academic performance as a potential threat to their aspirations and expectation. Academic performance is very much related to educational aspirations and expectations. In Bokan, Buljan, Marušić, Malički and Marušić (2020), they found that higher performance self-efficacy was associated with aspirations to continue university education. This implies that where students are uncertain about their academic performance or have low academic self-efficacy that may become a potential threat to their aspirations. Some students are worried of the effect of family break-up on their moving from the high school to higher level of education. Some students identified peer influence as a potential threat to meeting their aspirations and expectations for higher education. This means that peer pressure is acknowledged by students themselves as a threat to meeting academic goals. Female students express fear that pregnancy could be one of the threats that may inhibit their educational aspirations.

7. Conclusions, implications for pedagogy and further research

The overall objectives of this study was to examine higher educational aspirations and expectations among Senior High School students in Ghana. Specifically, the study assessed the factors that influence students' aspirations and expectation to higher level of education, with specific interest on examining the relationship between students' perception towards Mathematics and Science and aspiration to higher education; and to examine the threat to students' aspirations and expectations to higher education from the perspective of students. To achieve the objective of the study, the common push and pull factors in the literature such as parental education, occupation, age, and gender of students were included in addition to the main variable of interest as determinants of students' aspirations and expectations.

The study concludes that there is a moderate but significant relationship between students' perception of Mathematics and students' higher education aspirations and expectations. Students with positive perception and attitudes towards the study of Mathematics aspire to higher education. The study therefore concludes that, if students took their mathematics lessons seriously it could positively influence their perception and attitudes to higher education. Again, teachers' attitudes in class towards the teaching of Mathematics lessons significantly influences the aspirations of students to higher levels of education. Beyond the students' aspirations and expectations, students perceived that their expectations may be truncated by such other factors as financial support, health related issues including teenage pregnancy and family broken home.

Implications of findings for pedagogy

The findings of this study have important lessons for the practice of teaching and assessment generally in high schools. Teaching and assessment, especially of the four subjects; Mathematics, Science, Social Studies, and English language is particularly critical in determining how students formulate their aspirations and expectations about their future education. Among the core subjects, Mathematics is the subject that cannot be dispensed with regardless of the programme one is pursuing. The teaching and learning of mathematics, however, remains a drudgery in Ghana such that not more than half of students in a class will gladly opt for the subject if it was optional. Students leave high school and are barely able to solve basic Mathematical problems. Some students leave high school and hope not to ever be required to study Mathematics.

Many have attributed the scary nature of Mathematics to the manner the subject is taught and assessed in schools. The old lecture and drill method of teaching Mathematics where mathematical operations are presented in abstract form and students expected to apply formulas to real life situations makes the subject imaginary and unfriendly. If the teaching of Mathematics was in the form of an intellectual inquiry that allows students to appreciate its beauty by solving problems of real-life situations cooperatively, students would develop a positive attitude towards the subject. Cooperative learning approaches allow students to learn and work through Mathematical problems by engaging in group conversations about a problem at a time while teachers act as facilitators. The approach where teachers view themselves almost as newscasters delivering predetermined Mathematics formulas and expecting students to listen is inconsistent with teachers' responsibility to the student to enhance their knowledge, skills and thus their life chances.

In terms of assessment, the approach should not appear to be intended to filter out students of limited interest or ability in Mathematics to produce mathematics professors, but to help students learn basic mathematical functions like appreciating mathematical problems, generating, and appreciating statistics, probability and thinking in a logical manner. To ensure that the teaching of Mathematics does not pose a challenge to high students' educational aspirations and expectations, a differentiated pedagogical approach to Mathematics is recommended. Differentiated pedagogy involves tailoring teaching and learning experiences to individual learners' needs and interests, including their readiness, and learning preferences. It involves differentiated

teaching and differentiated assignments where teachers design assessments that allow students to demonstrate their learning in various ways. Considering the sensitivity of Mathematics, not just as a core subject, but perceivably a difficult subject, there is the need for regular capacity building for Mathematics teachers on new and innovative was of teaching Mathematics so that the subject can be delivered in a manner that does not scare students and frustrate the aspirations and expectations of their future dreams.

Further research

Building on the findings of this study, future research should attend to a number of areas with implications for educational policy, practice and attainment. First, it will be important to examine the relationship between educational aspirations and expectations and students' schooling efforts/commitment and achievement. Second, we need to understand the trajectories of students' ambitions over time and whether students across time are able to maintain initially high ambitions throughout high school and the years immediately following. This can be done using longitudinal studies by tracking high school students' aspirations and expectations over time. Third, in an era of technology, investigating the role of digital technologies, social media, and online platforms in shaping high school students' aspirations and expectations can provide insights into the changing dynamics of educational decision-making. Broadly, by addressing these research directions, scholars can contribute to a deeper understanding of high school students' aspirations and expectations, inform evidence-based policy interventions, and ultimately support students in realizing their full potential in education and beyond.

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The protocol for the study was reviewed by the Ethics Committee for the Humanities of the University of Ghana. The approval number is *ECG 007/16-17.*
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Appendix 1: **Table 1: Definition of Variables**

Variables	Definitions	Categories	Choice
Aspiration to higher education	Dependent variable which measures WISH to higher education	Higher level= 1 Lower level = 0	Dummy
	Dependent variable which measures the REALISTIC aspiration to higher education	Higher level = 1 Lower Level = 0	Dummy
Gender	The Gender of the students	1=Male 0=Female	Dummy
Household Size	The number of members in a household	1 up to 8 or more	Continuous
Mother's Education	Mothers' highest educational level measured by recoding the educational levels in categories	0=No Education 1=Basic Education 2=Secondary Education 3=Tertiary Education	Category
Father's Education	Fathers highest educational level measured by recoding all the levels into four categories	0=No Education 1=Basic Education 2=Secondary Education 3=Tertiary Education	Category
Father's Occupation	The occupation of the father was also measured by recoding all the fields of works into three categories	0=Agriculture 1=Services 2=Industry	Category
Mother's Occupation	The occupation of the mother was measured by grouping all the fields of work in to three categories	0=Agriculture 1=Services 2=Industry	Category
Student perception about learning maths	It's an index which measures perception of students towards learning maths	Perception of student about maths	Continuous
Student perception about learning Science	It's an index which measures perception of students towards learning science	Perception about science	Continuous
Student attitude towards personal studies	It an index which measures the time (hours) student spent on personal studies	Attitude toward personal studies	Continuous
Teacher's attitude towards teaching maths	It's an index which measures teachers attitudes towards teaching maths	Teacher's attitude towards maths	Continuous
Teacher's attitude towards teaching science	It's an index which measures teachers attitudes towards teaching science	Teacher's attitudes towards science	Continuous

Note: Students and teachers' perceptions/attitudes towards learning/teaching maths and science are composite variables generated using Principal Component Analysis (PCA).